SIGNAL GENETICS, INC.
Form 424B3
January 09, 2017
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Filed Pursuant to Rule 424(b)(3)
Registration No. 333-214893

PROPOSED MERGER

YOUR VOTE IS VERY IMPORTANT

To the Stockholders of Signal Genetics, Inc. and Miragen Therapeutics, Inc.:

Signal Genetics, Inc., or Signal, and Miragen Therapeutics, Inc., or Miragen, entered into an Agreement and Plan of Merger and Reorganization on October 31, 2016, or the Merger Agreement, pursuant to which a wholly-owned subsidiary of Signal will merge with and into Miragen, with Miragen surviving as a wholly-owned subsidiary of Signal, which is referred to as the Merger. Miragen and Signal believe that the Merger will result in a clinical-stage biopharmaceutical company that discovers and develops proprietary RNA-targeted therapeutics with a specific focus on microRNAs and their role in diseases where there is a high unmet medical need.

Immediately prior to the effective time of the Merger, each share of Miragen preferred stock will be converted into one share of Miragen s common stock, or Miragen common stock, as determined in accordance with the Miragen certificate of incorporation then in effect. At the effective time of the Merger, each share of Miragen common stock will be converted into the right to receive a fraction of a share of Signal common stock, or the Exchange Ratio. It is currently anticipated that, at the closing of the Merger, the Exchange Ratio would be approximately 0.6995 pre-split shares of Signal s common stock, or Signal common stock, and would be within a range of approximately 0.6995 to 0.0466 post-split shares of Signal common stock. Signal will assume (i) each outstanding warrant to purchase Miragen capital stock, which will be converted into warrants to purchase Signal common stock and (ii) each outstanding and unexercised option to purchase Miragen common stock, which will be converted into options to purchase Signal common stock. Signal stockholders will continue to own and hold their existing shares of Signal common stock. The Exchange Ratio is determined pursuant to a formula in the Merger Agreement and described in the attached proxy statement/prospectus/information statement, and these estimates are subject to adjustment.

Immediately after the Merger, Miragen securityholders will own approximately 96% of the fully-diluted common stock of the combined company, with Signal securityholders, whose shares of Signal common stock will remain outstanding after the Merger, owning approximately 4% of the fully-diluted common stock of the combined company, each assuming that Miragen closes its concurrent financing immediately prior to the effective time of the Merger. If the concurrent financing does not close, then Miragen securityholders would own approximately 94% of the fully-diluted common stock of the combined company and Signal securityholders would own approximately 6% of the fully-diluted common stock of the combined company. These estimates are based on the anticipated pre-split Exchange Ratio and post-split Exchange Ratios and are subject to adjustment.

Shares of Signal common stock are currently listed on The NASDAQ Capital Market under the symbol SGNL. Signal has filed an initial listing application for the combined company with The NASDAQ Capital Market. After completion of the Merger, Signal will be renamed Miragen Therapeutics, Inc. and expects to trade on The NASDAQ Capital

Market under the symbol MGEN. On January 5, 2017, the last trading day before the date of this proxy statement/prospectus/information statement, the closing sale price of Signal common stock was $5.33 per share.

Signal is holding a special meeting of stockholders, or the Signal special meeting, in order to obtain the stockholder approvals necessary to complete the Merger and related matters. At the Signal special meeting, which will be held at 12255 El Camino Real, Suite 300, San Diego, California 92130, at 9:00 a.m., local time, on February 10, 2017, unless postponed or adjourned to a later date, Signal will ask its stockholders to, among other things:

- approve the issuance of shares of Signal common stock to Miragen stockholders pursuant to the terms of the Merger Agreement;

- approve the change in control of Signal resulting from the Merger;

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approve the conversion of the Unsecured Demand Promissory Note, dated March 6, 2015, issued by Signal to Bennett LeBow in the original principal amount of $1,105,009, as amended on October 31, 2016, into shares of Signal common stock;

approve the Signal 2016 Equity Incentive Plan;

approve the Signal 2016 Employee Stock Purchase Plan;

approve an amendment to the certificate of incorporation of Signal changing the Signal corporate name to Miragen Therapeutics, Inc. ;

approve an amendment to the certificate of incorporation of Signal effecting a reverse stock split of Signal s issued and outstanding common stock within a range of every one to 15 shares (or any number in between) of outstanding Signal common stock being combined and reclassified into one share of Signal common stock;

approve an amendment to the certificate of incorporation of Signal increasing the authorized common stock from 50,000,000 to 100,000,000 shares;

approve the sale of all of Signal s intellectual property assets related to its MyPRS test to Quest Diagnostics Investments LLC pursuant to an intellectual property purchase agreement;

approve an amendment to the certificate of incorporation of Signal to eliminate the ability of Signal stockholders to act by written consent;

consider and vote upon an adjournment of the Signal special meeting, if necessary, to solicit additional proxies if there are not sufficient votes in favor of the proposals set forth above; and

transact such other business as may properly come before the stockholders at the Signal special meeting or any adjournment or postponement thereof.

As described in the accompanying proxy statement/prospectus/information statement, certain Miragen stockholders who in the aggregate own approximately 78% of the outstanding shares of Miragen common stock on an as-converted to common stock basis, and certain Signal stockholders who in the aggregate own 26% of the outstanding shares of Signal common stock, are parties to support agreements with Signal and Miragen, respectively, whereby such stockholders agreed to vote in favor of certain proposals described in this proxy statement/prospectus/information statement, subject to the terms of the support agreements.

In addition, following the registration statement on Form S-4, of which this proxy statement/prospectus/information statement is a part, being declared effective by the Securities and Exchange Commission, or the SEC, and pursuant to

the conditions of the Merger Agreement, the Miragen stockholders who are party to the support agreements will each execute an action by written consent of the Miragen stockholders, referred to herein as the written consent, adopting the Merger Agreement, thereby approving the Merger and related transactions. These stockholders hold a sufficient number of shares of Miragen capital stock to adopt the Merger Agreement, and no meeting of Miragen stockholders to adopt the Merger Agreement and approve the Merger and related transactions will be held. Nevertheless, all Miragen stockholders will have the opportunity to elect to adopt the Merger Agreement, thereby approving the Merger and related transactions, by signing and returning to Miragen a written consent.

After careful consideration, the Signal and Miragen boards of directors have approved the Merger Agreement and the respective proposals described in this proxy statement/prospectus/information statement, and each of the Signal and Miragen boards of directors has determined that it is advisable to consummate the Merger. Signal s board of directors recommends that its stockholders vote FOR the proposals described in the accompanying proxy statement/prospectus/information statement, and Miragen s board of directors recommends that its stockholders sign and return the written consent to Miragen indicating their approval of the Merger and adoption of the Merger Agreement and related transactions.

More information about Signal, Miragen and the Merger is contained in this proxy statement/prospectus/information statement. Signal and Miragen urge you to read the accompanying proxy statement/

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prospectus/information statement carefully and in its entirety. IN PARTICULAR, YOU SHOULD CAREFULLY CONSIDER THE MATTERS DISCUSSED UNDER RISK FACTORS BEGINNING ON PAGE 19.

Signal and Miragen are excited about the opportunities the Merger brings to both Signal s and Miragen s stockholders, and thank you for your consideration and continued support.

Samuel D. Riccitelli
President and Chief Executive Officer
Signal Genetics, Inc.

William S. Marshall, Ph.D.
President and Chief Executive Officer
Miragen Therapeutics, Inc.

Neither the SEC nor any state securities commission has approved or disapproved of these securities or passed upon the adequacy or accuracy of this proxy statement/prospectus/information statement. Any representation to the contrary is a criminal offense.

The accompanying proxy statement/prospectus/information statement is dated January 9, 2017, and is first being mailed to Signal and Miragen stockholders on or about January 17, 2017.

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SIGNAL GENETICS, INC.

5740 FLEET STREET

CARLSBAD, CALIFORNIA 92008

(760) 537-4100

NOTICE OF SPECIAL MEETING OF STOCKHOLDERS

To Be Held On February 10, 2017

Time: 9:00 a.m., local time
Date: Friday, February 10, 2017
Place: 12255 El Camino Real, Suite 300, San Diego, California 92130
Purposes:

1. To approve the issuance of shares of common stock of Signal Genetics, Inc. (Signal) to stockholders of Miragen Therapeutics, Inc. (Miragen) pursuant to the terms of the Agreement and Plan of Merger and Reorganization between Signal, Miragen and Signal Merger Sub, Inc., dated October 31, 2016, a copy of which is attached as *Annex A*, which is referred to as the Merger Agreement;

2. To approve the change in control of Signal resulting from the merger contemplated by the Merger Agreement;

3. To approve the conversion of the Unsecured Demand Promissory Note, dated March 6, 2015, issued by Signal to Bennett LeBow in the original principal amount of $1,105,009, as amended on October 31, 2016 into shares of Signal common stock;

4. To approve the Signal 2016 Equity Incentive Plan, a copy of which is attached as *Annex B*;

5. To approve the Signal 2016 Employee Stock Purchase Plan, a copy of which is attached as *Annex C*;

6. To approve an amendment to the certificate of incorporation of Signal changing the Signal corporate name to Miragen Therapeutics, Inc. in the form attached as *Annex D*;

7. To approve an amendment to the certificate of incorporation of Signal effecting a reverse stock split of Signal s issued and outstanding common stock within a range of every one to 15 shares (or any number in

between) of outstanding Signal common stock being combined and reclassified into one share of Signal common stock in the form attached as *Annex E*;

8. To approve an amendment to the certificate of incorporation of Signal increasing the number of authorized shares of Signal common stock from 50,000,000 shares to 100,000,000 shares in the form attached as *Annex F*;

9. To approve the sale of all of Signal s intellectual property assets related to its MyPRS test to Quest Diagnostics Investments LLC pursuant to an intellectual property purchase agreement, a copy of which is attached as *Annex G*;

10. To approve an amendment to the certificate of incorporation of Signal to eliminate the ability of Signal stockholders to act by written consent in the form attached as *Annex H*;

11. To consider and vote upon an adjournment of the Signal special meeting, if necessary, to solicit additional proxies if there are not sufficient votes in favor of the proposals set forth above; and

12. To transact such other business as may properly come before the stockholders at the Signal special meeting or any adjournment or postponement thereof.

Record Date: Signal s board of directors has fixed January 9, 2017 as the record date for the determination of stockholders entitled to notice of, and to vote at, the Signal special meeting and any adjournment or postponement thereof. Only holders of record of shares of Signal common stock at the close of business on the record date are entitled to notice of, and to vote at, the Signal special meeting. At the close of business on the record date, Signal had 742,293 shares of common stock outstanding and entitled to vote.

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Your vote is important. The affirmative vote of the holders of a majority of the shares of Signal common stock having voting power present in person or represented by proxy at the Signal special meeting, assuming a quorum is present, is required for approval of Signal Proposal Nos. 1, 2, 3, 4, 5 and 11. The affirmative vote of the holders of a majority of outstanding shares of Signal common stock entitled to vote on the record date for the Signal special meeting is required for approval of Signal Proposal Nos. 6, 7, 8, 9 and 10. Each of Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 9 are conditioned upon each other and the approval of each such proposal is a condition to the completion of the Merger. Therefore, the Merger cannot be consummated without the approval of Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 9.

Even if you plan to attend the Signal special meeting in person, Signal requests that you sign and return the enclosed proxy to ensure that your shares will be represented at the Signal special meeting if you are unable to attend. You may change or revoke your proxy at any time before it is voted at the Signal special meeting.

SIGNAL S BOARD OF DIRECTORS HAS DETERMINED AND BELIEVES THAT EACH OF THE PROPOSALS OUTLINED ABOVE IS FAIR TO, IN THE BEST INTERESTS OF, AND ADVISABLE TO SIGNAL AND ITS STOCKHOLDERS AND HAS APPROVED EACH SUCH PROPOSAL. SIGNAL S BOARD OF DIRECTORS RECOMMENDS THAT SIGNAL STOCKHOLDERS VOTE FOR EACH SUCH PROPOSAL.

By Order of Signal s Board of Directors,

Samuel D. Riccitelli

President and Chief Executive Officer

Carlsbad, California

January 9, 2017

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REFERENCES TO ADDITIONAL INFORMATION

This proxy statement/prospectus/information statement incorporates important business and financial information about Signal that is not included in or delivered with this document. You may obtain this information without charge through the SEC website (*www.sec.gov*) or upon your written or oral request by contacting the chief financial officer of Signal Genetics, Inc., 5740 Fleet Street, Carlsbad, California 92008 or by calling (760) 537-4100.

To ensure timely delivery of these documents, any request should be made no later than February 1, 2017 to receive them before the special meeting.

For additional details about where you can find information about Signal, please see the section titled *Where You Can Find More Information* in this proxy statement/prospectus/information statement.

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QUESTIONS AND ANSWERS ABOUT THE MERGER

Except where specifically noted, the following information and all other information contained in this proxy statement/prospectus/information statement gives effect to Signal s one-for-15 reverse stock split of its common stock, which was effective at 5:01 p.m. Eastern Time on November 4, 2016, but does not give effect to the proposed reverse stock split described in Signal Proposal No. 7, beginning on page 167 in this proxy statement/prospectus/information statement.

The following section provides answers to frequently asked questions about the Merger. This section, however, provides only summary information. For a more complete response to these questions and for additional information, please refer to the cross-referenced sections.

Q: What is the Merger?

A: Signal Genetics, Inc., or Signal, and Miragen Therapeutics, Inc., or Miragen, have entered into an Agreement and Plan of Merger and Reorganization, dated October 31, 2016, or the Merger Agreement. The Merger Agreement contains the terms and conditions of the proposed business combination of Signal and Miragen. Under the Merger Agreement, Signal Merger Sub, Inc., a wholly-owned subsidiary of Signal, or Merger Sub, will merge with and into Miragen, with Miragen surviving as a wholly-owned subsidiary of Signal. After the completion of the Merger, Signal will change its corporate name to Miragen Therapeutics, Inc. as required by the Merger Agreement. This transaction is referred to as the Merger.

Immediately prior to the effective time of the Merger, each share of Miragen preferred stock will be converted into one share of Miragen s common stock, or Miragen common stock, as determined in accordance with the Miragen certificate of incorporation then in effect. At the effective time of the Merger, each share of Miragen common stock will be converted into the right to receive a fraction of a share of Signal common stock, or the Exchange Ratio. It is currently anticipated that, at the closing of the Merger, the Exchange Ratio would be approximately 0.6995 pre-split shares of Signal s common stock, or Signal common stock, and would be within a range of approximately 0.6995 to 0.0466 post-split shares of Signal common stock. Signal will assume (i) each outstanding warrant to purchase Miragen capital stock, which will be converted into warrants to purchase Signal common stock and (ii) each outstanding and unexercised option to purchase Miragen common stock, which will be converted into options to purchase Signal common stock. Signal stockholders will continue to own and hold their existing shares of Signal common stock. The Exchange Ratio is determined pursuant to a formula in the Merger Agreement and described in this proxy statement/prospectus/information statement, and these estimates are subject to adjustment.

Immediately after the Merger, Miragen securityholders will own approximately 96% of the fully-diluted common stock of the combined company, with Signal securityholders, whose shares of Signal common stock will remain outstanding after the Merger, owning approximately 4% of the fully-diluted common stock of the combined company, each assuming that Miragen closes its concurrent financing immediately prior to the effective time of the Merger. If the concurrent financing does not close, then Miragen securityholders would own approximately 94% of the fully-diluted common stock of the combined company and Signal securityholders would own approximately 6% of the fully-diluted common stock of the combined company. These estimates are based on the anticipated pre-split Exchange Ratio and post-split Exchange Ratios and are subject to adjustment.

The rules applicable to the calculation of the Exchange Ratio, which are described in the sections titled *The Merger Merger Consideration and Exchange Ratio* beginning on page 113 and *The Merger Agreement Merger Consideration and Exchange Ratio* beginning on page 123, are complex and circumstances as of the effective time of the Merger may result in an Exchange Ratio that differs from estimates in this proxy

statement/prospectus/information statement.

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Q: What will happen to Signal if, for any reason, the Merger does not close?

A: If, for any reason, the Merger does not close, Signal s board of directors may elect to, among other things, dissolve or liquidate its assets, attempt to complete another strategic transaction like the Merger, attempt to sell or otherwise dispose of the various assets of Signal or continue to operate the business of Signal. If Signal decides to dissolve and liquidate its assets, Signal would be required to pay all of its debts and contractual obligations, and to set aside certain reserves for potential future claims, and there can be no assurances as to the amount or timing of available cash left, if any, to distribute to stockholders after paying the debts and other obligations of Signal and setting aside funds for reserves.

Q: Why are the two companies proposing to merge?

A: Following the Merger, Signal and Miragen believe that the Merger will result in a clinical-stage biopharmaceutical company that discovers and develops proprietary RNA-targeted therapeutics with a specific focus on microRNAs and their role in diseases where there is a high unmet medical need. Signal and Miragen believe that the combined company will have the following potential advantages: (i) a diversified, clinical stage product development pipeline; (ii) appropriate resources; (iii) an experienced management team; and (iv) the potential to access additional sources of capital.

Q: Why am I receiving this proxy statement/prospectus/information statement?

A: You are receiving this proxy statement/prospectus/information statement because you have been identified as a stockholder of Signal or Miragen as of the applicable record date, and you are entitled, as applicable, to vote at Signal s special meeting of stockholders to approve the matters set forth above, or to sign and return the Miragen written consent to adopt and approve the matters set forth in the written consent. This document serves as:

a proxy statement of Signal used to solicit proxies for its special meeting of stockholders to vote on the matters set forth above;

a prospectus of Signal used to offer shares of Signal common stock in exchange for shares of Miragen common stock in the Merger and issuable upon exercise of Miragen options and Miragen warrants; and

an information statement of Miragen used to solicit the written consent of its stockholders for approval of matters relating to the Merger.

Q: What is required to consummate the Merger?

A: To consummate the Merger, Signal stockholders must approve the proposal numbers 1 through 9. Pursuant to the terms of the Merger Agreement, Signal is also requesting that Signal stockholders approve proposal numbers 10 and 11 below, which are, collectively with proposal numbers 1 through 9, referred to as the Signal Proposals. The Signal Proposals include the following matters:

1.

the issuance of shares of Signal common stock to Miragen stockholders pursuant to the terms of the Agreement and Plan of Merger and Reorganization between Signal, Miragen and Signal Merger Sub, Inc., dated October 31, 2016, a copy of which is attached as *Annex A*, which is referred to as the Merger Agreement;

2. the change in control of Signal resulting from the Merger contemplated by the Merger Agreement;

3. the conversion of the Unsecured Demand Promissory Note, dated March 6, 2015, issued by Signal to Bennett LeBow in the original principal amount of $1,105,009, as amended on October 31, 2016, which is referred to as the Note, into shares of Signal common stock;

4. the Signal 2016 Equity Incentive Plan, a copy of which is attached as *Annex B*;

5. the Signal 2016 Employee Stock Purchase Plan, a copy of which is attached as *Annex C*;

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6. an amendment to the certificate of incorporation of Signal changing the Signal corporate name to Miragen Therapeutics, Inc. in the form attached as *Annex D*;

7. an amendment to the certificate of incorporation of Signal effecting a reverse stock split of Signal s issued and outstanding common stock within a range of every one to 15 shares (or any number in between) of outstanding Signal common stock being combined and reclassified into one share of Signal common stock in the form attached as *Annex E*, which is referred to as the reverse stock split;

8. an amendment to the certificate of incorporation of Signal increasing the number of authorized shares of Signal common stock from 50,000,000 shares to 100,000,000 shares in the form attached as *Annex F*;

9. the sale of all of Signal s intellectual property assets related to its MyPRS test to Quest Diagnostics Investments LLC pursuant to an intellectual property purchase agreement, a copy of which is attached as *Annex G*;

10. an amendment to the certificate of incorporation of Signal to eliminate the ability of Signal stockholders to act by written consent in the form attached as *Annex H*; and

11. to consider and vote on an adjournment of the Signal special meeting, if necessary, to solicit additional proxies if there are not sufficient votes in favor of the proposals set forth above.

The presence, in person or represented by proxy, at the Signal special meeting of the holders of a majority of the shares of Signal common stock outstanding and entitled to vote at the Signal special meeting is necessary to constitute a quorum at the meeting. Abstentions and broker non-votes will be counted towards a quorum. The affirmative vote of the holders of a majority of the shares of Signal common stock having voting power present in person or represented by proxy at the Signal special meeting, assuming a quorum is present, is required for approval of Signal Proposal Nos. 1, 2, 3, 4, 5 and 11. The affirmative vote of the holders of a majority of shares of Signal common stock entitled to vote on the record date for the Signal special meeting is required for approval of Signal Proposal Nos. 6, 7, 8, 9 and 10. Each of Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 9 are conditioned upon each other and the approval of each such proposal is a condition to the completion of the Merger. Therefore, the Merger cannot be consummated without the approval of Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 9.

Votes will be counted by the inspector of election appointed for the meeting, who will separately count FOR and AGAINST votes, abstentions and broker non-votes. Abstentions will be counted towards the vote total for each proposal and will have the same effect as AGAINST votes for Signal Proposal Nos. 6, 7, 8, 9 and 10, but will have no effect on Signal Proposal Nos. 1, 2, 3, 4, 5 and 11. Similarly, broker non-votes will have the same effect as AGAINST votes for Signal Proposal Nos. 6, 7, 8, 9 and 10, but will have no effect on Signal Proposal Nos. 1, 2, 3, 4, 5 and 11.

As of December 31, 2016, the directors and executive officers of Signal owned or controlled 26% of the outstanding shares of Signal common stock entitled to vote at the Signal special meeting. The directors and executive officers of Signal owning these shares are subject to support agreements. Each Signal stockholder that entered into a support agreement has agreed to vote all shares of Signal common stock owned by him as of the record date in favor of the Signal Proposals and against any acquisition proposal, as defined in the Merger Agreement.

The adoption of the Merger Agreement and the approval of the Merger and related transactions by the stockholders of Miragen require the affirmative votes of the holders of (i) a majority of the outstanding Miragen common stock and preferred stock, voting together as one class on an as-converted to common stock basis and (ii) 70% of the shares of Miragen preferred stock, voting together as one class on an as-converted to common stock basis. In addition to the requirement of obtaining such stockholder approvals, each of the other closing conditions set forth in the Merger Agreement must be satisfied or waived.

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In addition, following the registration statement on Form S-4, of which this proxy statement/prospectus/information statement is a part, being declared effective by the SEC and pursuant to the conditions of the Merger Agreement, Miragen stockholders who are party to the support agreements will each execute written consents approving the Merger and related transactions. These stockholders hold a sufficient number of shares of Miragen capital stock to adopt the Merger Agreement, and no meeting of Miragen stockholders to adopt the Merger Agreement and approve the Merger and related transactions will be held. Stockholders of Miragen, including those who are parties to support agreements, are being requested to execute written consents providing such approvals.

For a more complete description of the closing conditions under the Merger Agreement, you are urged to read the section titled *The Merger Agreement Conditions to the Completion of the Merger* in this proxy statement/prospectus/information statement.

Q: What will Miragen stockholders, warrantholders and optionholders receive in the Merger?

A: As a result of the Merger, Miragen securityholders will become entitled to receive shares of Signal common stock equal to approximately 96% of the outstanding common stock of the combined company, assuming that Miragen closes its concurrent financing immediately prior to the effective time of the Merger. If the concurrent financing does not close, then Miragen securityholders will become entitled to receive shares of Signal common stock equal to approximately 94% of the fully-diluted common stock of the combined company. Each of Miragen s outstanding warrants to purchase shares of Miragen capital stock not terminated or exercised at or prior to the effective time of the Merger will be converted into a warrant to purchase Signal common stock, with the number of shares and exercise price being appropriately adjusted to reflect the Exchange Ratio between Signal common stock and Miragen common stock determined in accordance with the Merger Agreement. Following the closing of the Merger, Miragen s optionholders will have each Miragen option converted into an option to purchase Signal common stock, with the number of shares and exercise price being appropriately adjusted to reflect the Exchange Ratio between Signal common stock and Miragen common stock determined in accordance with the Merger Agreement.

For a more complete description of what Miragen stockholders, warrantholders and optionholders will receive in the Merger, please see the sections titled *Market Price and Dividend Information* and *The Merger Agreement Merger Consideration and Exchange Ratio* in this proxy statement/prospectus/information statement.

Q: Who will be the directors of Signal following the Merger?

A: Immediately following the Merger, Signal s board of directors is expected to be composed of seven directors to be designated solely by Miragen, including the following: William S. Marshall, Ph.D., Bruce L. Booth, Ph.D., John W. Creecy, Thomas E. Hughes, Ph.D., Kevin Koch, Ph.D., Kyle A. Lefkoff and Joseph L. Turner.

Q: Who will be the executive officers of Signal immediately following the Merger?

A: Immediately following the Merger, the executive management team of Signal is expected to be composed solely of the members of the Miragen executive management team prior to the Merger, as set forth below:

Name	**Title**
William S. Marshall, Ph.D.	President and Chief Executive Officer
Jason A. Leverone	Chief Financial Officer, Secretary and Treasurer
Adam S. Levy	Chief Business Officer

Paul D. Rubin, M.D. Executive Vice President, Research and Development

Q: As a Signal stockholder, how does Signal s board of directors recommend that I vote?

A: After careful consideration, Signal s board of directors recommends that Signal stockholders vote FOR all of the Signal Proposals.

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Q: As a Miragen stockholder, how does Miragen s board of directors recommend that I vote?

A: After careful consideration, Miragen s board of directors recommends that Miragen stockholders execute the written consent indicating their vote in favor of the adoption of the Merger Agreement and the approval of the Merger and the transactions contemplated thereby.

Q: What risks should I consider in deciding whether to vote in favor of the Merger or to execute and return the written consent, as applicable?

A: You should carefully review the section of this proxy statement/prospectus/information statement titled *Risk Factors* beginning on page 19, which sets forth certain risks and uncertainties related to the Merger, risks and uncertainties to which the combined company s business will be subject, and risks and uncertainties to which each of Signal and Miragen, as an independent company, is subject.

Q: When do you expect the Merger to be consummated?

A: The Merger is anticipated to occur as early as the first quarter of 2017 after the Signal special meeting to be held on February 10, 2017, but the exact timing cannot be predicted. For more information, please see the section titled *The Merger Agreement Conditions to the Completion of the Merger* in this proxy statement/prospectus/information statement.

Q: What do I need to do now?

A: Signal and Miragen urge you to read this proxy statement/prospectus/information statement carefully, including its annexes, and to consider how the Merger affects you.

If you are a Signal stockholder of record, you may provide your proxy instructions in one of four different ways. First, you can attend the Signal special meeting in person and Signal will provide you with a ballot when you arrive at the meeting. Second, you can mail your signed proxy card in the enclosed return envelope. Third, you can provide your proxy instructions via telephone by following the instructions on your proxy card. Fourth, you can provide your proxy instructions via the Internet by following the instructions on your proxy card. If you hold your shares in street name (as described below), you may provide your proxy instructions via telephone or the internet by following the instructions on your vote instruction form. Please provide your proxy instructions only once, unless you are revoking a previously delivered proxy instruction, and as soon as possible so that your shares can be voted at the special meeting of Signal stockholders.

If you are a stockholder of Miragen, you may execute and return your written consent to Miragen in accordance with the instructions provided.

Q: What happens if I do not return a proxy card or otherwise provide proxy instructions, as applicable?

A: If you are a Signal stockholder, the failure to return your proxy card or otherwise provide proxy instructions will reduce the aggregate number of votes required to approve Signal Proposals Nos. 1, 2, 3, 4, 5 and 11 and will have the same effect as voting against 6, 7, 8, 9 and 10. Also, your shares will not be counted for purposes of determining whether a quorum is present at the Signal special meeting.

Q: May I vote in person at the special meeting of stockholders of Signal?

A: If your shares of Signal common stock are registered directly in your name with Signal s transfer agent, you are considered to be the stockholder of record with respect to those shares, and the proxy materials and proxy card are being sent directly to you by Signal. If you are a Signal stockholder of record, you may attend the special meeting of Signal stockholders and vote your shares in person. Even if you plan to attend the Signal special meeting in person, Signal requests that you sign and return the enclosed proxy to ensure that your shares will be represented at the Signal special meeting if you are unable to attend.

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If your shares of Signal common stock are held in a brokerage account or by another nominee, you are considered the beneficial owner of shares held in street name, and the proxy materials are being forwarded to you by your broker or other nominee together with a voting instruction card. As the beneficial owner, you are also invited to attend the special meeting of Signal stockholders. Because a beneficial owner is not the stockholder of record, you may not vote these shares in person at the Signal special meeting unless you obtain a legal proxy from the broker, trustee or nominee that holds your shares, giving you the right to vote the shares at the meeting.

Q: When and where is the special meeting of Signal stockholders being held?

A: The special meeting of Signal stockholders will be held at 12255 El Camino Real, Suite 300, San Diego, California 92130, at 9:00 a.m., local time, on February 10, 2017. Subject to space availability, all Signal stockholders as of the record date, or their duly appointed proxies, may attend the meeting. Since seating is limited, admission to the meeting will be on a first-come, first-served basis.

Q: If my Signal shares are held in street name by my broker, will my broker vote my shares for me?

A: Unless your broker has discretionary authority to vote on certain matters, your broker will not be able to vote your shares of Signal common stock on matters requiring discretionary authority without instructions from you. If you do not give instructions to your broker, your broker can vote your Signal shares with respect to discretionary items but not with respect to non-discretionary items. Discretionary items are proposals considered routine under the rules of The NASDAQ Capital Market on which your broker may vote shares held in street name in the absence of your voting instructions. On non-discretionary items for which you do not give your broker instructions, the Signal shares will be treated as broker non-votes. It is anticipated that Signal Proposal Nos. 1, 2, 3, 6, 7, 8, 9 and 10 will be non-discretionary items. To make sure that your vote is counted, you should instruct your broker to vote your shares, following the procedures provided by your broker.

Q: May I change my vote after I have submitted a proxy or provided proxy instructions?

A: Signal stockholders of record, other than those Signal stockholders who are parties to support agreements, may change their vote at any time before their proxy is voted at the Signal special meeting in one of three ways. First, a stockholder of record of Signal can send a written notice to the Secretary of Signal stating that it would like to revoke its proxy. Second, a stockholder of record of Signal can submit new proxy instructions either on a new proxy card or via the Internet. Third, a stockholder of record of Signal can attend the Signal special meeting and vote in person. Attendance alone will not revoke a proxy. If a Signal stockholder who owns Signal shares in street name has instructed a broker to vote its shares of Signal common stock, the stockholder must follow directions received from its broker to change those instructions.

Q: Who is paying for this proxy solicitation?

A: Signal and Miragen will share equally the cost of printing and filing of this proxy statement/prospectus/information statement and the proxy card. Arrangements will also be made with brokerage firms and other custodians, nominees and fiduciaries who are record holders of Signal common stock for the forwarding of solicitation materials to the beneficial owners of Signal common stock. Signal will reimburse these brokers, custodians, nominees and fiduciaries for the reasonable out-of-pocket expenses they incur in connection with the forwarding of solicitation materials. Signal has retained Advantage Proxy to assist it in soliciting proxies using the means referred to above. Signal will pay the fees of Advantage Proxy, which Signal expects to be approximately $7,500, plus reimbursement of out-of-pocket expenses.

Q: What are the material U.S. federal income tax consequences of the reverse stock split to Signal stockholders?

A: The reverse stock split described in Signal Proposal No. 7 should constitute a recapitalization for U.S. federal income tax purposes. As a result, a U.S. Holder (as described in more detail in the section titled *Matters*

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Being Submitted to a Vote of Signal Stockholders Signal Proposal No. 7: Approval of the Amendment of the Certificate of Incorporation of Signal Effecting the Reverse Stock Split Material U.S. Federal Income Tax Consequences of the Reverse Stock Split) of Signal common stock generally should not recognize gain or loss upon such reverse stock split, except with respect to cash received in lieu of a fractional share of Signal common stock, as discussed below in the section titled *Matters Being Submitted to a Vote of Signal Stockholders Signal Proposal No. 7: Approval of the Amendment of the Certificate of Incorporation of Signal Effecting the Reverse Stock Split Material U.S. Federal Income Tax Consequences of the Reverse Stock Split Cash in Lieu of Fractional Shares* . A U.S. Holder s aggregate tax basis in the shares of Signal common stock received pursuant to such reverse stock split should equal the aggregate tax basis of the shares of the Signal common stock surrendered (excluding any portion of such basis that is allocated to any fractional share of Signal common stock), and such U.S. Holder s holding period in the shares of Signal common stock received should include the holding period in the shares of Signal common stock surrendered. Treasury Regulations provide detailed rules for allocating the tax basis and holding period of the shares of Signal common stock surrendered to the shares of Signal common stock received in a recapitalization pursuant to such reverse stock split. U.S. Holders of shares of Signal common stock acquired on different dates and at different prices should consult their tax advisors regarding the allocation of the tax basis and holding period of such shares. For more information, please see the section titled *Matters Being Submitted to a Vote of Signal Stockholders Signal Proposal No. 7: Approval of the Amendment of the Certificate of Incorporation of Signal Effecting the Reverse Stock Split Material U.S. Federal Income Tax Consequences of the Reverse Stock Split* on page 167.

Q: What are the material U.S. federal income tax consequences of the Merger to Miragen stockholders?

A: Each of Signal and Miragen intends the Merger to qualify as a reorganization within the meaning of Section 368(a) of the Internal Revenue Code of 1986, as amended, or the Code. In general, and subject to the qualifications and limitations set forth in the section titled *The Merger Material U.S. Federal Income Tax Consequences of the Merger*, if the Merger qualifies as a reorganization within the meaning of Section 368(a) of the Code, the material tax consequences to U.S. Holders of Miragen common stock will be as follows:

- a Miragen stockholder will not recognize gain or loss upon the exchange of Miragen common stock for Signal common stock pursuant to the Merger, except to the extent of cash received in lieu of a fractional share of Miragen common stock as described below;
- a Miragen stockholder who receives cash in lieu of a fractional share of Signal common stock in the Merger will recognize capital gain or loss in an amount equal to the difference between the amount of cash received in lieu of a fractional share and the stockholder s tax basis allocable to such fractional share;
- a Miragen stockholder s aggregate tax basis for the shares of Signal common stock received in the Merger (including any fractional share interest for which cash is received) will equal the stockholder s aggregate tax basis in the shares of Miragen common stock surrendered in the Merger; and
- the holding period of the shares of Signal common stock received by a Miragen stockholder in the Merger will include the holding period of the shares of Miragen common stock surrendered in exchange therefor.

Tax matters are very complicated, and the tax consequences of the Merger to a particular Miragen stockholder will depend on such stockholder s circumstances. Accordingly, you are strongly urged to consult your tax advisor for a full

understanding of the tax consequences of the Merger to you, including the applicability and effect of federal, state, local and non-U.S. income and other tax laws. For more information, please see the section titled *The Merger Material U.S. Federal Income Tax Consequences of the Merger* beginning on page 115.

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Q: Who can help answer my questions?

A: If you are a Signal stockholder and would like additional copies of this proxy statement/prospectus/information statement without charge or if you have questions about the Merger, including the procedures for voting your shares, you should contact:

ADVANTAGE PROXY

Telephone: (877) 870-8565 (toll free); (206) 870-8565 (collect)

Email: ksmith@advantageproxy.com

If you are a Miragen stockholder and would like additional copies of this proxy statement/prospectus/information statement without charge or if you have questions about the Merger, including the procedures for voting your shares, you should contact:

Miragen Therapeutics, Inc.

6200 Lookout Road

Boulder, CO 80301

Telephone: (720) 407-4595

Attn: Investor Relations

Email: investorrelations@miragenrx.com

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PROSPECTUS SUMMARY

This summary highlights selected information from this proxy statement/prospectus/information statement and may not contain all of the information that is important to you. To better understand the Merger, the proposals being considered at the Signal special meeting and the Miragen stockholder actions that are the subject of the written consent, you should read this entire proxy statement/prospectus/information statement carefully, including the Merger Agreement and the other annexes to which you are referred herein. For more information, please see the section titled Where You Can Find More Information in this proxy statement/prospectus/information statement. Except where specifically noted, the following information and all other information contained in this proxy statement/prospectus/information statement gives effect to Signal s one-for-15 reverse stock split of its common stock, which was effective at 5:01 p.m. Eastern Time on November 4, 2016, but does not give effect to the proposed reverse stock split described in Signal Proposal No. 7, beginning on page 167 in this proxy statement/prospectus/information statement.

The Companies

Signal Genetics, Inc.

5740 Fleet Street

Carlsbad, CA 92008

(760)-537-4100

Signal is a commercial stage, molecular genetic diagnostic company focused on providing innovative diagnostic services that help physicians in the care of their patients suffering from multiple myeloma. Its MyPRS test, a microarray-based gene expression profile assay, is performed in Signal s laboratory located in Little Rock, Arkansas, which is certified under the Clinical Laboratory Improvement Amendments of 1988 and accredited by the College of American Pathologists. Signal is licensed to sell MyPRS in all 50 states. Since its inception, Signal has operated at a loss as it built the infrastructure to support the growing customer base for MyPRS. Due to current market conditions, Signal s current liquidity position and its depressed stock price, it has (i) entered into the Merger Agreement and (ii) entered into an intellectual property purchase agreement to sell all of Signal s intellectual property assets related to its MyPRS assay to Quest Diagnostics Investments LLC.

Miragen Therapeutics, Inc.

6200 Lookout Road

Boulder, CO 80301

(303) 531-5952

Miragen is a clinical-stage biopharmaceutical company discovering and developing proprietary RNA-targeted therapeutics with a specific focus on microRNAs and their role in diseases where there is a high unmet medical need. microRNAs are short RNA molecules, or oligonucleotides, that regulate gene expression or activity and play a vital role in influencing the pathways responsible for many disease processes. Miragen believes its experience in microRNA biology and chemistry, drug discovery, bioinformatics, and translational medicine provide it with a potential competitive advantage to identify and develop microRNA-targeted drugs designed to regulate gene pathways

to result in disease modification. Miragen uses its expertise in systems biology and oligonucleotide chemistry to discover and develop a pipeline of product candidates. Miragen s two lead product candidates, MRG-106 and MRG-201, are currently in Phase 1 clinical trials. Miragen s clinical product candidate for the treatment of certain cancers, MRG-106, is an inhibitor of microRNA-155, or miR-155, which is found at abnormally high levels in several blood cancers. Miragen s clinical product candidate for the treatment of pathological fibrosis, MRG-201, is a replacement for miR-29, which is found at abnormally low levels in a number of pathological fibrotic conditions, including cardiac, renal, hepatic, and pulmonary fibrosis, as well as systemic sclerosis. In addition to Miragen s clinical programs, it is developing a pipeline of pre-clinical product

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candidates. The goal of Miragen s translational medicine strategy is to progress rapidly to first in human studies once it has established the pharmacokinetics (the movement of drug into, through, and out of the body), pharmacodynamics (the effect and mechanism of action of a drug) and safety of the product candidate in pre-clinical studies.

Signal Merger Sub, Inc.

5740 Fleet Street

Carlsbad, CA 92008

(760)-537-4100

Merger Sub is a wholly-owned subsidiary of Signal and was formed solely for the purpose of carrying out the Merger.

The Merger (see page 88)

If the Merger is completed, Merger Sub will merge with and into Miragen, with Miragen surviving as a wholly-owned subsidiary of Signal.

Immediately prior to the effective time of the Merger, each share of Miragen preferred stock will be converted into one share of Miragen s common stock, or Miragen common stock, as determined in accordance with the Miragen certificate of incorporation then in effect. At the effective time of the Merger, each share of Miragen common stock will be converted into the right to receive a fraction of a share of Signal common stock, or the Exchange Ratio. It is currently anticipated that, at the closing of the Merger, the Exchange Ratio would be approximately 0.6995 pre-split shares of Signal common stock and would be within a range of approximately 0.6995 and 0.0466 post-split shares of Signal common stock. The Exchange Ratio is determined pursuant to a formula in the Merger Agreement and described in this proxy statement/prospectus/information statement and these estimates are subject to adjustment. At the effective time of the Merger, each outstanding option and warrant, whether or not vested, to purchase shares of Miragen capital stock unexercised immediately prior to the effective time of the Merger will be converted into an option or warrant to purchase shares of Signal common stock. All rights with respect to each Miragen option or warrant will be assumed by Signal in accordance with its terms. Accordingly, from and after the effective time of the Merger, each option or warrant assumed by Signal may be exercised solely for shares of Signal common stock.

Each share of Signal common stock issued and outstanding at the time of the Merger will remain issued and outstanding and those shares will be unaffected by the Merger. Signal warrants that are unexercised immediately prior to the effective time of the Merger will remain outstanding. Signal stock options and restricted stock units that are not exercised or settled, as applicable, prior to the effective time of the Merger will be cancelled and terminated upon the effectiveness of the Merger. Please see *The Merger Stock Options and Warrants* beginning on page 114.

For a more complete description of the Exchange Ratio, please see the section titled *The Merger Agreement Merger Consideration and Exchange Ratio* beginning on page 123.

The Merger will be completed as promptly as practicable after all of the conditions to completion of the Merger are satisfied or waived, including the approval of the stockholders of Signal and Miragen. Signal and Miragen are working to complete the Merger as quickly as practicable. However, Signal and Miragen cannot predict the exact timing of the completion of the Merger because it is subject to various conditions. After completion of the Merger, assuming that Signal receives the required stockholder approval of Signal Proposal No. 6, Signal will be renamed Miragen Therapeutics, Inc.

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Reasons for the Merger (see pages 95 and 98)

Following the Merger, the combined company will be a clinical-stage biopharmaceutical company that discovers and develops proprietary RNA-targeted therapeutics with a specific focus on microRNAs and their role in diseases where there is a high unmet medical need. Signal and Miragen believe that the combined company will have the following potential advantages:

- the combined company will be a publicly traded, clinical-stage company with a diversified development portfolio of two well-characterized compounds addressing novel targets for several distinct diseases, as well as a pipeline of RNA targeted therapeutic candidates;

- the combined company will be led by an experienced senior management team from Miragen and a board of directors of seven members designated by Miragen; and

- Miragen has commitments for $40.7 million to fund Miragen s development pipeline from an investor syndicate that includes some of Miragen s existing stockholders and new investors. Although not a condition to the completion of the Merger, if closed the investment, in addition to Miragen s $16.1 million sale of its Series C convertible preferred stock in September 2016, is expected to provide sufficient funding to advance Miragen s clinical development programs. Each of Miragen s clinical programs has the potential, if successful, to create value for the stockholders of the combined company and present the combined company with additional fund raising opportunities in the future.

Each of the board of directors of Signal and Miragen also considered other reasons for the Merger, as described herein. For example, Signal s board of directors considered, among other things:

- the strategic alternatives of Signal to the Merger, including potential transactions that could have resulted from discussions that Signal s management conducted with other potential merger parties;

- the consequences of current market conditions, Signal s current liquidity position, its depressed stock price and continuing net operating losses, and the likelihood that the resulting circumstances for the company would not change for the benefit of the Signal stockholders in the foreseeable future on a stand-alone basis;

- the risks of continuing to operate Signal on a stand-alone basis, including the need to continue building the company s tests services menu, infrastructure and management team to support the laboratory services business with insufficient capital resources;

- Signal management s belief that it would be difficult to obtain additional equity or debt financing on acceptable terms, if at all;

the opportunity as a result of the Merger for Signal stockholders to participate in the potential value that may result from development of the Miragen clinical development programs and the potential increase in value of the combined company following the Merger; and

the opinion of Cantor Fitzgerald & Co., referred to herein as Cantor, delivered to the board of directors of Signal (in its capacity as such) that, as of October 31, 2016 and based upon and subject to the assumptions made, procedures followed, matters considered, and qualifications and limitations set forth in the opinion, the Exchange Ratio for the conversion of Miragen capital stock into Signal common stock pursuant to the Merger Agreement was fair to Signal from a financial point of view.

In addition, Miragen s board of directors approved the Merger based on a number of factors, including the following:

the potential to provide its current stockholders with greater liquidity by owning stock in a public company;

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the potential to access of public market capital, including sources of capital from a broader range of investors to support the clinical development of its product candidates than it could otherwise obtain if it continued to operate as a privately-held company;

the expectation that the Merger would be a more time- and cost-effective means to access capital than other options considered, including an initial public offering;

the fact that shares of Signal common stock issued to Miragen stockholders will be registered pursuant to a registration statement on Form S-4 by Signal and will become freely tradable for Miragen s stockholders who are not affiliates of Miragen;

the likelihood that the Merger will be consummated on a timely basis;

the terms and conditions of the Merger Agreement, including, without limitation, the following:

the determination that the Exchange Ratio, which is not subject to adjustment based on trading prices, is appropriate to reflect the expected relative percentage ownership of Signal securityholders, Miragen securityholders and securityholders of those shares sold in the concurrent financing was appropriate in the judgment of Miragen s board of directors;

the expectation that the Merger will be treated as a reorganization for U.S. federal income tax purposes, with the result that the Miragen stockholders will not recognize taxable gain or loss for U.S. federal income tax purposes upon the exchange of Miragen common stock for Signal common stock pursuant to the Merger;

the rights of Miragen under the Merger Agreement to consider certain unsolicited competing proposals under certain circumstances should Miragen receive a superior proposal; and

the conclusion of Miragen s board of directors that the potential termination fee of $300,000 and/or expense reimbursements of up to $100,000, payable by Signal to Miragen and the circumstances when such fee may be payable, were reasonable.

Opinion of Signal Financial Advisor (see page 99)

On April 28, 2016, Signal engaged Cantor to act as Signal s financial advisor in connection with consideration of potential strategic alternatives for Signal. As part of this engagement, Signal s board of directors requested that Cantor evaluate the fairness, from a financial point of view, to Signal of the Exchange Ratio for the conversion of Miragen common stock into Signal common stock pursuant to the Merger Agreement. On October 31, 2016, at a meeting of Signal s board of directors, Cantor rendered its oral opinion to Signal s board of directors (in its capacity as such), which opinion was subsequently confirmed by delivery of a written opinion dated October 31, 2016, that, as of such date and based upon and subject to the assumptions made, procedures followed, matters considered, and qualifications

and limitations set forth in the opinion, the Exchange Ratio for the conversion of Miragen common stock into Signal common stock pursuant to the Merger Agreement was fair, from a financial point of view, to Signal, as more fully described below under the caption *The Merger Opinion of Signal Financial Advisor*.

The full text of the written opinion of Cantor, dated October 31, 2016, which sets forth, among other things, the assumptions made, procedures followed, matters considered and qualifications and limitations of the review undertaken in connection with such opinion, is attached as *Annex I*. Holders of Signal common stock are urged to read this opinion carefully and in its entirety. Cantor s opinion was provided for the sole benefit and use of Signal s board of directors (in its capacity as such) in connection with its consideration of the Merger and addresses only the fairness to Signal, from a financial point of view, of the Exchange Ratio for the conversion of Miragen common stock into Signal common stock pursuant to the Merger Agreement. It does not address any other aspects of the Merger and does not constitute a recommendation as to how holders of Signal common stock or Miragen common stock should vote or act

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in connection with the Merger. The Exchange Ratio was determined through negotiations between Signal and Miragen and not pursuant to any recommendation of Cantor. The summary of the opinion set forth in the section of this proxy statement/prospectus/information statement captioned *The Merger Opinion of Signal Financial Advisor* is qualified in its entirety by reference to the full text of the opinion.

Interests of Certain Directors, Officers and Affiliates of Signal and Miragen (see pages 105 and 108)

In considering the recommendation of Signal s board of directors with respect to issuing shares of Signal common stock pursuant to the Merger Agreement and the other matters to be acted upon by Signal stockholders at the Signal special meeting, Signal stockholders should be aware that certain members of Signal s board of directors and executive officers of Signal have interests in the Merger that may be different from, or in addition to, interests they have as Signal stockholders. For example, Signal has permitted the severance payments to be paid under the employment agreements with each of Samuel D. Riccitelli, Signal s president and chief executive officer, and Tamara A. Seymour, Signal s chief financial officer, to be paid in a lump sum payment instead of monthly installments over the applicable period. The employment of Mr. Riccitelli and Ms. Seymour are expected to terminate no later than the consummation of the Merger. Furthermore, Signal approved the payment of the remainder of bonuses to its executive officers based on their performance during the 2015 fiscal year, contingent upon the closing of the proposed Merger. In the event that Signal s compensation committee determines that funds are available to provide for the payment of incentive compensation bonus payment for the 2016 performance of Mr. Riccitelli and Ms. Seymour, Mr. Riccitelli and Ms. Seymour are eligible to receive an amount to be determined by the compensation committee. In addition, immediately prior to the execution of the Merger Agreement, Signal entered into an amendment to the Note, or the Note Amendment, with Bennett S. LeBow, a member of Signal s board of directors and Signal s largest stockholder. The Note Amendment allows for the conversion of the outstanding balance per the Note Amendment plus an additional 11% premium on the outstanding balance into shares of Signal common stock immediately prior to the effective time of the Merger at a conversion price equal to $5.39 per share, which was the closing price of Signal s common stock on The NASDAQ Capital Market as of the effective date of the Note Amendment. The conversion provision of the Note Amendment is subject to, among other things, approval by Signal stockholders and if the conversion of the Note into Signal common stock is not approved by the stockholders or if the Merger Agreement is terminated prior to the completion of the Merger, the outstanding balance of the Note will not be converted into Signal s common stock and will remain outstanding.

As of December 31, 2016, directors and executive officers of Signal owned or controlled 26% of the outstanding shares of Signal common stock. Signal directors and executive officers have entered into support agreements in connection with the Merger. The support agreements are discussed in greater detail in the section titled *Agreements Related to the Merger Support Agreements* in this proxy statement/prospectus/information statement.

In considering the recommendation of Miragen s board of directors with respect to consenting to the adoption of the Merger Agreement and the approval of the Merger and related transactions, Miragen s stockholders should be aware that certain members of the board of directors and executive officers of Miragen have interests in the Merger that may be different from, or in addition to, interests they have as Miragen stockholders. For example, some of Miragen s executive officers and directors have options to purchase shares of Miragen common stock that will each convert into an option to purchase shares of Signal common stock, and some of Miragen s directors and executive officers are expected to become directors and executive officers of the combined company upon the closing of the Merger. Specifically, William S. Marshall, Ph.D., Jason A. Leverone, Adam S. Levy and Paul D. Rubin, M.D., all currently executive officers of Miragen, are expected to become executive officers of the combined company upon the closing of the Merger, with Dr. Marshall serving as the president and chief executive officer, Mr. Leverone serving as chief financial officer, Mr. Levy serving as chief business officer and Dr. Rubin serving as executive vice president, research and development. Additionally, Bruce L. Booth, Ph.D., John W. Creecy, Thomas E. Hughes, Ph.D., Kyle A.

Lefkoff, Kevin Koch, Ph.D., William S. Marshall, Ph.D., all current directors of Miragen, and

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Joseph L. Turner, who will be designated to serve on the board of directors of the combined company following the completion of the Merger. Reza Halse, Ph.D., has informed Miragen that he will resign as a member of Miragen s board of directors immediately prior to the effectiveness of the Merger. Some of Miragen officers, directors and significant stockholders also entered into support agreements in connection with the Merger. The support agreements are discussed in greater detail in the section titled *Agreements Related to the Merger Support Agreements* beginning on page 143.

Management Following the Merger (see page 247)

Effective as of the closing of the Merger, Signal s executive officers are expected to be the current Miragen management team, including:

Name	Title
William S. Marshall, Ph.D.	President and Chief Executive Officer
Jason A. Leverone	Chief Financial Officer, Treasurer and Secretary
Adam S. Levy	Chief Business Officer
Paul D. Rubin, M.D.	Executive Vice President, Research and Development

Overview of the Merger Agreement and Agreements Related to the Merger Agreement

Merger Consideration and Exchange Ratio (see page 123)

Immediately prior to the effective time of the Merger, each share of Miragen preferred stock outstanding at such time will be converted into one share of Miragen common stock as determined in accordance with the Miragen certificate of incorporation then in effect. At the effective time of the Merger:

- each share of Miragen common stock outstanding immediately prior to the effective time of the Merger will automatically be converted into the right to receive a number of shares of Signal common stock at a rate equal to the Exchange Ratio, which is currently estimated to be approximately 0.6995, prior to giving effect to the reverse stock split, and within a range of 0.6995 to 0.0466, after giving effect to the reverse stock split;

- each warrant to purchase shares of Miragen capital stock outstanding and unexercised immediately prior to the effective time of the Merger will be assumed by Signal and will become a warrant to purchase shares of Signal common stock, with the number of shares and exercise price being adjusted by the Exchange Ratio, which is currently estimated to be approximately 0.6995, prior to giving effect to the reverse stock split, and within a range of 0.6995 to 0.0466, after giving effect to the reverse stock split; and

- each option to purchase shares of Miragen common stock outstanding and unexercised immediately prior to the effective time of the Merger will be assumed by Signal and will become an option to purchase shares of Signal common stock, with the number of shares and exercise price being adjusted by the Exchange Ratio, which is currently estimated to be approximately 0.6995, prior to giving effect to the reverse stock split, and within a range of 0.6995 to 0.0466, after giving effect to the reverse stock split.

Immediately after the Merger, Miragen securityholders will own approximately 96% of the fully-diluted common stock of the combined company, with Signal securityholders owning approximately 4% of the fully-diluted common stock of the combined company, which is subject to adjustment before closing and assuming that Miragen closes its concurrent financing immediately prior to the effective time of the Merger. If the concurrent financing does not close, then Miragen securityholders would own approximately 94% of the fully-diluted common stock of the combined company, with Signal securityholders owning approximately 6% of the fully-diluted common stock of the combined company. See the section titled *The Merger Agreement Merger Consideration and Exchange Ratio.*

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There will be no adjustment to the total number of shares of Signal common stock that Miragen stockholders will be entitled to receive for changes in the market price of Signal common stock. Accordingly, the market value of the shares of Signal common stock issued pursuant to the Merger will depend on the market value of the shares of Signal common stock at the time the Merger closes, and could vary significantly from the market value on the date of this proxy statement/prospectus/information statement.

Treatment of Signal Warrants and Stock Options (see page 114)

All warrants to purchase shares of Signal s common stock that are outstanding immediately prior to the effective time of the Merger will remain outstanding following the effective time of the Merger. All options to purchase shares of Signal common stock and restricted stock units that are not exercised or settled, as applicable, prior to the effective time will be cancelled and terminated upon the effectiveness of the Merger.

Treatment of Miragen Warrants and Stock Options (see page 135)

At the effective time of the Merger, each outstanding option and warrant, whether or not vested, to purchase shares of Miragen capital stock unexercised immediately prior to the effective time of the Merger will be converted into an option or warrant to purchase shares of Signal common stock. All rights with respect to each Miragen option or warrant will be assumed by Signal in accordance with its terms. Accordingly, from and after the effective time of the Merger each option or warrant assumed by Signal may be exercised solely for shares of Signal common stock.

The number of shares of Signal common stock subject to each outstanding Miragen option or warrant assumed by Signal will be determined by multiplying the number of shares of Miragen capital stock that were subject to such option or warrant (on an as-converted to common stock basis), as applicable, by the Exchange Ratio and rounding the resulting number down to the nearest whole number of shares of Signal common stock. The per share exercise price for the shares of Signal common stock issuable upon exercise of each Miragen option or warrant assumed by Signal will be determined by dividing the per share exercise price of Miragen capital stock subject to such option or warrant, as applicable, by the Exchange Ratio and rounding the resulting exercise price up to the nearest whole cent. Any restriction on the exercise of any option or warrant will continue in full force and effect and the term, exercisability, vesting schedule and other provisions of such option or warrant will otherwise remain unchanged.

Conditions to the Completion of the Merger (see page 137)

To complete the Merger, Signal stockholders must approve Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8, and 9. Additionally, the Miragen stockholders must approve the Merger and adopt the Merger Agreement. In addition to obtaining such stockholder approvals, each of the other closing conditions set forth in the Merger Agreement must be satisfied or waived.

Non-Solicitation (see page 132)

The Merger Agreement contains provisions prohibiting Signal and Miragen from seeking a competing transaction, subject to specified exceptions described in the Merger Agreement. Under these non-solicitation provisions, each of Signal and Miragen has agreed that neither it nor its subsidiaries, nor any of its officers, directors, employees, representatives, affiliates, advisors or agents will directly or indirectly:

solicit, initiate, respond to or take any action to facilitate or encourage any inquiries or the communication, making, submission or announcement of any competing proposal or take any action that could reasonably be expected to lead to a competing proposal;

enter into or participate in any discussions or negotiations with any person with respect to any competing proposal;

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furnish any information regarding such party to any person in connection with, in response to, relating to or for the purpose of assisting with or facilitating a competing proposal;

approve, endorse or recommend any competing proposal, subject to the terms and conditions in the Merger Agreement;

execute or enter into any letter of intent or similar document or any contract contemplating or otherwise relating to any competing proposal; or

grant any waiver or release under any confidentiality, standstill or similar agreement (other than to the other party).

Termination of the Merger Agreement (see page 139)

Either Signal or Miragen can terminate the Merger Agreement under certain circumstances, which would prevent the Merger from being consummated.

Termination Fee (see page 139)

The Merger Agreement provides that, upon termination of the Merger Agreement under specified circumstances, Signal may be required to pay Miragen a termination fee of $300,000 and/or up to $100,000 in expense reimbursements, or Miragen may be required to pay Signal a termination fee of $300,000 and/or up to $100,000 in expense reimbursements.

Subscription Agreement (see page 142)

On October 31, 2016, prior to the execution of the Merger Agreement, Miragen entered into a subscription agreement, or the Subscription Agreement, with certain current stockholders of Miragen and certain new investors in Miragen pursuant to which Miragen agreed to sell, and the purchasers listed therein agreed to purchase, shares of Miragen common stock for an aggregate purchase price of $40.7 million.

The consummation of the financing contemplated by the Subscription Agreement is subject to certain conditions, including the satisfaction or waiver of each of the conditions to the consummation of the Merger set forth in the Merger Agreement and the parties to the Merger Agreement being ready, willing and able to consummate the Merger immediately after the closing of the financing, which include (i) the SEC having declared effective the registration statement on Form S-4 of which this proxy statement/prospectus/information statement is a part and no stop order suspending the effectiveness of the registration statement on Form S-4 of which this proxy statement/prospectus/information statement is a part having been issued and remain pending, and (ii) the approval of Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8, and 9 by Signal stockholders.

Support Agreements (see page 143)

In connection with the execution of the Merger Agreement, officers, directors and some stockholders of Miragen, who collectively beneficially own or control approximately 78% of the voting power of Miragen s outstanding capital stock on an as-converted to common stock basis as of December 31, 2016 entered into support agreements with Signal under which such stockholders have agreed to vote in favor of the Merger and the Merger Agreement and against any

competing transaction.

In connection with the execution of the Merger Agreement, Signal s officers, directors and some stockholders of Signal, who collectively beneficially own or control approximately 26% of Signal common stock as of December 31, 2016, also entered into support agreements with Miragen under which such stockholder has agreed to vote in favor of the Signal Proposals and against any competing transaction.

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Each stockholder executing a support agreement has made representations and warranties to Signal or Miragen, as applicable, regarding ownership and unencumbered title to the shares subject to such agreement, such stockholder s power and authority to execute the support agreement, due execution and enforceability of the support agreement, and ownership and unencumbered title to the shares. Unless otherwise waived, all of these support agreements prohibit the transfer, sale, assignment, gift or other disposition by the stockholder of their respective shares of Signal or Miragen capital stock, or the entrance into an agreement or commitment to do any of the foregoing, subject to specified exceptions. Each Miragen stockholder executing a support agreement has also waived its statutory appraisal rights in connection with the Merger.

The support agreements will terminate at the earlier of the effective time of the Merger or the termination of the Merger Agreement in accordance with its terms.

Lock-up Agreements (see page 144)

The officers, directors and certain other securityholders of Miragen also entered into lock-up agreements, pursuant to which such securityholders have agreed not to, except in limited circumstances, offer, pledge, sell, contract to sell, sell any option to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, or otherwise transfer or dispose of, any Miragen securities or shares of Signal common stock, including, as applicable, shares received in the Merger and issuable upon exercise of certain warrants and options, until 180 days after the closing date of the Merger.

The Miragen stockholders who have executed lock-up agreements as of December 31, 2016 owned, in the aggregate, approximately 98% of the shares of Miragen s outstanding capital stock on an as-converted to common stock basis.

Regulatory Approvals (see page 135)

In the United States, Signal must comply with applicable federal and state securities laws and the rules and regulations of The NASDAQ Capital Market in connection with the issuance of shares of Signal common stock and the filing of this proxy statement/prospectus/information statement with the SEC. As of the date hereof, the registration statement on Form S-4 of which this proxy statement/prospectus/information statement is a part has not become effective.

Material U.S. Federal Income Tax Consequences of the Merger (for more information, see page 115)

Each of Signal and Miragen intends the Merger to qualify as a reorganization within the meaning of Section 368(a) of the Code. In general, and subject to the qualifications and limitations set forth in the section titled *The Merger Material U.S. Federal Income Tax Consequences of the Merger*, if the Merger qualifies as a reorganization within the meaning of Section 368(a) of the Code, the material tax consequences to U.S. Holders of Miragen common stock will be as follows:

- a Miragen stockholder will not recognize gain or loss upon the exchange of Miragen common stock for Signal common stock pursuant to the Merger, except to the extent of cash received in lieu of a fractional share of Signal common stock as described below;

- a Miragen stockholder who receives cash in lieu of a fractional share of Signal common stock in the Merger will recognize capital gain or loss in an amount equal to the difference between the amount of cash received

in lieu of a fractional share and the stockholder s tax basis allocable to such fractional share;

a Miragen stockholder s aggregate tax basis for the shares of Signal common stock received in the Merger (including any fractional share interest for which cash is received) will equal the stockholder s aggregate tax basis in the shares of Miragen common stock surrendered in the Merger; and

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the holding period of the shares of Signal common stock received by a Miragen stockholder in the Merger will include the holding period of the shares of Miragen common stock surrendered in exchange therefor.

Tax matters are very complicated, and the tax consequences of the Merger to a particular Miragen stockholder will depend on such stockholder s circumstances. Accordingly, you are strongly urged to consult your tax advisor for a full understanding of the tax consequences of the Merger to you, including the applicability and effect of federal, state, local and non-U.S. income and other tax laws.

NASDAQ Stock Market Listing (see page 118)

Signal has filed an initial listing application for the combined company with The NASDAQ Capital Market. If such application is accepted, Signal anticipates that Signal s common stock will be listed on The NASDAQ Capital Market following the closing of the Merger under the trading symbol MGEN.

Anticipated Accounting Treatment (see page 118)

The Merger will be treated by Signal as a reverse merger under the acquisition method of accounting in accordance with accounting principles generally accepted in the United States, or U.S. GAAP. For accounting purposes, Miragen is considered to be acquiring Signal in the Merger.

Appraisal Rights and Dissenters Rights (see page 119)

Holders of Signal common stock are not entitled to appraisal rights in connection with the Merger. Holders of Miragen common stock are entitled to appraisal rights in connection with the Merger under Delaware law. For more information about such rights, see the provisions of Section 262 of the Delaware General Corporation Law, or the DGCL, attached hereto as *Annex J*, and the section titled *The Merger Appraisal Rights and Dissenters Rights* in this proxy statement/prospectus/information statement.

Comparison of Stockholder Rights (see page 288)

Both Signal and Miragen are incorporated under the laws of the State of Delaware and, accordingly, the rights of the stockholders of each are currently, and will continue to be, governed by the DGCL. If the Merger is completed, Miragen stockholders will become stockholders of Signal, and their rights will be governed by the DGCL, the bylaws of Signal and the certificate of incorporation of Signal, as may be amended by Signal Proposal Nos. 6, 7, 8, 9 and 10 if approved by Signal stockholders at the Signal special meeting. The rights of Signal stockholders contained in the certificate of incorporation, as amended, and bylaws of Signal differ from the rights of Miragen stockholders under the amended and restated certificate of incorporation and bylaws of Miragen, as more fully described under the section titled *Comparison of Rights of Holders of Signal Capital Stock and Miragen Capital Stock* in this proxy statement/prospectus/information statement.

Risk Factors (see page 19)

Both Signal and Miragen are subject to various risks associated with their businesses and their industries. In addition, the Merger, including the possibility that the Merger may not be completed, poses a number of risks to each company and its respective stockholders, including the following risks:

the Exchange Ratio is not adjustable based on the market price of Signal common stock so the Merger consideration at the closing may have a greater or lesser value than at the time the Merger Agreement was signed;

failure to complete the Merger may result in Signal or Miragen paying a termination fee to the other party and could harm the common stock price of Signal and future business and operations of each company;

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if the conditions to the Merger are not met, the Merger may not occur;

the Merger may be completed even though material adverse changes may result from the announcement of the Merger, industry-wide changes and other causes;

while Miragen has commitments for the sale of $40.7 million in shares of its common stock, consummation of this financing is not a condition to closing the Merger. If Miragen and Signal complete the Merger, but Miragen does not complete the concurrent financing, then the combined company may need to raise additional capital by issuing securities or debt or through licensing arrangements, which may be on worse commercial terms than the concurrent financing, cause significant dilution to the combined company s stockholders, restrict the combined company s operations or require the combined company to relinquish proprietary rights;

some Signal and Miragen executive officers and directors have interests in the Merger that are different from yours and that may influence them to support or approve the Merger without regard to your interests;

the market price of Signal common stock following the Merger may decline as a result of the Merger;

Miragen and Signal securityholders will have a reduced ownership and voting interest in, and will exercise less influence over the management of, the combined company as compared to their current ownership and voting interest in the respective companies following the completion of the Merger;

during the pendency of the Merger, Signal and Miragen may not be able to enter into a business combination with another party at a favorable price because of restrictions in the Merger Agreement, which could adversely affect their respective businesses;

certain provisions of the Merger Agreement may discourage third parties from submitting competing proposals, including proposals that may be superior to the arrangements contemplated by the Merger Agreement; and

because the lack of a public market for Miragen s capital stock makes it difficult to evaluate the fairness of the Merger, the stockholders of Miragen may receive consideration in the Merger that is less than the fair market value of Miragen s capital stock and/or Signal may pay more than the fair market value of Miragen s capital stock.

These risks and other risks are discussed in greater detail under the section titled *Risk Factors* in this proxy statement/prospectus/information statement. Signal and Miragen both encourage you to read and consider all of these risks carefully.

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SELECTED HISTORICAL AND UNAUDITED PRO FORMA

COMBINED FINANCIAL INFORMATION AND DATA

The following tables present summary historical financial data for Signal and Miragen, summary unaudited pro forma condensed combined financial data for Signal and Miragen, and comparative historical and unaudited pro forma per share data for Signal and Miragen.

Selected Historical Consolidated Financial Data of Signal

The selected consolidated statements of operations data for the years ended December 31, 2015 and 2014 and the selected consolidated balance sheet data as of December 31, 2015 and 2014 are derived from Signal s audited consolidated financial statements included elsewhere in this proxy statement/prospectus/information statement. The selected statements of operations data for the nine months ended September 30, 2016 and 2015 and the selected balance sheet data as of September 30, 2016 and 2015 are derived from Signal s unaudited interim financial statements included elsewhere in this proxy statement/prospectus/information statement. Signal s unaudited interim financial statements have been prepared in accordance with U.S. GAAP on the same basis as its audited annual consolidated financial statements and, in the opinion of management, reflect all adjustments, consisting only of normal, recurring adjustments, necessary for the fair presentation of those unaudited interim consolidated financial statements. Signal s historical results are not necessarily indicative of the results that may be expected in any future period and the results for the nine months ended September 30, 2016 are not necessarily indicative of results to be expected for the full year ending December 31, 2016 or any other period.

The selected historical consolidated financial data below should be read in conjunction with the sections titled *Signal Management s Discussion and Analysis of Financial Condition and Results of Operations*, *Risk Factors Risks Related to Signal* and Signal s consolidated financial statements and related notes included elsewhere in this proxy statement/prospectus/information statement.

	Years Ended December 31,		Nine Months Ended September 30,	
(in thousands, except share and per share data)	**2015**	**2014**	**2016**	**2015**
Consolidated statements of operations data				
Net revenue(1)	$ 2,538	$ 4,320	$ 2,581	$ 1,879
Operating expenses:				
Cost of revenue	2,472	3,366	1,856	2,016
Research and development	1,002	347	867	546
Selling and marketing	2,559	717	1,438	1,804
General and administrative	7,692	6,857	5,455	5,743
Gain on legal settlement		(100)		
Total operating expenses	13,725	11,187	9,616	10,109
Loss from operations	(11,187)	(6,867)	(7,035)	(8,230)
Interest expense	(141)	(1,023)	(69)	(118)

Net loss attributable to stockholders of Signal Genetics, Inc./members of Signal Genetics LLC	$ (11,328)	$ (7,890)	$ (7,104)	$ (8,348)
Net loss per common share, basic and diluted(2)	$ (21.00)	$ (52.50)	$ (9.90)	$ (17.25)
Weighted-average number of shares outstanding, basic and diluted(2)	539,460	150,390	716,957	482,308

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	As of December 31,		As of September 30,	
	2015	2014	2016	2015
Consolidated balance sheet data				
Cash and cash equivalents	$ 10,832	$ 5,119	$ 5,351	$ 12,124
Total assets	12,902	8,089	7,541	14,797
Note payable related party	1,105		1,105	1,105
Total liabilities	2,492	2,098	2,855	2,164
Total stockholders equity	10,410	5,991	4,686	12,633

(1) During the year ended December 31, 2015, net unfavorable changes in estimates were recorded to revenue related to non-contracted revenues recorded in the prior year of $193,000. During the year ended December 31, 2014, net unfavorable changes in estimates were recorded to revenue related to non-contracted revenues recorded in prior years of $380,000, of which $106,000 and $274,000 related to revenues previously recorded during 2012 and 2013, respectively.

(2) On November 4, 2016, Signal effected a one-for-15 reverse stock split of shares of its common stock. Share and per share amounts in the Selected Historical Financial Data of Signal reflect this reverse stock split of Signal common stock.

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Selected Historical Consolidated Financial Data of Miragen

The selected consolidated statements of operations data for the years ended December 31, 2015 and 2014 and the selected consolidated balance sheet data as of December 31, 2015 and 2014 are derived from Miragen s audited consolidated financial statements included elsewhere in this proxy statement/prospectus/information statement. The selected consolidated statements of operations data for the nine months ended September 30, 2016 and 2015 and the selected consolidated balance sheet data as of September 30, 2016 are derived from Miragen s unaudited interim condensed consolidated financial statements included elsewhere in this proxy statement/prospectus/information statement. Miragen s unaudited interim condensed consolidated financial statements have been prepared in accordance with U.S. GAAP on the same basis as its audited annual consolidated financial statements and, in the opinion of management, reflect all adjustments, consisting only of normal, recurring adjustments, necessary for the fair presentation of those unaudited interim condensed consolidated financial statements. Miragen s historical results are not necessarily indicative of the results that may be expected in any future period and the results for the nine months ended September 30, 2016 are not necessarily indicative of results to be expected for the full year ending December 31, 2016 or any other period.

The selected historical consolidated financial data below should be read in conjunction with the sections titled *Miragen Management s Discussion and Analysis of Financial Condition and Results of Operations*, *Risk Factors Risks Related to Miragen s Financial Condition and Capital Requirements* and Miragen s consolidated financial statements and related notes included elsewhere in this proxy statement/prospectus/information statement.

	Years Ended December 31,		Nine Months Ended September 30,	
(in thousands, except per share and share amounts)	**2015**	**2014**	**2016**	**2015**
Consolidated Statements of Operations Data:				
Revenue	$ 5,004	$ 7,641	$ 2,969	$ 4,016
Operating expenses:				
Research and development	13,312	9,488	9,786	9,918
General and administrative	3,850	4,068	4,255	2,902
Total operating expenses	17,162	13,566	14,041	12,820
Loss from operations	(12,158)	(5,915)	(11,072)	(8,804)
Interest and other income (expense), net	(3,528)	9	(229)	(1,599)
Net loss	$ (15,686)	$ (5,906)	$ (11,301)	$ (10,403)
Accretion of preferred stock to redemption value	(34)	(30)	(36)	(24)
Net loss applicable to common stockholders	$ (15,720)	$ (5,936)	$ (11,337)	$ (10,427)
Net loss per share, basic and diluted	$ (18.37)	$ (7.03)	$ (13.25)	$ (12.18)
Shares used in computing net loss per share, basic and diluted	855,734	844,093	855,734	855,734

	As of December 31,

(in thousands)	**2015**	**2014**	**As of September 30, 2016**
Consolidated Balance Sheet Data:			
Cash and cash equivalents	$ 21,235	$ 5,114	$ 24,598
Short term investments			1,001
Working capital	19,251	3,073	22,808
Total assets	23,536	7,119	28,434
Notes payable	4,934		5,098
Redeemable convertible preferred stock	60,850	36,057	76,967
Accumulated deficit	(49,753)	(34,033)	(61,090)
Total stockholders deficit	(45,290)	(32,822)	(56,498)

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Selected Unaudited Pro Forma Condensed Combined Financial Data of Signal and Miragen

The following information gives effect to Signal s one-for-15 reverse stock split of its common stock, which was effective at 5:01 p.m. Eastern Time on November 4, 2016, but does not give effect to the proposed reverse stock split described in Signal Proposal No. 7, beginning on page 167 in this proxy statement/prospectus/information statement.

(in thousands except per share amount)	Year Ended December 31, 2015	Nine Months Ended September 30, 2016
Unaudited Pro Forma Combined Consolidated Statements of Operations Data:		
Revenue	$ 5,004	$ 2,969
Operating expenses:		
Research and development	13,312	9,786
General and administrative	10,249	7,706
Total operating expenses	23,561	17,492
Loss from operations	(18,557)	(14,523)
Interest and other income (expense), net	(3,493)	(230)
Net loss	$ (22,050)	$ (14,753)
Net loss applicable to common stockholders	$ (22,050)	$ (14,753)
Net loss per share, basic and diluted	$ (1.26)	$ (0.71)
Shares used in computing net loss per share, basic and diluted	17,432,318	20,873,519

(in thousands)	As of September 30, 2016
Unaudited Pro Forma Combined Balance Sheet data:	
Consolidated Balance Sheet Data:	
Cash and cash equivalents	$ 70,197
Short term investments	1,001
Working capital	64,204
Total assets	74,317
Notes payable	5,098
Accumulated deficit	(61,503)
Total stockholders equity	61,929

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Comparative Historical and Unaudited Pro Forma Per Share Data

The following information gives effect to Signal s one-for-15 reverse stock split of its common stock, which was effective at 5:01 p.m. Eastern Time on November 4, 2016, but does not give effect to the proposed reverse stock split described in Signal Proposal No. 7, beginning on page 167 in this proxy statement/prospectus/information statement.

The information below reflects the historical net loss and book value per share of Signal common stock and the historical net loss and book value per share of Miragen common stock in comparison with the unaudited pro forma net loss and book value per share after giving effect to the Merger of Signal with Miragen on a pro forma basis.

You should read the tables below in conjunction with the audited and unaudited consolidated financial statements of Signal included in this proxy statement/prospectus/information statement and the audited and unaudited consolidated financial statements of Miragen included in this proxy statement/prospectus/information statement and the related notes and the unaudited pro forma condensed combined financial information and notes related to such financial statements included elsewhere in this proxy statement/prospectus/information statement.

	Nine Months Ended September 30, 2016	Year Ended December 31, 2015
Signal Historical Per Common Share Data:		
Basic and diluted net loss per share	$ (9.90)	$ (21.00)
Book value per share	6.51	14.68
Miragen Historical Per Common Share Data:		
Basic and diluted net loss per share	$ (13.25)	$ (18.37)
Book value per share	(66.02)	(52.93)
Signal and Miragen Combined Company Pro Forma Data:		
Basic and diluted net loss per share	$ (0.70)	$ (1.28)
Book value per share	2.95	N/A

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MARKET PRICE AND DIVIDEND INFORMATION

Signal common stock is listed on The NASDAQ Capital Market under the symbol SGNL. The following table presents, for the periods indicated, the range of high and low per share sales prices for Signal common stock as reported on The NASDAQ Capital Market for each of the periods set forth below. Miragen is a private company and its common stock and preferred stock are not publicly traded. These per share sales prices have not been adjusted to give effect to the proposed reverse stock split of Signal common stock.

Signal Common Stock

	High	Low
2014:		
Second Quarter (from June 18, 2014)	$ 149.84	$ 105.74
Third Quarter	$ 135.74	$ 61.80
Fourth Quarter	$ 75.00	$ 31.65
2015:		
First Quarter	$ 59.55	$ 26.40
Second Quarter	$ 44.10	$ 21.30
Third Quarter	$ 40.95	$ 13.20
Fourth Quarter	$ 18.60	$ 9.94
2016:		
First Quarter	$ 12.45	$ 6.15
Second Quarter	$ 11.10	$ 6.00
Third Quarter	$ 9.45	$ 6.00
Fourth Quarter	$ 15.11	$ 1.80

The closing price of Signal common stock on October 31, 2016, the last trading day prior to the public announcement of the Merger, was $5.39 per share and the closing price of Signal common stock on January 5, 2017 was $5.33 per share, in each case as reported on The NASDAQ Capital Market.

Because the market price of Signal common stock is subject to fluctuation, the market value of the shares of Signal common stock that Miragen stockholders will be entitled to receive in the Merger may increase or decrease.

Assuming approval of Signal Proposal No. 6 and successful application for initial listing with The NASDAQ Capital Market, following the completion of the Merger, Signal common stock will be listed on The NASDAQ Capital Market and will trade under Signal s new name, Miragen Therapeutics, Inc., and new trading symbol, MGEN.

As of December 31, 2016 Signal had 22 holders of record of its common stock. For detailed information regarding the beneficial ownership of some stockholders of Signal and Miragen, see the section titled *Principal Stockholders of Signal* beginning on page 297 and the section titled *Principal Stockholders of Miragen* beginning on page 299 of this proxy statement/prospectus/information statement.

Dividends

Signal has never paid or declared any cash dividends on its common stock and does not anticipate paying cash dividends on its common stock for the foreseeable future. Notwithstanding the foregoing, any determination to pay cash dividends subsequent to the Merger will be at the discretion of Signal s then-current board of directors

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and will depend upon a number of factors, including its results of operations, financial condition, future prospects, contractual restrictions, restrictions imposed by applicable law and other factors Signal s then-current board of directors deems relevant.

Miragen has never paid or declared any cash dividends on its common or preferred stock. If the Merger does not occur, Miragen does not anticipate paying any cash dividends on its common or preferred stock in the foreseeable future, and Miragen intends to retain all available funds and any future earnings to fund the development and expansion of its business. Any future determination to pay dividends will be at the discretion of Miragen s board of directors and will depend upon a number of factors, including its results of operations, financial condition, future prospects, contractual restrictions, restrictions imposed by applicable law and other factors Miragen s then-current board of directors deems relevant.

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RISK FACTORS

The combined company will be faced with a market environment that cannot be predicted and that involves significant risks, many of which will be beyond its control. In addition to the other information contained in this proxy statement/prospectus/information statement, you should carefully consider the material risks described below before deciding how to vote your shares of stock. In addition, you should read and consider the risks associated with the business of Signal because these risks may also affect the combined company these risks can be found in Signal s Annual Report on Form 10-K, as updated by subsequent Quarterly Reports on Form 10-Q, all of which are filed with the SEC. You should also read and consider the other information in this proxy statement/prospectus/information statement. Please see the section titled Where You Can Find More Information in this proxy statement/prospectus/information statement.

Risks Related to the Merger

The Exchange Ratio is not adjustable based on the market price of Signal common stock so the Merger consideration at the closing may have a greater or lesser value than at the time the Merger Agreement was signed.

It is currently anticipated that, at the closing of the Merger, the Exchange Ratio would be approximately 0.6995 pre-split shares of Signal common stock and would be within a range of approximately 0.6995 and 0.0466 post-split shares of Signal common stock. These estimates are subject to adjustment prior to closing of the Merger, including (i) adjustments to account for the issuance of any additional shares of Miragen or Signal common stock, as applicable, prior to the consummation of the Merger, provided that, the issuance of Miragen common stock in the concurrent financing will not impact the Exchange Ratio, or (ii) an upward adjustment to the extent that Signal s net cash at the effective time of the Merger is less than negative $100,000 (and as a result, Signal securityholders could own less, and Miragen securityholders could own more, of the combined company). Any changes in the market price of Signal common stock before the completion of the Merger will not affect the number of shares Miragen securityholders will be entitled to receive pursuant to the Merger Agreement. Therefore, if before the completion of the Merger the market price of Signal common stock declines from the market price on the date of the Merger Agreement, then Miragen securityholders could receive Merger consideration with substantially lower value. Similarly, if before the completion of the Merger the market price of Signal common stock increases from the market price on the date of the Merger Agreement, then Miragen securityholders could receive Merger consideration with substantially more value for their shares of Miragen capital stock than the parties had negotiated for in the establishment of the Exchange Ratio. The Merger Agreement does not include a price-based termination right. However, Miragen s obligation to consummate the Merger is conditioned upon Signal having Net Cash that is greater than or equal to negative $300,000, as defined and described under *The Merger Agreement Conditions to the Completion of the Merger*. Because the Exchange Ratio does not adjust as a result of changes in the value of Signal common stock, for each one percentage point that the market value of Signal common stock rises or declines, there is a corresponding one percentage point rise or decline, respectively, in the value of the total Merger consideration issued to Miragen securityholders.

Failure to complete the Merger may result in Signal or Miragen paying a termination fee to the other party and could harm the common stock price of Signal and future business and operations of each company.

If the Merger is not completed, Signal and Miragen are subject to the following risks:

- if the Merger Agreement is terminated under specified circumstances, Signal or Miragen will be required to pay the other party a termination fee of $300,000 and/or up to $100,000 in expense reimbursements;

the price of Signal common stock may decline and remain volatile;

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costs related to the Merger, such as legal and accounting fees, which Signal and Miragen estimate will total approximately $800,000 and $1.1 million, respectively, some of which must be paid even if the Merger is not completed; and

Signal may be forced to cease its operations, dissolve and liquidate its assets.

In addition, if the Merger Agreement is terminated and the board of directors of Signal or Miragen determines to seek another business combination, there can be no assurance that either Signal or Miragen will be able to find a partner willing to provide equivalent or more attractive consideration than the consideration to be provided by each party in the Merger.

If the conditions to the Merger are not met, the Merger may not occur.

Even if the Merger is approved by the stockholders of Miragen and change of control and related share issuance are approved by the stockholders of Signal, specified conditions must be satisfied or waived to complete the Merger. These conditions are set forth in the Merger Agreement and described in the section titled *The Merger Agreement Conditions to the Completion of the Merger* in this proxy statement/prospectus/information statement. Signal and Miragen cannot assure you that all of the conditions will be satisfied or waived. If the conditions are not satisfied or waived, the Merger may not occur or will be delayed, and Signal and Miragen each may lose some or all of the intended benefits of the Merger.

The Merger may be completed even though material adverse changes may result from the announcement of the Merger, industry-wide changes and other causes.

In general, either Signal or Miragen can refuse to complete the Merger if there is a material adverse change affecting the other party between October 31, 2016, the date of the Merger Agreement, and the closing of the Merger. However, certain types of changes do not permit either party to refuse to complete the Merger, even if such change could be said to have a material adverse effect on Signal or Miragen, including:

any effect, change, event, circumstance or development in the conditions generally affecting the industries in which Miragen and Signal operate or the U.S. or global economy or capital markets as a whole;

the failure by Miragen to complete the concurrent financing in connection with the Merger;

any natural disaster or any acts of terrorism, sabotage, military action or war or any escalation of worsening thereof;

any change in accounting requirements or principles or any change in applicable laws, rules or regulations or the interpretation thereof;

any effect resulting from the announcement or pendency of the Merger or any related transactions;

any failure by Signal or Miragen to meet internal projections or forecasts or third-party revenue or earnings predictions for any period ending on or after October 31, 2016;

with respect to Signal, any change in the price or trading volume of Signal common stock;

any rejection by a governmental body of a registration or filing by Miragen or Signal relating to specified intellectual property rights; or

with respect to Miragen, any change in the cash position of Miragen which results from operations in the ordinary course of business.

If adverse changes occur and Signal and Miragen still complete the Merger, the stock price of the combined company may suffer. This in turn may reduce the value of the Merger to the stockholders of Signal, Miragen or both.

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While Miragen has commitments for the sale of $40.7 million in shares of its common stock, consummation of this financing is not a condition to closing the Merger. If Miragen and Signal complete the Merger, but Miragen does not complete the concurrent financing, then the combined company may need to raise additional capital by issuing securities or debt or through licensing arrangements, which may be on worse commercial terms than the concurrent financing, cause significant dilution to the combined company s stockholders, restrict the combined company s operations or require the combined company to relinquish proprietary rights.

Since the concurrent financing is not a condition to the Merger, Miragen and Signal may complete the Merger, but Miragen may not complete the concurrent financing. If this were to occur, the combined company would have substantially less funds than Miragen and Signal currently anticipate and may be required to raise additional funds sooner than currently planned. Additional financing may not be available to the combined company when it needs it or may not be available on favorable terms. To the extent that the combined company raises additional capital by issuing equity securities, the terms of such an issuance may be on worse commercial terms than the concurrent financing and may cause more significant dilution to the combined company s stockholders ownership. and the terms of any new equity securities may have preferences over the combined company s common stock. Any debt financing the combined company enters into may involve covenants that restrict its operations. These restrictive covenants may include limitations on additional borrowing and specific restrictions on the use of the combined company s assets, as well as prohibitions on its ability to create liens, pay dividends, redeem its stock or make investments. In addition, if the combined company raises additional funds through licensing arrangements, it may be necessary to relinquish potentially valuable rights to current product candidates and potential products or proprietary technologies, or grant licenses on terms that are not favorable to the combined company.

Some Signal and Miragen executive officers and directors have interests in the Merger that are different from yours and that may influence them to support or approve the Merger without regard to your interests.

Some officers and directors of Signal and Miragen participate in arrangements that provide them with interests in the Merger that are different from yours, including, among others, the continued service as an officer or director of the combined company, severance and retention benefits, the acceleration of stock option and restricted stock vesting, payment of deferred and current year incentive compensation, additional premiums associated with outstanding indebtedness, continued indemnification and the potential ability to sell an increased number of shares of common stock of the combined company in accordance with Rule 144 under the Securities Act of 1933, as amended, or the Securities Act. For more information regarding the interests of the Signal and Miragen executive officers and directors in the Merger, see the sections titled *The Merger Interests of the Signal Directors and Executive Officers in the Merger* and *The Merger Interests of Miragen Directors and Executive Officers in the Merger* of this proxy statement/prospectus/information statement.

The market price of Signal common stock following the Merger may decline as a result of the Merger.

The market price of Signal common stock may decline as a result of the Merger for a number of reasons, including if:

- investors react negatively to the prospects of the combined company s business and prospects from the Merger;
- the effect of the Merger on the combined company s business and prospects is not consistent with the expectations of financial or industry analysts; or

the combined company does not achieve the perceived benefits of the Merger as rapidly or to the extent anticipated by financial or industry analysts.

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Miragen and Signal securityholders will have a reduced ownership and voting interest in, and will exercise less influence over the management of, the combined company as compared to their current ownership and voting interest in the respective companies following the completion of the Merger.

After the completion of the Merger, the current stockholders of Miragen and Signal will own a smaller percentage of the combined company than their ownership of their respective companies prior to the Merger. Immediately after the Merger, Miragen securityholders will own approximately 96% of the fully-diluted common stock of Signal, with Signal securityholders, whose shares of Signal common stock will remain outstanding after the Merger, owning approximately 4% of the fully-diluted common stock of the combined company, each assuming that Miragen closes its concurrent financing immediately prior to the effective time of the Merger. If the concurrent financing does not close, then Miragen s securityholders would own approximately 94% of the fully-diluted common stock of the combined company and Signal s securityholders would own approximately 6% of the fully-diluted common stock of the combined company. These estimates are based on the anticipated pre-split Exchange Ratio and post-split Exchange Ratios and are subject to adjustment. In addition, the seven-member board of directors of the combined company will initially consist of William S. Marshall, Ph.D., Bruce L. Booth, Ph.D., John W. Creecy, Thomas E. Hughes, Ph.D., Kevin Koch, Ph.D., Kyle A. Lefkoff and Joseph L. Turner. Consequently, securityholders of Miragen and Signal will be able to exercise less influence over the management and policies of the combined company than they currently exercise over the management and policies of their respective companies.

During the pendency of the Merger, Signal and Miragen may not be able to enter into a business combination with another party at a favorable price because of restrictions in the Merger Agreement, which could adversely affect their respective businesses.

Covenants in the Merger Agreement impede the ability of Signal and Miragen to make acquisitions, subject to specified exceptions relating to fiduciary duties or complete other transactions that are not in the ordinary course of business pending completion of the Merger. As a result, if the Merger is not completed, the parties may be at a disadvantage to their competitors during that period. In addition, while the Merger Agreement is in effect, each party is generally prohibited from soliciting, initiating, encouraging or entering into specified extraordinary transactions, such as a Merger, sale of assets or other business combination, with any third party, subject to specified exceptions. Any such transactions could be favorable to such party s stockholders.

Certain provisions of the Merger Agreement may discourage third parties from submitting competing proposals, including proposals that may be superior to the arrangements contemplated by the Merger Agreement.

The terms of the Merger Agreement prohibit each of Signal and Miragen from soliciting competing proposals or cooperating with persons making unsolicited takeover proposals, except in limited circumstances when such party s board of directors determines in good faith, after consultation with its independent financial advisor, if any, and outside counsel, that an unsolicited competing proposal constitutes, or would reasonably be expected to result in, a superior competing proposal and that failure to take such action would be reasonably likely to result in a breach of the fiduciary duties of the board of directors. In addition, if Signal or Miragen terminate the Merger Agreement under specified circumstances, including terminating because of a decision of a board of directors to recommend a superior competing proposal, Signal or Miragen would be required to pay a termination fee of $300,000 and/or up to $100,000 in expense reimbursements to the other party. If the Merger Agreement is terminated under specified circumstances, Signal or Miragen will be required to pay the other party a termination fee of $300,000, and/or up to $100,000 in expense reimbursements, as defined and described under *The Merger Agreement Termination of the Merger Agreement and Termination Fee.* This termination fee may discourage third parties from submitting competing proposals to Signal or Miragen or their stockholders, and may cause the respective boards of directors to be less inclined to recommend a competing proposal.

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Because the lack of a public market for Miragen s capital stock makes it difficult to evaluate the fairness of the Merger, the stockholders of Miragen may receive consideration in the Merger that is less than the fair market value of Miragen s capital stock and/or Signal may pay more than the fair market value of Miragen s capital stock

The outstanding capital stock of Miragen is privately held and is not traded in any public market. The lack of a public market makes it extremely difficult to determine the fair market value of Miragen s capital stock. Because the percentage of Signal equity to be issued to Miragen stockholders was determined based on negotiations between the parties, it is possible that the value of the Signal common stock to be received by Miragen stockholders will be less than the fair market value of Miragen s capital stock, or Signal may pay more than the aggregate fair market value for Miragen s capital stock.

Risks Related to Signal

Signal is an early stage company with a limited commercial history and a history of net losses; Signal expects to incur net losses in the future and may never achieve sustained profitability.

Signal is a diagnostics company with a limited commercial history. Substantially all of Signal s revenue has been derived from its MyPRS testing services, which was launched in 2011. Signal has historically incurred substantial net losses. Signal incurred losses attributable to stockholders of Signal Genetics, Inc. (or members of Signal Genetics LLC, as applicable) of $11.3 million and $7.9 million during the years ended December 31, 2015 and 2014, respectively. As of September 30, 2016, Signal had cash and cash equivalents totaling $5.4 million. Signal s existing cash resources will not be sufficient to meet its operating plan for the full 12-month period after the date of this proxy statement/prospectus/information statement. Based on available resources, Signal believes it can maintain its operations into the second quarter of 2017. Signal expects its losses to continue as a result of ongoing research and development expenses, increased selling and marketing costs and increased general and administrative costs to support Signal s planned growth. These losses have had, and will continue to have, an adverse effect on Signal s working capital, total assets and stockholders equity. Because of the numerous risks and uncertainties associated with Signal s research, development and commercialization efforts, Signal is unable to predict when it will become profitable, and Signal may never become profitable. Even if Signal does achieve profitability, it may not be able to sustain or increase profitability on a quarterly or annual basis. Signal s inability to achieve and then maintain profitability would negatively affect its business, financial condition, results of operations and cash flows.

If the Merger is not completed, Signal would need to raise substantial additional funding to the extent it continues its commercialization and research and development efforts, which may not be available on acceptable terms, or at all. Failure to obtain this necessary capital when needed may force Signal to dissolve or liquidate its operations.

Signal s operations have consumed substantial amounts of cash since inception. As of September 30, 2016, Signal s cash, cash equivalents and investments were approximately $5.4 million. Signal s total operating expenses were $9.6 million and $10.1 million for the nine months ended September 30, 2016 and 2015, respectively. Signal believes that its existing cash, cash equivalents and investments will enable it to fund its operations into the second quarter of 2017. However, Signal has historically incurred substantial net losses and maintaining and growing revenues from MyPRS depends on the availability of adequate coverage and reimbursement for Signal s tests from third-party payors, including government programs such as Medicare, private insurance plans and managed care programs. Therefore, Signal will need to raise substantial additional capital to fund future activities.

Any additional fundraising efforts may divert Signal s management from their day-to-day activities, which may adversely affect its ability to develop and commercialize additional diagnostic tests. In addition, it cannot guarantee

that future financing will be available in sufficient amounts or on terms acceptable to Signal, if at all. If Signal is unable to obtain funding on a timely basis, it may be required to significantly curtail or be unable to

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deploy the capital necessary to refocus or expand its operations or otherwise capitalize on its business opportunities, as desired, any of which could materially adversely affect its business, financial condition and results of operations and could even require it to cease operations entirely.

If the Merger is not completed, raising additional funds through debt or equity financing is likely to be difficult, could be dilutive and may cause the market price of Signal s common stock to decline further.

To the extent that Signal raises additional capital through the sale of equity or convertible debt securities, the issuance of those securities could result in substantial dilution for Signal s current stockholders and the terms may include liquidation or other preferences that adversely affect the rights of its current stockholders. Furthermore, the issuance of additional securities, whether equity or debt, by Signal, or the possibility of such issuance, may cause the market price of its common stock to decline further and existing stockholders may not agree with its financing plans or the terms of such financings.

If the Merger is not completed, Signal will require, and may not be able to obtain, substantial additional financial resources in order to carry out planned activities and to continue as a going concern beyond the second quarter of 2017.

As of September 30, 2016, Signal has cash and cash equivalents totaling $5.4 million. Signal s existing cash resources will not be sufficient to meet its operating plan for the full 12-month period after the date of this proxy statement/prospectus/information statement. Based on available resources, Signal believes it can maintain its operations into the second quarter of 2017. As a result, to continue to fund Signal s operations beyond the second quarter of 2017, Signal would need to (i) raise additional capital through the issuance of equity, debt or other securities, (ii) convert its existing debt into equity, (iii) enter into strategic partnerships, alliances, collaborations or other similar transactions or (iv) a combination thereof. Due to current market conditions, Signal s current liquidity position and its stock price, Signal believes it may be difficult to obtain additional equity or debt financing on terms acceptable to Signal, if at all, thus raising substantial doubt about Signal s ability to continue as a going concern. If Signal is unable to raise additional capital or successfully complete the Merger or another strategic partnership, alliance, collaboration or other similar transaction, Signal will need to delay or reduce expenses or limit or curtail operations, any of which would have a material adverse effect on its business. Further, if Signal is unable to raise additional capital or successfully complete the Merger or a strategic partnership, alliance, collaboration or other similar transaction on a timely basis and on terms that are acceptable, Signal may also be required to sell or license its assets, sell the company or otherwise liquidate all or a portion of Signal s assets and/or cease its operations altogether. If Signal cannot continue as a viable entity, its stockholders might lose some or all of their investment. Signal s financial statements do not include any adjustments that might be necessary if Signal is unable to continue as a going concern.

Signal s business to date has been almost entirely dependent on the success of MyPRS, and a small number of test ordering sites account for most of the sales of Signal s tests and services.

Due to the early stage nature of Signal s business and its limited selling and marketing activities to date, Signal has historically derived a significant portion of Signal s revenue from a limited number of test ordering sites. In particular, the most significant portion of Signal s revenue is generated from its MyPRS test services provided at its clinical laboratory in Little Rock, Arkansas for three major customers, including UAMS. Revenue sourced either from or through UAMS as a percentage of net revenue during the first nine months of 2016 and 2015 were 22% and 64%, respectively. The decrease in revenue is due to the decrease in research funds available at UAMS for such programs. Signal expects continued declining revenue from the UAMS research programs. Signal s test ordering sites are largely hospitals and cancer centers. Oncologists and pathologists at these sites order the tests on behalf of their oncology

patients or as part of a clinical trial sponsored by a pharmaceutical company in which the patient is enrolled. Signal generally does not enter into formal written agreements with such test ordering sites and, as a result, Signal may lose the business of any of these test ordering sites at any time.

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Signal has suspended certain activities to reduce operating expenses while seeking a merger or sale. There can be no assurance that the proposed Merger transaction will be approved or consummated, or if consummated, that it would enhance stockholder value. If the Merger is not consummated, there also can be no assurance that Signal can increase its revenue.

There is no assurance that the proposed Merger between Signal and Miragen will be completed in a timely manner or at all. If the Merger with Miragen is not consummated, Signal s business could suffer materially and its stock price could decline.

The consummation of the proposed Merger between Signal and Miragen is subject to a number of closing conditions, including the approval by Signal stockholders and other customary closing conditions. The parties are targeting a closing of the transaction in the first quarter of 2017, however, there can be no assurance that the proposed Merger will be consummated on their desired timeframe, or at all.

If the proposed Merger between Signal and Miragen is not consummated, Signal may be subject to a number of material risks, and its business and stock price could be adversely affected, as follows:

- Signal has incurred and expects to continue to incur significant expenses related to the proposed Merger with Miragen even if the Merger is not consummated;
- Signal could be obligated to pay Miragen a $300,000 termination fee and/or up to $100,000 in expense reimbursements in connection with the termination of the Merger Agreement, depending on the reason for the termination;
- The market price of Signal s common stock may decline to the extent that the current market price reflects a market assumption that the proposed Merger will be completed; and
- If the sale of the MyPRS intellectual property assets is approved by the stockholders of Signal or as a result of limited financial resources, Signal may not pursue an alternate merger transaction if the proposed Merger with Miragen is not completed.

If the Merger is not completed, Signal s board of directors may decide to pursue a dissolution and liquidation of the company. In such an event, the amount of cash available for distribution to its stockholders will depend heavily on the timing of such liquidation as well as the amount of cash that will need to be reserved for commitments and contingent liabilities.

There can be no assurance that the Merger will be completed. If the Merger is not completed, Signal s board of directors may decide to pursue a dissolution and liquidation of the company. In such an event, the amount of cash available for distribution to its stockholders will depend heavily on the timing of such decision, as with the passage of time the amount of cash available for distribution will be reduced as Signal continues to fund its operations. In addition, if Signal s board of directors were to approve and recommend, and its stockholders were to approve, a dissolution and liquidation of the company, it would be required under Delaware corporate law to pay its outstanding obligations, as well as to make reasonable provision for contingent and unknown obligations, prior to making any distributions in liquidation to its stockholders. Signal s commitments and contingent liabilities may include

(i) non-cancelable lease obligations and (ii) non-cancellable operating expenses associated with winding down operations. As a result of this requirement, a portion of Signal s assets may need to be reserved pending the resolution of such obligations. In addition, Signal may be subject to litigation or other claims related to a dissolution and liquidation of its company. If a dissolution and liquidation were pursued, Signal s board of directors, in consultation with its advisors, would need to evaluate these matters and make a determination about a reasonable amount to reserve. Accordingly, holders of its common stock could lose all or a significant portion of their investment in the event of Signal s liquidation, dissolution or winding up.

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If Signal fails to continue to meet all applicable NASDAQ Capital Market requirements and NASDAQ determines to delist Signal s common stock, the delisting could adversely affect the value of the Merger, market liquidity of its common stock and the market price of its common stock could decrease.

Signal s common stock is listed on The NASDAQ Capital Market. In order to maintain the listing, Signal must meet minimum financial and other requirements, including requirements for a minimum amount of capital, a minimum price per share and continued business operations so that it is not characterized as a public shell company. If Signal is unable to comply with NASDAQ s listing standards, NASDAQ may determine to delist its common stock from The NASDAQ Capital Market. If its common stock is delisted for any reason, it could reduce the value of its common stock and its liquidity. Delisting could also adversely affect the ability to obtain financing for the continuation of Signal s operations, if Signal chooses to reestablish its business, or to use its common stock in acquisitions, including the Merger. Delisting could result in the loss of confidence by suppliers and employees. Delisting would prevent Signal from satisfying a closing condition for the Merger, and, in such event, Miragen may elect not to consummate the Merger. In addition, the combined company must submit a new application for listing on NASDAQ after the Merger pursuant to the reverse merger rules, and the combined company will need to meet NASDAQ s minimum listing requirements condition.

If Signal is unable to complete the sale of the MyPRS intellectual property assets and receive the anticipated cash proceeds from the sale as planned, then Signal may have incurred additional expenses that may not allow Signal to satisfy the closing net cash requirement contained in the Merger Agreement.

The Merger Agreement contains a condition precedent to the obligation of Miragen to complete the Merger, which, unless waived by Miragen, requires that Signal have net cash, as defined, of greater than or equal to negative $300,000. If Signal is unable to complete the sale of the MyPRS intellectual property assets and receive the anticipated cash proceeds from that transaction as planned, Signal may have incurred additional expenses that may not allow Signal to meet the closing net cash requirement in the Merger Agreement, and as a consequence, Miragen will have the right to terminate the Merger Agreement.

If Signal is unable to obtain adequate coverage and reimbursement for its tests, it is unlikely that Signal s tests will gain widespread acceptance.

Maintaining and growing revenues from MyPRS depends on the availability of adequate coverage and reimbursement for Signal s tests from third-party payors, including government programs such as Medicare and Medicaid, private insurance plans and managed care programs. Health care providers that order diagnostic services such as MyPRS generally expect that those diagnostic services are covered and reimbursed by third-party payors for all or part of the costs and fees associated with the diagnostic tests they order. If such diagnostic tests are not covered and reimbursed then their patients may be responsible for the entire cost of the test, which can be substantial. Therefore, health care providers generally do not order tests that are not covered and reimbursed by third-party payors in order to avoid subjecting their patients to such financial liability. The existence of adequate coverage and reimbursement for the procedures performed with MyPRS by government and private insurance plans is central to the acceptance of MyPRS and any future services Signal provides. During the past several years, third-party payors have undertaken cost-containment initiatives including different payment methods, monitoring health care expenditures, and anti-fraud initiatives. For example, the Centers for Medicare & Medicaid Services, or CMS, which administers the Medicare program, has taken the position that the algorithm portion of multi-analyte algorithmic assays, or MAAAs, such as MyPRS, is not a clinical laboratory test and is therefore not reimbursable under the Medicare program. Although this position is only applicable to tests with a CMS determined national payment amount, it is possible that the local MACs, who make coverage and payment determinations for tests like MyPRS may adopt this policy and reduce payment for MyPRS. If that were to happen, reimbursement might be made for each gene used in the MyPRS test and

coverage and the amount of reimbursement for the genes Signal uses in MyPRS would be uncertain. Signal may not be able to achieve or maintain profitability if third-party payors deny coverage or reduce their current levels of payment, or if Signal s costs of production increase faster than increases in reimbursement levels. For some

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governmental programs, such as Medicaid, coverage and reimbursement differ from state to state, and some state Medicaid programs may not pay an adequate amount for MyPRS or may make no payment at all. As the portion of the U.S. population over the age of 65 and eligible for Medicare continues to grow, Signal may be more vulnerable to coverage and reimbursement limitations imposed by CMS. Furthermore, the health care industry in the United States has experienced a general trend toward cost containment as government and private insurers seek to control health care costs through various mechanisms, including imposing limitations on payment rates and negotiating reduced contract rates with service providers, among other things. Therefore, Signal cannot be certain that Signal s services will be reimbursed at a level that is sufficient to meet Signal s costs.

There is a scarcity of experienced professionals in the cancer diagnostic industry. If Signal is not able to retain and recruit personnel with the requisite technical skills, Signal may be unable to successfully execute its business strategy.

The specialized nature of Signal s industry results in an inherent scarcity of experienced personnel in the field. Signal s future success depends upon its ability to attract and retain highly skilled personnel (including medical, scientific, technical, commercial, business, regulatory and administrative personnel) necessary to support its anticipated growth, develop Signal s business and perform certain contractual obligations. Given the scarcity of professionals with the scientific knowledge that Signal requires and the competition for qualified personnel among life science businesses, Signal may not succeed in attracting or retaining the personnel it requires to continue and grow Signal s operations. The loss of a key employee, the failure of a key employee to perform in his or her current position or its inability to attract and retain skilled employees could result in Signal s inability to continue to grow Signal s business or to implement its business strategy.

If Signal is unable to increase sales of its laboratory tests and services or to successfully develop and commercialize other indications for its proprietary tests, Signal s revenues will be insufficient for it to achieve profitability.

Signal s revenue is derived primarily from its laboratory testing services. Signal currently offers the MyPRS test through its state-of the-art Clinical Laboratory Improvement Amendments of 1988, or CLIA,-certified, College of American Pathologists, or CAP,-accredited and state licensed laboratory in Little Rock, Arkansas. MyPRS is not assigned a specific Current Procedural Terminology, also referred to as a CPT code, but Signal s local MAC and Blue Cross Blue Shield, or BCBS, of Arkansas have established a specific payment amount for the test, which is billed under a nonspecific code. Signal is in varying stages of research and development for other diagnostic tests that it may offer. Signal does not currently offer any other testing services. If Signal is unable to increase sales of MyPRS or to successfully develop and commercialize other diagnostic tests, Signal will not produce sufficient revenues to become profitable. Signal s laboratory testing services are expensive and may be a negative factor for gaining routine reimbursement.

If pathologists and oncologists decide not to order Signal s diagnostic tests, Signal may be unable to generate sufficient revenue to sustain its business.

To increase awareness and adoption of Signal s molecular diagnostic tests and services, Signal will need to educate oncologists and pathologists on the clinical utility, benefits and value of each type of test Signal provides through published papers, presentations at scientific conferences and one-on-one education sessions by members of its commercial team. In addition, Signal will need to assure oncologists and pathologists of its ability to obtain and maintain adequate reimbursement coverage from third-party payors. Signal may need to hire additional commercial, scientific, technical, selling and marketing and other personnel to support this process. If Signal s educational efforts fail and medical practitioners do not order its diagnostic tests or other tests Signal may develop, utilization of its tests in sufficient volume for Signal to achieve sustained profitability or, perhaps, viability may not be possible.

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Signal s business depends on its ability to successfully develop and commercialize novel cancer diagnostic tests and services, which is time consuming and complex, and Signal s development efforts may fail.

Signal s current business strategy focuses on discovering, developing and commercializing molecular diagnostic tests and services. Signal believes the success of its business depends on its ability to fully commercialize its existing diagnostic tests and services and to develop and commercialize new diagnostic tests. In particular, it is essential to Signal s business strategy that it expand the indications for use of MyPRS. The first additional indications for which Signal hopes MyPRS will be used include MGUS and SMM. Collectively, these precursor conditions are referred to as AMG. However, Signal may be unsuccessful and MyPRS may never be used for these indications. Signal may not succeed because it may never be accepted by the oncologist community, third-party payors may not pay for it, and the recent peer-reviewed publication that could support these indications for MyPRS may not be sufficient to drive adoption support coverage and reimbursement and the results may not be duplicated in additional studies.

In addition, prior to commercializing its diagnostic tests, Signal must undertake time-consuming and costly development activities, sometimes including clinical trials, and may be required to obtain regulatory clearance or approval, which may be denied. This development process involves a high degree of risk, substantial expenditures and will occur over several years. Signal development efforts may fail for many reasons, including:

- failure of the tests at the research or development stage;
- difficulty in accessing archival tissue samples, especially tissue samples with known clinical results; or
- lack of clinical validation data to support the effectiveness of the test.

Tests that appear promising in early development may fail to be validated in subsequent studies, and even if Signal achieves positive results, Signal may ultimately fail to obtain the necessary regulatory clearances, approvals or coverage and reimbursement. There is substantial risk that Signal s research and development projects will not result in commercially viable tests, and that success in early clinical studies will not be replicated in later studies. At any point, Signal may abandon development of a test or be required to expend considerable resources repeating clinical trials, which would adversely impact its ability to generate revenues from that test. In addition, as Signal develops tests, it will have to make significant investments in research, development and marketing resources. If a clinical validation study of a particular test fails to meet its endpoint, Signal might choose to abandon the development of that test. Further, its ability to develop and launch diagnostic tests will likely depend on its receipt of additional funding beyond that obtained through its public offerings. If Signal s discovery and development programs yield fewer commercial tests than Signal expects, it may be unable to execute its business plan, which may adversely affect its business, financial condition and results of operations.

If Signal is unable to execute its marketing strategy for its cancer diagnostic tests and is unable to gain acceptance in the market, Signal may be unable to generate sufficient revenue to sustain its business.

Signal is an early-stage company and has engaged in only limited selling and marketing activities for MyPRS. There is not currently widespread awareness or adoption of its MyPRS testing system. Although Signal believes that MyPRS represents a promising commercial opportunity, it may never gain significant acceptance in the marketplace and therefore may never generate substantial revenue or profits for Signal. This is also true for any additional diagnostic tests Signal may market. Signal will need to establish a market for its diagnostic tests and build that market through

physician education and awareness programs. Gaining acceptance in medical communities requires publication in leading peer-reviewed journals of results from studies using its tests. The process of publication in leading medical journals is subject to a peer review process and peer reviewers may not consider the results of its studies sufficiently novel or worthy of publication. Failure to have its studies published in peer-reviewed journals would limit the adoption of its tests and future coverage and reimbursement decisions for its tests could be negatively affected.

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Signal s ability to successfully market the diagnostic tests that it may develop will depend on numerous factors, including:

- whether health care providers believe its diagnostic tests are clinically useful;
- whether the medical community accepts that its diagnostic tests are sufficiently sensitive and specific to be meaningful in patient care and treatment decisions; and
- whether health insurers, government health programs and other third-party payors will cover and pay for Signal s diagnostic tests and, if so, whether they will adequately reimburse Signal.

If any of these do not occur, Signal could fail to achieve widespread market acceptance of its diagnostic tests and its business would be materially harmed, as would its financial condition and results of operations.

If Signal s tests do not perform as expected, its operating results, reputation and business will suffer.

Signal s success depends on the market s confidence that it can continue to provide reliable, high-quality diagnostic tests. Signal believes that its customers are likely to be particularly sensitive to test defects and errors, such as false positive or false negative results which could affect the patient s eventual diagnosis and/or treatment. As a result, the failure of its tests or services to perform as expected would significantly impair its reputation and the public image of its tests and services, and Signal may be subject to legal claims arising from any defects or errors.

Signal may implement a product recall or voluntary market withdrawal of MyPRS due to test defects or enhancements and modifications, which would significantly increase its costs.

The marketing of MyPRS and any future diagnostic tests that it may develop involves an inherent risk that such tests may prove to be defective. In that event, Signal may voluntarily implement a market withdrawal of such tests or may be required to do so by a regulatory authority. A recall of MyPRS or one of its future diagnostic tests, or a similar product or service offered by another provider, could impair sales of the services Signal markets as a result of confusion concerning the scope of the recall or as a result of the damage to its reputation for quality and safety.

If Signal s sole laboratory facility becomes damaged or inoperable, or Signal is required to vacate the facility, Signal s ability to provide services and pursue its research and development efforts may be jeopardized.

Signal currently derives substantially all of its revenues from its laboratory testing services. Signal does not have any clinical reference laboratory facilities other than its facility in Little Rock, Arkansas. Signal s facilities and equipment could be harmed or rendered inoperable by natural or man-made disasters, including fire, flooding and power outages, which may render it difficult or impossible for Signal to perform its tests or provide laboratory services for some period of time. The inability to perform Signal s tests or the backlog of tests that could develop if its facility is inoperable for even a short period of time may result in the loss of customers or harm to its reputation or relationships with collaborators, and Signal may be unable to regain those customers or repair its reputation in the future. Furthermore, Signal s facilities and the equipment Signal uses to perform its research and development work could be costly and time-consuming to repair or replace, which could further delay its ability to provide testing services.

Additionally, a key component of its research and development process involves using biological samples and the resulting data sets and medical histories, as the basis for its diagnostic test development. In some cases, these samples are difficult to obtain. If the parts of Signal s laboratory facility where it stores these biological samples are damaged or compromised, Signal s ability to pursue its research and development projects, as well as Signal s reputation, could be jeopardized. Signal carries insurance for damage to its property and the disruption of its business, but this insurance may not be sufficient to cover all of Signal s potential losses and may not continue to be available to Signal on acceptable terms, if at all.

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Further, if Signal s laboratory became inoperable, it may not be able to license or transfer its proprietary technology to a third party, with established state licensure and CLIA certification under the scope of which its diagnostic tests could be performed following validation and other required procedures, to perform the tests. Even if Signal finds a third party with such qualifications to perform its tests, such party may not be willing to perform the tests for Signal on commercially reasonable terms. Signal may have to reapply for state licensure and CLIA certification if Signal is unable to find a third party with such qualifications.

If Signal cannot compete successfully with its competitors, Signal may be unable to increase or sustain its revenues or achieve and sustain profitability.

Signal s principal competition comes from the existing mainstream diagnostic methods that pathologists and oncologists use and have used for many years. It may be difficult to change the methods or behavior of the referring pathologists and oncologists to incorporate its molecular diagnostic testing in their practices. However, Signal believes that it can introduce its diagnostic tests successfully due to their clinical utility and the desire of pathologists and oncologists to find solutions for more accurate diagnosis, prognosis and personalized treatment options for MM and AMG patients. But this is not certain and if the health care providers who are in a position to order its tests do not adopt them, it could adversely affect Signal s business.

Signal also faces competition from companies that currently offer or are developing products to profile genes, gene expression or protein biomarkers in various cancers. Personalized genetic diagnostics is a new area of science, and Signal cannot predict what tests others will develop that may compete with or provide results superior to the results Signal is able to achieve with the tests Signal develops. Signal s competitors include public companies such as NeoGenomics, Inc., Quest Diagnostics, Abbott Laboratories, Inc., Johnson & Johnson, Roche Molecular Systems, Inc., Genomic Health, Inc., Myriad Genetics Inc., Qiagen N.V., Foundation Medicine, Inc., Cancer Genetics, Inc., and many private companies, including Agendia B.V. and bioTheranostics, Inc. Another source of competition comes from other scientific teams attempting to develop GEP signatures utilizing other genes or a subset of the genes utilized in Signal s MyPRS test. Two groups of note include the French IFM-15 gene signature and the Netherlands EMC-92 gene signature which have been studied by independent groups and compared to the UAMS GEP test, or MyPRS.

Signal provides services in a segment of the health care industry that is highly fragmented and extremely competitive. Any failure to respond to technological advances and emerging industry standards could impair Signal s ability to attract and retain clients. This industry is characterized by rapid technological change. It is anticipated that competition will continue to increase due to such factors as the potential for commercial applications of biotechnology and the continued availability of investment capital and government funding for cancer-related research. Signal s competitors may succeed in developing diagnostic tests and/or services that are superior to Signal s tests and technologies, including Signal s pipeline tests. This could render its tests obsolete and, as a result, they might not be ordered, thus impairing the viability of Signal s business.

Signal expects that pharmaceutical and biopharmaceutical companies will increasingly focus attention and resources on the personalized diagnostic sector as the potential and prevalence increases for molecularly targeted oncology therapies approved by the FDA along with companion diagnostics. For example, the FDA has approved two such agents Xalkori® (crizotinib) from Pfizer Inc. along with its companion anaplastic lymphoma kinase, fluorescence in situ hybridization (FISH) test from Abbott Laboratories, Inc. and Zelboraf® (vemurafenib) from Genentech USA Incorporated and Daiichi-Sankyo Inc. along with its companion B-RAF kinase V600 mutation test from Roche Molecular Systems, Inc. These two FDA approvals are the second and third instances of simultaneous approvals of a drug and companion diagnostic, the first being the 1998 approval of Genentech, Inc. s Herceptin® (trastuzumab) for HER2 positive breast cancer along with the HercepTest™ from partner Dako A/S.

Signal also face competition from companies such as Genoptix, Inc. (a Novartis AG company), Neogenomics, Inc., Cancer Genetics, Inc., Bio-Reference Laboratories, Inc. (a division of OPKO Health, Inc.), Integrated

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Genetics (a LabCorp Specialty Testing Group) and Foundation Medicine, Inc., which offer products or services or have conducted research to develop genetic profiles, or genetic or protein biomarkers for various cancers. Additionally, projects related to cancer genomics have received increased government funding, both in the United States and internationally. As more information regarding cancer genomics becomes available to the public, Signal anticipates that more products and services aimed at predicting patient outcome as well as identifying targeted treatment options will be developed and that these products and services may compete with the services Signal offers. In addition, competitors may develop their own versions of Signal s tests in countries where Signal did not apply for patents or where Signal s patents have not issued and compete with Signal in those countries, including promoting the use of their test(s) by physicians or patients in other countries.

Many of its present and potential competitors have widespread brand recognition and substantially greater financial and technical resources and development, production and marketing capabilities than Signal does. Others may develop lower-priced, less complex tests that payors, pathologists and oncologists could view as functionally equivalent to Signal s tests, which could force Signal to lower the list price of Signal s tests and impact its operating margins and its ability to achieve profitability. In addition, technological innovations that result in the creation of enhanced diagnostic tools may enable other clinical laboratories, hospitals, physicians or medical providers to provide specialized diagnostic services similar to ours in a more patient-friendly, efficient or cost-effective manner than is currently possible. If Signal cannot compete successfully against current or future competitors, Signal may be unable to increase market acceptance and sales of its tests, which could prevent Signal from increasing or sustaining its revenues or achieving or sustaining profitability.

The loss of Signal s Chairman or key members of its executive management team could adversely affect its business.

Signal s success in implementing its business strategy depends largely on the skills, experience and performance of the Chairman of its board of directors, Bennett S. LeBow, key members of Signal s executive management team and others in key management positions, including Samuel D. Riccitelli, its president and chief executive officer, and Tamara A. Seymour, Signal s chief financial officer. The collective efforts of each of these persons working as a team are critical as Signal continues to develop its technologies, tests and research and development and sales programs. As a result of the difficulty in locating qualified new management, the loss or incapacity of existing members of its executive management team could adversely affect its operations. If Signal were to lose one or more of these key employees, Signal could experience difficulties in finding qualified successors, competing effectively, developing its technologies and implementing its business strategy. Signal s president and chief executive officer, Samuel D. Riccitelli, Signal s chief financial officer, Tamara A. Seymour, and other members of the executive team have employment agreements with Signal. However, the existence of an employment agreement does not guarantee retention of members of its executive management team or its key employees and Signal may not be able to retain those individuals for the duration of or beyond the end of their respective terms.

If Signal were sued for product liability or professional liability, Signal could face substantial liabilities that exceed its resources.

The marketing, sale and use of Signal s tests could lead to the filing of product liability claims were someone to allege that its tests failed to perform as designed. Signal may also be subject to liability for errors in the test results Signal provides to pathologists and oncologists or for a misunderstanding of, or inappropriate reliance upon, the information Signal provides. A product liability or professional liability claim could result in substantial damages and be costly and time-consuming for Signal to defend.

Although Signal believes that its existing product and professional liability insurance is adequate, Signal s insurers may fail to defend Signal or Signal s insurance may not fully protect Signal from the financial impact of defending against product liability or professional liability claims. Any product liability or professional liability claim brought against Signal, with or without merit, could increase its insurance rates or prevent Signal from

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securing insurance coverage in the future. Additionally, any product liability lawsuit could damage its reputation, or cause current clinical partners and collaborators to terminate existing agreements and potential clinical partners to seek other partners, cause customers to terminate their relationship with Signal and potential customers to seek alternative testing solutions, any of which could impact Signal s results of operations.

Declining general economic or business conditions may have a negative impact on Signal s business.

Continuing concerns over U.S. health care reform legislation and energy costs, geopolitical issues, the availability and cost of credit and government stimulus programs in the United States and other countries have contributed to increased volatility and diminished expectations for the global economy. These factors, combined with low business and consumer confidence and high unemployment, precipitated an economic slowdown and recession. If the economic climate does not improve or deteriorates, Signal s business, including its access to patient samples and the addressable market for diagnostic tests that Signal may successfully develop, as well as the financial condition of Signal s suppliers and Signal s third-party payors, could be adversely affected, resulting in a negative impact on Signal s business, financial condition and results of operations.

Signal depends on its information technology and telecommunications systems, and any failure of these systems could harm its business.

Signal depends on information technology and telecommunications systems for significant aspects of its operations. In addition, Signal s third-party billing and collections provider depends upon telecommunications and data systems provided by outside vendors and information Signal provides on a regular basis. These information technology and telecommunications systems support a variety of functions, including test processing, sample tracking, quality control, customer service and support, billing and reimbursement, research and development activities and Signal s general and administrative activities. Information technology and telecommunications systems are vulnerable to damage from a variety of sources, including telecommunications or network failures, malicious human acts and natural disasters. Moreover, despite network security and back-up measures, some of its systems are potentially vulnerable to physical or electronic break-ins, computer viruses and similar disruptive problems. Despite the precautionary measures Signal has taken to prevent unanticipated problems that could affect its information technology and telecommunications systems, failures or significant downtime of Signal s information technology or telecommunications systems or those used by its third-party service providers could prevent Signal from processing tests, providing test results to pathologists, oncologists, billing payors, processing reimbursement appeals, handling patient or physician inquiries, conducting research and development activities and managing the administrative aspects of Signal s business. Any disruption or loss of information technology or telecommunications systems on which critical aspects of its operations depend could have an adverse effect on Signal s business. Furthermore, Signal depends on FedEx as its courier. Any disruption in any of Signal s mail services or transportation logistics could result in spoiled or lost samples, which could reduce revenue. Moreover, Signal is required to comply with laws governing the transmission, security and privacy of health information that require significant compliance costs, and any failure to comply with these laws could result in material criminal and civil penalties and civil liabilities.

Signal or its suppliers and/or manufacturers may be subject to litigation relating to, among other things, payor and customer disputes, regulatory actions, professional liability, intellectual property, employee-related matters, product liability and other potential claims, which could adversely affect its business.

Signal or its suppliers and/or manufacturers may become subject in the ordinary course of business to material litigation related to things, payor or customer disputes, professional liability, regulatory actions, intellectual property, employee-related matters, product liability and other potential claims, as well as investigations by governmental agencies and governmental payors relating to the specialized diagnostic services Signal provides. Responding to these

types of claims, regardless of their merit, could result in significant expense and divert the time, attention and resources of its management. Legal actions could result in substantial monetary damages as well as significant harm to its reputation with Signal s oncologist customers and with payors, which could

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adversely affect Signal s business, financial condition and results of operations. Signal s laboratory directors and other laboratory professionals may be sued, or may be added as an additional party, under physician liability or other liability law for acts or omissions by its lab directors, laboratory personnel, and other employees and consultants, including but not limited to being sued for misdiagnoses or liabilities arising from the professional interpretations of test results. Signal may periodically become involved as defendants in medical malpractice and other lawsuits, and are subject to the attendant risk of substantial damage awards, in particular in connection with Signal s MyPRS test. Signal s laboratory directors are insured for medical malpractice risks on a claims-made basis under traditional professional liability insurance policies. Signal also maintains general liability insurance that covers certain claims to which Signal may be subject. Signal s general insurance does not cover all potential liabilities that may arise, including governmental fines and penalties that it may be required to pay, liabilities it may incur under indemnification agreements and certain other uninsurable losses that Signal may suffer. It is possible that future claims will not be covered by or will exceed the limits of Signal s insurance coverage or that Signal s insurers will refuse to defend Signal against claims. The suppliers and manufacturers of the diagnostic tests it performs, which are critical to the performance of its specialized diagnostic services, may be exposed to, or threatened with, future litigation by third parties having patent or other intellectual property rights alleging that their diagnostic tests infringe the intellectual property rights of these third parties. In such event, Signal could no longer have access to, or may be prohibited from marketing or performing, such diagnostic tests unless Signal obtained a license from such third party. A license may not be available on acceptable terms, if at all. If Signal is unable to license diagnostic tests that are important to its specialized diagnostic services, its business, financial condition and results of operations may be adversely affected.

Regulatory Risks Relating to Signal s Business

Signal s commercial success could be compromised if third-party payors, including managed care organizations and Medicare, do not provide coverage and reimbursement, breach, rescind or modify their contracts or reimbursement policies or delay payments for Signal s molecular diagnostic tests.

Pathologists and oncologists may not order Signal s molecular diagnostic tests unless third-party payors, such as managed care organizations and government payors such as Medicare and Medicaid, pay a substantial portion of the test price. Coverage and reimbursement by a third-party payor may depend on a number of factors, including a payor s determination that tests using Signal s technologies are:

- experimental or investigational;
- not medically necessary;
- not appropriate for the specific patient;
- not cost-effective;
- not supported by peer-reviewed publications; and/or

not included in clinical practice guidelines.

Uncertainty surrounds third-party payor reimbursement of any test incorporating new technology, including tests developed using microarrays. Technology assessments of new medical tests and devices conducted by research centers and other entities may be disseminated to interested parties for informational purposes. Third-party payors and health care providers may use such technology assessments as grounds to deny coverage for a test or procedure. To Signal s knowledge, no technology assessments have been performed on its tests to date. However, if any technology assessments on Signal s tests are performed, they could conclude that its tests are not clinically useful and this could result in payor non-coverage decisions, which would adversely affect its business.

Because each payor generally determines for its own enrollees or insured patients whether to cover or otherwise establish a policy to reimburse Signal s diagnostic tests, seeking coverage and reimbursement is a time-consuming and costly process. Signal cannot be certain that coverage for Signal s tests will be provided in the

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future by additional third-party payors or that existing contracts, agreements or policy decisions or reimbursement levels will remain in place or be fulfilled under existing terms and provisions. If Signal cannot obtain coverage and reimbursement from private and governmental payors such as Medicare and Medicaid for Signal s current tests, or new tests or test enhancements that Signal may develop in the future, Signal s ability to generate revenues could be limited, which may have a material adverse effect on Signal s financial condition, results of operations and cash flow. Further, Signal has experienced in the past, and will likely experience in the future, delays and temporary interruptions in the receipt of payments from third-party payors due to missing documentation and other issues, which could cause delay in collecting its revenue.

In some circumstances, being contracted with private third-party payors may limit the amount of reimbursement.

Signal is currently considered a non-contracted provider by a number of private third-party payors because Signal has not entered into a specific contract to provide Signal s specialized diagnostic services to their insured patients at specified rates of reimbursement. If Signal were to become a contracted provider in the future, the amount of overall reimbursement Signal would receive may decrease because Signal could be reimbursed less at a contracted rate than it would be at a non-contracted rate, which could have a negative impact on its revenues. Further, Signal may be unable to collect payments from patients beyond that which is paid by their insurance and may experience lost revenue as a result.

Because of certain Medicare billing rules, Signal may not receive reimbursement for all tests provided to Medicare patients.

Under current Medicare billing rules, claims for Signal s tests performed on Medicare beneficiaries who were hospital patients when the tumor tissue samples were obtained and whose tests were ordered less than 14 days from discharge must be included in the payment that the hospital receives for the patient services provided. Accordingly, Signal must bill individual hospitals for tests performed on Medicare beneficiaries during these timeframes in order to receive payment for its tests. Because Signal generally does not have a written agreement in place with these hospitals that purchase these tests, Signal may not be paid for Signal s tests or may have to pursue payment from the hospital on a case-by-case basis. This could be especially problematic for Signal if the hospital does not receive separate payment from Medicare for its test.

Because a portion of Signal s revenues is from third-party payors with whom Signal is not currently contracted, Signal may be required to make positive or negative adjustments to accounting estimates with respect to contractual allowances, which may adversely affect Signal s results of operations, its credibility with financial analysts and investors, and its stock price.

Signal records revenues net of contractual allowances. Signal estimates contractual allowances for non-contracted insurance companies based on its historical collection experience for each type of payor. In the event that the actual amount of payment received differs from the previously recorded estimate, an adjustment to revenue is made in the current period at the time of final collection and settlement. Signal s estimates of net revenue for non-contracted insurance companies are subject to change based on the contractual status and payment policies of the third-party payors with whom Signal deals. Signal regularly refines its estimates in order to make its estimated revenue as accurate as possible based on Signal s most recent collection experience with each third-party payor. There can be no assurances that Signal will not be required to make similar adjustments to estimates with respect to contractual allowances in the future, which could adversely affect Signal s results of operations, its credibility with financial analysts and investors, and its stock price.

Complying with numerous regulations pertaining to Signal s business is an expensive and time-consuming process, and any failure to comply could result in substantial penalties.

Signal is subject to CLIA, a federal law regulating clinical laboratories that perform testing on specimens derived from humans for the purpose of providing information for the diagnosis, prevention or treatment of disease.

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Signal s clinical laboratory must be certified under CLIA in order for Signal to perform testing on human specimens. In addition, Signal s proprietary tests must also be categorized as part of its CLIA certification so that Signal can offer them in Signal s laboratory. CLIA is intended to ensure the quality and reliability of clinical laboratories in the United States by mandating specific standards in the areas of personnel qualifications, administration, and participation in proficiency testing, patient test management, quality control, quality assurance and inspections. Signal has a current certificate under CLIA to perform high complexity testing. To renew this certificate, Signal is subject to survey and inspection every two years. Moreover, CLIA inspectors may make periodic inspections of its clinical reference laboratory outside of the renewal process. Because Signal is also CAP-accredited, Signal is subject to published accreditation standards to which Signal must conform in order to maintain Signal s accreditation, and subject to periodic unannounced laboratory audits.

The law also requires Signal to maintain a state laboratory license to conduct testing. Signal s laboratory is located in Arkansas and must have an Arkansas state license. Arkansas laws establish standards for day-to-day operation of Signal s clinical reference laboratory, including the training and skills required of personnel and quality control. In addition, several other states require that Signal holds licenses to test specimens from patients in those states. Other states may have similar requirements or may adopt similar requirements in the future. Finally, Signal may be subject to regulation in foreign jurisdictions as Signal seeks to expand international distribution of its tests.

If Signal were to lose its CLIA certificate or Arkansas laboratory license, whether as a result of a revocation, suspension or limitation, Signal would no longer be able to offer its tests, which would limit its revenues and harm Signal s business. If Signal were to lose its license in other states where Signal is required to hold licenses, Signal would not be able to test specimens from those states.

Signal is subject to federal and state health care fraud and abuse laws and regulations and could face substantial penalties if it is unable to fully comply with such laws.

Signal is subject to health care fraud and abuse regulation and enforcement by both the federal government and the states in which Signal conducts its business. These health care laws and regulations include, for example:

- the federal Anti-Kickback Statute, which prohibits, among other things, persons or entities from soliciting, receiving, offering or providing remuneration, directly or indirectly, in return for, to induce or to arrange for the referral of an individual for, or the purchase, order or recommendation of, any items or services for which payment may be made under a federal health care program such as the Medicare and Medicaid programs;

- the federal physician self-referral prohibition, commonly known as the Stark Law, which prohibits physicians from referring Medicare or Medicaid patients to providers of designated health services with whom the physician or a member of the physician s immediate family has an ownership interest or compensation arrangement, unless a statutory or regulatory exception applies;

- the federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, which establishes federal crimes for knowingly and willfully executing a scheme to defraud any health care benefit program or making false statements in connection with the delivery of or payment for health care benefits, items or services;

the federal False Claims Act, which prohibits, among other things, individuals or entities from knowingly presenting, or causing to be presented, claims for payment from Medicare, Medicaid, or other third-party payors that are false or fraudulent;

the federal Physician Payment Sunshine Act requirements under the ACA, which require manufacturers of drugs, devices, biologics and medical supplies to report to HHS information related to payments and other transfers of value made to or at the request of covered recipients, such as physicians and teaching hospitals, and physician ownership and investment interests in such manufacturers. Payments made to physicians and research institutions for clinical trials are included within the ambit of this law; and

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state law equivalents of each of the above federal laws, which may apply more broadly, contain additional restrictions, or carry different types of penalties.

Signal seeks to comply with these laws. However, it is possible that Signal could be the subject of a government investigation regarding its compliance with these or other laws and that the government could take the position that Signal is not in compliance with one or more of them. In such case, Signal may be judged to be in violation of those laws and subject to civil and criminal penalties. In addition, many of these laws and regulations are vague or indefinite and have not been interpreted by the courts or regulatory agencies. These laws and regulations may be interpreted or applied by a prosecutorial, regulatory or judicial authority in a manner that could subject Signal to liability and/or require Signal to make changes in Signal s operations.

Signal believes that federal and state governments continue to strengthen their enforcement efforts against health care fraud. In addition, the ACA increases the funding, power, penalties and remedies to pursue suspected cases of fraud and abuse and provides the government with expanded opportunities to pursue actions under the federal Anti-Kickback Statute, the False Claims Act, and the Stark Law. For example, the ACA narrowed the public disclosure bar under the False Claims Act, allowing increased opportunities for whistleblower litigation. In addition, the legislation modified the intent standard under the federal Anti-Kickback Statute, making it easier for prosecutors to prove that alleged violators had met the requisite knowledge requirement. The ACA and final regulations promulgated thereunder also require Medicare Part A and B providers and suppliers to report and return Medicare overpayments by the later of 60 days after the date on which the overpayment was identified or, if applicable, the date any corresponding cost report is due. Overpayments are considered to be identified when the provider or supplier has or should have, through the exercise of reasonable diligence, determined that it has received an overpayment, and quantified the amount of the overpayment. The ACA also provides that claims that include items or services resulting from a violation of the Anti-Kickback Statute constitutes a false or fraudulent claims for purposes of the False Claims Act. Any action brought against Signal for violation of these laws or regulations, even if Signal successfully defends against it, could cause Signal to incur significant legal expenses and divert Signal s management s attention from the operation of its business. If Signal s operations are found to be in violation of any of these laws and regulations, Signal may be subject to any applicable penalty associated with the violation, including civil and criminal penalties, damages and fines, and/or exclusion from participation in Medicare, Medicaid or other state or federal health care programs, Signal could be required to refund payments received by Signal, and Signal could be required to curtail or cease its operations. Any of the foregoing consequences could seriously harm its business, its financial condition and results of operations.

Signal is required to comply with laws governing the transmission, security and privacy of health information that require significant compliance costs, and any failure to comply with these laws could result in material criminal and civil penalties.

Under the administrative simplification provisions of HIPAA, HHS has issued regulations which establish uniform standards governing the conduct of certain electronic health care transactions and protecting the privacy and security of Protected Health Information, or PHI, used or disclosed by health care providers and other covered entities. Three principal regulations with which Signal is currently required to comply have been issued in final form under HIPAA: privacy regulations, security regulations and standards for electronic transactions.

The privacy regulations cover the use and disclosure of PHI by health care providers. It also sets forth certain rights that an individual has with respect to his or her PHI maintained by a health care provider, including the right to access or amend certain records containing PHI or to request restrictions on the use or disclosure of PHI. Signal has also implemented policies, procedures and standards to comply appropriately with the final HIPAA security regulations, which establish requirements for safeguarding the confidentiality, integrity and availability of PHI, which is electronically transmitted or electronically stored. The HIPAA privacy and security regulations establish a uniform

federal floor and do not supersede state laws that are more stringent or provide individuals with greater rights with respect to the privacy or security of, and access to, their records containing PHI. As a result, Signal is required to comply with both HIPAA privacy regulations and varying state privacy and security

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laws. Almost all U.S. states now require notification to affected individuals and state authorities, as well as the media in certain cases, in the event of a breach of the security of personal information (including PHI in a few states), often with significant financial penalties for noncompliance.

The Health Information Technology for Economic and Clinical Health Act, or HITECH Act, enacted pursuant to the American Recovery and Reinvestment Act of 2009, or ARRA, made sweeping changes to the health information privacy and security regulations of HIPAA by expanding the scope and application of the statute. These changes include, among other things: (1) establishing an affirmative obligation to provide patient data breach notification in the event of the unauthorized acquisition, access, use or disclosure of unsecured PHI; (2) elaborating upon the standard for minimum necessary uses and disclosures of PHI by a covered entity; (3) restricting certain uses of PHI for marketing purposes (by expanding the definition of marketing activities requiring authorization); (4) prohibiting certain sales of PHI; (5) establishing an affirmative obligation to provide an accounting of disclosures made for payment, treatment and health care operations (up to three years made through an electronic health record); (6) requiring covered entities to agree to individuals requests to restrict disclosure of PHI in certain circumstances; (7) applying the security regulations and certain provisions of the privacy regulations to business associates; and (8) modifying an individuals right to access PHI in an electronic format. HHS issued modifications to the HIPAA Regulations, effective March 26, 2013, implementing some of these changes including the obligation to provide patient data breach notifications, which subject the company to additional administrative requirements in the United States. With regard to the accounting of disclosures, the HITECH Act provides for removing the exception in the existing HIPAA privacy regulations accounting of disclosures of PHI requirement for disclosures of PHI for payment, treatment, and health care operations purposes made through an electronic health record (within the past three years). HHS issued proposed regulations to implement this provision of the HITECH Act in May 2011, but those regulations have not been finalized.

The HITECH Act also implemented measures to strengthen enforcement of HIPAA and increased applicable penalties for HIPAA violations. Penalties are now tiered and range from $100 to $50,000 per violation with an annual cap for the same violations of $25,000 to $1,500,000. The Office for Civil Rights of the HHS, or the OCR, has increased enforcement activities and has recently levied large penalties for violations. In addition, as mandated by the HITECH Act, OCR has begun an audit program to assess compliance by covered entities and their business associates with the HIPAA privacy and security rules and breach notification standards.

Signal seeks to comply with HIPAA privacy regulations and state privacy laws. In addition, Signal is in the process of taking necessary steps to comply with HIPAA s standards for electronic transactions, which establish standards for common health care transactions. Given the complexity of HIPAA, the HITECH Act and state privacy restrictions, the possibility that the regulations may change, and the fact that the regulations are subject to changing and potentially conflicting interpretation, Signal s ability to comply with HIPAA, the HITECH Act and state privacy requirements is uncertain and the costs of compliance are significant. To the extent that Signal or its third-party billing company submit electronic health care claims and payment transactions that do not comply with the electronic data transmission standards established under HIPAA and the HITECH Act, payments to Signal may be delayed or denied. Additionally, the costs of complying with any changes to HIPAA, the HITECH Act and state privacy restrictions may have a negative impact on Signal s operations. Signal could be subject to criminal penalties and civil sanctions for failing to comply with HIPAA, the HITECH Act and state privacy restrictions, which could result in the incurrence of significant monetary penalties.

Risks Related to Signal s Reliance on Third Parties

Signal licenses its billing and collections web-based software platform from a third-party provider. Signal s provider may fail in its obligations to maintain the system and thereby reduce its cash collections and harm its

business.

Billing for laboratory tests is complicated and is subject to extensive and non-uniform rules and administrative requirements. Missing or incorrect information on requisitions adds complexity to and slows the billing process,

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creates backlogs and increases the aging of accounts receivable and bad debt expenses. Failure to timely or correctly bill may lead to Signal not being reimbursed for its services or an increase in aging of Signal s accounts receivable. In addition, failure to comply with applicable federal and state laws relating to billing, including, but not limited, to the federal False Claims Act may lead to various penalties including civil and criminal fines and penalties, recoupment efforts, and exclusion from participation in Medicare and other federal health care programs. Signal relies heavily on a single third party to provide Signal with key software for Signal s billing. If that third party is unable or unwilling to provide these software systems to Signal for any reason, or violates the law, Signal may not be able to submit claims promptly or at all and Signal may be subject to an investigation and potential civil and criminal penalties. Delays in invoicing can lead to delays in collections, and inaccuracies in its billing could result in lost revenue. If Signal fails to adapt quickly and effectively to changes affecting Signal s costs, pricing and billing, its profitability and cash flow will be adversely affected.

Signal depends on third parties for the supply of certain tissue samples and biological materials that Signal uses in its research and development efforts. If these costs increase or Signal s third-party collaborators terminate their relationship with Signal, Signal s business may be materially harmed.

Under standard clinical practice in the United States, tumor biopsies removed from patients are chemically preserved, embedded in paraffin wax and stored. Signal s clinical development relies on its ability to access these archived tumor biopsy samples, as well as information pertaining to their associated clinical outcomes. Other companies often compete with Signal for access. Additionally, the process of negotiating access to archived samples is lengthy, because it typically involves numerous parties and approvals to resolve complex issues such as usage rights, institutional review board approval, privacy rights, publication rights, intellectual property ownership and research parameters.

UAMS and other institutions provide Signal with tissue samples and other biological materials that Signal uses in developing and validating its tests. Signal does not have written agreements with some of these third parties, and, in many of the cases in which the agreements are in writing, Signal s relationships with such third parties are terminable on 30 days notice or less. Disagreements or disputes might cause delays or termination of the research, development or commercialization of testing systems or additional test indications, might lead to additional responsibilities or costs to Signal or might result in litigation or arbitration, any of which could divert management attention and resources and be time-consuming and expensive. If one or more of these suppliers terminate their relationship with Signal, Signal will need to identify other third parties to provide Signal with tissue samples and biological materials, which could result in a delay in its research and development activities and negatively affect its business. In addition, as Signal grows, research and academic institutions may begin to seek financial contributions from Signal, which may negatively affect Signal s results of operations. Potential suppliers may elect not to work with Signal based on their assessment of Signal s financial, regulatory or intellectual property position. Even if it establishes new agreements, this may not result in the successful development of future testing systems or additional test indications.

Signal relies on a limited number of third parties for manufacture and supply of all of its laboratory instruments, tests and materials, and Signal may not be able to find replacement suppliers or manufacturers in a timely manner in the event of any disruption, which could adversely affect its business.

Signal relies on third parties for the manufacture and supply of all of Signal s laboratory instruments, equipment and materials, such as reagents, microarray chips and disposable test kits, that Signal needs to perform its specialized diagnostic services, and rely on a limited number of suppliers for certain laboratory materials and some of the laboratory equipment with which Signal performs its diagnostic services. Signal does not have long-term contracts with its suppliers and manufacturers that commit them to supply equipment and materials to Signal. Certain of its suppliers provide Signal with analyte specific regents, or ASRs, which serve as building blocks in the diagnostic tests

Signal conducts in its laboratory. These suppliers are subject to regulation by the FDA, and must comply with federal regulations related to the manufacture and distribution of ASR products. Because Signal cannot ensure the actual production or manufacture of such critical equipment and materials, or

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the ability of its suppliers to comply with applicable legal and regulatory requirements, Signal may be subject to significant delays caused by interruption in production or manufacturing. If any of its third-party suppliers or manufacturers were to become unwilling or unable to provide this equipment or these materials in required quantities or on Signal s required timelines, Signal would need to identify and acquire acceptable replacement sources on a timely basis. While Signal has developed alternate sourcing strategies for the equipment and materials it uses, Signal cannot be certain that these strategies will be effective and even if Signal were to identify other suppliers and manufacturers for the equipment and materials Signal needs to perform its specialized diagnostic services, there can be no assurance that Signal will be able to enter into agreements with such suppliers and manufacturers or otherwise obtain such items on a timely basis or on acceptable terms, if at all. If Signal encounters delays or difficulties in securing necessary laboratory equipment or materials, including consumables, Signal will face an interruption in its ability to perform its specialized diagnostic services and experience other disruptions that would adversely affect its business, results of operations and financial condition.

Intellectual Property Risks Related to Signal s Business

If Signal is unable to maintain intellectual property protection, its competitive position could be harmed.

Signal s ability to protect its proprietary discoveries and technologies affects its ability to compete and to achieve sustained profitability. Currently, Signal relies on a combination of issued U.S. patents, U.S. and foreign patent applications, copyrights, trademarks and trademark applications, confidentiality or non-disclosure agreements, material transfer agreements, licenses, work-for-hire agreements and invention assignment agreements to protect Signal s intellectual property rights. Signal also maintains certain company know-how, trade secrets and technological innovations designed to provide Signal with a competitive advantage in the market place as trade secrets.

Currently, Signal is the worldwide exclusive licensee, in Signal s licensed field, and the owner of 14 issued patents (12 issued U.S. patents, one issued European patent validated in nine countries: Switzerland, Germany, Denmark, Spain, France, United Kingdom, Italy, Netherlands, and Sweden, and one issued Japanese patent) and 11 pending patent applications, which include both U.S. and foreign patent applications, relating to various aspects of its technology. Of the 11 pending patent applications, two are owned outright by Signal Genetics, Inc. Signal s exclusive field of use covers, inter alia, therapeutic, diagnostic, prognostic, and personalized medicine applications worldwide, excluding applications using FISH and some claims directly covering DKK1 inhibitors and their uses.

While Signal intends to pursue additional patent applications, it is possible that Signal s pending patent applications and any future applications may not result in issued patents. Even if patents are issued, third parties may independently develop similar or competing technology that avoids the claims of Signal s patents or may challenge the validity of its patents. Further, Signal cannot be certain that the steps it has taken will prevent the misappropriation of Signal s trade secrets and other confidential information as well as the misuse of its patents and other intellectual property, particularly in foreign countries where Signal has not filed for patent protection.

From time to time the U.S. Supreme Court, other federal courts, the U.S. Congress or the U.S. Patent and Trademark Office, or USPTO, as well as counterpart agencies and bodies in corresponding foreign jurisdictions, may change the standards of patentability and any such changes could have a negative impact on its business.

For instance, on October 30, 2008, the Court of Appeals for the Federal Circuit issued a decision that methods or processes cannot be patented unless they are tied to a machine or involve a physical transformation. The U.S. Supreme Court later reversed that decision in Bilski v. Kappos, or Bilski, finding that the machine-or-transformation test is not the only test for determining patent eligibility. The Court, however, declined to specify how and when processes are patentable. On March 20, 2012, in Mayo v. Prometheus, or Mayo, the U.S. Supreme Court reversed the Federal

Circuit s application of Bilski and invalidated a patent focused on a diagnostic process

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because the patent claim embodied a law of nature. On July 30, 2012, the USPTO released a memorandum titled *2012 Interim Procedure for Subject Matter Eligibility Analysis of Process Claims Involving Laws of Nature,* with guidelines for determining patentability of diagnostic or other processes in line with the Mayo decision. On June 13, 2013, in Association for Molecular Pathology v. Myriad Genetics, or Myriad, the Supreme Court held that a naturally occurring DNA segment is a product of nature and not patent eligible merely because it has been isolated, but cDNA is patent eligible because it is not naturally occurring. The Supreme Court s decision reversed in part and affirmed in part the earlier decision of the Federal Circuit that both isolated genes and cDNA were patent eligible, however, the Supreme Court specifically did not address the patentability of any method claims involving the use of such isolated genes. On March 4, 2014, the USPTO released a memorandum titled *2014 Procedure For Subject Matter Eligibility Analysis Of Claims Reciting Or Involving Laws Of Nature/Natural Principles, Natural Phenomena, And/Or Natural Products*, which Signal refers to as the March 4, 2014 memorandum. This memorandum provides guidelines for the USPTO s new examination procedure for subject matter eligibility under 35 U.S.C. §101 for claims embracing natural products or natural principles. On December 16, 2014, the USPTO issued a *2014 Interim Guidance on Patent Subject Matter Eligibility*, which Signal refers to as the 2014 Interim Guidance, for use by USPTO personnel in determining subject matter eligibility in view of recent decisions by the U.S. Supreme Court, which superseded the March 4, 2014 memorandum. On July 2015, the USPTO published an updated guidance document titled *July 2015 Update on Subject Matter Eligibility* that includes new examples and discussion of relevant issues. Although the guidelines do not have the force of law, patent examiners have been instructed to follow them.

Some aspects of Signal s technology involve products and/or processes that may be subject to this evolving standard and Signal cannot guarantee that any of its pending claims will be patentable as a result of such evolving standards or that issued patents will be held valid, if challenged under these changing standards.

In addition, on February 5, 2010, the Secretary s Advisory Committee on Genetics, Health and Society voted to approve a report titled *Gene Patents and Licensing Practices and Their Impact on Patient Access to Genetic Tests*. That report defines patent claims on genes broadly to include claims to isolated nucleic acid molecules as well as methods of detecting particular sequences or mutations. The report also contains six recommendations, including the creation of an exemption from liability for infringement of patent claims on genes for anyone making, using, ordering, offering for sale or selling a test developed under the patent for patient care purposes, or for anyone using the patent-protected genes in the pursuit of research. The report also recommended that the Secretary should explore, identify and implement mechanisms that will encourage more voluntary adherence to current guidelines that promote nonexclusive in-licensing of diagnostic genetic and genomic technologies. It is unclear whether the HHS will act upon these recommendations, or if the recommendations would result in a change in law or process that could negatively impact its patent portfolio or future research and development efforts.

Signal may face intellectual property infringement claims that could be time-consuming and costly to defend, and could result in Signal s loss of significant rights and the assessment of treble damages.

From time to time Signal may face intellectual property infringement, misappropriation, or invalidity/non-infringement claims from third parties. Some of these claims may lead to litigation. The outcome of any such litigation can never be guaranteed, and an adverse outcome could affect Signal negatively. For example, were a third party to succeed on an infringement claim against Signal, Signal may be required to pay substantial damages (including up to treble damages if such infringement were found to be willful). In addition, Signal could face an injunction, barring Signal from conducting the allegedly infringing activity. The outcome of the litigation could require Signal to enter into a license agreement which may not be under acceptable, commercially reasonable, or practical terms or Signal may be precluded from obtaining a license at all.

It is also possible that an adverse finding of infringement against Signal may require Signal to dedicate substantial resources and time in developing non-infringing alternatives, which may or may not be possible. In the case of diagnostic tests, Signal would also need to include non-infringing technologies which would require

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Signal to re-validate its tests. Any such re-validation, in addition to being costly and time consuming, may be unsuccessful.

Finally, Signal may initiate claims to assert or defend its own intellectual property against third parties. If one or more of its patents were held to be invalid or not infringed, Signal might not be able to exclude others from offering similar or identical tests to ours. Any intellectual property litigation, irrespective of whether Signal is the plaintiff or the defendant, and regardless of the outcome, is expensive and time-consuming, and could divert its management s attention from its business and negatively affect its operating results or financial condition.

Risks Related to Ownership of Signal s Common Stock

The price of Signal s common stock may be volatile and fluctuate substantially, which could result in substantial losses for Signal stockholders.

Signal s stock price is likely to be volatile. The stock market in general and the market for smaller diagnostic services companies in particular have experienced extreme volatility that has often been unrelated to the operating performance of particular companies. As a result of this volatility, Signal stockholders may not be able to sell its common stock at or above the price they paid for it. The market price for Signal s common stock may be influenced by many factors, including:

- announcements related to the Merger;
- issuances of new equity securities pursuant to a future offering, including issuances of preferred stock;
- the success of competitive products, services or technologies;
- regulatory or legal developments in the United States and other countries;
- developments or disputes concerning patent applications, issued patents or other proprietary rights;
- the recruitment or departure of key personnel;
- actual or anticipated changes in estimates as to financial results, development timelines or recommendations by securities analysts;
- variations in Signal s financial results or those of companies that are perceived to be similar to Signal;
- changes in the structure of health care payment systems;

market conditions in the diagnostic services sector;

general economic, industry and market conditions; and

the other factors described in this Risk Factors section.

Provisions in Signal s corporate charter documents and under Delaware law could make an acquisition of Signal, which may be beneficial to its stockholders, more difficult and may prevent attempts by its stockholders to replace or remove its current management.

Provisions in Signal s corporate charter and its bylaws may discourage, delay or prevent a merger, acquisition or other change in control of Signal s company that stockholders may consider favorable, including transactions in which you might otherwise receive a premium for your shares. These provisions could also limit the price that investors might be willing to pay in the future for shares of Signal s common stock, thereby depressing the market price of Signal s common stock. In addition, because Signal s board of directors is responsible for appointing the members of its management team, these provisions may frustrate or prevent any attempts by Signal stockholders to replace or remove its current management by making it more difficult for stockholders to replace members of Signal s board of directors. Among other things, these provisions state that:

the authorized number of directors can be changed only by resolution of Signal s board of directors;

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Signal s bylaws may be amended or repealed by its board of directors or Signal stockholders;

stockholders may not call special meetings of the stockholders or fill vacancies on the board of directors;

Signal s board of directors will be authorized to issue, without stockholder approval, preferred stock, the rights of which will be determined at the discretion of the board of directors and that, if issued, could operate as a poison pill to dilute the stock ownership of a potential hostile acquirer to prevent an acquisition that Signal s board of directors does not approve;

Signal stockholders do not have cumulative voting rights, and therefore its stockholders holding a majority of the shares of common stock outstanding will be able to elect all of its directors; and

its stockholders must comply with advance notice provisions to bring business before or nominate directors for election at a stockholder meeting.

Moreover, because Signal is incorporated in Delaware, Signal is governed by the provisions of Section 203 of the Delaware General Corporation Law, which prohibits a person who owns in excess of 15% of Signal s outstanding voting stock from merging or combining with Signal for a period of three years after the date of the transaction in which the person acquired in excess of 15% of Signal s outstanding voting stock, unless the Merger or combination is approved in a prescribed manner.

Signal s failure to meet the continued listing requirements of The NASDAQ Capital Market could result in a delisting of its common stock.

The listing standards of NASDAQ provide, among other things, that a company may be delisted if the bid price of its stock drops below $1.00 for a period of 30 consecutive business days. The bid price of Signal s stock has recently been below $1.00 for a period of greater than 30 consecutive business days. As such, on November 24, 2015, Signal received a notice from The NASDAQ Listing Qualifications Department informing Signal that it must regain compliance with listing requirements or face delisting. After an initial 180-day grace period, Signal received a second letter from NASDAQ dated May 25, 2016 regarding the expiration of the 180-day grace period and granting Signal a second 180-day grace period until November 21, 2016. In order to regain compliance, the bid price of Signals common stock must close at a price of at least $1.00 per share for a minimum of 10 consecutive business days prior to November 21, 2016. The notice stated that NASDAQ will provide Signal with written notification when its common stock has regained compliance. In order to achieve compliance this listing standard, Signal implemented a one-for-15 reverse split of its common stock effective as of 5:01 p.m. Eastern Time on November 4, 2016. On November 22, 2016, NASDAQ notified Signal that it had regained compliance with the minimum bid price requirement for its common stock. While this reverse split of Signal common stock allowed Signal to regain compliance with the listing standards of The NASDAQ Capital Market, there is no guarantee that Signal will be able to maintain compliance with these requirements or that its common stock will not again fall below the minimum bid price requirements for The NASDAQ Capital Market.

While Signal is exercising diligent efforts to maintain the listing of its common stock on NASDAQ, it is possible that Signal may fail to satisfy one of the other the continued listing requirements of The NASDAQ Capital Market, such as the corporate governance requirements or the minimum shareholders equity, publicly held shares or market value of publicly held shares requirements. If that were to occur, NASDAQ may take steps to delist Signal s common stock.

Such a delisting would likely have a negative effect on the price of Signal s common stock and would impair your ability to sell or purchase Signal s common stock when you wish to do so. In the event of a delisting, Signal would take actions to restore Signal s compliance with NASDAQ s listing requirements, but Signal can provide no assurance that any such action taken by Signal would allow its common stock to become listed again, stabilize the market price or improve the liquidity of its common stock, prevent Signal s common stock from dropping below the NASDAQ minimum bid price requirement again or prevent future non-compliance with NASDAQ s listing requirements. Further, if Signal were to be delisted from The NASDAQ Capital Market, its common stock would cease to be recognized as covered securities and Signal would be subject to regulation in each state in which Signal offers its securities.

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Delisting from NASDAQ could adversely affect Signal s ability to raise additional financing through the public or private sale of equity securities, would significantly affect the ability of investors to trade its securities and would negatively affect the value and liquidity of Signal s common stock. Delisting could also have other negative results, including the potential loss of confidence by employees, the loss of institutional investor interest and fewer business development opportunities.

If Signal s shares become subject to the penny stock rules, it may be more difficult to sell Signal shares.

The SEC has adopted rules that regulate broker-dealer practices in connection with transactions in penny stocks. Penny stocks are generally equity securities with a price of less than $5.00 (other than securities registered on certain national securities exchanges or authorized for quotation on certain automated quotation systems, provided that current price and volume information with respect to transactions in such securities is provided by the exchange or system). The OTC Bulletin Board does not meet such requirements and if the price of Signal s common stock remains less than $5.00 and Signal is no longer listed on a national securities exchange, its common stock may be deemed a penny stock. The penny stock rules require a broker-dealer, prior to a transaction in a penny stock not otherwise exempt from those rules, to deliver a standardized risk disclosure document containing specified information. In addition, the penny stock rules require that prior to effecting any transaction in a penny stock not otherwise exempt from those rules, a broker-dealer must make a special written determination that the penny stock is a suitable investment for the purchaser and receive: (i) the purchaser s written acknowledgment of the receipt of a risk disclosure statement; (ii) a written agreement to transactions involving penny stocks; and (iii) a signed and dated copy of a written suitability statement. These disclosure requirements may have the effect of reducing the trading activity in the secondary market for Signal s common stock, and therefore stockholders may have difficulty selling their shares.

An active trading market for Signal s common stock may not develop.

Prior to Signal s initial public offering in June 2014, there was no public market for its common stock. The listing of Signal s common stock on The NASDAQ Capital Market does not assure that a meaningful, consistent and liquid trading market exists. Although Signal s common stock is listed on The NASDAQ Capital Market, trading volume in its common stock has been limited and an active trading market for Signal s shares may never develop or be sustained. If an active market for Signal s common stock does not develop, it may be difficult for investors to sell their shares without depressing the market price for the shares or at all.

Reports published by securities or industry analysts, including projections in those reports that exceed Signal s actual results, could adversely affect its common stock price and trading volume.

Securities research analysts may establish and publish their own periodic projections for Signal s business. These projections may vary widely from one another and may not accurately predict the results Signal actually achieves. Signal s stock price may decline if its actual results do not match securities research analysts projections. Similarly, if one or more of the analysts who writes reports on Signal downgrades its stock or publishes inaccurate or unfavorable research about its business, Signal s stock price could decline. If one or more of these analysts ceases coverage of Signal s company or fails to publish reports on Signal regularly, Signal s stock price or trading volume could decline. While Signal expects securities research analyst coverage, if no securities or industry analysts begin to cover Signal, the trading price for its stock and the trading volume could be adversely affected.

Future sales of Signal s common stock, or the perception that future sales may occur, may cause the market price of its common stock to decline, even if its business is doing well.

Sales of substantial amounts of Signal s common stock in the public market, or the perception that these sales may occur, could materially and adversely affect the price of its common stock and could impair its ability to

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raise capital through the sale of additional equity securities. Signal maintains a shelf registration statement on Form S-3 with the SEC pursuant to which Signal may, from time to time, sell up to an aggregate of $50 million of its common stock, preferred stock, debt securities, warrants, rights and units. Signal has established an at-the-market offering pursuant to which Signal may offer and sell shares of its common stock, if and when Signal s public float increases. Sales of securities under the registration statement will result in dilution of its stockholders and could cause its stock price to fall.

Signal is an emerging growth company, and the reduced disclosure requirements applicable to emerging growth companies may make its common stock less attractive to investors.

Signal is an emerging growth company, as defined in the Jumpstart Our Business Startups Act of 2012, or the JOBS Act, and may remain an emerging growth company for up to five years. For so long as Signal remains an emerging growth company, Signal is permitted and intend to rely on exemptions from certain disclosure requirements that are applicable to other public companies that are not emerging growth companies. These exemptions include:

- being permitted to provide only two years of audited financial statements, in addition to any required unaudited interim financial statements, with correspondingly reduced *Management s Discussion and Analysis of Financial Condition and Results of Operations* disclosure;
- not being required to comply with the auditor attestation requirements in the assessment of its internal control over financial reporting;
- not being required to comply with any requirement that may be adopted by the Public Company Accounting Oversight Board regarding mandatory audit firm rotation or a supplement to the auditor s report providing additional information about the audit and the financial statements;
- reduced disclosure obligations regarding executive compensation; and
- exemptions from the requirements of holding a non-binding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved.

Signal has taken advantage of reduced reporting burdens in its periodic disclosure reports. In particular, Signal has not included all of the executive compensation related information that would be required if Signal were not an emerging growth company. Signal cannot predict whether investors will find Signal s common stock less attractive if Signal relies on these exemptions. If some investors find Signal s common stock less attractive as a result, there may be a less active trading market for its common stock and its stock price may be more volatile.

Signal has elected to avail itself of the extended transition period for adopting new or revised accounting standards available to emerging growth companies under the JOBS Act and will, therefore, not be subject to the same new or revised accounting standards as other public companies that are not emerging growth companies, which could make Signal s common stock less attractive to investors.

The JOBS Act provides that an emerging growth company can take advantage of an extended transition period for complying with new or revised accounting standards. This allows an emerging growth company to delay the adoption of these accounting standards until they would otherwise apply to private companies. Signal has elected to avail itself of this extended transition period for adopting new or revised accounting standards and therefore, Signal will not be subject to the same new or revised accounting standards as other public companies that are not emerging growth companies. As a result of this election, its financial statements may not be comparable to companies that comply with public company effective dates.

Signal cannot predict whether investors will find its stock less attractive as a result of this election. If some investors find Signal s common stock less attractive as a result of this election, there may be a less active trading market for Signal s common stock and its stock price may be more volatile.

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Since Signal s initial public offering in June 2014, Signal has incurred significantly increased costs and its management has had to devote substantial time as a result of operating as a public company; and such costs are expected to further increase after Signal is no longer an emerging growth company.

As a public company, Signal incurs significant legal, accounting and other expenses that Signal did not incur as a private company. The Sarbanes-Oxley Act of 2002, the Dodd-Frank Wall Street Reform and Consumer Protection Act, the listing requirements of The NASDAQ Capital Market and other applicable securities rules and regulations impose various requirements on public companies, including establishment and maintenance of effective disclosure and financial controls and corporate governance practices. Signal s management and other personnel have had to devote a substantial amount of time to these compliance initiatives since becoming a public company. Moreover, these rules and regulations have increased its legal and financial compliance costs and have made certain activities more time-consuming and costly.

Because Signal only recently became a public company, Signal cannot yet predict or estimate the costs Signal may incur in the future with respect to these compliance initiatives or the timing of such costs. In addition, these rules and regulations are often subject to varying interpretations, in many cases due to their lack of specificity, and, as a result, their application in practice may evolve over time as new guidance is provided by regulatory and governing bodies. This could result in continuing uncertainty regarding compliance matters and higher costs necessitated by ongoing revisions to disclosure and governance practices.

Pursuant to Section 404 of the Sarbanes-Oxley Act of 2002, or Section 404, as an emerging growth company, Signal is not required to include an attestation report on internal control over financial reporting issued by its independent registered public accounting firm in its annual report. To achieve compliance with Section 404 within the prescribed period, Signal will be engaged in a process to document and evaluate its internal control over financial reporting, which is both costly and challenging. In this regard, Signal will need to continue to dedicate internal resources, potentially engage outside consultants and adopt a detailed work plan to assess and document the adequacy of internal control over financial reporting, continue steps to improve control processes as appropriate, validate through testing that controls are functioning as documented and implement a continuous reporting and improvement process for internal control over financial reporting. Despite Signal s efforts, there is a risk that Signal will not be able to conclude, within the prescribed timeframe or at all, that its internal control over financial reporting is effective as required by Section 404. If Signal identifies one or more material weaknesses, it could result in an adverse reaction in the financial markets due to a loss of confidence in the reliability of its financial statements.

Because Signal does not anticipate paying any cash dividends on its capital stock in the foreseeable future, capital appreciation, if any, will be Signal s sole source of gain.

Signal does not anticipate paying future dividends on its capital stock. Signal currently intends to retain all of its future earnings, as applicable, to finance the growth and development of its business. In addition, the terms of any future debt agreements may preclude Signal from paying dividends. As a result, capital appreciation, if any, of Signal s common stock will be your sole source of gain for the foreseeable future.

Certain of Signal s net operating loss carryforwards have been limited.

Net operating losses incurred by Signal as of June 17, 2014 and prior to the corporate conversion of Signal Genetics LLC into Signal Genetics, Inc. have been used by the members of Signal Genetics LLC to offset gains on other interests and are therefore not able to be carried forward to Signal. The net operating loss carryforward for federal tax purposes held by Signal after the corporate conversion through December 31, 2015 totaled $10.6 million.

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Risks Related to Miragen s Financial Condition and Capital Requirements

Miragen has incurred losses since its inception, has a limited operating history on which to assess its business, and anticipates that it will continue to incur significant losses for the foreseeable future.

Miragen is a clinical development-stage biopharmaceutical company with a limited operating history. Miragen has incurred net losses in each year since its inception in 2006, including net losses of $15.7 million and $5.9 million for the years ended December 31, 2015 and 2014, respectively, and $11.3 million for the nine months ended September 30, 2016. As of September 30, 2016, Miragen had an accumulated deficit of $61.1 million.

As of September 30, 2016, Miragen had cash and cash equivalents of $24.6 million. In September 2016, Miragen received $16.1 million in financing through a follow-on sale of its Series C preferred stock. Additionally, in October 2016, Miragen entered into the Subscription Agreement pursuant to which specified investors agreed to purchase, immediately prior to the consummation of the Merger, shares of Miragen common stock for an aggregate purchase price of $40.7 million. Miragen will continue to require substantial additional capital to continue its clinical development and potential commercialization activities. Accordingly, Miragen will need to raise substantial additional capital to continue to fund its operations. The amount and timing of its future funding requirements will depend on many factors, including the pace and results of its clinical development efforts. Failure to raise capital as and when needed, on favorable terms or at all, would have a negative impact on its financial condition and its ability to develop its product candidates.

Miragen has devoted substantially all of its financial resources to identify, acquire, and develop its product candidates, including conducting clinical trials and providing general and administrative support for its operations. To date, Miragen has financed its operations primarily through the sale of equity securities and convertible promissory notes. The amount of its future net losses will depend, in part, on the rate of its future expenditures and its ability to obtain funding through equity or debt financings, strategic collaborations, or grants. Biopharmaceutical product development is a highly speculative undertaking and involves a substantial degree of risk. Miragen expects losses to increase as it completes Phase 1 development and advances into Phase 2 development its lead product candidates. Miragen has not yet commenced pivotal clinical trials for any product candidate and it may be several years, if ever, before Miragen completes pivotal clinical trials and has a product candidate approved for commercialization. Miragen expects to invest significant funds into the research and development of its current product candidates to determine the potential to advance these product candidates to regulatory approval.

If Miragen obtains regulatory approval to market a product candidate, its future revenue will depend upon the size of any markets in which its product candidates may receive approval, and its ability to achieve sufficient market acceptance, pricing, reimbursement from third-party payors, and adequate market share for its product candidates in those markets. Even if Miragen obtains adequate market share for its product candidates, because the potential markets in which its product candidates may ultimately receive regulatory approval could be very small, Miragen may never become profitable despite obtaining such market share and acceptance of its products.

Miragen expects to continue to incur significant expenses and increasing operating losses for the foreseeable future and its expenses will increase substantially if and as Miragen:

- continues the clinical development of its product candidates;

continues efforts to discover new product candidates;

undertakes the manufacturing of its product candidates or increases volumes manufactured by third parties;

advances its programs into larger, more expensive clinical trials;

initiates additional pre-clinical, clinical, or other trials or studies for its product candidates;

seeks regulatory and marketing approvals and reimbursement for its product candidates;

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establishes a sales, marketing, and distribution infrastructure to commercialize any products for which Miragen may obtain marketing approval and market for itself;

seeks to identify, assess, acquire, and/or develop other product candidates;

makes milestone, royalty or other payments under third-party license agreements;

seeks to maintain, protect, and expand its intellectual property portfolio;

seeks to attract and retain skilled personnel; and

experiences any delays or encounters issues with the development and potential for regulatory approval of its clinical candidates such as safety issues, clinical trial accrual delays, longer follow-up for planned studies, additional major studies, or supportive studies necessary to support marketing approval.

Further, the net losses Miragen incurs may fluctuate significantly from quarter to quarter and year to year, such that a period-to-period comparison of its results of operations may not be a good indication of its future performance.

Miragen has never generated any revenue from product sales and may never be profitable.

Miragen has no products approved for commercialization and has never generated any revenue. Miragen s ability to generate revenue and achieve profitability depends on its ability, alone or with strategic collaborators, to successfully complete the development of, and obtain the regulatory and marketing approvals necessary to commercialize one or more of its product candidates. Miragen does not anticipate generating revenue from product sales for the foreseeable future. Miragen s ability to generate future revenue from product sales depends heavily on its success in many areas, including but not limited to:

completing research and development of its product candidates;

obtaining regulatory and marketing approvals for its product candidates;

manufacturing product candidates and establishing and maintaining supply and manufacturing relationships with third parties that are commercially feasible, meet regulatory requirements and Miragen s supply needs in sufficient quantities to meet market demand for its product candidates, if approved;

marketing, launching and commercializing product candidates for which Miragen obtains regulatory and marketing approval, either directly or with a collaborator or distributor;

gaining market acceptance of its product candidates as treatment options;

addressing any competing products;

protecting and enforcing its intellectual property rights, including patents, trade secrets, and know-how;

negotiating favorable terms in any collaboration, licensing, or other arrangements into which Miragen may enter;

obtaining reimbursement or pricing for its product candidates that supports profitability; and

attracting, hiring, and retaining qualified personnel.

Even if one or more of the product candidates that Miragen develops is approved for commercial sale, Miragen anticipates incurring significant costs associated with commercializing any approved product candidate. Portions of its current pipeline of product candidates have been in-licensed from third parties, which make the commercial sale of such in-licensed products potentially subject to additional royalty and milestone payments to such third-parties. Miragen will also have to develop or acquire manufacturing capabilities or continue to contract with contract manufacturers in order to continue development and potential commercialization of its product

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candidates. For instance, Miragen s current costs of manufacturing its drug product is not commercially feasible and it will need to develop or procure its drug product in a commercially feasible manner in order to successfully commercialize any future approved product, if any. Additionally, if Miragen is not able to generate revenue from the sale of any approved products, Miragen may never become profitable.

Raising additional capital may cause dilution to Miragen s stockholders, restrict its operations or require Miragen to relinquish rights.

To the extent that Miragen raises additional capital through the sale of equity, convertible debt or other securities convertible into equity, including the issuance of shares of capital stock in its concurrent financing in connection with the Merger, the ownership interest of Miragen s stockholders will be diluted, and the terms of these new securities may include liquidation or other preferences that adversely affect rights of Miragen s stockholders. Debt financing, if available at all, would likely involve agreements that include covenants limiting or restricting Miragen s ability to take specific actions, such as incurring additional debt, making capital expenditures, making additional product acquisitions, or declaring dividends. For instance, Miragen s loan and security agreement with Silicon Valley Bank limits Miragen s ability to enter into an asset sale, enter into any change of control, incur additional indebtedness, pay any dividends or enter into specified transactions with its affiliates. If Miragen raises additional funds through strategic collaborations or licensing arrangements with third parties, Miragen may have to relinquish valuable rights to its product candidates or future revenue streams or grant licenses on terms that are not favorable to Miragen. Miragen cannot be assured that it will be able to obtain additional funding if and when necessary to fund its entire portfolio of product candidates to meet its projected plans. If Miragen is unable to obtain funding on a timely basis, Miragen may be required to delay or discontinue one or more of its development programs or the commercialization of any product candidates or be unable to expand its operations or otherwise capitalize on potential business opportunities, which could materially harm Miragen s business, financial condition, and results of operations.

Miragen has also historically received funds from state and federal government grants for research and development. The grants have been, and any future government grants and contracts Miragen may receive may be, subject to the risks and contingencies set forth below under the risk factor titled *Reliance on government funding for Miragen s programs may add uncertainty to its research and commercialization efforts with respect to those programs that are tied to such funding and may impose requirements that limit its ability to take specified actions, increase the costs of commercialization and production of product candidates developed under those programs and subject it to potential financial penalties, which could materially and adversely affect its business, financial condition and results of operations*. Although Miragen might apply for government contracts and grants in the future, it cannot assure you that it will be successful in obtaining additional grants for any product candidates or programs.

Risks Related to the Development of Miragen s Product Candidates

Clinical trials are costly, time consuming and inherently risky, and Miragen may fail to demonstrate safety and efficacy to the satisfaction of applicable regulatory authorities.

Clinical development is expensive, time consuming and involves significant risk. Miragen cannot guarantee that any clinical trials will be conducted as planned or completed on schedule, if at all. A failure of one or more clinical trials can occur at any stage of development. Events that may prevent successful or timely completion of clinical development include but are not limited to:

inability to generate satisfactory pre-clinical, toxicology, or other in vivo or in vitro data or diagnostics to support the initiation or continuation of clinical trials;

delays in reaching agreement on acceptable terms with clinical research organizations, or CROs, and clinical trial sites, the terms of which can be subject to extensive negotiation and may vary significantly among different CROs and clinical trial sites;

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delays in obtaining required institutional review board, or IRB, approval at each clinical trial site;

failure to permit the conduct of a clinical trial by regulatory authorities, after review of an investigational new drug or equivalent foreign application or amendment;

delays in recruiting qualified patients in its clinical trials;

failure by clinical sites or CROs or other third parties to adhere to clinical trial requirements;

failure by Miragen clinical sites, CROs or other third parties to perform in accordance with the good clinical practices requirements of the U.S. Food and Drug Administration, or the FDA, or applicable foreign regulatory guidelines;

patients dropping out of Miragen s clinical trials;

adverse events or tolerability or animal toxicology issues significant enough for the FDA or other regulatory agencies to put any or all clinical trials on hold;

occurrence of adverse events associated with Miragen s product candidates;

changes in regulatory requirements and guidance that require amending or submitting new clinical protocols;

the cost of clinical trials of Miragen s product candidates;

negative or inconclusive results from Miragen s clinical trials which may result in Miragen s deciding, or regulators requiring Miragen, to conduct additional clinical trials or abandon development programs in other ongoing or planned indications for a product candidate; and

delays in reaching agreement on acceptable terms with third-party manufacturers and the time for manufacture of sufficient quantities of its product candidates for use in clinical trials.

Any inability to successfully complete clinical development and obtain regulatory approval for its product candidates could result in additional costs to Miragen or impair its ability to generate revenue. In addition, if Miragen makes manufacturing or formulation changes to its product candidates, Miragen may need to conduct additional pre-clinical trials or the results obtained from such new formulation may not be consistent with previous results obtained. Clinical trial delays could also shorten any periods during which its products have patent protection and may allow competitors to develop and bring products to market before Miragen does, which could impair its ability to successfully commercialize its product candidates and may harm its business and results of operations.

The approach Miragen is taking to discover and develop novel therapeutics using microRNA is unproven and may never lead to marketable products.

The scientific discoveries that form the basis for Miragen s efforts to discover and develop its product candidates are relatively recent. To date, neither Miragen nor any other company has received regulatory approval to market therapeutics utilizing microRNA targeted molecules. The scientific evidence to support the feasibility of developing drugs based on these discoveries is both preliminary and limited. Successful development of microRNA therapeutic products by Miragen will require solving a number of issues, including providing suitable methods of stabilizing the microRNA material and delivering it into target cells in the human body. In addition, any product candidates that Miragen develops may not demonstrate in patients the chemical and pharmacological properties ascribed to them in laboratory and pre-clinical trials, and they may interact with human biological systems in unforeseen, ineffective or even harmful ways. For instance, Miragen s clinical and pre-clinical data to date is not validated and Miragen has no way of knowing if after validation Miragen s clinical trial data will be complete and consistent. If Miragen does not successfully develop and commercialize product candidates based upon this technological approach, it may not become profitable and the value of its capital stock may decline.

Further, Miragen s focus on microRNA technology for developing product candidates as opposed to multiple, more proven technologies for drug development increases the risk associated with its business. If Miragen is not

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successful in developing an approved product using microRNA technology, it may not be able to identify and successfully implement an alternative product development strategy. In addition, work by other companies pursuing similar technologies may encounter setbacks and difficulties that regulators and investors may attribute to Miragen s product candidates, whether appropriate or not.

Miragen s microRNA therapeutic product candidates are based on a relatively novel technology, which makes it difficult to predict the time and cost of development and of subsequently obtaining regulatory approval, if at all. To date, no microRNA therapeutics have been approved in the United States.

Miragen has concentrated its research and development efforts to date on a limited number of product candidates based on its microRNA therapeutic platform and identifying its initial targeted disease indications. Miragen s future success depends on its successful development of viable product candidates. Currently, only two of its product candidates, MRG-106 and MRG-201, are in clinical development, and the remainder of its product candidates are in pre-clinical development. There can be no assurance that Miragen will not experience problems or delays in developing its product candidates and that such problems or delays will not cause unanticipated costs, or that any such development problems can be solved.

Additionally, the FDA has relatively limited experience with microRNA-targeted therapeutics. No regulatory authority has granted approval to any person or entity, including Miragen, to market or commercialize microRNA therapeutics, which may increase the complexity, uncertainty and length of the regulatory approval process for Miragen s product candidates. If Miragen s microRNA product candidates fail to prove to be safe, effective or commercially viable, its product candidate pipeline would have little, if any, value, which would have a material adverse effect on its business, financial condition or results of operations.

The clinical trial and manufacturing requirements of the FDA, the European Medicines Agency, or the EMA, and other regulatory authorities, and the criteria these regulators use to determine the safety and efficacy of a product candidate, vary substantially according to the type, complexity, novelty and intended use and market of the product candidate. The regulatory approval process for novel product candidates such as microRNA therapeutics can be more expensive and take longer than for other, better known or more extensively studied product candidates. It is difficult to determine how long it will take or how much it will cost to obtain regulatory approvals for Miragen s product candidates in either the United States or the European Union or how long it will take to commercialize its product candidates, even if approved for marketing. Approvals by the European Commission may not be indicative of what the FDA, and vice versa, may require for approval and different or additional pre-clinical trials or clinical trials may be required to support regulatory approval in each respective jurisdiction. Delay or failure to obtain, or unexpected costs in obtaining, the regulatory approval necessary to bring a potential product candidate to market could decrease Miragen s ability to generate sufficient product revenue, and Miragen s business, financial condition, results of operations and prospects may be harmed.

Miragen may not be able to develop or identify a technology that can effectively deliver MRG-106, MRG-201 or any other of its microRNA-targeted product candidates to the intended diseased cells or tissues, and any failure in such delivery technology could adversely affect and delay the development of MRG-106, MRG-201 and its other product candidates.

In connection with its Phase 1 clinical trials of MRG-106 and MRG-201, Miragen has used subcutaneous and intradermal injections as the route of product candidate administration. Miragen cannot be certain that subcutaneous or intradermal injections will be capable of delivering adequate levels of MRG-106, MRG-201 or its other product candidates to produce a therapeutic response for all indications. While Miragen is continuing to evaluate the use of subcutaneous, intraveneous and intradermal injections in different indications, and additional delivery technologies

and routes of administration that might enable it to target specific cells with its product candidates, Miragen cannot be certain whether it will be successful in developing such alternative delivery mechanisms. Miragen s failure to effectively deliver any of its product candidates to the intended diseased cells or tissues could adversely affect and delay the development of its product candidates.

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Miragen s product candidates may cause undesirable side effects or have other properties that could delay or prevent their regulatory approval, limit the commercial viability of an approved label, or result in significant negative consequences following marketing approval, if any.

Undesirable side effects caused by its product candidates could cause Miragen or regulatory authorities to interrupt, delay, or terminate clinical trials or even if approved, result in a restrictive label or delay regulatory approval by the FDA or comparable foreign authorities.

In addition, Miragen s MRG-106 and MRG-201 product candidates have been studied in only a limited number of patients with a confirmed diagnosis of MF and healthy volunteers, respectfully, and the most common adverse events of any grade were injection site reactions, including pain, itchiness and swelling. Miragen may experience a higher rate or severity of adverse events and comparable or higher rates of discontinuation in testing in its future clinical trials. There is no guarantee that additional or more severe side effects will not be identified through ongoing clinical trials of Miragen s product candidates for current and other indications. Undesirable side effects and negative results for other indications may negatively impact the development and potential for approval of Miragen s product candidates for their proposed indications.

Additionally, even if one or more of its product candidates receives marketing approval, and Miragen or others later identify undesirable side effects caused by such products, potentially significant negative consequences could result, including but not limited to:

- regulatory authorities may withdraw approvals of such products;
- regulatory authorities may require additional warnings on the label;
- Miragen may be required to create a Risk Evaluation and Mitigation Strategy, or REMS, plan, which could include a medication guide outlining the risks of such side effects for distribution to patients, a communication plan for healthcare providers, and/or other elements to assure safe use;
- Miragen could be sued and held liable for harm caused to patients; and
- its reputation may suffer.

Any of these events could prevent Miragen from achieving or maintaining market acceptance of a product candidate, even if approved, and could significantly harm its business, results of operations, and prospects.

Miragen s product development program may not uncover all possible adverse events that patients who take MRG-106, MRG-201 or its other product candidates may experience. The number of subjects exposed to MRG-106, MRG-201 or its other product candidates and the average exposure time in the clinical development program may be inadequate to detect rare adverse events, or chance findings, that may only be detected once the product is administered to more patients and for greater periods of time.

Clinical trials by their nature utilize a sample of the potential patient population. However, with a limited number of subjects and limited duration of exposure, Miragen cannot be fully assured that rare and severe side effects of MRG-106, MRG-201 or its other product candidates will be uncovered. Such rare and severe side effects may only be uncovered with a significantly larger number of patients exposed to the drug. If such safety problems occur or are identified after MRG-106, MRG-201 or another product candidate reaches the market, the FDA may require that Miragen amend the labeling of the product or recall the product, or may even withdraw approval for the product.

Miragen s microRNA therapeutic approach is novel. Negative public opinion and increased regulatory scrutiny of microRNA or other nucleic acid based therapies may damage public perception of the safety of its product candidates and adversely affect its ability to conduct its business or obtain regulatory approvals for its product candidates.

MicroRNA therapy remains a novel technology, with no microRNA therapy product approved to date in the United States. Public perception may be influenced by claims that microRNA therapy is unsafe, and microRNA

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therapy may not gain the acceptance of the public or the medical community. In particular, Miragen s success will depend upon physicians who specialize in the treatment of the diseases targeted by Miragen s product candidates, prescribing treatments that involve the use of its product candidates in lieu of, or in addition to, existing treatments with which they are familiar and for which greater clinical data may be available. More restrictive government regulations or negative public opinion regarding microRNA or other nucleic acid based therapeutics could have an adverse effect on Miragen s business, financial condition or results of operations and may delay or impair the development and commercialization of its product candidates or demand for any products Miragen may develop. Serious adverse events in microRNA clinical trials for Miragen s competitors products, even if not ultimately attributable to the relevant product candidates, and the resulting publicity, could result in increased government regulation, unfavorable public perception, potential regulatory delays in the testing or approval of Miragen s product candidates, stricter labeling requirements for those product candidates that are approved and a decrease in demand for any such product candidates. For instance, in June 2016, the FDA placed a regulatory hold on the clinical trial of a microRNA or nucleic acid focused biopharmaceutical company with a microRNA product candidate for the treatment of hepatitis C virus due to serious adverse events in that trial. Another microRNA-focused biopharmaceutical company also voluntarily halted an ongoing Phase 1 trial for a microRNA therapy for multiple cancers in September 2016 due to multiple immune-related severe adverse events. Miragen cannot predict what effect, if any, these clinical holds will have on the government and public perception of Miragen s product candidates.

Miragen is heavily dependent on the success of its product candidates, which are in the early stages of clinical development. Some of its product candidates have produced results in pre-clinical settings to date, or for other indications than those for which Miragen contemplates conducting development and seeking FDA approval, and Miragen cannot give any assurance that it will generate data for any of its product candidates sufficient to receive regulatory approval in its planned indications, which will be required before they can be commercialized.

Miragen has invested substantially all of its efforts and financial resources to identify, acquire and develop its portfolio of product candidates. Its future success is dependent on its ability to successfully further develop, obtain regulatory approval for, and commercialize one or more product candidates. Miragen currently generates no revenue from sales of any products, and Miragen may never be able to develop or commercialize a product candidate.

Miragen currently has two product candidates in Phase 1 clinical trials. Of these Miragen product candidates, MRG-106 has only been administered in volunteers with MF. This is only one of the multiple indications for which Miragen plans to develop this product candidate. Additionally, Miragen s clinical and pre-clinical data to date is not validated and Miragen has no way of knowing if after validation Miragen s clinical trial data will be complete and consistent. There can be no assurance that the data that Miragen develops for its product candidates in its planned indications will be sufficient to obtain regulatory approval.

In addition, none of its product candidates have advanced into a pivotal clinical trial for Miragen s proposed indications and it may be years before any such clinical trial is initiated and completed, if at all. Miragen is not permitted to market or promote any of its product candidates before it receives regulatory approval from the FDA or comparable foreign regulatory authorities, and Miragen may never receive such regulatory approval for any of its product candidates. Miragen cannot be certain that any of its product candidates will be successful in clinical trials or receive regulatory approval. Further, its product candidates may not receive regulatory approval even if they are successful in clinical trials. If Miragen does not receive regulatory approvals for its product candidates, Miragen may not be able to continue its operations.

Product development involves a lengthy and expensive process with an uncertain outcome, and results of earlier pre-clinical and clinical trials may not be predictive of future clinical trial results.

Clinical testing is expensive and generally takes many years to complete, and the outcome is inherently uncertain. Failure can occur at any time during the clinical trial process. The results of pre-clinical trials and early

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clinical trials of Miragen s product candidates may not be predictive of the results of larger, later-stage controlled clinical trials. Product candidates that have shown promising results in early-stage clinical trials may still suffer significant setbacks in subsequent clinical trials. Miragen s clinical trials to date have been conducted on a small number of patients in limited numbers of clinical sites for a limited number of indications. Miragen will have to conduct larger, well-controlled trials in its proposed indications to verify the results obtained to date and to support any regulatory submissions for further clinical development. A number of companies in the biopharmaceutical industry have suffered significant setbacks in advanced clinical trials due to lack of efficacy or adverse safety profiles despite promising results in earlier, smaller clinical trials. For instance, in June 2016, the FDA placed a regulatory hold on the clinical trial of a microRNA-focused biopharmaceutical company with a microRNA product candidate for the treatment of hepatitis C virus due to serious adverse events in that trial. Another microRNA-focused biopharmaceutical company also voluntarily halted an ongoing Phase 1 trial for a microRNA therapy for multiple cancers in September 2016 due to multiple immune-related severe adverse events. Moreover, clinical data are often susceptible to varying interpretations and analyses. Miragen does not know whether any Phase 2, Phase 3, or other clinical trials Miragen may conduct will demonstrate consistent or adequate efficacy and safety with respect to the proposed indication for use sufficient to receive regulatory approval or market its drug candidates.

Miragen may use its financial and human resources to pursue a particular research program or product candidate and fail to capitalize on programs or product candidates that may be more profitable or for which there is a greater likelihood of success.

Because Miragen has limited financial and human resources, it may forego or delay pursuit of opportunities with some programs or product candidates or for other indications that later prove to have greater commercial potential. Miragen s resource allocation decisions may cause it to fail to capitalize on viable commercial products or more profitable market opportunities. Miragen s spending on current and future research and development programs and future product candidates for specific indications may not yield any commercially viable products. Miragen may also enter into additional strategic collaboration agreements to develop and commercialize some of its programs and potential product candidates in indications with potentially large commercial markets. If Miragen does not accurately evaluate the commercial potential or target market for a particular product candidate, it may relinquish valuable rights to that product candidate through strategic collaborations, licensing or other royalty arrangements in cases in which it would have been more advantageous for Miragen to retain sole development and commercialization rights to such product candidate, or Miragen may allocate internal resources to a product candidate in a therapeutic area in which it would have been more advantageous to enter into a partnering arrangement.

Miragen may find it difficult to enroll patients in its clinical trials given the limited number of patients who have the diseases for which its product candidates are being studied. Difficulty in enrolling patients could delay or prevent clinical trials of its product candidates.

Identifying and qualifying patients to participate in clinical trials of Miragen s product candidates is essential to its success. The timing of Miragen s clinical trials depends in part on the rate at which Miragen can recruit patients to participate in clinical trials of its product candidates, and Miragen may experience delays in its clinical trials if Miragen encounters difficulties in enrollment.

The eligibility criteria of Miragen s planned clinical trials may further limit the available eligible trial participants as Miragen expects to require that patients have specific characteristics that Miragen can measure or meet the criteria to assure their conditions are appropriate for inclusion in its clinical trials. For instance, Miragen s Phase 1 clinical trial of MRG-106 includes patients with MF. The estimated prevalence of MF is 16,000 to 20,000 cases in the United States and only a subset of this group satisfies the enrollment criteria for Miragen s MRG-106 clinical trial. Miragen may not be able to identify, recruit, and enroll a sufficient number of patients to complete its clinical trials in a timely manner

because of the perceived risks and benefits of the product candidate under study, the availability and efficacy of competing therapies and clinical trials, and the

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willingness of physicians to participate in its planned clinical trials. If patients are unwilling to participate in Miragen s clinical trials for any reason, the timeline for conducting trials and obtaining regulatory approval of its product candidates may be delayed.

If Miragen experiences delays in the completion of, or termination of, any clinical trials of its product candidates, the commercial prospects of its product candidates could be harmed, and its ability to generate product revenue from any of these product candidates could be delayed or prevented. In addition, any delays in completing its clinical trials would likely increase its overall costs, impair product candidate development and jeopardize its ability to obtain regulatory approval relative to its current plans. Any of these occurrences may harm its business, financial condition, and prospects significantly.

Miragen may face potential product liability, and, if successful claims are brought against it, Miragen may incur substantial liability and costs. If the use or misuse of Miragen s product candidates harms patients, or is perceived to harm patients even when such harm is unrelated to its product candidates, Miragen s regulatory approvals, if any, could be revoked or otherwise negatively impacted and Miragen could be subject to costly and damaging product liability claims. If Miragen is unable to obtain adequate insurance or is required to pay for liabilities resulting from a claim excluded from, or beyond the limits of, its insurance coverage, a material liability claim could adversely affect its financial condition.

The use or misuse of Miragen s product candidates in clinical trials and the sale of any products for which Miragen may obtain marketing approval exposes Miragen to the risk of potential product liability claims. Product liability claims might be brought against Miragen by consumers, healthcare providers, pharmaceutical companies or others selling or otherwise coming into contact with its product candidates and approved products, if any. There is a risk that Miragen s product candidates may induce adverse events. If Miragen cannot successfully defend against product liability claims, it could incur substantial liability and costs. Some of its microRNA therapeutics have shown in clinical trials adverse events, including injection site reactions and pain at the injection site, nausea, decreased white blood cell count, neutropenia, elevated aspartate aminotransferase, alanine aminotransferase and creatine kinase levels, prolonged partial thromboplastin time, blurred vision, itchiness, fatigue, headache and microscopic hematuria, among others. There is a risk that Miragen s future product candidates may induce similar or more severe adverse events. Patients with the diseases targeted by Miragen s product candidates may already be in severe and advanced stages of disease and have both known and unknown significant preexisting and potentially life-threatening health risks. During the course of treatment, patients may suffer adverse events, including death, for reasons that may be related to Miragen s product candidates. Such events could subject Miragen to costly litigation, require it to pay substantial amounts of money to injured patients, delay, negatively impact or end its opportunity to receive or maintain regulatory approval to market its products, or require Miragen to suspend or abandon its commercialization efforts. Even in a circumstance in which an adverse event is unrelated to Miragen s product candidates, the investigation into the circumstance may be time-consuming or inconclusive. These investigations may delay Miragen s regulatory approval process or impact and limit the type of regulatory approvals its product candidates receive or maintain. As a result of these factors, a product liability claim, even if successfully defended, could have a material adverse effect on Miragen s business, financial condition or results of operations.

Although Miragen has product liability insurance, which covers its clinical trials in the United States, for up to $5.0 million per occurrence, up to an aggregate limit of $5.0 million, its insurance may be insufficient to reimburse it for any expenses or losses Miragen may suffer. Miragen will also likely be required to increase its product liability insurance coverage for the advanced clinical trials that it plans to initiate. If Miragen obtains marketing approval for any of its product candidates, it will need to expand its insurance coverage to include the sale of commercial products. There is no way to know if Miragen will be able to continue to obtain product liability coverage and obtain expanded coverage if it requires it, in sufficient amounts to protect it against losses due to liability, on acceptable terms, or at all.

Miragen may not have sufficient resources to pay for any liabilities resulting from a claim excluded from, or beyond the limits of, its insurance coverage. Where Miragen has provided indemnities in favor of third parties under its agreements with them, there is also a risk that these third

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parties could incur liability and bring a claim under such indemnities. An individual may bring a product liability claim against Miragen alleging that one of its product candidates causes, or is claimed to have caused, an injury or is found to be unsuitable for consumer use. Any such product liability claims may include allegations of defects in manufacturing, defects in design, a failure to warn of dangers inherent in the product, negligence, strict liability, and a breach of warranties. Claims could also be asserted under state consumer protection acts. Any product liability claim brought against Miragen, with or without merit, could result in:

- withdrawal of clinical trial volunteers, investigators, patients or trial sites or limitations on approved indications;
- the inability to commercialize, or if commercialized, decreased demand for, its product candidates;
- if commercialized, product recalls, withdrawals of labeling, marketing or promotional restrictions or the need for product modification;
- initiation of investigations by regulators;
- loss of revenues;
- substantial costs of litigation, including monetary awards to patients or other claimants;
- liabilities that substantially exceed Miragen s product liability insurance, which Miragen would then be required to pay itself;
- an increase in Miragen s product liability insurance rates or the inability to maintain insurance coverage in the future on acceptable terms, if at all;
- the diversion of management s attention from Miragen s business; and
- damage to Miragen s reputation and the reputation of its products and its technology.

Product liability claims may subject Miragen to the foregoing and other risks, which could have a material adverse effect on its business, financial condition or results of operations.

Risks Related to Regulatory Approval of Miragen s Product Candidates and Other Legal Compliance Matters

A potential breakthrough therapy designation by the FDA for Miragen s product candidates may not lead to a faster development or regulatory review or approval process, and it does not increase the likelihood that Miragen s

product candidates will receive marketing approval.

Miragen may seek a breakthrough therapy designation from the FDA for some of its product candidates. A breakthrough therapy is defined as a drug or biological product that is intended, alone or in combination with one or more other drugs, to treat a serious or life-threatening disease or condition, and preliminary clinical evidence indicates that the drug or biological product may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints, such as substantial treatment effects observed early in clinical development. For drugs or biological products that have been designated as breakthrough therapies, interaction and communication between the FDA and the sponsor of the trial can help to identify the most efficient path for clinical development while minimizing the number of patients placed in ineffective control regimens. Drugs designated as breakthrough therapies by the FDA could also be eligible for accelerated approval.

Designation as a breakthrough therapy is within the discretion of the FDA. Accordingly, even if Miragen believes one of its product candidates meets the criteria for designation as a breakthrough therapy, the FDA may disagree and instead determine not to make such designation. In any event, the receipt of a breakthrough therapy designation for a product candidate may not result in a faster development process, review or approval compared to drugs considered for approval under conventional FDA procedures and does not assure ultimate approval by the FDA. In addition, even if one or more of Miragen s product candidates qualify and are designated as breakthrough therapies, the FDA may later decide that the drugs or biological products no longer meet the conditions for designation and the designation may be rescinded.

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Miragen may seek Fast Track designation for one or more of its product candidates, but it might not receive such designation, and even if Miragen does, such designation may not actually lead to a faster development or regulatory review or approval process.

If a product candidate is intended for the treatment of a serious condition and nonclinical or clinical data demonstrate the potential to address unmet medical need for this condition, a product sponsor may apply for FDA Fast Track designation. If Miragen seeks Fast Track designation for a product candidate, Miragen may not receive it from the FDA. However, even if Miragen receives Fast Track designation, Fast Track designation does not ensure that Miragen will receive marketing approval or that approval will be granted within any particular timeframe. Miragen may not experience a faster development or regulatory review or approval process with Fast Track designation compared to conventional FDA procedures. In addition, the FDA may withdraw Fast Track designation if it believes that the designation is no longer supported by data from Miragen s clinical development program. Fast Track designation alone does not guarantee qualification for the FDA s priority review procedures.

Even if Miragen obtains regulatory approval for a product, Miragen will remain subject to ongoing regulatory requirements.

If any of Miragen s product candidates are approved, Miragen will be subject to ongoing regulatory requirements with respect to manufacturing, labeling, packaging, storage, advertising, promotion, sampling, record-keeping, conduct of post-marketing clinical trials, and submission of safety, efficacy and other post-approval information, including both federal and state requirements in the United States and requirements of comparable foreign regulatory authorities.

Manufacturers and manufacturers facilities are required to continuously comply with FDA and comparable foreign regulatory authority requirements, including ensuring that quality control and manufacturing procedures conform to current Good Manufacturing Practices, or cGMP, regulations and corresponding foreign regulatory manufacturing requirements. As such, Miragen and its contract manufacturers will be subject to continual review and inspections to assess compliance with cGMP and adherence to commitments made in any NDA or marketing authorization application.

Any regulatory approvals that Miragen receives for its product candidates may be subject to limitations on the approved indicated uses for which the product candidate may be marketed or to the conditions of approval, or contain requirements for potentially costly post-marketing testing, including Phase 4 clinical trials, and surveillance to monitor the safety and efficacy of the product candidate. Miragen will be required to report adverse reactions and production problems, if any, to the FDA and comparable foreign regulatory authorities. Any new legislation addressing drug safety issues could result in delays in product development or commercialization, or increased costs to assure compliance. If its original marketing approval for a product candidate was obtained through an accelerated approval pathway, Miragen could be required to conduct a successful post-marketing clinical trial in order to confirm the clinical benefit for its products. An unsuccessful post-marketing clinical trial or failure to complete such a trial could result in the withdrawal of marketing approval.

If a regulatory agency discovers previously unknown problems with a product, such as adverse events of unanticipated severity or frequency, or problems with the facility where the product is manufactured, or disagrees with the promotion, marketing or labeling of a product, the regulatory agency may impose restrictions on that product or Miragen, including requiring withdrawal of the product from the market. If Miragen fails to comply with applicable regulatory requirements, a regulatory agency or enforcement authority may, among other things:

issue warning letters;

impose civil or criminal penalties;

suspend or withdraw regulatory approval;

suspend any of Miragen s ongoing clinical trials;

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refuse to approve pending applications or supplements to approved applications submitted by Miragen;

impose restrictions on Miragen s operations, including closing its contract manufacturers facilities; or

require a product recall.

Any government investigation of alleged violations of law would be expected to require Miragen to expend significant time and resources in response and could generate adverse publicity. Any failure to comply with ongoing regulatory requirements may significantly and adversely affect its ability to develop and commercialize its products and the value of Miragen and its operating results would be adversely affected.

Healthcare legislative reform measures may have a material adverse effect on Miragen s business, financial condition or results of operations.

In the United States, there have been and continue to be a number of legislative initiatives to contain healthcare costs. For example, in March 2010, the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act, or the Health Care Reform Law, was passed, which substantially changes the way health care is financed by both governmental and private insurers, and significantly impacts the U.S. pharmaceutical industry. The Health Care Reform Law, among other things, addresses a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for drugs that are inhaled, infused, instilled, implanted, or injected, increases the minimum Medicaid rebates owed by manufacturers under the Medicaid Drug Rebate Program and extends the rebate program to individuals enrolled in Medicaid managed care organizations, establishes annual fees and taxes on manufacturers of specified branded prescription drugs, and promotes a new Medicare Part D coverage gap discount program.

In addition, other legislative changes have been proposed and adopted in the United States since the Health Care Reform Law was enacted and Miragen expects that additional state and federal healthcare reform measures will be adopted in the future, any of which could limit the amounts that federal and state governments will pay for healthcare products and services, which could result in reduced demand or lower pricing for its product candidates, or additional pricing pressures.

Miragen may be subject, directly or indirectly, to federal and state healthcare fraud and abuse laws, false claims laws, and health information privacy and security laws. If Miragen is unable to comply, or has not fully complied, with such laws, it could face substantial penalties.

If Miragen obtains FDA approval for any of its product candidates and begins commercializing those products in the United States, its operations may be subject to various federal and state fraud and abuse laws, including, without limitation, the federal Anti-Kickback Statute, the federal False Claims Act, and physician sunshine laws and regulations. These laws may impact, among other things, its proposed sales, marketing, and education programs. In addition, Miragen may be subject to patient privacy regulation by both the federal government and the states in which Miragen conduct its business. The laws that may affect its ability to operate include:

the federal Anti-Kickback Statute, which prohibits, among other things, persons from knowingly and willfully soliciting, receiving, offering or paying remuneration, directly or indirectly, to induce, or in return for, the purchase or recommendation of an item or service reimbursable under a federal healthcare program,

such as the Medicare and Medicaid programs;

federal civil and criminal false claims laws and civil monetary penalty laws, which prohibit, among other things, individuals or entities from knowingly presenting, or causing to be presented, claims for payment from Medicare, Medicaid, or other third-party payors that are false or fraudulent;

the federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, which created new federal criminal statutes that prohibit executing a scheme to defraud any healthcare benefit program and making false statements relating to healthcare matters;

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HIPAA, as amended by the Health Information Technology and Clinical Health Act, and its implementing regulations, which imposes specified requirements relating to the privacy, security, and transmission of individually identifiable health information;

the federal physician sunshine requirements under the Health Care Reform Laws requires manufacturers of drugs, devices, biologics, and medical supplies to report annually to the U.S. Department of Health and Human Services information related to payments and other transfers of value to physicians, other healthcare providers, and teaching hospitals, and ownership and investment interests held by physicians and other healthcare providers and their immediate family members and applicable group purchasing organizations; and

state law equivalents of each of the above federal laws, such as anti-kickback and false claims laws that may apply to items or services reimbursed by any third-party payor, including governmental and private payors, to comply with the pharmaceutical industry s voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government, or otherwise restrict payments that may be made to healthcare providers and other potential referral sources; state laws that require drug manufacturers to report information related to payments and other transfers of value to physicians and other healthcare providers or marketing expenditures, and state laws governing the privacy and security of health information in specified circumstances, many of which differ from each other in significant ways and may not have the same effect, thus complicating compliance efforts.

Because of the breadth of these laws and the narrowness of the statutory exceptions and safe harbors available, it is possible that some of Miragen s business activities could be subject to challenge under one or more of such laws. In addition, recent health care reform legislation has strengthened these laws. For example, the Health Care Reform Law, among other things, amends the intent requirement of the federal anti-kickback and criminal healthcare fraud statutes. A person or entity no longer needs to have actual knowledge of this statute or specific intent to violate it. Moreover, the Health Care Reform Law provides that the government may assert that a claim including items or services resulting from a violation of the federal anti-kickback statute constitutes a false or fraudulent claim for purposes of the False Claims Act.

If Miragen s operations are found to be in violation of any of the laws described above or any other governmental regulations that apply to Miragen, Miragen may be subject to penalties, including civil and criminal penalties, damages, fines, exclusion from participation in government health care programs, such as Medicare and Medicaid, imprisonment, and the curtailment or restructuring of its operations, any of which could adversely affect its ability to operate Miragen s business and its results of operations.

Reliance on government funding for Miragen s programs may add uncertainty to its research and commercialization efforts with respect to those programs that are tied to such funding and may impose requirements that limit its ability to take specified actions, increase the costs of commercialization and production of product candidates developed under those programs and subject Miragen to potential financial penalties, which could materially and adversely affect its business, financial condition and results of operations.

During the course of Miragen s development of its product candidates, it has been funded in part through federal and state grants, including but not limited to the funding it received from Yale University, or Yale, pursuant to a subcontract agreement with Yale. In addition to the funding Miragen has received to date, it has applied and intends to continue to apply for federal and state grants to receive additional funding in the future. Contracts and grants funded by the U.S. government, state governments and their related agencies include provisions that reflect the government s

substantial rights and remedies, many of which are not typically found in commercial contracts, including powers of the government to:

require repayment of all or a portion of the grant proceeds, in specified cases with interest, in the event Miragen violates specified covenants pertaining to various matters that include a failure to achieve

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specified milestones or to comply with terms relating to use of grant proceeds, or failure to comply with specified laws;

terminate agreements, in whole or in part, for any reason or no reason;

reduce or modify the government s obligations under such agreements without the consent of the other party;

claim rights, including intellectual property rights, in products and data developed under such agreements;

audit contract related costs and fees, including allocated indirect costs;

suspend the contractor or grantee from receiving new contracts pending resolution of alleged violations of procurement laws or regulations;

impose U.S. manufacturing requirements for products that embody inventions conceived or first reduced to practice under such agreements;

impose qualifications for the engagement of manufacturers, suppliers and other contractors as well as other criteria for reimbursements;

suspend or debar the contractor or grantee from doing future business with the government;

control and potentially prohibit the export of products;

pursue criminal or civil remedies under the False Claims Act, False Statements Act and similar remedy provisions specific to government agreements; and

limit the government s financial liability to amounts appropriated by the U.S. Congress on a fiscal year basis, thereby leaving some uncertainty about the future availability of funding for a program even after it has been funded for an initial period.

In addition to those powers set forth above, the government funding Miragen may receive could also impose requirements to make payments based upon sales of its products, if any, in the future.

Miragen may not have the right to prohibit the U.S. government from using specified technologies developed by it, and Miragen may not be able to prohibit third-party companies, including its competitors, from using those technologies in providing products and services to the U.S. government. The U.S. government generally takes the position that it has the right to royalty-free use of technologies that are developed under U.S. government contracts.

These and other provisions of government grants may also apply to intellectual property Miragen licenses now or in the future.

In addition, government contracts and grants normally contain additional requirements that may increase Miragen s costs of doing business, reduce its profits, and expose it to liability for failure to comply with these terms and conditions. These requirements include, for example:

- specialized accounting systems unique to government contracts and grants;
- mandatory financial audits and potential liability for price adjustments or recoupment of government funds after such funds have been spent;
- public disclosures of some contract and grant information, which may enable competitors to gain insights into Miragen s research program; and
- mandatory socioeconomic compliance requirements, including labor standards, non-discrimination and affirmative action programs and environmental compliance requirements.

If Miragen fails to maintain compliance with any such requirements that may apply to it now or in the future, Miragen may be subject to potential liability and to termination of Miragen s contracts.

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If Miragen fails to comply with environmental, health and safety laws and regulations, Miragen could become subject to fines or penalties or incur costs that could have a material adverse effect on its business, financial condition or results of operations.

Miragen s research and development activities and its third-party manufacturers and suppliers activities involve the controlled storage, use, and disposal of hazardous materials, including the components of its product candidates and other hazardous compounds. Miragen and its manufacturers and suppliers are subject to laws and regulations governing the use, manufacture, storage, handling, and disposal of these hazardous materials. In some cases, these hazardous materials and various wastes resulting from their use are stored at Miragen s and its manufacturers facilities pending their use and disposal. Miragen cannot eliminate the risk of contamination, which could cause an interruption of its commercialization efforts, research and development efforts and business operations, environmental damage resulting in costly clean-up and liabilities under applicable laws and regulations governing the use, storage, handling, and disposal of these materials and specified waste products. Although Miragen believes that the safety procedures utilized by it and its third-party manufacturers for handling and disposing of these materials generally comply with the standards prescribed by these laws and regulations, Miragen cannot guarantee that this is the case or eliminate the risk of accidental contamination or injury from these materials. In such an event, Miragen may be held liable for any resulting damages and such liability could exceed its resources and state or federal or other applicable authorities may curtail Miragen s use of specified materials and/or interrupt its business operations. Furthermore, environmental laws and regulations are complex, change frequently, and have tended to become more stringent. Miragen cannot predict the impact of such changes and cannot be certain of its future compliance. Miragen does not currently carry biological or hazardous waste insurance coverage.

Risks Related to Miragen s Intellectual Property

Miragen may not be successful in obtaining or maintaining necessary rights to microRNA targets, product compounds and processes for its development pipeline through acquisitions and in-licenses.

Presently, Miragen has rights to the intellectual property, through licenses from third parties and under patents and patent applications that Miragen owns, to modulate only a subset of the known microRNA targets. Because Miragen s programs may involve a range of microRNA targets, including targets that require the use of proprietary rights held by third parties, the growth of its business will likely depend in part on Miragen s ability to acquire, in-license or use these proprietary rights. In addition, Miragen s product candidates may require specific formulations to work effectively and efficiently and these rights may be held by others. Miragen may be unable to acquire or in-license any compositions, methods of use, processes or other third-party intellectual property rights from third parties that it identifies. The licensing and acquisition of third-party intellectual property rights is a competitive area, and a number of more established companies are also pursuing strategies to license or acquire third-party intellectual property rights that Miragen may consider attractive. These established companies may have a competitive advantage over Miragen due to their size, cash resources and greater clinical development and commercialization capabilities.

For example, Miragen has previously and may continue to collaborate with U.S. and foreign academic institutions to accelerate its pre-clinical research or development under written agreements with these institutions. Typically, these institutions provide an option to negotiate a license to any of the institution s rights in technology resulting from the collaboration. Regardless of such right of first negotiation for intellectual property, Miragen may be unable to negotiate a license within the specified time frame or under terms that are acceptable to it. If Miragen is unable to do so, the institution may offer the intellectual property rights to other parties, potentially blocking Miragen s ability to pursue its program.

In addition, companies that perceive Miragen to be a competitor may be unwilling to assign or license rights to it. Miragen also may be unable to license or acquire third-party intellectual property rights on terms that would allow it to make an appropriate return on its investment. If Miragen is unable to successfully obtain rights to third-party intellectual property rights, its business, financial condition and prospects for growth could suffer.

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Miragen intends to rely on patent rights for its product candidates and any future product candidates. If Miragen is unable to obtain or maintain exclusivity from the combination of these approaches, Miragen may not be able to compete effectively in its markets.

Miragen relies or will rely upon a combination of patents, trade secret protection, and confidentiality agreements to protect the intellectual property related to its technologies and product candidates. Its success depends in large part on its and its licensors ability to obtain regulatory exclusivity and maintain patent and other intellectual property protection in the United States and in other countries with respect to its proprietary technology and products.

Miragen has sought to protect its proprietary position by filing patent applications in the United States and abroad related to its product candidates that are important to its business. This process is expensive and time consuming, and Miragen may not be able to file and prosecute all necessary or desirable patent applications at a reasonable cost or in a timely manner. It is also possible that Miragen will fail to identify patentable aspects of its research and development output before it is too late to obtain patent protection.

The patent position of biotechnology and pharmaceutical companies generally is highly uncertain and involves complex legal and factual questions for which legal principles remain unsolved. The patent applications that Miragen owns or in-licenses may fail to result in issued patents with claims that cover its product candidates in the United States or in other foreign countries. There is no assurance that all potentially relevant prior art relating to its patents and patent applications has been found, which can invalidate a patent or prevent a patent from issuing from a pending patent application. Even if patents do successfully issue, and even if such patents cover Miragen s product candidates, third parties may challenge their validity, enforceability, or scope, which may result in such patents being narrowed, found unenforceable or invalidated. Furthermore, even if they are unchallenged, Miragen s patents and patent applications may not adequately protect its intellectual property, provide exclusivity for its product candidates, or prevent others from designing around the Miragen claims. Any of these outcomes could impair Miragen s ability to prevent competition from third parties, which may have an adverse impact on its business.

Miragen, independently or together with its licensors, has filed several patent applications covering various aspects of its product candidates. Miragen cannot offer any assurances about which, if any, patents will issue, the breadth of any such patent or whether any issued patents will be found invalid and unenforceable or will be threatened by third parties. Any successful opposition to these patents or any other patents owned by or licensed to Miragen after patent issuance could deprive Miragen of rights necessary for the successful commercialization of any product candidates that Miragen may develop. Further, if Miragen encounters delays in regulatory approvals, the period of time during which Miragen could market a product candidate under patent protection could be reduced.

If Miragen cannot obtain and maintain effective protection of exclusivity from its regulatory efforts and intellectual property rights, including patent protection or data exclusivity, for its product candidates, Miragen may not be able to compete effectively and its business and results of operations would be harmed.

Miragen may not have sufficient patent term protections for its product candidates to effectively protect its business.

Patents have a limited term. In the United States, the statutory expiration of a patent is generally 20 years after it is filed. Although various extensions may be available, the life of a patent, and the protection it affords, is limited. Even if patents covering its product candidates are obtained, once the patent life has expired for a product candidate, Miragen may be open to competition from generic medications. In addition, upon issuance in the United States any patent term can be adjusted based on specified delays caused by the applicant(s) or the USPTO.

Patent term extensions under the Hatch-Waxman Act in the United States and under supplementary protection certificates in Europe may be available to extend the patent or data exclusivity terms of Miragen s product

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candidates. Miragen will likely rely on patent term extensions, and Miragen cannot provide any assurances that any such patent term extensions will be obtained and, if so, for how long. As a result, Miragen may not be able to maintain exclusivity for its product candidates for an extended period after regulatory approval, if any, which would negatively impact its business, financial condition, results of operations and prospects. If Miragen does not have sufficient patent terms or regulatory exclusivity to protect its product candidates, its business and results of operations will be adversely affected.

Changes in U.S. patent law could diminish the value of patents in general, thereby impairing Miragen s ability to protect its products, and recent patent reform legislation could increase the uncertainties and costs surrounding the prosecution of its patent applications and the enforcement or defense of its issued patents.

As is the case with other biotechnology companies, Miragen s success is heavily dependent on patents. Obtaining and enforcing patents in the biotechnology industry involve both technological and legal complexity, and is therefore costly, time-consuming and inherently uncertain. In addition, the United States has recently enacted and is currently implementing wide-ranging patent reform legislation. Recent U.S. Supreme Court rulings have narrowed the scope of patent protection available in specified circumstances and weakened the rights of patent owners in specified situations. In addition to increasing uncertainty with regard to Miragen s ability to obtain patents in the future, this combination of events has created uncertainty with respect to the value of patents, once obtained. Depending on decisions by the U.S. Congress, the federal courts, and the USPTO, the laws and regulations governing patents could change in unpredictable ways that would weaken Miragen s ability to obtain new patents or to enforce Miragen s existing patents and patents that it might obtain in the future. Some of Miragen s patent claims may be affected by the recent U.S. Supreme Court decision in *Association for Molecular Pathology v. Myriad Genetics*. In *Myriad*, the Supreme Court held that unmodified isolated fragments of genomic sequences, such as the DNA constituting the BRCA1 and BRCA2 genes, are not eligible for patent protection because they constitute a product of nature. The exact boundaries of the Supreme Court s decision remain unclear as the Supreme Court did not address other types of nucleic acids, such as isolated microRNAs.

On December 16, 2014, the USPTO issued guidance to patent examiners titled 2014 Interim Guidance on Patent Subject Matter Eligibility (Fed. Reg. 79 (241): 74618-33. These guidelines instruct USPTO examiners on the ramifications of the Prometheus and Myriad rulings and apply the Myriad ruling to natural products and principles including all naturally occurring nucleic acids. In addition, the USPTO continues to provide updates to its guidance and this is a developing area. The recent USPTO guidance could make it impossible for Miragen to pursue similar patent claims in patent applications Miragen may prosecute in the future.

Miragen s patent portfolio contains claims of various types and scope, including chemically modified mimics, as well as methods of medical treatment. The presence of varying claims in Miragen s patent portfolio significantly reduces, but may not eliminate, its exposure to potential validity challenges under *Myriad* or future judicial decisions. However, it is not yet clear what, if any, impact this recent Supreme Court decision or future decisions will have on the operation of Miragen s business.

For Miragen s U.S. patent applications containing a claim not entitled to priority before March 16, 2013, there is a greater level of uncertainty in the patent law. On September 16, 2011, the Leahy-Smith America Invents Act, or the Leahy-Smith Act, was signed into law. The Leahy-Smith Act includes a number of significant changes to U.S. patent law. These include provisions that affect the way patent applications will be prosecuted and may also affect patent litigation. The USPTO has promulgated regulations and developed procedures to govern administration of the Leahy-Smith Act, and many of the substantive changes to patent law associated with the Leahy-Smith Act, and in particular, the first to file provisions, did not come into effect until March 16, 2013. Accordingly, it is not yet clear what, if any, impact the Leahy-Smith Act will have on the operation of Miragen s business. However, the Leahy-Smith

Act and its implementation could increase the uncertainties and costs surrounding the prosecution of its patent applications and the enforcement or defense of its issued patents, all of which could have a material adverse effect on Miragen s business, financial condition or results of operations.

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An important change introduced by the Leahy-Smith Act is that, as of March 16, 2013, the United States transitioned to a first-to-file system for deciding which party should be granted a patent when two or more patent applications are filed by different parties claiming the same invention. A third party that files a patent application in the USPTO after that date but before Miragen could therefore be awarded a patent covering an invention of Miragen s even if Miragen had made the invention before it was made by the third party. This will require Miragen to be cognizant going forward of the time from invention to filing of a patent application. Furthermore, Miragen s ability to obtain and maintain valid and enforceable patents depends on whether the differences between its technology and the prior art allow its technology to be patentable over the prior art. Since patent applications in the United States and most other countries are confidential for a period of time after filing, Miragen cannot be certain that it was the first to either (i) file any patent application related to its product candidates or (ii) invent any of the inventions claimed in its patents or patent applications.

Among some of the other changes introduced by the Leahy-Smith Act are changes that limit where a patentee may file a patent infringement suit and new procedures providing opportunities for third parties to challenge any issued patent in the USPTO. Included in these new procedures is a process known as Inter Partes Review, or IPR, which has been generally used by many third parties over the past two years to invalidate patents. The IPR process is not limited to patents filed after the Leahy-Smith Act was enacted, and would therefore be available to a third party seeking to invalidate any of Miragen s U.S. patents, even those issued before March 16, 2013. Because of a lower evidentiary standard in USPTO proceedings compared to the evidentiary standard in U.S. federal court necessary to invalidate a patent claim, a third party could potentially provide evidence in a USPTO proceeding sufficient for the USPTO to hold a claim invalid even though the same evidence would be insufficient to invalidate the claim if first presented in a district court action. Accordingly, a third party may attempt to use the USPTO procedures to invalidate Miragen s patent claims that would not have been invalidated if first challenged by the third party as a defendant in a district court action.

If Miragen is unable to maintain effective proprietary rights for its product candidates or any future product candidates, Miragen may not be able to compete effectively in its proposed markets.

In addition to the protection afforded by patents, Miragen relies on trade secret protection and confidentiality agreements to protect proprietary know-how that is not patentable or that Miragen elects not to patent, processes for which patents are difficult to enforce and any other elements of its product candidate discovery and development processes that involve proprietary know-how, information or technology that is not covered by patents. However, trade secrets can be difficult to protect. Miragen seeks to protect its proprietary technology and processes, in part, by entering into confidentiality agreements with its employees, consultants, scientific advisors, and contractors. Miragen also seeks to preserve the integrity and confidentiality of its data and trade secrets by maintaining physical security of its premises and physical and electronic security of its information technology systems. While Miragen has confidence in these individuals, organizations and systems, agreements or security measures may be breached, and Miragen may not have adequate remedies for any breach. In addition, its trade secrets may otherwise become known or be independently discovered by competitors.

Although Miragen expects all of its employees and consultants to assign their inventions to Miragen, and all of its employees, consultants, advisors, and any third parties who have access to its proprietary know-how, information, or technology to enter into confidentiality agreements, Miragen cannot provide any assurances that all such agreements have been duly executed or that its trade secrets and other confidential proprietary information will not be disclosed or that competitors will not otherwise gain access to its trade secrets or independently develop substantially equivalent information and techniques. Misappropriation or unauthorized disclosure of Miragen s trade secrets could impair its competitive position and may have a material adverse effect on its business, financial condition or results of operations. Additionally, if the steps taken to maintain its trade secrets are deemed inadequate, Miragen may have

insufficient recourse against third parties for misappropriating the trade secret.

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Third-party claims of intellectual property infringement may prevent or delay Miragen s development and commercialization efforts.

Miragen s commercial success depends in part on its ability to develop, manufacture, market and sell its product candidates and use its proprietary technology without infringing the patent rights of third parties. Numerous third-party U.S. and non-U.S. issued patents and pending applications exist in the area of microRNA. Miragen is aware of U.S. and foreign patents and pending patent applications owned by third parties that cover therapeutic uses of microRNA replacements and inhibitors. Miragen is currently monitoring these patents and patent applications. Miragen may in the future pursue available proceedings in the U.S. and foreign patent offices to challenge the validity of these patents and patent applications. In addition, or alternatively, Miragen may consider whether to seek to negotiate a license of rights to technology covered by one or more of such patents and patent applications. If any patents or patent applications cover its product candidates or technologies, Miragen may not be free to manufacture or market its product candidates, including MRG-106 or MRG-201, as planned, absent such a license, which may not be available to Miragen on commercially reasonable terms, or at all.

It is also possible that Miragen has failed to identify relevant third-party patents or applications. For example, applications filed before November 29, 2000 and applications filed after that date that will not be filed outside the United States remain confidential until patents issue. Moreover, it is difficult for industry participants, including Miragen, to identify all third-party patent rights that may be relevant to its product candidates and technologies because patent searching is imperfect due to differences in terminology among patents, incomplete databases and the difficulty in assessing the meaning of patent claims. Miragen may fail to identify relevant patents or patent applications or may identify pending patent applications of potential interest but incorrectly predict the likelihood that such patent applications may issue with claims of relevance to its technology. In addition, Miragen may be unaware of one or more issued patents that would be infringed by the manufacture, sale or use of a current or future product candidate, or Miragen may incorrectly conclude that a third-party patent is invalid, unenforceable or not infringed by its activities. Additionally, pending patent applications that have been published can, subject to specified limitations, be later amended in a manner that could cover Miragen s technologies, its product candidates or the use of its product candidates.

There have been many lawsuits and other proceedings involving patent and other intellectual property rights in the biotechnology and pharmaceutical industries, including patent infringement lawsuits, interferences, oppositions, and reexamination proceedings before the USPTO and corresponding foreign patent offices. Numerous U.S. and foreign issued patents and pending patent applications, which are owned by third parties, exist in the fields in which Miragen is developing product candidates. As the biotechnology and pharmaceutical industries expand and more patents are issued, the risk increases that its product candidates may be subject to claims of infringement of the patent rights of third parties.

Parties making claims against Miragen may obtain injunctive or other equitable relief, which could effectively block its ability to further develop and commercialize one or more of its product candidates. Defense of these claims, regardless of their merit, would involve substantial litigation expense and would be a substantial diversion of employee resources from its business. In the event of a successful claim of infringement against Miragen, Miragen may have to pay substantial damages, including treble damages and attorneys fees for willful infringement, pay royalties, redesign its infringing products or obtain one or more licenses from third parties, which may be impossible or require substantial time and monetary expenditure.

Miragen may not be successful in meeting its obligations under its existing license agreements necessary to maintain its product candidate licenses in effect. In addition, if required in order to commercialize its product candidates, Miragen may be unsuccessful in obtaining or maintaining necessary rights to its product candidates

through acquisitions and in-licenses.

Miragen currently has rights to the intellectual property, through licenses from third parties and under patents that Miragen does not own, to develop and commercialize its product candidates. Because its programs may

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require the use of proprietary rights held by third parties, the growth of its business will likely depend in part on its ability to maintain in effect these proprietary rights. Any termination of license agreements with third parties with respect to its product candidates would be expected to negatively impact its business prospects.

Miragen may be unable to acquire or in-license any compositions, methods of use, processes, or other third-party intellectual property rights from third parties that Miragen identifies as necessary for its product candidates. The licensing and acquisition of third-party intellectual property rights is a competitive area, and a number of more established companies are also pursuing strategies to license or acquire third-party intellectual property rights that Miragen may consider attractive. These established companies may have a competitive advantage over Miragen due to their size, cash resources, and greater clinical development and commercialization capabilities. In addition, companies that perceive Miragen to be a competitor may be unwilling to assign or license rights to Miragen. Even if Miragen is able to license or acquire third-party intellectual property rights that are necessary for its product candidates, there can be no assurance that they will be available on favorable terms.

Miragen collaborates with U.S. and foreign academic institutions to identify product candidates, accelerate its research and conduct development. Typically, these institutions have provided Miragen with an option to negotiate an exclusive license to any of the institution s rights in the patents or other intellectual property resulting from the collaboration. Regardless of such option, Miragen may be unable to negotiate a license within the specified timeframe or under terms that are acceptable to Miragen. If Miragen is unable to do so, the institution may offer the intellectual property rights to other parties, potentially blocking its ability to pursue a program of interest to Miragen.

If Miragen is unable to successfully obtain and maintain rights to required third-party intellectual property, Miragen may have to abandon development of that product candidate or pay additional amounts to the third-party, and its business and financial condition could suffer.

The patent protection and patent prosecution for some of Miragen s product candidates is dependent on third parties.

While Miragen normally seeks and gains the right to fully prosecute the patents relating to its product candidates, there may be times when patents relating to its product candidates are controlled by its licensors. For instance, this is the case with its agreement with Santaris Pharma A/S, which has changed its name to Roche Innovation Center Copenhagen A/S, or RICC, who is primarily responsible for the prosecution of patents and patent applications licensed to Miragen under the applicable agreement. If they or any of its future licensors fail to appropriately and broadly prosecute and maintain patent protection for patents covering any of its product candidates, its ability to develop and commercialize those product candidates may be adversely affected and Miragen may not be able to prevent competitors from making, using, importing, and selling competing products. In addition, even where Miragen now has the right to control patent prosecution of patents and patent applications Miragen has licensed from third parties, Miragen may still be adversely affected or prejudiced by actions or inactions of its licensors in effect from actions prior to Miragen assuming control over patent prosecution.

If Miragen fails to comply with obligations in the agreements under which Miragen licenses intellectual property and other rights from third parties or otherwise experience disruptions to its business relationships with its licensors, Miragen could lose license rights that are important to its business.

Miragen is a party to a number of intellectual property license and supply agreements that are important to its business and expects to enter into additional license agreements in the future. Miragen s existing agreements impose, and Miragen expects that future license agreements will impose, various diligence, milestone payment, royalty, purchasing, and other obligations on it. If Miragen fails to comply with its obligations under these agreements, or

Miragen is subject to a bankruptcy, its agreements may be subject to termination by the licensor, in which event Miragen would not be able to develop, manufacture, or market products covered by the license or subject to supply commitments.

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Miragen may be involved in lawsuits to protect or enforce its patents or the patents of its licensors, which could be expensive, time consuming, and unsuccessful.

Competitors may infringe Miragen s patents or the patents of its licensors. If Miragen or one of its licensing partners were to initiate legal proceedings against a third party to enforce a patent covering one of its product candidates, the defendant could counterclaim that the patent covering its product candidate is invalid and/or unenforceable. In patent litigation in the United States, defendant counterclaims alleging invalidity and/or unenforceability are commonplace. Grounds for a validity challenge could be an alleged failure to meet any of several statutory requirements, including lack of novelty, obviousness, written description, clarity or non-enablement. Grounds for an unenforceability assertion could be an allegation that someone connected with prosecution of the patent withheld relevant information from the USPTO, or made a misleading statement, during prosecution. The outcome following legal assertions of invalidity and unenforceability is unpredictable.

Interference proceedings provoked by third parties or brought by Miragen or declared by the USPTO may be necessary to determine the priority of inventions with respect to Miragen s patents or patent applications or those of its licensors. An unfavorable outcome could require Miragen to cease using the related technology or to attempt to license rights to it from the prevailing party. Miragen s business could be harmed if the prevailing party does not offer Miragen a license on commercially reasonable terms. Its defense of litigation or interference proceedings may fail and, even if successful, may result in substantial costs and distract its management and other employees. In addition, the uncertainties associated with litigation could have a material adverse effect on its ability to raise the funds necessary to continue its clinical trials, continue its research programs, license necessary technology from third parties, or enter into development partnerships that would help Miragen bring its product candidates to market.

Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of Miragen s confidential information could be compromised by disclosure during this type of litigation. There could also be public announcements of the results of hearings, motions, or other interim proceedings or developments. If securities analysts or investors perceive these results to be negative, it could have a material adverse effect on the price of its common stock.

Miragen may be subject to claims that its employees, consultants, or independent contractors have wrongfully used or disclosed confidential information of third parties or that its employees have wrongfully used or disclosed alleged trade secrets of their former employers.

Miragen employs individuals who were previously employed at universities or other biotechnology or pharmaceutical companies, including Miragen s competitors or potential competitors. Although Miragen has written agreements and makes every effort to ensure that its employees, consultants, and independent contractors do not use the proprietary information or intellectual property rights of others in their work for Miragen, Miragen may in the future be subject to any claims that its employees, consultants, or independent contractors have wrongfully used or disclosed confidential information of third parties. Litigation may be necessary to defend against these claims. If Miragen fails in defending any such claims, in addition to paying monetary damages, Miragen may lose valuable intellectual property rights or personnel, which could adversely impact its business. Even if Miragen is successful in defending against such claims, litigation could result in substantial costs and be a distraction to management and other employees.

Miragen may not be able to protect its intellectual property rights throughout the world.

Filing, prosecuting, and defending patents on product candidates in all countries throughout the world would be prohibitively expensive, and its intellectual property rights in some countries outside the United States can be less extensive than those in the United States. In addition, the laws of some foreign countries do not protect intellectual

property rights to the same extent as federal and state laws in the United States. Competitors may use Miragen s technologies in jurisdictions where Miragen has not obtained patent protection to develop its own

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products and may also export infringing products to territories where Miragen has patent protection, but enforcement is not as strong as that in the United States. These products may compete with its products and its patents or other intellectual property rights may not be effective or sufficient to prevent them from competing.

Many companies have encountered significant problems in protecting and defending intellectual property rights in foreign jurisdictions. The legal systems of some countries, particularly some developing countries, do not favor the enforcement of patents, trade secrets, and other intellectual property protection, particularly those relating to biotechnology products, which could make it difficult for Miragen to stop the infringement of its patents or marketing of competing products in violation of its proprietary rights generally. Proceedings to enforce Miragen s patent rights in foreign jurisdictions, whether or not successful, could result in substantial costs and divert Miragen s efforts and attention from other aspects of its business, could put Miragen s patents at risk of being invalidated or interpreted narrowly and its patent applications at risk of not issuing and could provoke third parties to assert claims against Miragen. Miragen may not prevail in any lawsuits that Miragen initiates and the damages or other remedies awarded, if any, may not be commercially meaningful. Accordingly, its efforts to enforce its intellectual property rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that Miragen develops or licenses.

Risks Related to Miragen s Reliance on Third Parties

Miragen relies on third parties to conduct its clinical trials, manufacture its product candidates and perform other services. If these third parties do not successfully perform and comply with regulatory requirements, Miragen may not be able to successfully complete clinical development, obtain regulatory approval or commercialize its product candidates and its business could be substantially harmed.

Miragen has relied upon and plans to continue to rely upon third-party CROs to conduct, monitor and manage its ongoing clinical programs. Miragen relies on these parties for execution of clinical trials and manages and controls only some aspects of their activities. Miragen remains responsible for ensuring that each of its trials is conducted in accordance with the applicable protocol, legal, regulatory, and scientific standards and its reliance on the CROs does not relieve Miragen of its regulatory responsibilities. Miragen and its CROs and other vendors are required to comply with all applicable laws, regulations and guidelines, including those required by the FDA and comparable foreign regulatory authorities for all of its product candidates in clinical development. If Miragen or any of its CROs or vendors fail to comply with applicable laws, regulations and guidelines, the results generated in its clinical trials may be deemed unreliable and the FDA or comparable foreign regulatory authorities may require Miragen to perform additional clinical trials before approving its marketing applications. Miragen cannot be assured that its CROs and other vendors will meet these requirements, or that upon inspection by any regulatory authority, such regulatory authority will determine that efforts, including any of its clinical trials, comply with applicable requirements. Its failure to comply with these laws, regulations and guidelines may require Miragen to repeat clinical trials, which would be costly and delay the regulatory approval process.

If any of Miragen s relationships with these third-party CROs terminate, Miragen may not be able to enter into arrangements with alternative CROs in a timely manner or do so on commercially reasonable terms. In addition, Miragen s CROs may not prioritize Miragen s clinical trials relative to those of other customers and any turnover in personnel or delays in the allocation of CRO employees by the CRO may negatively affect its clinical trials. If CROs do not successfully carry out their contractual duties or obligations or meet expected deadlines, Miragen s clinical trials may be delayed or terminated and Miragen may not be able to meet its current plans with respect to its product candidates. CROs may also involve higher costs than anticipated, which could negatively affect Miragen s financial condition and operations.

In addition, Miragen does not currently have, nor does Miragen currently plan to establish the capability to manufacture product candidates for use in the conduct of its clinical trials, and Miragen lacks the resources and the capability to manufacture any of its product candidates on a clinical or commercial scale without the use of third-party manufacturers. Miragen plans to rely on third-party manufacturers and their responsibilities will

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include purchasing from third-party suppliers the materials necessary to produce its product candidates for its clinical trials and regulatory approval. There are expected to be a limited number of suppliers for the active ingredients and other materials that Miragen expects to use to manufacture its product candidates, and Miragen may not be able to identify alternative suppliers to prevent a possible disruption of the manufacture of its product candidates for its clinical trials, and, if approved, ultimately for commercial sale. Although Miragen generally does not expect to begin a clinical trial unless Miragen believes it has a sufficient supply of a product candidate to complete the trial, any significant delay or discontinuity in the supply of a product candidate, or the active ingredient or other material components in the manufacture of the product candidate could delay completion of its clinical trials and potential timing for regulatory approval of its product candidates, which would harm its business and results of operations.

Miragen relies and expects to continue to rely on third parties to manufacture its clinical product supplies, and Miragen intends to rely on third parties to produce and process its product candidates, if approved, and Miragen s commercialization of any of its product candidates could be stopped, delayed or made less profitable if those third parties fail to obtain approval of government regulators, fail to provide Miragen with sufficient quantities of drug product, or fail to do so at acceptable quality levels or prices.

Miragen does not currently have nor does it currently plan to develop the infrastructure or capability internally to manufacture its clinical supplies for use in the conduct of Miragen s clinical trials, and Miragen lacks the resources and the capability to manufacture any of its product candidates on a clinical or commercial scale. Miragen currently relies on outside vendors to manufacture its clinical supplies of its product candidates and plans to continue relying on third parties to manufacture its product candidates on a commercial scale, if approved.

Miragen does not yet have sufficient information to reliably estimate the cost of the commercial manufacturing of its product candidates and its current costs to manufacture its drug products is not commercially feasible, and the actual cost to manufacture its product candidates could materially and adversely affect the commercial viability of its product candidates. As a result, Miragen may never be able to develop a commercially viable product.

In addition, Miragen s reliance on third-party manufacturers exposes Miragen to the following additional risks:

- Miragen may be unable to identify manufacturers on acceptable terms or at all.
- Miragen s third-party manufacturers might be unable to timely formulate and manufacture Miragen s product or produce the quantity and quality required to meet Miragen s clinical and commercial needs, if any.
- Contract manufacturers may not be able to execute Miragen s manufacturing procedures appropriately.
- Miragen s future third-party manufacturers may not perform as agreed or may not remain in the contract manufacturing business for the time required to supply its clinical trials or to successfully produce, store and distribute its products.
- Manufacturers are subject to ongoing periodic unannounced inspection by the FDA and corresponding state agencies to ensure strict compliance with cGMPs and other government regulations and corresponding

foreign standards. Miragen does not have control over third-party manufacturers compliance with these regulations and standards.

Miragen may not own, or may have to share, the intellectual property rights to any improvements made by Miragen s third-party manufacturers in the manufacturing process for its product candidates.

Miragen s third-party manufacturers could breach or terminate their agreement with Miragen.

Each of these risks could delay Miragen s clinical trials, the approval, if any of its product candidates by the FDA or the commercialization of its product candidates or result in higher costs or deprive Miragen of potential

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product revenue. In addition, Miragen relies on third parties to perform release testing on its product candidates prior to delivery to patients. If these tests are not appropriately conducted and test data are not reliable, patients could be put at risk of serious harm and could result in product liability suits.

The manufacture of medical products is complex and requires significant expertise and capital investment, including the development of advanced manufacturing techniques and process controls. Manufacturers of medical products often encounter difficulties in production, particularly in scaling up and validating initial production and absence of contamination. These problems include difficulties with production costs and yields, quality control, including stability of the product, quality assurance testing, operator error, shortages of qualified personnel, as well as compliance with strictly enforced federal, state and foreign regulations. Furthermore, if contaminants are discovered in Miragen s supply of its product candidates or in the manufacturing facilities, such manufacturing facilities may need to be closed for an extended period of time to investigate and remedy the contamination. Miragen cannot be assured that any stability or other issues relating to the manufacture of its product candidates will not occur in the future. Additionally, Miragen s manufacturers may experience manufacturing difficulties due to resource constraints or as a result of labor disputes or unstable political environments. If Miragen s manufacturers were to encounter any of these difficulties, or otherwise fail to comply with their contractual obligations, Miragen s ability to provide its product candidates to patients in clinical trials would be jeopardized. Any delay or interruption in the supply of clinical trial supplies could delay the completion of clinical trials, increase the costs associated with maintaining clinical trial programs and, depending upon the period of delay, require Miragen to commence new clinical trials at additional expense or terminate clinical trials completely.

Miragen may be unable to realize the potential benefits of any collaboration.

Even if Miragen is successful in entering into a collaboration with respect to the development and/or commercialization of one or more product candidates, there is no guarantee that the collaboration will be successful. Collaborations may pose a number of risks, including:

- collaborators often have significant discretion in determining the efforts and resources that they will apply to the collaboration, and may not commit sufficient resources to the development, marketing or commercialization of the product or products that are subject to the collaboration;

- collaborators may not perform their obligations as expected;

- any such collaboration may significantly limit Miragen s share of potential future profits from the associated program, and may require it to relinquish potentially valuable rights to its current product candidates, potential products or proprietary technologies or grant licenses on terms that are not favorable to Miragen;

- collaborators may cease to devote resources to the development or commercialization of Miragen s product candidates if the collaborators view its product candidates as competitive with their own products or product candidates;

disagreements with collaborators, including disagreements over proprietary rights, contract interpretation or the course of development, might cause delays or termination of the development or commercialization of product candidates, and might result in legal proceedings, which would be time consuming, distracting and expensive;

collaborators may be impacted by changes in their strategic focus or available funding, or business combinations involving them, which could cause them to divert resources away from the collaboration;

collaborators may infringe the intellectual property rights of third parties, which may expose Miragen to litigation and potential liability;

the collaborations may not result in Miragen achieving revenues to justify such transactions; and

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collaborations may be terminated and, if terminated, may result in a need for Miragen to raise additional capital to pursue further development or commercialization of the applicable product candidate.

As a result, a collaboration may not result in the successful development or commercialization of Miragen s product candidates.

For instance, in October 2011, Miragen entered into a strategic alliance with Les Laboratoires Servier and the Institut de Recherches Servier, or Servier, for the research, development, and commercialization of RNA-targeting therapeutics in cardiovascular disease, or the Servier Collaboration Agreement, which was subsequently amended in May 2013, May 2014, May 2015 and September 2016. Under the Servier Collaboration Agreement, Miragen granted Servier an exclusive license to research, develop, and commercialize RNA-targeting therapeutics for three targets in the cardiovascular field. Servier s rights to each of the targets are limited to therapeutics in the cardiovascular field in their territory, which is worldwide except for the United States and Japan. Miragen retains all rights for each named target in the United States and Japan and for any products or product candidates outside of the cardiovascular field. Miragen cannot guarantee that any product candidate will ever be successfully commercialized under the Servier Collaboration Agreement. If no product candidate subject to the Servier Collaboration Agreement is successfully commercialized, Miragen may never receive additional milestone or any royalty payments under the Servier Collaboration Agreement. Also, due to restrictions contained in the Servier Collaboration Agreement, Miragen may not be able to effectively develop, market or commercialize any such product candidate in the United States and Japan.

Miragen enters into various contracts in the normal course of its business in which Miragen indemnifies the other party to the contract. In the event Miragen has to perform under these indemnification provisions, it could have a material adverse effect on its business, financial condition and results of operations.

In the normal course of business, Miragen periodically enters into academic, commercial, service, collaboration, licensing, consulting and other agreements that contain indemnification provisions. With respect to Miragen s academic and other research agreements, Miragen typically indemnifies the institution and related parties from losses arising from claims relating to the products, processes or services made, used, sold or performed pursuant to the agreements for which Miragen has secured licenses, and from claims arising from Miragen s or its sublicensees exercise of rights under the agreement. With respect to Miragen s collaboration agreements, Miragen indemnifies its collaborators from any third-party product liability claims that could result from the production, use or consumption of the product, as well as for alleged infringements of any patent or other intellectual property right by a third party. With respect to consultants, Miragen indemnifies them from claims arising from the good faith performance of their services.

Should Miragen s obligation under an indemnification provision exceed applicable insurance coverage or if Miragen were denied insurance coverage, Miragen s business, financial condition and results of operations could be adversely affected. Similarly, if Miragen is relying on a collaborator to indemnify Miragen and the collaborator is denied insurance coverage or the indemnification obligation exceeds the applicable insurance coverage, and if the collaborator does not have other assets available to indemnify Miragen, its business, financial condition and results of operations could be adversely affected.

Risks Related to Commercialization of Miragen s Product Candidates

Miragen currently has limited marketing and sales experience. If Miragen is unable to establish sales and marketing capabilities or enter into agreements with third parties to market and sell its product candidates, Miragen may be unable to generate any revenue.

Although some of its employees may have marketed, launched, and sold other pharmaceutical products in the past while employed at other companies, Miragen has no experience selling and marketing its product candidates

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and Miragen currently has no marketing or sales organization. To successfully commercialize any products that may result from its development programs, Miragen will need to find one or more collaborators to commercialize its products or invest in and develop these capabilities, either on its own or with others, which would be expensive, difficult and time consuming. Any failure or delay in the timely development of Miragen s internal commercialization capabilities could adversely impact the potential for success of its products.

If commercialization collaborators do not commit sufficient resources to commercialize its future products and Miragen is unable to develop the necessary marketing and sales capabilities on its own, Miragen will be unable to generate sufficient product revenue to sustain or grow its business. Miragen may be competing with companies that currently have extensive and well-funded marketing and sales operations, particularly in the markets its product candidates are intended to address. Without appropriate capabilities, whether directly or through third-party collaborators, Miragen may be unable to compete successfully against these more established companies.

Miragen may attempt to form collaborations in the future with respect to its product candidates, but it may not be able to do so, which may cause it to alter its development and commercialization plans.

Miragen may attempt to form strategic collaborations, create joint ventures or enter into licensing arrangements with third parties with respect to its programs that it believes will complement or augment its existing business. Miragen may face significant competition in seeking appropriate strategic collaborators, and the negotiation process to secure appropriate terms is time consuming and complex. Miragen may not be successful in its efforts to establish such a strategic collaboration for any product candidates and programs on terms that are acceptable to it, or at all. This may be because Miragen s product candidates and programs may be deemed to be at too early of a stage of development for collaborative effort, its research and development pipeline may be viewed as insufficient, the competitive or intellectual property landscape may be viewed as too intense or risky, and/or third parties may not view its product candidates and programs as having sufficient potential for commercialization, including the likelihood of an adequate safety and efficacy profile.

Any delays in identifying suitable collaborators and entering into agreements to develop and/or commercialize Miragen s product candidates could delay the development or commercialization of its product candidates, which may reduce their competitiveness even if they reach the market. Absent a strategic collaborator, Miragen would need to undertake development and/or commercialization activities at its own expense. If Miragen elects to fund and undertake development and/or commercialization activities on its own, it may need to obtain additional expertise and additional capital, which may not be available to it on acceptable terms or at all. If Miragen is unable to do so, it may not be able to develop its product candidates or bring them to market and its business may be materially and adversely affected.

If the market opportunities for its product candidates are smaller than Miragen believes they are, Miragen may not meet its revenue expectations and, assuming approval of a product candidate, its business may suffer. Because the patient populations in the market for its product candidates may be small, Miragen must be able to successfully identify patients and acquire a significant market share to achieve profitability and growth.

Given the small number of patients who have the diseases that Miragen is targeting, its eligible patient population and pricing estimates may differ significantly from the actual market addressable by its product candidates. For instance, Miragen s Phase 1 clinical trial in MRG-106 is focused on MF. The estimated prevalence of MF is 16,000 to 20,000 cases in the United States, only a subset of which may benefit from treatment with MRG-106. Miragen s projections of both the number of people who have these diseases, as well as the subset of people with these diseases who have the potential to benefit from treatment with its product candidates, are based on its beliefs and estimates. These estimates have been derived from a variety of sources, including the scientific literature, patient foundations, or market research,

and may prove to be incorrect. Further, new studies may change the estimated incidence or prevalence of these diseases. The number of patients may turn out to be lower than expected. Additionally, while Miragen believes that the data in its Phase 1 clinical trials for MRG-106 and

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MRG-201 are supportive of application to other indications, there can be no assurance that its clinical trials will successfully address any additional indications. Likewise, the potentially addressable patient population for each of its product candidates may be limited or may not be amenable to treatment with its product candidates, and new patients may become increasingly difficult to identify or gain access to, which would adversely affect its business, financial condition, results of operations and prospects.

Miragen faces substantial competition and its competitors may discover, develop or commercialize products faster or more successfully than Miragen.

The development and commercialization of new drug products is highly competitive. Miragen faces competition from major pharmaceutical companies, specialty pharmaceutical companies, biotechnology companies, universities and other research institutions worldwide with respect to MRG-106, MRG-201 and the other product candidates that it may seek to develop or commercialize in the future. Miragen is aware that the following companies have therapeutics marketed or in development for CTCL: Actelion Ltd, Bristol-Myers Squibb Company, Celgene Corporation, Merck & Co., Inc., Mylan Pharmaceuticals Inc., Novartis International AG, Spectrum Pharmaceuticals, Inc., Seattle Genetics, Inc., Takeda Pharmaceutical Company Ltd, and Valeant Pharmaceuticals International, Inc. Miragen is also aware that the several companies have marketed therapeutics for pulmonary fibrosis, including Boehringer Ingelheim GmbH and F. Hoffmann-La Roche Ltd. Miragen s competitors may succeed in developing, acquiring or licensing technologies and drug products that are more effective or less costly than MRG-106, MRG-201 or any other product candidates that Miragen is currently developing or that it may develop, which could render its product candidates obsolete and noncompetitive.

In addition to the competition Miragen faces from alternative therapies for the diseases it intends to target with its product candidates, Miragen is also aware of several companies that are also working specifically to develop microRNA therapeutics, including Mirna Therapeutics, Inc., Regulus Therapeutics, Inc., Microlin Bio, Inc. and InteRNA Technologies B.V. Further there are several companies working to develop other types of oligonucleotide therapeutic products, including Ionis Pharmaceuticals, Inc., Alnylam Pharmaceuticals, Inc., Dicerna Pharmaceuticals, Inc., RaNa Therapeutics, Inc., RXi Pharmaceuticals Corporation, and Silence Therapeutics AG. Many of Miragen s competitors have substantially greater financial, technical and other resources, such as larger research and development staff and experienced marketing and manufacturing organizations. Third-party payors, including governmental and private insurers, may also encourage the use of generic products. For example, if MRG-106 or MRG-201 is approved, it may be priced at a significant premium over other competitive products. This may make it difficult for MRG-106, MRG-201 or any other future products to compete with these products.

If Miragen s competitors obtain marketing approval from the FDA or comparable foreign regulatory authorities for their product candidates more rapidly than Miragen, it could result in its competitors establishing a strong market position before Miragen is able to enter the market.

Many of Miragen s competitors have materially greater name recognition and financial, manufacturing, marketing, research and drug development resources than it does. Additional mergers and acquisitions in the biotechnology and pharmaceutical industries may result in even more resources being concentrated in its competitors. Large pharmaceutical companies in particular have extensive expertise in pre-clinical and clinical testing and in obtaining regulatory approvals for drugs. In addition, academic institutions, government agencies, and other public and private organizations conducting research may seek patent protection with respect to potentially competitive products or technologies. These organizations may also establish exclusive collaborative or licensing relationships with Miragen s competitors. Failure of MRG-106, MRG-201 or other product candidates to effectively compete against established treatment options or in the future with new products currently in development would harm Miragen s business, financial condition, results of operations and prospects.

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The commercial success of any of Miragen s current or future product candidates will depend upon the degree of market acceptance by physicians, patients, third-party payors, and others in the medical community.

Even with the approvals from the FDA and comparable foreign regulatory authorities, the commercial success of Miragen s products will depend in part on the health care providers, patients, and third-party payors accepting its product candidates as medically useful, cost-effective, and safe. Any product that Miragen brings to the market may not gain market acceptance by physicians, patients and third-party payors. The degree of market acceptance of any of Miragen s products will depend on a number of factors, including but not limited to:

- the efficacy of the product as demonstrated in clinical trials and potential advantages over competing treatments;
- the prevalence and severity of the disease and any side effects;
- the clinical indications for which approval is granted, including any limitations or warnings contained in a product s approved labeling;
- the convenience and ease of administration;
- the cost of treatment;
- the willingness of the patients and physicians to accept these therapies;
- the perceived ratio of risk and benefit of these therapies by physicians and the willingness of physicians to recommend these therapies to patients based on such risks and benefits;
- the marketing, sales and distribution support for the product;
- the publicity concerning its products or competing products and treatments; and
- the pricing and availability of third-party insurance coverage and reimbursement.

Even if a product displays a favorable efficacy and safety profile upon approval, market acceptance of the product remains uncertain. Efforts to educate the medical community and third-party payors on the benefits of the products may require significant investment and resources and may never be successful. If its products fail to achieve an adequate level of acceptance by physicians, patients, third-party payors, and other health care providers, Miragen will not be able to generate sufficient revenue to become or remain profitable.

Miragen may not be successful in any efforts to identify, license, discover, develop, or commercialize additional product candidates.

Although a substantial amount of Miragen s effort will focus on the continued clinical testing, potential approval, and commercialization of its existing product candidates, the success of Miragen s business is also expected to depend in part upon its ability to identify, license, discover, develop, or commercialize additional product candidates. Research programs to identify new product candidates require substantial technical, financial, and human resources. Miragen may focus its efforts and resources on potential programs or product candidates that ultimately prove to be unsuccessful. Miragen s research programs or licensing efforts may fail to yield additional product candidates for clinical development and commercialization for a number of reasons, including but not limited to the following:

Miragen s research or business development methodology or search criteria and process may be unsuccessful in identifying potential product candidates;

Miragen may not be able or willing to assemble sufficient resources to acquire or discover additional product candidates;

its product candidates may not succeed in pre-clinical or clinical testing;

its potential product candidates may be shown to have harmful side effects or may have other characteristics that may make the products unmarketable or unlikely to receive marketing approval;

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competitors may develop alternatives that render Miragen s product candidates obsolete or less attractive;

product candidates Miragen develops may be covered by third parties patents or other exclusive rights;

the market for a product candidate may change during Miragen s program so that such a product may become unreasonable to continue to develop;

a product candidate may not be capable of being produced in commercial quantities at an acceptable cost, or at all; and

a product candidate may not be accepted as safe and effective by patients, the medical community, or third-party payors.

If any of these events occur, Miragen may be forced to abandon its development efforts for a program or programs, or Miragen may not be able to identify, license, discover, develop, or commercialize additional product candidates, which would have a material adverse effect on its business, financial condition or results of operations and could potentially cause Miragen to cease operations.

Failure to obtain or maintain adequate reimbursement or insurance coverage for products, if any, could limit Miragen s ability to market those products and decrease its ability to generate revenue.

The pricing, coverage, and reimbursement of Miragen s approved products, if any, must be sufficient to support its commercial efforts and other development programs and the availability and adequacy of coverage and reimbursement by third-party payors, including governmental and private insurers, are essential for most patients to be able to afford expensive treatments. Sales of Miragen s approved products, if any, will depend substantially, both domestically and abroad, on the extent to which the costs of its approved products, if any, will be paid for or reimbursed by health maintenance, managed care, pharmacy benefit and similar healthcare management organizations, or government payors and private payors. If coverage and reimbursement are not available, or are available only in limited amounts, Miragen may have to subsidize or provide products for free or Miragen may not be able to successfully commercialize its products.

In addition, there is significant uncertainty related to the insurance coverage and reimbursement for newly approved products. In the United States, the principal decisions about coverage and reimbursement for new drugs are typically made by CMS, an agency within the U.S. Department of Health and Human Services, as CMS decides whether and to what extent a new drug will be covered and reimbursed under Medicare. Private payors tend to follow the coverage reimbursement policies established by CMS to a substantial degree. It is difficult to predict what CMS will decide with respect to reimbursement for novel product candidates such as Miragen s and what reimbursement codes its product candidates may receive if approved.

Outside the United States, international operations are generally subject to extensive governmental price controls and other price-restrictive regulations, and Miragen believes the increasing emphasis on cost-containment initiatives in Europe, Canada, and other countries has and will continue to put pressure on the pricing and usage of products. In many countries, the prices of products are subject to varying price control mechanisms as part of national health systems. Price controls or other changes in pricing regulation could restrict the amount that Miragen is able to charge for its products, if any. Accordingly, in markets outside the United States, the potential revenue may be insufficient to

generate commercially reasonable revenue and profits.

Moreover, increasing efforts by governmental and private payors in the United States and abroad to limit or reduce healthcare costs may result in restrictions on coverage and the level of reimbursement for new products and, as a result, they may not cover or provide adequate payment for its products. Miragen expects to experience pricing pressures in connection with products due to the increasing trend toward managed healthcare, including the increasing influence of health maintenance organizations and additional legislative changes. The downward pressure on healthcare costs in general, particularly prescription drugs has and is expected to continue to increase

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in the future. As a result, profitability of Miragen s products, if any, may be more difficult to achieve even if they receive regulatory approval.

Risks Related to Miragen s Business Operations

Miragen s future success depends in part on its ability to retain its president and chief executive officer and to attract, retain, and motivate other qualified personnel.

Miragen is highly dependent on William S. Marshall, Ph.D., its president and chief executive officer, the loss of whose services may adversely impact the achievement of its objectives. Dr. Marshall could leave Miragen s employment at any time, as he is an at will employee. Recruiting and retaining other qualified employees, consultants, and advisors for Miragen s business, including scientific and technical personnel, will also be critical to Miragen success. There is currently a shortage of highly qualified personnel in Miragen s industry, which is likely to continue. Additionally, this shortage of highly qualified personnel is particularly acute in the area where Miragen is located. As a result, competition for personnel is intense and the turnover rate can be high. Miragen may not be able to attract and retain personnel on acceptable terms given the competition among numerous pharmaceutical and biotechnology companies for individuals with similar skill sets. In addition, failure to succeed in development and commercialization of Miragen s product candidates may make it more challenging to recruit and retain qualified personnel. The inability to recruit and retain qualified personnel, or the loss of the services of Dr. Marshall may impede the progress of Miragen s research, development, and commercialization objectives and would negatively impact Miragen s ability to succeed in its product development strategy.

Miragen will need to expand its organization and Miragen may experience difficulties in managing this growth, which could disrupt its operations.

As of December 31, 2016, Miragen had 43 full-time employees. As Miragen s development and commercialization plans and strategies develop, Miragen expects to need additional managerial, operational, sales, marketing, financial, legal, and other resources. Its management may need to divert a disproportionate amount of its attention away from its day-to-day activities and devote a substantial amount of time to managing these growth activities. Miragen may not be able to effectively manage the expansion of its operations, which may result in weaknesses in its infrastructure, operational mistakes, loss of business opportunities, loss of employees, and reduced productivity among remaining employees. Miragen s expected growth could require significant capital expenditures and may divert financial resources from other projects, such as the development of additional product candidates. If its management is unable to effectively manage its growth, its expenses may increase more than expected, its ability to generate and/or grow revenue could be reduced and Miragen may not be able to implement its business strategy. Miragen s future financial performance and its ability to commercialize product candidates and compete effectively will depend, in part, on its ability to effectively manage any future growth.

Failure in Miragen s information technology and storage systems could significantly disrupt the operation of Miragen s business.

Miragen s ability to execute its business plan and maintain operations depends on the continued and uninterrupted performance of its information technology, or IT, systems. IT systems are vulnerable to risks and damages from a variety of sources, including telecommunications or network failures, malicious human acts and natural disasters. Moreover, despite network security and back-up measures, some of Miragen s and its vendors servers are potentially vulnerable to physical or electronic break-ins, including cyber-attacks, computer viruses and similar disruptive problems. These events could lead to the unauthorized access, disclosure and use of non-public information. The techniques used by criminal elements to attack computer systems are sophisticated, change frequently and may

originate from less regulated and remote areas of the world. As a result, Miragen may not be able to address these techniques proactively or implement adequate preventative measures. If its computer systems are compromised, it could be subject to fines, damages, litigation and enforcement actions, and it could

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lose trade secrets, the occurrence of which could harm its business. Despite precautionary measures to prevent unanticipated problems that could affect its IT systems, sustained or repeated system failures that interrupt Miragen s ability to generate and maintain data could adversely affect its ability to operate its business.

Miragen s principal stockholders own a significant percentage of its stock and will be able to exert significant control over matters subject to stockholder approval.

Miragen s principal stockholders and their affiliates currently beneficially own in excess of 76% of Miragen s outstanding voting stock, without giving effect to Miragen s concurrent financing in connection with the Merger. Therefore, these stockholders have the ability and may continue to have the ability to influence Miragen through this ownership position. These stockholders may be able to determine some or all matters requiring stockholder approval. For example, these stockholders, acting together, may be able to control elections of directors, amendments of organizational documents, or approval of any merger, sale of assets, or other major corporate transaction. This may prevent or discourage unsolicited acquisition proposals or offers for Miragen s common stock that you may believe are in your best interest as one of Miragen s stockholders.

Risks Related to the Combined Company

In determining whether you should approve the Merger, the issuance of shares of Signal common stock and other matters related to the Merger, as applicable, you should carefully read the following risk factors in addition to the risks described above.

The market price of the combined company s common stock is expected to be volatile, and the market price of its common stock may drop following the Merger.

The market price of the combined company s common stock following the Merger could be subject to significant fluctuations. Market prices for securities of early-stage pharmaceutical, biotechnology and other life sciences companies have historically been particularly volatile. Some of the factors that may cause the market price of Signal s common stock to fluctuate include:

- the ability of the combined company to obtain regulatory approvals for MRG-106, MRG-201 or other product candidates, and delays or failures to obtain such approvals;
- failure of any of the combined company s product candidates, if approved, to achieve commercial success;
- failure to maintain its existing third-party license and supply agreements;
- failure by Signal or its licensors to prosecute, maintain, or enforce its intellectual property rights;
- changes in laws or regulations applicable to its product candidates;

any inability to obtain adequate supply of its product candidates or the inability to do so at acceptable prices;

adverse regulatory authority decisions;

introduction of new products, services, or technologies by its competitors;

failure to meet or exceed financial and development projections Miragen may provide to the public;

failure to meet or exceed the financial and development projections of the investment community;

the perception of the pharmaceutical industry by the public, legislatures, regulators, and the investment community;

announcements of significant acquisitions, strategic collaborations, joint ventures, or capital commitments by Signal or its competitors;

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disputes or other developments relating to proprietary rights, including patents, litigation matters, and its ability to obtain patent protection for its technologies;

additions or departures of key personnel;

significant lawsuits, including patent or stockholder litigation;

if securities or industry analysts do not publish research or reports about its business, or if they issue an adverse or misleading opinions regarding its business and stock;

changes in the market valuations of similar companies;

general market or macroeconomic conditions;

sales of its common stock by Signal or its stockholders in the future;

trading volume of its common stock;

announcements by commercial partners or competitors of new commercial products, clinical progress or the lack thereof, significant contracts, commercial relationships or capital commitments;

adverse publicity relating to microRNA therapeutics generally, including with respect to other products and potential products in such markets;

the introduction of technological innovations or new therapies that compete with potential products of the combined company;

changes in the structure of health care payment systems; and

period-to-period fluctuations in the combined company s financial results.

Moreover, the stock markets in general have experienced substantial volatility that has often been unrelated to the operating performance of individual companies. These broad market fluctuations may also adversely affect the trading price of the combined company s common stock.

In the past, following periods of volatility in the market price of a company s securities, stockholders have often instituted class action securities litigation against those companies. Such litigation, if instituted, could result in

substantial costs and diversion of management attention and resources, which could significantly harm the combined company s profitability and reputation.

Additionally, a decrease in the stock price of the combined company may cause the combined company s common stock to no longer satisfy the continued listing standards of The NASDAQ Capital Market. If the combined company is not able to maintain the requirements for listing on The NASDAQ Capital Market, it could be delisted, which could have a materially adverse effect on its ability to raise additional funds as well as the price and liquidity of its common stock.

The combined company will incur costs and demands upon management as a result of complying with the laws and regulations affecting public companies.

The combined company will incur significant legal, accounting and other expenses that Miragen did not incur as a private company, including costs associated with public company reporting requirements. The combined company will also incur costs associated with corporate governance requirements, including requirements under the Sarbanes-Oxley Act, as well as new rules implemented by the SEC and The NASDAQ Stock Market LLC. These rules and regulations are expected to increase the combined company s legal and financial compliance costs and to make some activities more time-consuming and costly. For example, the combined company s management team will consist of the executive officers of Miragen prior to the Merger, some of whom have not previously managed and operated a public company. These executive officers and other personnel will need to devote substantial time to gaining expertise regarding operations as a public company and compliance with

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applicable laws and regulations. These rules and regulations may also make it difficult and expensive for the combined company to obtain directors and officers liability insurance. As a result, it may be more difficult for the combined company to attract and retain qualified individuals to serve on the combined company s board of directors or as executive officers of the combined company, which may adversely affect investor confidence in the combined company and could cause the combined company s business or stock price to suffer.

Anti-takeover provisions in the combined company s charter documents and under Delaware law could make an acquisition of the combined company more difficult and may prevent attempts by the combined company stockholders to replace or remove the combined company management.

Provisions in the combined company s certificate of incorporation and bylaws may delay or prevent an acquisition or a change in management. These provisions include a prohibition on actions by written consent of the combined company s stockholders, assuming that the Signal stockholders approve Signal Proposal No. 10, and the ability of the board of directors to issue preferred stock without stockholder approval. In addition, because the combined company will be incorporated in Delaware, it is governed by the provisions of Section 203 of the Delaware General Corporate Law, which prohibits stockholders owning in excess of 15% of the outstanding combined company voting stock from merging or combining with the combined company. Although Signal and Miragen believe these provisions collectively will provide for an opportunity to receive higher bids by requiring potential acquirors to negotiate with the combined company s board of directors, they would apply even if the offer may be considered beneficial by some stockholders. In addition, these provisions may frustrate or prevent any attempts by the combined company s stockholders to replace or remove then current management by making it more difficult for stockholders to replace members of the board of directors, which is responsible for appointing the members of management.

The bylaws of the combined company will provide that the Court of Chancery of the State of Delaware is the exclusive forum for substantially all disputes between the combined company and its stockholders, which could limit its stockholders ability to obtain a favorable judicial forum for disputes with the combined company or its directors, officers or other employees.

The bylaws of the combined company will provide that the Court of Chancery of the State of Delaware is the sole and exclusive forum for any derivative action or proceeding brought on the combined company s behalf, any action asserting a breach of fiduciary duty owed by any of its directors, officers or other employees to the combined company or its stockholders, any action asserting a claim against it arising pursuant to any provisions of the Delaware General Corporation Law, its certificate of incorporation or its bylaws, or any action asserting a claim against it that is governed by the internal affairs doctrine. The choice of forum provision may limit a stockholder s ability to bring a claim in a judicial forum that it finds favorable for disputes with the combined company or its directors, officers or other employees, which may discourage such lawsuits against the combined company and its directors, officers and other employees. If a court were to find the choice of forum provision contained in the bylaws to be inapplicable or unenforceable in an action, the combined company may incur additional costs associated with resolving such action in other jurisdictions.

Signal and Miragen do not anticipate that the combined company will pay any cash dividends in the foreseeable future.

The current expectation is that the combined company will retain its future earnings, if any, to fund the development and growth of the combined company s business. As a result, capital appreciation, if any, of the common stock of the combined company will be your sole source of gain, if any, for the foreseeable future.

An active trading market for the combined company s common stock may not develop and its stockholders may not be able to resell their shares of common stock for a profit, if at all.

Prior to the Merger, there had been no public market for Miragen s common stock. An active trading market for the combined company s shares of common stock may never develop or be sustained. If an active market for its

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common stock does not develop or is not sustained, it may be difficult for its stockholders to sell their shares at an attractive price or at all.

Future sales of shares by existing stockholders could cause the combined company s stock price to decline.

If existing stockholders of Signal and Miragen sell, or indicate an intention to sell, substantial amounts of the combined company s common stock in the public market after legal restrictions on resale discussed in this proxy statement/prospectus/information statement lapse, the trading price of the common stock of the combined company could decline. Based on shares outstanding as of December 31, 2016, shares expected to be issued upon completion of the Merger, and assuming completion of Miragen s concurrent financing in connection with the Merger, the combined company is expected to have outstanding a total of approximately 21.2 million shares of common stock immediately following the completion of the Merger, assuming an Exchange Ratio of 0.6995, without giving effect to the reverse stock split. Of the 21.2 million shares of common stock, 13.6 million shares, assuming an Exchange Ratio of 0.6995, without giving effect to the reverse stock split, will be available for sale in the public market beginning 180 days after the closing of the Merger as a result of the expiration of lock-up or similar agreements between certain Miragen stockholders and Miragen. All other outstanding shares of common stock will be freely tradable, without restriction, in the public market. In addition, shares of common stock that are subject to outstanding options of Miragen will become eligible for sale in the public market to the extent permitted by the provisions of various vesting agreements and Rules 144 and 701 under the Securities Act. If these shares are sold, the trading price of the combined company s common stock could decline.

If the ownership of the combined company common stock is highly concentrated, it may prevent you and other stockholders from influencing significant corporate decisions and may result in conflicts of interest that could cause the combined company stock price to decline.

Executive officers and directors of the combined company and their affiliates are expected to beneficially own or control approximately 39% of the outstanding shares of common stock of the combined company following the completion of the Merger and assuming that Miragen closes its concurrent financing immediately prior to the effective time of the Merger. Accordingly, these executive officers, directors and their affiliates, acting as a group, will have substantial influence over the outcome of corporate actions requiring stockholder approval, including the election of directors, any merger, consolidation or sale of all or substantially all of the combined company assets or any other significant corporate transactions. These stockholders may also delay or prevent a change of control of the combined company, even if such a change of control would benefit the other stockholders of the combined company. The significant concentration of stock ownership may adversely affect the trading price of the combined company s common stock due to investors perception that conflicts of interest may exist or arise.

If equity research analysts do not publish research or reports, or publish unfavorable research or reports, about the combined company, its business or its market, its stock price and trading volume could decline.

The trading market for the combined company s common stock will be influenced by the research and reports that equity research analysts publish about it and its business. Equity research analysts may elect not to provide research coverage of the combined company s common stock after the completion of this offering, and such lack of research coverage may adversely affect the market price of its common stock. In the event it does have equity research analyst coverage, the combined company will not have any control over the analysts or the content and opinions included in their reports. The price of the combined company s common stock could decline if one or more equity research analysts downgrade its stock or issue other unfavorable commentary or research. If one or more equity research analysts ceases coverage of the combined company or fails to publish reports on it regularly, demand for its common stock could decrease, which in turn could cause its stock price or trading volume to decline.

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The combined company will have broad discretion in the use of proceeds from the concurrent financing in connection with the Merger and may invest or spend the proceeds in ways with which you do not agree and in ways that may not increase the value of your investment.

The combined company will have broad discretion over the use of proceeds from Miragen s concurrent financing in connection with the Merger. You may not agree with the combined company s decisions, and its use of the proceeds may not yield any return on your investment. The combined company s failure to apply the net proceeds of the concurrent financing effectively could compromise its ability to pursue its growth strategy and the combined company might not be able to yield a significant return, if any, on its investment of these net proceeds. You will not have the opportunity to influence its decisions on how to use the net proceeds from the concurrent financing.

Because the Merger will result in an ownership change under Section 382 of the Code for Signal, Signal s pre-Merger net operating loss carryforwards and certain other tax attributes will be subject to limitation or elimination. The net operating loss carryforwards and certain other tax attributes of Miragen and of the combined company may also be subject to limitations as a result of ownership changes.

If a corporation undergoes an ownership change within the meaning of Section 382 of the Code, or Section 382, the corporation s net operating loss carryforwards and certain other tax attributes arising from before the ownership change are subject to limitations on use after the ownership change. In general, an ownership change occurs if there is a cumulative change in the corporation s equity ownership by certain stockholders that exceeds fifty percentage points by value over a rolling three-year period. Similar rules may apply under state tax laws. The Merger will result in an ownership change for Signal and, accordingly, Signal s net operating loss carryforwards and certain other tax attributes will be subject to limitation and possibly elimination after the Merger. Miragen has performed an analysis on whether it has experienced any ownership changes in the past. However, it is possible that Miragen s net operating loss carryforwards and certain other tax attributes may also be subject to limitation as a result of prior shifts in equity ownership and/or the Merger. Additional ownership changes in the future could result in additional limitations on Signal s, Miragen s and the combined company s net operating loss carryforwards and certain other tax attributes. Consequently, even if the combined company achieves profitability, it may not be able to utilize a material portion of Signal s, Miragen s or the combined company s net operating loss carryforwards and certain other tax attributes, which could have a material adverse effect on cash flow and results of operations.

If the combined company fails to maintain proper and effective internal controls, its ability to produce accurate financial statements on a timely basis could be impaired.

The combined company will be subject to the reporting requirements of the Exchange Act, the Sarbanes-Oxley Act and the rules and regulations of The NASDAQ Stock Market LLC. The Sarbanes-Oxley Act requires, among other things, that the combined company maintain effective disclosure controls and procedures and internal control over financial reporting. The combined company must perform system and process evaluation and testing of its internal control over financial reporting to allow management to report on the effectiveness of its internal controls over financial reporting in its Annual Report on Form 10-K filing for that year, as required by Section 404 of the Sarbanes-Oxley Act. As a private company, Miragen, has never been required to test its internal controls within a specified period. This will require that the combined company incur substantial professional fees and internal costs to expand its accounting and finance functions and that it expend significant management efforts. The combined company may experience difficulty in meeting these reporting requirements in a timely manner.

The combined company may discover weaknesses in its system of internal financial and accounting controls and procedures that could result in a material misstatement of its financial statements. The combined company s internal control over financial reporting will not prevent or detect all errors and all fraud. A control system, no matter how

well designed and operated, can provide only reasonable, not absolute, assurance that the control

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system s objectives will be met. Because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that misstatements due to error or fraud will not occur or that all control issues and instances of fraud will be detected.

If the combined company is not able to comply with the requirements of Section 404 of the Sarbanes-Oxley Act, or if it is unable to maintain proper and effective internal controls, the combined company may not be able to produce timely and accurate financial statements. If that were to happen, the market price of its common stock could decline and it could be subject to sanctions or investigations by The Nasdaq Stock Market LLC, the SEC, or other regulatory authorities.

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CAUTIONARY STATEMENT CONCERNING FORWARD-LOOKING STATEMENTS

This proxy statement/prospectus/information statement and the documents incorporated by reference into this proxy statement/prospectus/information statement contain forward-looking statements relating to Signal, Miragen and the Merger. These forward-looking statements are based on current expectations and beliefs and involve numerous risks and uncertainties that could cause actual results to differ materially from expectations. These forward-looking statements should not be relied upon as predictions of future events as Miragen and Signal cannot assure you that the events or circumstances reflected in these statements will be achieved or will occur. You can identify forward-looking statements by the use of forward-looking terminology including believes, expects, may, will, should, seeks, plans, pro forma, estimates, or anticipates or the negative of these words and phrases or other variations of these words and phrases or comparable terminology. All statements other than statements of historical fact are statements that could be deemed forward-looking statements. For example, forward-looking statements include any statements regarding the strategies, prospects, plans, expectations or objectives of management of Signal or Miragen for future operations of the combined company, the progress, scope or duration of the development of product candidates or programs, the benefits that may be derived from product candidates or the commercial or market opportunity in any target indication, the ability of Signal or Miragen to protect their intellectual property rights, the anticipated operations, financial position, revenues, costs or expenses of Signal, Miragen or the combined company, statements regarding future economic conditions or performance, statements of belief and any statement of assumptions underlying any of the foregoing. Forward looking statements may also include any statements regarding the approval and closing of the Merger, including the timing of the Merger, Signal s ability to solicit a sufficient number of proxies to approve the Merger, other conditions to the completion of the Merger and the Exchange Ratio as of the closing of the Merger, the expected benefits of the Merger, the ability of Miragen and Signal to complete the Merger, Miragen s ability to complete the concurrent financing of its common stock in connection with the Merger, Signal s ability to complete the sale of its MyPRS intellectual property assets and any statement of assumptions underlying any of the foregoing.

For a discussion of the factors that may cause Signal, Miragen or the combined company s actual results, performance or achievements to differ materially from any future results, performance or achievements expressed or implied in such forward-looking statements, or for a discussion of risk associated with the ability of Signal and Miragen to complete the Merger and the effect of the Merger on the business of Signal, Miragen and the combined company, see Risk Factors beginning on page 19. Additional factors that could cause actual results to differ materially from those expressed in the forward-looking statements are discussed in reports filed with the SEC by Signal. See *Where You Can Find More Information* beginning on page 303. There can be no assurance that the Merger will be completed, or if it is completed, that it will close within the anticipated time period or that the expected benefits of the Merger will be realized.

If any of these risks or uncertainties materialize or any of these assumptions prove incorrect, the results of Signal, Miragen or the combined company could differ materially from the forward-looking statements. All forward-looking statements in this proxy statement/prospectus/information statement are current only as of the date on which the statements were made. Signal and Miragen do not undertake any obligation (and expressly disclaim any such obligation to) to publicly update any forward-looking statement to reflect events or circumstances after the date on which any statement is made or to reflect the occurrence of unanticipated events.

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THE SPECIAL MEETING OF SIGNAL STOCKHOLDERS

Date, Time and Place

The Signal special meeting will be held on February 10, 2017, at 12255 El Camino Real, Suite 300, San Diego, California, 92130, commencing at 9:00 a.m. local time. Signal is sending this proxy statement/prospectus/information statement to its stockholders in connection with the solicitation of proxies by Signal s board of directors for use at the Signal special meeting and any adjournments or postponements of the Signal special meeting. This proxy statement/prospectus/information statement is first being furnished to stockholders of Signal on or about January 17, 2017.

Purposes of the Signal Special Meeting

The purposes of the Signal special meeting are:

1. To approve the issuance of shares of Signal common stock to Miragen stockholders pursuant to the terms of the Merger Agreement, a copy of which is attached as *Annex A*;

2. To approve the change in control of Signal resulting from the Merger contemplated by the Merger Agreement;

3. To approve the conversion of the Note into shares of Signal common stock;

4. To approve the Signal 2016 Equity Incentive Plan, a copy of which is attached as *Annex B*;

5. To approve the Signal 2016 Employee Stock Purchase Plan, a copy of which is attached as *Annex C*;

6. To approve an amendment to the certificate of incorporation of Signal changing the Signal corporate name to Miragen Therapeutics, Inc. in the form attached as *Annex D*;

7. To approve an amendment to the certificate of incorporation of Signal effecting a reverse stock split of Signal s issued and outstanding common stock within a range of every one to 15 shares (or any number in between) of outstanding Signal common stock being combined and reclassified into one share of Signal common stock in the form attached as *Annex E*, which is referred to as the reverse stock split;

8. To approve an amendment to the certificate of incorporation of Signal increasing the number of authorized shares of Signal common stock from 50,000,000 shares to 100,000,000 shares in the form attached as *Annex F*;

9. To approve the sale of all of Signal s intellectual property assets related to its MyPRS test, pursuant to an intellectual property purchase agreement, a copy of which is attached as *Annex G*;

10. To approve an amendment to the certificate of incorporation of Signal to eliminate the ability of Signal stockholders to act by written consent in the form attached as *Annex H*;

11. To consider and vote upon an adjournment of the Signal special meeting, if necessary, to solicit additional proxies if there are not sufficient votes in favor of the proposals set forth above; and

12. To transact such other business as may properly come before the stockholders at the Signal special meeting or any adjournment or postponement thereof.

Each of Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 9 are conditioned upon each other and the approval of each such proposal is a condition to the completion of the Merger. Therefore, the Merger cannot be consummated without the approval of Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 9.

Recommendation of Signal s Board of Directors

Signal s board of directors has determined and believes that the issuance of shares of Signal common stock pursuant to the Merger Agreement and the resulting change of control is fair to, in the best

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interests of, and advisable to, Signal and its stockholders and has approved such items. Signal s board of directors recommends that Signal stockholders vote **FOR** Signal Proposal Nos. 1 and 2 to approve the issuance of shares of Signal common stock pursuant to the Merger Agreement and the change of control of Signal resulting from the Merger.

Signal s board of directors has determined and believes that the conversion of the Note into shares of Signal common stock is fair to, in the best interests of, and advisable to, Signal and its stockholders and has approved such item. Signal s board of directors recommends that Signal stockholders vote **FOR** Signal Proposal No. 3 to approve the conversion of the Note.

Signal s board of directors has determined and believes that the approval of the Signal 2016 Equity Incentive Plan and the Signal 2016 Employee Stock Purchase Plan and the reservation of shares of common stock for issuance thereunder is fair to, in the best interests of, and advisable to, Signal and its stockholders and has approved and adopted the plans. Signal s board of directors recommends that Signal stockholders vote **FOR** Proposal Nos. 4 and 5 and the reservation of shares of common stock for issuance thereunder.

Signal s board of directors has determined and believes that the amendment to the certificate of incorporation of Signal to change the name of Signal to Miragen Therapeutics, Inc. is advisable to, and in the best interests of, Signal and its stockholders and has approved such name change. Signal s board of directors recommends that Signal stockholders vote **FOR** Signal Proposal No. 6 to approve the name change.

Signal s board of directors has determined and believes that it is advisable to, and in the best interests of, Signal and its stockholders to approve the amendment to the certificate of incorporation of Signal effecting the reverse stock split, as described in this proxy statement/prospectus/information statement. Signal s board of directors recommends that Signal stockholders vote **FOR** Signal Proposal No. 7 to approve the reverse stock split.

Signal s board of directors has determined and believes that it is advisable to, and in the best interests of, Signal and its stockholders to approve an amendment to the certificate of incorporation of Signal to increase the number of authorized shares of Signal common stock from 50,000,000 shares to 100,000,000 shares. Signal s board of directors recommends that Signal stockholders vote **FOR** Signal Proposal No. 8 to approve the increase in the authorized number of shares of Signal common stock.

Signal s board of directors has determined and believes that the sale of all of Signal s intellectual property assets related to its MyPRS test in the best interests of, and advisable to, Signal and its stockholders and has approved such item. Signal s board of directors recommends that Signal stockholders vote **FOR** Signal Proposal No. 9 to approve the sale of all of Signal s intellectual property assets related to its MyPRS test to Quest Diagnostics Investments LLC.

Signal s board of directors has determined and believes that it is advisable to, and in the best interests of, Signal and its stockholders to approve an amendment to the certificate of incorporation of Signal to eliminate the ability of Signal stockholders to act by written consent. Signal s board of directors recommends that Signal stockholders vote **FOR** Signal Proposal No. 10 to approve the amendment to eliminate the ability of Signal stockholders to act by written consent.

Signal s board of directors has determined and believes that adjourning the Signal special meeting, if necessary, to solicit additional proxies if there are not sufficient votes in favor of Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 is fair to, in the best interests of, and advisable to, Signal and its stockholders and has approved and adopted the proposal. Signal s board of directors recommends that Signal stockholders vote **FOR** Signal Proposal No. 11 to adjourn the Signal special meeting, if necessary, to solicit additional proxies if there are not sufficient votes in favor of Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10.

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Record Date and Voting Power

Only holders of record of Signal common stock at the close of business on the record date, January 9, 2017, are entitled to notice of, and to vote at, the Signal special meeting. At the close of business on the record date, there were 22 holders of record of Signal common stock and there were 742,293 shares of Signal common stock issued and outstanding. Each share of Signal common stock entitles the holder thereof to one vote on each matter submitted for stockholder approval. See the section titled *Principal Stockholders of Signal* beginning on page 297 of this proxy statement/prospectus/information statement for information regarding persons known to the management of Signal to be the beneficial owners of more than 5% of the outstanding shares of Signal common stock.

Voting and Revocation of Proxies

The proxy accompanying this proxy statement/prospectus/information statement is solicited on behalf of Signal s board of directors for use at the Signal special meeting.

If you are a stockholder of record of Signal as of the record date referred to above, you may vote in person at the Signal special meeting or vote by proxy using the enclosed proxy card. Whether or not you plan to attend the Signal special meeting, Signal urges you to vote by proxy to ensure your vote is counted. You may still attend the Signal special meeting and vote in person if you have already voted by proxy. As a stockholder of record:

- to vote in person, attend the Signal special meeting and Signal will give you a ballot when you arrive at the meeting;
- to vote using the proxy card, simply mark, sign and date your proxy card and return it promptly, but in any event, before the Signal special meeting to ensure your shares are voted; or
- to vote by telephone or on the Internet, dial the number on the proxy card or go to the website on the proxy card or voting instruction form to complete an electronic proxy card. You will be asked to provide the company number and control number from the enclosed proxy card. Your vote must be received by February 9, 2017, 11:59 p.m. Eastern Time to be counted.

If your Signal shares are held by your broker as your nominee, that is, in street name, you should receive voting instructions from the bank, broker or other nominee that holds your shares. If you do not give instructions to your broker, your broker can vote your Signal shares with respect to discretionary items but not with respect to non-discretionary items. Discretionary items are proposals considered routine under the rules of The NASDAQ Capital Market on which your broker may vote shares held in street name in the absence of your voting instructions. On non-discretionary items for which you do not give your broker instructions, the Signal shares will be treated as broker non-votes. It is anticipated that Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 will be non-discretionary items. If your shares of Signal common stock are held in street name, you may vote in one the following ways:

- to vote by mail, you should follow the instructions included on the proxy card regarding how to instruct your broker to vote your Signal shares;

to vote in person at the Signal special meeting, you will need to contact the bank, broker or other nominee that is the stockholder of record for your shares to obtain a legal proxy and then bring the legal proxy indicating that you beneficially owned the shares as of the record date and a form of government issued picture identification to the Signal special meeting. If you bring all of these materials to the Signal special meeting, you may vote by completing a paper proxy card or a ballot, which will be available at the Signal special meeting. If you do not bring all of these materials, you will not be able to vote at the Signal special meeting; or

to vote by telephone or over the Internet if you are permitted and wish to do so, you should receive instructions from your bank, broker or other nominee and follow those instructions.

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All properly executed proxies that are not revoked will be voted at the Signal special meeting and at any adjournments or postponements of the Signal special meeting in accordance with the instructions contained in the proxy. If a holder of Signal common stock executes and returns a proxy and does not specify otherwise, the shares represented by that proxy will be voted FOR Signal Proposal No. 1 to approve the issuance of shares of Signal common stock in the Merger, FOR Signal Proposal No. 2 to approve the change of control resulting from the Merger, FOR Signal Proposal No. 3 to approve the conversion of the Note into shares of Signal common stock, FOR Signal Proposal No. 4 to approve the Signal 2016 Equity Incentive Plan, FOR Signal Proposal No. 5 to approve the Signal 2016 Employee Stock Purchase Plan, FOR Signal Proposal No. 6 to approve an amendment to the certificate of incorporation of Signal changing the Signal corporate name to Miragen Therapeutics, Inc., FOR Signal Proposal No. 7 to approve an amendment to the certificate of incorporation of Signal effecting the reverse stock split, FOR Signal Proposal No. 8 to approve the amendment to the certificate of incorporation of Signal to increase the number of authorized shares of Signal common stock, FOR Signal Proposal No. 9 to approve the sale of all of Signal s intellectual property assets related to its MyPRS Test to Quest Diagnostics Investments LLC, FOR Signal Proposal No. 10 to approve an amendment to the certificate of incorporation of Signal to eliminate the ability of Signal stockholders to act by written consent and FOR Signal Proposal No. 11 to adjourn the Signal special meeting, if necessary, to solicit additional proxies if there are not sufficient votes in favor of Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 in accordance with the recommendation of Signal s board of directors.

If you are a stockholder of record of Signal and you have not executed a support agreement, you may change your vote at any time before your proxy is voted at the Signal special meeting in any one of the following ways:

- you can send a written notice to the Secretary of Signal before the Signal special meeting stating that you would like to revoke your proxy;
- if you have signed and returned a paper proxy card, you may sign a new proxy card bearing a later date and submit it as instructed above;
- if you have voted by telephone or Internet, you may cast a new vote by telephone or over the Internet as instructed above; or
- you can attend the Signal special meeting and vote in person, but attendance alone will not revoke a proxy. You must specifically request at the meeting that it be revoked.

Required Vote

The presence, in person or represented by proxy, at the Signal special meeting of the holders of a majority of the shares of Signal common stock outstanding and entitled to vote at the Signal special meeting is necessary to constitute a quorum at the meeting. Abstentions and broker non-votes will be counted towards a quorum. The affirmative vote of the holders of a majority of the shares of Signal common stock having voting power present in person or represented by proxy at the Signal special meeting, assuming a quorum is present, is required for approval of Signal Proposal Nos. 1, 2, 3, 4, 5 and 11. The affirmative vote of the holders of a majority of shares of Signal common stock entitled to vote outstanding on the record date for the Signal special meeting is required for approval of Signal Proposal Nos. 6, 7, 8, 9 and 10. Each of Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 9 are conditioned upon each other and the approval of each such proposal is a condition to the completion of the Merger. Therefore, the Merger cannot be consummated

without the approval of Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 9.

Votes will be counted by the inspector of election appointed for the meeting, who will separately count FOR and AGAINST votes, abstentions and broker non-votes. Abstentions will be counted towards the vote total for each proposal and will have the same effect as AGAINST votes for Signal Proposal Nos. 6, 7, 8, 9 and 10, but will have no effect on Signal Proposal Nos. 1, 2, 3, 4, 5 and 11. Similarly, broker non-votes will have the same effect as AGAINST votes for Signal Proposal Nos. 6, 7, 8, 9 and 10, but will have no effect on Signal Proposal Nos. 1, 2, 3, 4, 5 and 11.

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As of December 31, 2016, the directors and executive officers of Signal owned or controlled 26% of the outstanding shares of Signal common stock entitled to vote at the Signal special meeting. The directors and executive officers of Signal owning these shares are subject to support agreements. Each stockholder that entered into a support agreement has agreed to vote all shares of Signal common stock owned by him as of the record date in favor of Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 and against any acquisition proposal, as defined in the Merger Agreement.

Solicitation of Proxies

In addition to solicitation by mail, the directors, officers, employees and agents of Signal may solicit proxies from Signal stockholders by personal interview, telephone, telegram or otherwise. Signal and Miragen will share equally the costs of printing and filing this proxy statement/prospectus/information statement and proxy card. Arrangements will also be made with brokerage firms and other custodians, nominees and fiduciaries who are record holders of Signal common stock for the forwarding of solicitation materials to the beneficial owners of Signal common stock. Signal will reimburse these brokers, custodians, nominees and fiduciaries for the reasonable out-of-pocket expenses they incur in connection with the forwarding of solicitation materials. Signal has retained Advantage Proxy to assist it in soliciting proxies using the means referred to above. Signal will pay the fees of Advantage Proxy, which Signal expects to be approximately $7,500, plus reimbursement of out-of-pocket expenses.

Other Matters

As of the date of this proxy statement/prospectus/information statement, Signal s board of directors does not know of any business to be presented at the Signal special meeting other than as set forth in the notice accompanying this proxy statement/prospectus/information statement. If any other matters should properly come before the Signal special meeting, it is intended that the shares represented by proxies will be voted with respect to such matters in accordance with the judgment of the persons voting the proxies.

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THE MERGER

This section and the section titled The Merger Agreement in this proxy statement/prospectus/information statement describe the material aspects of the Merger, including the Merger Agreement. While Signal and Miragen believe that this description covers the material terms of the Merger and the Merger Agreement, it may not contain all of the information that is important to you. You should read carefully this entire proxy statement/prospectus/information statement for a more complete understanding of the Merger and the Merger Agreement, including the Merger Agreement, and the other documents to which you are referred herein. See the section titled Where You Can Find More Information in this proxy statement/prospectus/information statement beginning on page 303.

Background of the Merger

Historical Background of Signal

Signal is currently marketing and selling its MyPRS test to physicians treating patients suffering from multiple myeloma in academic institutions in all 50 states. Signal has been operating at a net loss since inception, based upon a business plan that anticipated raising additional funds through debt or equity financing to operate beyond the second quarter of 2017. Due to current market conditions, Signal s current liquidity position and its depressed stock price, Signal came to believe it would be difficult to obtain additional equity or debt financing on acceptable terms, if at all. As a result, Signal s board of directors began discussing and evaluating its strategic opportunities to maximize stockholder value beginning near the end of 2015. Signal s management provided Signal s board of directors with management s preliminary assessment of a variety of strategic alternatives that Signal could pursue to maximize stockholder value, including engaging in a sale of the company or a merger transaction.

On March 24, 2016, Signal s board of directors decided to move forward to hire an investment bank to serve as financial advisor to the company in exploring and assessing strategic opportunities. Two investment banks were selected for interview based on the qualifications, expertise and reputation of each investment bank and Signal management s and the board s familiarity with their handling of strategic transactions of similar nature (including industry and valuation).

On April 5, 2016, Signal s board of directors and members of Signal s management reviewed proposals from the two investment banks by teleconferences with representatives from each investment bank and ultimately selected Cantor as its financial advisor to advise Signal.

On April 28, 2016, Signal executed an engagement letter with Cantor for Cantor to act as Signal s exclusive financial advisor in connection with, among other things, the possible sale or merger of Signal with a potential acquiror, as well as its exclusive financial advisor and placement agent in connection with a potential capital raise for equity or debt capital.

Beginning in April 2016 and continuing through October 2016, Signal conducted a process of identifying and evaluating potential parties to strategic combinations. In its review of potential public-company combination partners, Signal focused on diagnostic companies possessing the financial resources to integrate MyPRS into their commercial organizations and expand its use among physicians treating patients suffering with multiple myeloma throughout the United States. In its review of potential private company combination partners, Signal focused on biotechnology and diagnostic companies possessing (i) a portfolio of commercialized products or a portfolio of product development candidates with the potential for significant value appreciation, (ii) resources sufficient to achieve potentially meaningful development milestones within such portfolio, including resources to be obtained through financing activities consummated prior to the effectiveness of a combination with Signal, (iii) an ability to enter into an

agreement in the near-term for a combination with a public company (i.e., Signal) and thereafter proceed in an orderly manner toward implementing the combination (necessitating, for example,

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the availability of the requisite financial statements to accompany a registration statement on Form S-4) and (iv) a management team with the breadth and skills to accomplish the foregoing. At the direction of Signal, Cantor contacted over 30 potential parties to gauge their interest in a potential transaction with Signal. On behalf of Signal, Cantor received 12 fully-executed non-disclosure agreements during May and June 2016. In evaluating the indications of interest received in response to this outreach, including in certain cases through discussions and diligence activities with potential counterparties (see in this regard the discussion below with respect to Signal s engagement with Parties 1, 2, 3, 5, 6, 7, 8 and 9), Signal ultimately concluded in each instance that (x) one or more desired elements were missing from a potential combination except with respect to Miragen (for example, that the counterparty did not have sufficient resources to achieve potentially meaningful development milestones within its portfolio of product development candidates, or the counterparty s requirement for Signal to have an unreasonably large cash balance at closing, or the counterparty s uncertain ability to enter into an agreement in the near-term for a combination with a public company), (y) the terms expected to be available to Signal and its stockholders in a potential combination with parties other than Miragen, including as represented by the potential share of the combined company that might be owned by the pre-combination Signal stockholders immediately following a combination and any concurrent financing, would likely not be fair or appropriate to the pre-combination Signal stockholders, and/or (z) Signal should pursue a combination with Miragen and a sale of the assets relating to the MyPRS business to the exclusion of other possibilities. In the course of its process, Miragen is the only party with which Signal ultimately reached a mutual understanding on deal terms, including the potential share of the combined company that would be owned by the pre-combination Signal stockholders immediately following a combination and any concurrent financing, and moved forward with negotiating a definitive merger agreement. A more detailed chronological description of the Merger process follows below under *The Merger Background of the Merger History of Signal Strategic Alternatives and Significant Corporate Events*.

Historical Background of Miragen

Miragen is a clinical stage biopharmaceutical company developing proprietary RNA-targeted therapeutics with a specific focus on microRNAs and their role in diseases where there is a high unmet medical need. microRNAs are short RNA molecules, or oligonucleotides that regulate gene expression and play a vital role in influencing the pathways responsible for many disease processes. Miragen believes its experience in bioinformatics, microRNA biology, drug discovery, and translational medicine provide it with a potential competitive advantage to identify and develop microRNA-targeted drugs designed to regulate gene pathways to result in disease modification. Miragen uses its expertise in systems biology and oligonucleotide chemistry to develop a pipeline of product candidates.

Miragen s board of directors and executive management regularly review Miragen s operating and strategic plans, both near term and long- term, as well as potential partnerships in an effort to enhance stockholder value, including debt and/or equity financing, mergers and acquisitions, and other strategic transactions, and engaged in discussions with numerous potential strategic partners, lenders and investors, including then current investors in Miragen and potential new investors.

In 2015, the Miragen management team and board began considering an initial public offering of its common stock as well as various other fundraising strategies to fund future research and development activities. During this time, Miragen was approached by a number of investment banks suggesting a reverse merger as an attractive alternative to an initial public offering and the Miragen management team began to consider various reverse merger opportunities as they presented themselves in parallel with exploring an initial public offering.

In May 2016, Miragen management was contacted by a representative of Cantor acting at the direction of and on behalf of Signal regarding Miragen s potential interest in a potential transaction involving Signal, which led to discussions among Miragen s management and several members of Miragen s board of directors and an eventual

indication of interest from Miragen.

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History of Signal Strategic Alternatives and Significant Corporate Events

During May and June, 2016, a confidential information memorandum was circulated, at the direction of Signal, by Cantor to the 12 parties that executed non-disclosure agreements with Signal and expressed interest in pursuing a potential strategic combination with Signal. Following receipt of the confidential information memorandum, one party communicated to Signal that it was not interested in a potential transaction with Signal.

Between May 20, 2016 and June 9, 2016, Signal s management held initial calls with four interested parties, at their request, regarding a potential business combination.

Between June 3, 2016 and June 17, 2016, at the direction of Signal, Cantor distributed process letters to 11 parties asking for bids by June 17, 2016.

Between June 16, 2016 and June 21, 2016, Signal received initial indications of interest from six parties, including Miragen.

On June 21, 2016, Signal s board of directors held a teleconference to review the initial indications of interest and selected four companies to move into the due diligence phase: Party 1, Party 2, Party 3 and Miragen.

On June 24, 2016, at the direction of Signal, Cantor sent second round process letters to the four companies, which indicated that final bids were due by July 29, 2016.

On June 27, 2016, Signal granted access to its virtual data room to personnel representing the four companies for the purposes of reviewing due diligence materials. Party 3 did not respond after obtaining access.

On July 12, 2016, a vice president and two board members representing Party 1 met with Signal s management team (i.e., Samuel D. Riccitelli, president and chief executive officer, Tamara A. Seymour, chief financial officer, and Sudipto Sur, Ph.D., chief information officer) in an extensive diligence meeting. Signal s management team presented information to answer questions submitted by Party 1 prior to the meeting.

On July 15, 2016, Mr. Riccitelli and Ms. Seymour and a representative from Cantor met with Miragen s management team (i.e., William S. Marshall, Ph.D., president and chief executive officer, Jason A. Leverone, chief financial officer, Adam S. Levy, chief business officer, and Christopher J. Morl, former chief operating officer), at Miragen s Boulder, Colorado office for an in-depth review of Miragen s clinical development programs.

On July 19, 2016, Party 1 notified Signal that it would not submit a final indication of interest citing lack of a strategic fit between MyPRS and Party 1 s tests currently in development.

On July 21, 2016, Signal s management provided an update via teleconference to Signal s board of directors, indicating that there were two parties interested in a potential merger transaction, Party 2 and Miragen. Signal management noted that if Signal were to move forward in a merger transaction with Miragen, Miragen had indicated it would require the MyPRS business to be divested or wound down prior to the closing of a merger. Also on July 21, 2016, Signal s chairman contacted Party 5 regarding a potential interest in acquiring MyPRS and determined that Party 5 may be interested. Party 5 indicated that it would be in touch to pursue further conversations.

On July 22, 2016, Signal received a revised indication of interest from Miragen offering Signal stockholders 6% of the fully-diluted stock of the combined company, measured prior to any financing contemplated to take place concurrent with the Merger, with Miragen s stockholders being issued the remaining 94%.

On July 25, 2016, Mr. Riccitelli held an initial conversation by phone with Party 5 s chief operating officer regarding the acquisition of the MyPRS business, and Party 5 agreed to execute a non-disclosure agreement.

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On July 26, 2016, Mr. Riccitelli and Ms. Seymour met with Party 2 s chief executive officer, chief commercial officer, director of finance and financial advisors for an extensive diligence meeting. Each company presented the details of its business.

On July 27, 2016, Party 2 submitted a revised indication of interest, which included the requirement for Signal to have a large cash balance at the closing of a proposed business combination transaction, and offering Signal stockholders 5% of the fully-diluted stock of the combined company, with Party 2 s stockholders being issued the remaining 95%.

On July 29, 2016, Signal s board of directors met to review the two revised indications of interest from Party 2 and Miragen. Signal s board of directors determined that Party 2 s requirement for Signal to have a large cash balance at closing, combined with Party 2 s low cash position and significant outstanding debt, among other things, disqualified Party 2 as a viable combination partner for Signal at that time. In contrast, Signal s board of directors noted that Miragen had a strong balance sheet, experienced management team, strong investor base and viable clinical development program. Therefore, Signal s board of directors decided to move forward with discussions with Miragen. Mr. Riccitelli and Ms. Seymour and a representative from Cantor were instructed by Signal s board of directors to reach out to potential acquirers for the lab business or the intellectual property relating to MyPRS, in addition to Party 5, as Miragen had indicated the divestiture of the MyPRS business would be a condition to Miragen closing a merger transaction. Signal s board of directors also discussed the potential business combination process with its legal counsel, Pillsbury Winthrop Shaw Pittman LLP, or Pillsbury.

During the period of July 31, 2016 through October 6, 2016, Mr. Riccitelli and Ms. Seymour met with, either in person or by phone, Parties 5, 6, 7, 8 and 9 multiple times for diligence discussions regarding potential acquisitions of the MyPRS business. All parties were given access to Signal s virtual data room for the purpose of reviewing due diligence materials. During such time, Parties 6, 7, 8 and 9 notified Signal management, directly or by communication to Cantor, that they would not be submitting a proposal to acquire the MyPRS business or any other transaction. The primary reason cited by these parties for not submitting proposals was the additional cash burn required in the near term to continue to offer the MyPRS test commercially.

On July 29, 2016, at the request of Mr. Riccitelli, Richard A. Bender, M.D., Signal s chief medical officer, contacted Charles Strom, M.D. Ph.D., vice president of research and development for Quest Diagnostics, Incorporated, or Quest, via email, to inquire as to whether Quest might be interested in licensing Signal s MyPRS business. As a result of this communication, on August 5, 2016, Mr. Riccitelli and Dr. Bender met with management and medical team personnel from Quest at Quest s Orange County, California facility for an in-depth review of MyPRS.

On August 5, 2016, Signal received a proposed draft term sheet from Miragen with respect to a proposed business combination between the parties. The draft term sheet provided that the pre-combination Miragen securityholders would collectively receive 94% of fully-diluted stock of the combined company, measured prior to any financing contemplated to occur concurrent with the Merger, and Signal securityholders would hold 6% of the fully-diluted stock of the combined company, with Miragen having the option to conduct a financing that would close concurrent with the Merger and be dilutive to both Signal and Miragen stockholders.

On August 11, 2016, Signal s board of directors reviewed a draft term sheet between Miragen and Signal which outlined a potential business combination between the companies and included reference to a concurrent financing that Miragen intended to complete immediately prior to close of a merger transaction, with such concurrent financing to be dilutive to all securityholders. Signal s board of directors instructed Mr. Riccitelli and Ms. Seymour to continue to negotiate with Miragen regarding a potential business combination between the parties.

On August 15, 2016, Signal and Miragen entered into an amended and restated nondisclosure agreement to include a 30-day exclusivity clause and expand the persons and entities affiliated with Miragen allowed to review Signal s confidential information.

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On August 18, 2016, Quest indicated an interest in moving forward with exploring the potential acquisition of MyPRS to Mr. Riccitelli and requested access to Signal s virtual data room to review due diligence materials.

On August 23, 2016, Miragen s legal counsel, Cooley LLP, or Cooley, sent a draft Merger Agreement to Pillsbury for review on behalf of Signal. The draft Merger Agreement provided that the pre-combination Miragen securityholders would collectively receive 94% of fully-diluted stock of the combined company, measured prior to any financing contemplated to occur concurrent with the Merger, and Signal securityholders would hold 6% of the fully-diluted stock of the combined company. The draft Merger Agreement also provided that Miragen would conduct a financing concurrent with the proposed combination which would be dilutive to all securityholders, and that the two-way termination fee payable by the parties in certain circumstances would be $300,000 plus up to $100,000 in expense reimbursements.

On August 30, 2016, Pillsbury and Cooley held a telephone conference to discuss material issues in the draft Merger Agreement.

On September 6, 2016, Signal s and Miragen s management teams held an all-hands teleconference, in which their respective attorneys and representatives of Cantor also participated, to discuss status of the draft Merger Agreement and Miragen s concurrent financing. Miragen indicated it believed it would be able to finalize commitments for its concurrent financing in the near term.

On September 7, 2016, Cooley sent a revised draft Merger Agreement to Pillsbury.

On September 12, 2016, Pillsbury and Cooley held a telephone conference to discuss material issues in the draft Merger Agreement.

On September 14, 2016, Mr. Riccitelli was informed that Quest s business development committee had approved moving forward with the MyPRS acquisition.

On September 16, 2016, Pillsbury sent a revised draft Merger Agreement to Cooley.

On September 20, 2016, Pillsbury and Cooley held a telephone conference to discuss material issues in the draft Merger Agreement.

On September 26, 2016, Cooley sent a revised draft Merger Agreement to Pillsbury. The draft Merger Agreement provided that the pre-combination Miragen securityholders would collectively receive 94% of fully-diluted capital stock of the combined company, measured prior to any financing concurrent with the Merger, and Signal securityholders would hold 6% of the fully-diluted capital stock of the combined company.

On September 30, 2016, Quest submitted an initial non-binding letter of intent, or LOI, to purchase the lab business from Signal, and then submitted a revised LOI on October 10, 2016 to purchase the intellectual property assets related to MyPRS.

On October 3, 2016, Signal s and Miragen s management teams held an all-hands teleconference, in which their respective attorneys and representatives of Cantor also participated, to discuss status of the draft Merger Agreement and Miragen s concurrent financing. Miragen indicated that it believed the financing would be finalized in the coming weeks.

On October 7, 2016, Party 5 submitted a letter of intent to purchase the lab business. The proposal contained in such letter of intent was not considered a viable offer by Signal s management team and chairman of the board as it included, among other matters, post-closing obligations by Signal personnel to continue employment or consulting for Party 5 that could not be fulfilled by Signal.

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On October 10, 2016, Signal returned a revised LOI to Quest, including revisions that would allow Signal to complete on a concurrent basis both the Merger and the sale to Quest of the MyPRS intellectual property.

On October 10, 2016, Signal s and Miragen s management teams held an all-hands teleconference, in which their respective attorneys and representatives of Cantor also participated, to discuss status of the draft Merger Agreement and Miragen s concurrent financing.

On October 11, 2016, Signal s board of directors reviewed the proposed non-binding Quest LOI to sell the intellectual property assets related to MyPRS and instructed management to negotiate an asset purchase agreement with Quest, subject to the board s further review of such agreement. In addition, Signal s board of directors reviewed Signal s liquidity and cash requirements necessary to meet its obligations, including costs to wind down operations and terminate its employees prior to the closing of the Merger, with and without the sale to Quest of the MyPRS intellectual property.

On October 11, 2016, Mr. Riccitelli and Ms. Seymour, a representative of Pillsbury, and Quest s legal and business development representatives held a teleconference to discuss suggested revisions to the letter of intent. Quest s representatives agreed to seek internal approval on a LOI and return it to Signal as soon as possible.

On October 14, 2016, Signal s and Miragen s management teams held an all-hands teleconference, in which their respective attorneys and representatives of Cantor also participated, to discuss status of the draft Merger Agreement and Miragen s concurrent financing.

On October 18, 2016, Signal s and Miragen s management teams held an all-hands teleconference, in which their respective attorneys and representatives of Cantor also participated, to discuss status of the draft Merger Agreement and Miragen s concurrent financing.

On October 18, 2016, Signal received the revised draft Quest LOI in substantially the same form as presented by Signal to Quest per the draft of October 10, 2016.

On October 19, 2016, Mr. Riccitelli and Mr. Marshall, the chief executive officers of Signal and Miragen, respectively, discussed Miragen s concurrent financing via telephone. Mr. Marshall expressed confidence in a near-term commitment for the proposed concurrent financing.

On October 19, 2016, Signal s board of directors reaffirmed its instruction to management to negotiate an asset purchase agreement with Quest based on the Quest LOI dated October 18, 2016, subject to the board s further review of such agreement.

On October 24, 2016, Signal s and Miragen s management teams held an all-hands teleconference, in which their respective attorneys and representatives of Cantor also participated, to discuss status of the draft Merger Agreement and Miragen s concurrent financing. Miragen s management indicated that a commitment for the financing had been secured and terms were agreed. They also indicated that they expected to receive subscription agreements for approximately $40 million and to have the executed subscription agreements within the coming week.

On October 26, 2016, Signal s and Miragen s management teams held an all-hands teleconference, in which their respective attorneys and representatives of Cantor also participated, to discuss status of the draft Merger Agreement and Miragen s concurrent financing. Miragen confirmed that the financing would total approximately $40 million. The parties agreed that the Merger Agreement would be finalized by October 31, 2016, if possible. Signal and Miragen each agreed that they would schedule board meetings for October 31, 2016 to consider the proposed Merger

Agreement. In addition, Signal s projected net cash position of less than zero at Merger closing was discussed. It was agreed that Signal and Miragen s chief executive officers would speak separately to resolve the issue.

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On October 27, 2016, Messrs. Riccitelli and Marshall discussed the potential for Signal s net cash position to be less than zero at closing of the Merger due to delays in the transaction. In the course of those discussions, mutually acceptable thresholds and formulas with respect to net cash were developed to be included in the proposed Merger Agreement.

On October 27, 2016, Mr. Riccitelli and Ms. Seymour and Pillsbury held a teleconference with Quest s general manager of oncology, legal counsel and business development representative to discuss the diligence process. The parties agreed to a target date for executing a definitive purchase agreement for Signal s intellectual property assets for its MyPRS test, presuming the completion of satisfactory due diligence.

Between October 27, 2016 and November 23, 2016, there were various teleconferences, in-person meetings, facility tours and email communications among Mr. Riccitelli, Ms. Seymour and Dr. Sur and representatives from Quest s business development, informatics, operations and management teams regarding Quest s due diligence review of Signal s MyPRS test.

On October 28, 2016, Signal and Miragen agreed to Signal s net cash definition and thresholds to be included in the proposed Merger Agreement and the draft was finalized.

On October 29, 2016, Mr. Riccitelli distributed to Signal s board of directors copies of the proposed Merger Agreement with respect to a proposed business combination transaction between Signal and Miragen, proposed resolutions for adoption by Signal s board of directors if it elected to authorize Signal s management to proceed with such transaction, and related transaction documents, for review prior to the board meeting scheduled for October 31, 2016.

On October 29, 2016, Cooley distributed to Miragen s board of directors copies of the proposed Merger Agreement and Subscription Agreement, proposed resolutions for adoption by Miragen s board of directors if it elected to authorize Miragen s management to proceed with such transactions, and related transaction documents for review prior to the board meeting scheduled for October 31, 2016.

On October 31, 2016, Signal s board of directors held a meeting that representatives of Pillsbury and Cantor attended at the invitation of Signal s board of directors. During the meeting, members of Signal s management reviewed the key features of the proposed business combination between Signal and Miragen, including: structure and timing considerations; the Exchange Ratio for the conversion of Miragen capital stock into Signal common stock as well as the relative percentages of ownership of the existing Signal stockholders, on the one hand, and the Miragen stockholders (including investors in Miragen s planned concurrent financing), on the other hand, following the completion of the Merger; the planned concurrent financing of Miragen; the terms of support agreements from certain Miragen directors, officers, stockholders and affiliates, as well as Signal directors, officers and affiliates, to vote in favor of the proposed business combination; the closing conditions in the Merger Agreement as well as the subscription agreement for Miragen s planned concurrent financing; and the termination provisions and termination fees set forth in the Merger Agreement. In addition, representatives of Cantor reviewed with Signal s board of directors Cantor s analysis of the Exchange Ratio for the conversion of Miragen capital stock into Signal common stock and rendered Cantor s opinion to Signal s board of directors (in its capacity as such), subsequently confirmed by delivery of a written opinion on that same day, that, as of October 31, 2016 and based upon and subject to the assumptions made, procedures followed, matters considered, and qualifications and limitations set forth in the opinion, the Exchange Ratio for the conversion of Miragen capital stock into Signal common stock was fair from a financial point of view to Signal. Representatives from Pillsbury reviewed with Signal s board of directors the fiduciary duties of the board members in the context of the proposed business combination. During the various discussions, Signal s board of directors asked questions and discussed the terms and features of the proposed business combination, including

provisions of the proposed Merger Agreement and related documentation, as well as Signal s cash forecast and ability to satisfy its obligations prior to the projected closing date in light of the net cash requirement contained in the Merger Agreement. After further discussion among Signal s board of directors, the board unanimously (i) determined

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that the Merger and the other transactions contemplated by the Merger Agreement were fair to and in the best interests of Signal and its stockholders, (ii) approved and adopted the Merger Agreement and the transactions contemplated thereby, subject to finalization of the Merger Agreement and ancillary documents by Signal s management in consultation with Signal s legal counsel, with such changes thereto as Signal s management deems to be in the best interests of Signal and its stockholders, (iii) resolved to recommend that the Signal stockholders vote to approve the Merger, adopt the Merger Agreement and approve and/or adopt the other transactions and arrangements as contemplated by the Merger Agreement, including the issuance of shares of Signal common stock in the Merger, (iv) approved the Note Amendment to make the Note convertible into shares of Signal common stock in connection with the Merger and pursuant to the terms of the Note Amendment that had been distributed for review in advance of the meeting, and (v) approved a reverse split of Signal s common stock in a ratio of one-for-15 to be effective at 5:01 p.m. Eastern Time on November 4, 2016, which reverse split had been previously approved by Signal stockholders at the annual meeting.

Later that day, members of the Signal s and Miragen s management teams met, together with representatives of Pillsbury and Cooley, to finalize the Merger Agreement and related transaction documents. After finalization, Signal and Miragen entered into the Merger Agreement and related transaction documents.

Signal Reasons for the Merger

Signal s board of directors considered the following factors in reaching its conclusion to approve and adopt the Merger Agreement and the transactions contemplated thereby and the sale of the MyPRS intellectual property assets and to recommend that the Signal stockholders approve the Merger, adopt the Merger Agreement and other transactions contemplated by the Merger Agreement, including the issuance of shares of Signal common stock in the Merger and approve the sale of the MyPRS intellectual property assets, all of which Signal s board of directors viewed as supporting its decision to approve the business combination with Miragen:

Signal s board of directors believes, based in part on the judgment, advice and analysis of Signal management with respect to the potential strategic, financial and operational benefits of the Merger (which judgment, advice and analysis was informed in part on the business, technical, financial, accounting and legal due diligence investigation performed with respect to Miragen), that:

Miragen is a clinical-stage biopharmaceutical company discovering and developing proprietary RNA-targeted therapeutics with a specific focus on microRNAs and their role in diseases where there is a high unmet medical need;

the combined company will be led by an experienced senior management team from Miragen and a board of directors of seven members designated by Miragen; and

Miragen has commitments for $40.7 million to fund Miragen s development pipeline from an investor syndicate that includes its existing venture investors, Brace Pharma Capital, Atlas Venture, Boulder Ventures, JAFCO Co., Ltd., MP Healthcare Venture Management, MRL Ventures (a venture fund of Merck, known as MSD outside the United States and Canada), Remeditex Ventures, as well as new investors, Fidelity Management and Research Company. Although not a condition to the completion of

the Merger, if closed the concurrent financing, in addition to $16.1 million from the second tranche of Miragen s Series C Preferred Stock funding, which closed prior to execution of the definitive Merger Agreement, is expected to provide sufficient funding to advance Miragen s clinical development programs. Each of Miragen s clinical programs has the potential, if successful, to create value for the stockholders of the merged company and present the combined company with additional fund raising opportunities in the future.

Signal s board of directors also reviewed with the management of Signal the current plans of Miragen for developing its clinical programs to confirm the likelihood that the combined company would possess sufficient financial resources to allow the management team to focus initially on the continued

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development of its clinical programs. Signal s board of directors also considered the possibility that the combined company would be able to take advantage of the potential benefits resulting from the combination of Signal and Miragen to raise additional funds in the future.

Signal s board of directors considered the opportunity as a result of the Merger for Signal stockholders to participate in the potential value that may result from development of the Miragen clinical development programs and the potential increase in value of the combined company following the Merger.

Signal s board of directors concluded that the Merger would provide the existing Signal stockholders with an opportunity to participate in the potential increase in value of the combined company following the Merger.

Signal s board of directors considered the opinion of Cantor delivered to Signal s board of directors (in its capacity as such) that, as of October 31, 2016 and based upon and subject to the assumptions made, procedures followed, matters considered, and qualifications and limitations set forth in the opinion, the Exchange Ratio for the conversion of Miragen capital stock into Signal common stock pursuant to the Merger Agreement, was fair to Signal from a financial point of view, as more fully described below under the section titled *The Merger Opinion of Signal s Financial Advisor.*

Signal s board of directors also reviewed various factors impacting the financial condition, results of operations and prospects for Signal, including:

- the strategic alternatives of Signal to the Merger, including potential transactions that could have resulted from discussions that Signal s management conducted with other potential merger partners;
- the consequences of current market conditions, Signal s current liquidity position, its depressed stock price and continuing net operating losses, and the likelihood that the resulting circumstances for the company would not change for the benefit of the Signal stockholders in the foreseeable future on a stand-alone basis;
- the risks of continuing to operate Signal on a stand-alone basis, including the need to continue building the company s tests services menu, infrastructure and management team to support the laboratory services business with insufficient capital resources; and
- Signal management s belief that it would be difficult to obtain additional equity or debt financing on acceptable terms, if at all.

Signal s board of directors also reviewed the terms and conditions of the proposed Merger Agreement and associated transactions, as well as the safeguards and protective provisions included therein intended to mitigate risks, including:

the Exchange Ratio used to establish the number of shares of Signal common stock to be issued in the Merger, and the expected relative percentage ownership of Signal stockholders and Miragen stockholders immediately following the completion of the Merger;

the planned concurrent financing in Miragen, the limited number and nature of conditions to the obligation of the proposed investors in Miragen to consummate the planned concurrent financing, and the ability of Signal to specifically enforce the obligations of the investors to complete the investment in Miragen if all of such conditions have been satisfied;

the limited number and nature of the conditions to the Miragen obligation to consummate the Merger and the limited risk of non-satisfaction of such conditions as well as the likelihood that the Merger will be consummated on a timely basis;

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the respective rights of, and limitations on, Signal and Miragen under the Merger Agreement to consider certain unsolicited acquisition proposals under certain circumstances should Signal or Miragen receive a superior competing proposal;

the reasonableness of the potential termination fee of $300,000 and/or expense reimbursements of up to $100,000, which could become payable by either Signal or Miragen if the Merger Agreement is terminated in certain circumstances;

the support agreements, pursuant to which certain directors, officers and affiliated stockholders of Miragen agreed, solely in their capacity as stockholders, to vote all of their shares of Miragen capital stock in favor of adoption of the Merger Agreement;

the agreement of Miragen to provide written consent of its stockholders necessary to adopt the Merger Agreement thereby approving the Merger and related transactions within five business days of the registration statement on Form S-4, of which this proxy statement/prospectus/information statement is a part, becoming effective; and

the belief that the terms of the Merger Agreement, including the parties representations, warranties and covenants, and the conditions to their respective obligations, are reasonable under the circumstances.

In the course of its deliberations, Signal s board of directors also considered a variety of risks and other countervailing factors related to entering into the Merger, including:

the $300,000 termination fee and/or expense reimbursements of up to $100,000 that may be payable by Signal to Miragen upon the occurrence of certain events, and the potential effect of such termination fee or reimbursement of transaction expenses in deterring other potential acquirors from proposing a competing transaction that may be more advantageous to Signal stockholders;

the substantial expenses to be incurred in connection with the Merger;

the possible volatility, at least in the short term, of the trading price of the Signal common stock resulting from the Merger announcement;

the risk that the Merger might not be consummated in a timely manner, or at all, and the potential adverse effect of the public announcement of the Merger or on the delay or failure to complete the Merger on the reputation of Signal;

the risk that if the sale of the MyPRS business is not completed, then Signal would have incurred additional expenses that may not allow it to meet the closing net cash requirement of the Merger Agreement;

the risk to Signal s business, operations and financial results in the event that the Merger is not consummated;

the strategic direction of the continuing entity following the completion of the Merger, which will be determined by a board of directors initially designated entirely by Miragen;

the fact that the Merger would give rise to substantial limitations on the utilization of Signal s NOLs;

the ability to amend the Note so that the indebtedness would convert into shares of Signal common stock; and

various other risks associated with the combined company and the Merger, including those described in the section titled *Risk Factors* in this proxy statement/prospectus/information statement.

The foregoing information and factors considered by Signal s board of directors are not intended to be exhaustive, but are believed to include all of the material factors considered by Signal s board of directors. In view of the wide variety of factors considered in connection with its evaluation of the Merger and the complexity

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of these matters, Signal s board of directors did not find it useful to attempt, and did not attempt, to quantify, rank or otherwise assign relative weights to these factors. In considering the factors described above, individual members of Signal s board of directors may have given different weight to different factors. Signal s board of directors conducted an overall analysis of the factors described above, including thorough discussions with, and questioning of, the Signal management team and the legal and financial advisors of Signal, and considered the factors overall to be favorable to, and to support, its determination.

Miragen Reasons for the Merger

In the course of reaching its decision to approve the Merger, Miragen s board of directors consulted with its senior management, financial advisor and legal counsel, reviewed a significant amount of information and considered a number of factors, including, among others:

- the potential to provide its current stockholders with greater liquidity by owning stock in a public company;
- the potential to access of public market capital, including sources of capital from a broader range of investors to support the clinical development of its product candidates than it could otherwise obtain if it continued to operate as a privately-held company;
- the expectation that the Merger would be a more time- and cost-effective means to access capital than other options considered, including an initial public offering which Miragen was alternatively planning to pursue;
- the fact that shares of Signal common stock issued to Signal stockholders will be registered pursuant to a registration statement on Form S-4 by Signal and will become freely tradable for Miragen s stockholders who are not affiliates of Miragen;
- the likelihood that the Merger will be consummated on a timely basis;
- the terms and conditions of the Merger Agreement, including, without limitation, the following:
  - the determination that an exchange ratio that is not subject to adjustment based on trading prices is appropriate to reflect the expected relative percentage ownership of Signal securityholders, Miragen securityholders and securityholders of those shares sold in the concurrent financing was appropriate based, in the judgment of Miragen s board of directors;
  - the expectation that the Merger will be treated as a reorganization for U.S. federal income tax purposes, with the result that the Miragen stockholders will not recognize taxable gain or loss for U.S. federal income tax purposes upon the exchange of Miragen common stock for Signal common stock pursuant to the Merger;

the rights of Miragen under the Merger Agreement to consider certain unsolicited competing proposals under certain circumstances should Miragen receive a superior proposal; and

the conclusion of Miragen s board of directors that the potential termination fee of $300,000 and/or expense reimbursements of up to $100,000, payable by Signal to Miragen and the circumstances when such fee may be payable, were reasonable.

Miragen s board of directors also considered a number of uncertainties and risks in its deliberations concerning the Merger and the other transactions contemplated by the Merger Agreement, including the following:

the possibility that the Merger might not be completed and the potential adverse effect of the public announcement of the Merger on the reputation of Miragen and the ability of Miragen to obtain financing in the future in the event the Merger is not completed;

the termination fee of $300,000 and/or expense reimbursements of up to $100,000, payable by Miragen to Signal upon the occurrence of certain events, and the potential effect of such termination fee in deterring other potential acquirers from proposing a competing transaction that may be more advantageous to Miragen s stockholders;

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the risk that the Merger might not be consummated in a timely manner or at all;

the expenses to be incurred in connection with the Merger and related administrative challenges associated with combining the companies;

the additional public company expenses and obligations that Miragen s business will be subject to following the Merger to which it has not previously been subject; and

various other risks associated with the combined company and the Merger, including the risks described in the section titled *Risk Factors* in this proxy statement/prospectus/information statement.

The foregoing information and factors considered by Miragen s board of directors are not intended to be exhaustive, but are believed to include all of the material factors considered by Miragen s board of directors. In view of the wide variety of factors considered in connection with its evaluation of the Merger and the complexity of these matters, Miragen s board of directors did not find it useful, and did not attempt, to quantify, rank or otherwise assign relative weights to these factors. In considering the factors described above, individual members of Miragen s board of directors may have given different weight to different factors. Miragen s board of directors conducted an overall analysis of the factors described above, including thorough discussions with, and questioning of, Miragen s management and Miragen s legal advisors, and considered the factors overall to be favorable to, and to support, its determination.

Opinion of Signal Financial Advisor

On April 28, 2016, Signal engaged Cantor to act as Signal s financial advisor in connection with potential strategic alternatives for Signal. As part of this engagement, Signal s board of directors requested that Cantor evaluate the fairness, from a financial point of view, to Signal of the Exchange Ratio for the conversion of Miragen common stock into Signal common stock pursuant to the Merger Agreement. On October 31, 2016, at a meeting of Signal s board of directors, Cantor rendered its oral opinion to Signal s board of directors (in its capacity as such), which opinion was subsequently confirmed by delivery of a written opinion dated October 31, 2016, that, as of such date and based upon and subject to the assumptions made, procedures followed, matters considered, and qualifications and limitations set forth in the opinion, the Exchange Ratio for the conversion of Miragen common stock into Signal common stock pursuant to the Merger Agreement was fair, from a financial point of view, to Signal.

The full text of the written opinion of Cantor, dated October 31, 2016, which sets forth, among other things, the assumptions made, procedures followed, matters considered and qualifications and limitations of the review undertaken in connection with such opinion, is attached as *Annex I*. Holders of Signal common stock are urged to read this opinion carefully and in its entirety. Cantor s opinion was provided for the sole benefit and use of Signal s board of directors (in its capacity as such) in connection with its consideration of the Merger and addresses only the fairness to Signal, from a financial point of view, of the Exchange Ratio for the conversion of Miragen common stock into Signal common stock pursuant to the Merger Agreement. It does not address any other aspects of the Merger and does not constitute a recommendation as to how holders of Signal common stock or Miragen common stock should vote or act in connection with the Merger. The Exchange Ratio was determined through negotiations between Signal and Miragen and not pursuant to any recommendation of Cantor. The summary of the opinion below is qualified in its entirety by reference to the full text of the opinion.

In the course of performing its review and analyses for rendering its opinion, Cantor, among other things:

reviewed a draft of the Merger Agreement, dated October 30, 2016;

reviewed a draft of the Subscription Agreement, dated October 30, 2016;

reviewed certain publicly available business and financial information relating to Signal and Miragen;

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reviewed certain operating and financial information relating to Signal and Miragen s respective businesses and Signal s prospects, as provided to Cantor by Signal s and Miragen s management, including projections for Signal for the five years ended December 31, 2020, and monthly cash projections for October, November, and December 2016, as prepared and provided to Cantor by Signal s management;

held conference calls with certain members of Signal s senior management and Signal s board of directors to discuss Signal s and Miragen s respective businesses, operations, historical and projected financial results and future prospects;

held conference calls with certain members of Miragen s senior management to discuss Miragen s business and operations;

reviewed certain publicly available information with respect to other companies in the biopharmaceutical industry that Cantor deemed to be relevant;

reviewed the financial terms, to the extent publicly available, of selected recent business combinations and initial public offerings involving companies in the biopharmaceutical industry that Cantor deemed to be relevant; and

conducted such other studies, analyses, inquiries and investigations as Cantor deemed appropriate.

In rendering its opinion, Cantor relied upon and assumed, without independent verification, the accuracy and completeness of the financial and other information provided to or discussed with it by Signal and Miragen or obtained by it from public sources, including, without limitation, the projections referred to above. With respect to the projections, Cantor relied on representations that they have been reasonably prepared on bases reflecting the best currently available estimates and judgments of the senior management of Signal, as to the expected future performance of and liquidation value of Signal. Cantor assumed no responsibility for the independent verification of any such information, including, without limitation, the projections, and expressed no view or opinion as to such projections and the assumptions upon which they were based. Cantor further relied upon the assurances of senior management of Signal that they were unaware of any facts that would make the information and projections incomplete or misleading. Cantor also relied upon, without independent verifications, the assessment of Signal management and Miragen management as to the viability of, and risks associated with, the current and future products and services of Miragen (including without limitation, the development, testing and marketing of such products and services, the receipt of all necessary governmental and other regulatory approvals for the development, testing and marketing thereof, and the life and enforceability of all relevant patents and other intellectual and other property rights associated with such products and services). Cantor assumed that the executed Merger Agreement and Subscription Agreement would not differ in any material respect from the drafts thereof reviewed by Cantor, and that the Merger and Miragen s concurrent financing would be consummated in accordance with the terms of the Merger Agreement and the Subscription Agreement, respectively, without waiver, modification or amendment and in compliance with all applicable laws, documents and other requirements. Cantor also assumed that in the course of obtaining the necessary regulatory or third-party approvals, consents and releases for the Merger, no delay, limitation, restriction or condition would be imposed that would have an adverse effect on Signal, Miragen, or the contemplated benefits of the Merger. Cantor also assumed that the representations and warranties of the parties to the Merger Agreement contained therein were true and correct in all respects material to Cantor s analysis. Cantor also assumed, at the direction of Signal

management, that the Miragen allocation percentage would be no greater than 0.94.

In arriving at its opinion, Cantor did not perform or obtain any independent evaluation or appraisal of the assets or liabilities (contingent or otherwise) of Signal and Miragen, nor did it conduct a physical inspection of any of the properties or facilities of Signal or Miragen, nor was it furnished with any such evaluations, appraisals or inspections, nor did it assume any responsibility to obtain any such evaluations, appraisals or inspections. During the course of its engagement, Cantor was directed by Signal s board of directors to solicit indications of interest from various third parties regarding a transaction with Signal, and it considered the results of such solicitation in

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rendering its opinion. Cantor is not a legal, tax, regulatory or accounting advisor and relied on the assessments made by Signal and its advisors with respect to such issues. Cantor s opinion does not address any legal, tax, regulatory or accounting matters.

Cantor did not express any opinion as to the range of prices at which the shares of Signal common stock may trade subsequent to the announcement or consummation of the Merger or at any time.

The opinion of Cantor was intended solely for the benefit and use of Signal s board of directors (in its capacity as such) in connection with its consideration of the Merger. Cantor s opinion is not to be used for any other purpose, or to be reproduced, disseminated, quoted from or referred to at any time, in whole or in part, without its prior written consent; provided, however, that Cantor authorized the inclusion of its written opinion in its entirety in this proxy statement/prospectus/information statement. Cantor s opinion does not constitute a recommendation to Signal s board of directors in connection with the Merger, nor does it constitute a recommendation to any holders of Signal common stock or Miragen common stock as to how to vote or act in connection with the Merger. Cantor s opinion addressed only the fairness of the Exchange Ratio for the conversion of Miragen common stock into Signal common stock pursuant to the Merger Agreement from a financial point of view to Signal. Cantor s opinion did not address Signal s underlying business decision to pursue the Merger, the relative merits of the Merger as compared to any alternative business or financial strategies that might exist for Signal or the effects of any other transaction in which Signal might engage. In addition, Cantor s opinion did not constitute a solvency opinion or a fair value opinion, and Cantor did not evaluate the solvency or fair value of Signal under any federal or state laws relating to bankruptcy, insolvency or similar matters. Furthermore, Cantor did not express any view or opinion as to the fairness, financial or otherwise, of the amount or nature of any compensation payable to or to be received by any of Signal s officers, directors or employees, or any class of such persons, in connection with the Merger relative to the Exchange Ratio. Cantor expressed no view as to any other aspect or implication of the Merger or any other agreement, arrangement or understanding entered into in connection with the Merger or otherwise, and expressed no opinion as to the terms of Miragen s concurrent financing or the sale of all of Signal s intellectual property assets related to its MyPRS test.

Cantor s opinion was authorized for issuance by the Fairness Opinion and Valuation Committee of Cantor. Cantor s opinion is subject to the assumptions, limitations, qualifications and other conditions contained therein and is necessarily based on economic, market and other conditions, and the information made available to Cantor, as of the date thereof. Cantor assumed no responsibility for updating or revising its opinion based on circumstances or events of which it becomes aware after the date thereof.

The following is a summary of the material analyses performed by Cantor in preparing its opinion, dated October 31, 2016, to Signal s board of directors (in its capacity as such). The preparation of an opinion necessarily is not susceptible to partial analysis or summary description. In performing its analyses, Cantor did not attribute any particular weight to any analysis, methodology or factor considered by it, but rather made qualitative judgments as to the significance and relevance of each analysis and factor. Accordingly, Cantor s illustrative analyses must be considered as a whole. Considering any portion of the analyses or the factors considered, without considering all analyses and factors, could create a misleading or incomplete view of Cantor s analyses.

Selected IPO Analysis

Oncology IPO Companies. Using publicly available information, Cantor reviewed the implied pre-money equity valuations of seven selected biotechnology companies with a therapeutic focus on oncology that completed an initial public offering between September 2013 and October 2016 which raised a minimum of $40 million. The implied pre-money equity valuation is defined as the equity valuation of a company implied by the offering price of such company s shares in its initial public offering, minus the total gross proceeds of the initial public offering. Cantor noted

that, although such companies were deemed relevant for comparative purposes, they may differ from Miragen in one or more ways, including, but not limited to, indications for technology, size and

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competitive nature of targeted markets, number of compounds, scientific evidence, attractiveness of pre-clinical and clinical data, perceived quality of management, the boards of directors and investors, intellectual property, cash resources or financial position, and partnerships. Accordingly, there are inherent limitations on the applicability of such companies to the illustrative analysis of Miragen. These selected companies, which are referred to as the Oncology IPO Companies, were:

Syros Pharmaceuticals, Inc.

Corvus Pharmaceuticals, Inc.

Mirna Therapeutics, Inc.

Loxo Oncology, Inc.

Immune Design Corp.

MacroGenics, Inc.

Five Prime Therapeutics, Inc.

Cantor observed a range of implied pre-money equity valuations for the selected Oncology IPO Companies of between $97 million and $304 million with a mean and median implied pre-money equity valuation of $184 million and $146 million, respectively. Cantor then compared the implied equity values attributable to the 3.1% of the combined company to be held immediately following the Merger by holders of Signal common stock at the time of Cantor s opinion of approximately $5.7 million and $4.5 million based on the mean and median, respectively, implied pre-money equity valuations for the selected Oncology IPO Companies to Signal s estimated liquidation value, per Signal management, of negative $559,000.

Early Stage IPO Companies. Using publicly available information, Cantor reviewed the implied pre-money equity valuations of six selected biotechnology companies that had a focus outside of oncology, but which were considered early stage because they had no product candidate beyond Phase 1 clinical trials, who completed initial public offerings between September 2013 and October 2016 which raised a minimum of $40 million. Cantor noted that although such companies were deemed relevant for comparative purposes, they may differ from Miragen in one or more ways, including, but not limited to, indications for technology, size and competitive nature of targeted markets, number of compounds, scientific evidence, attractiveness of pre-clinical and clinical data, perceived quality of management, the boards of directors and investors, intellectual property, cash resources or financial position, and partnerships. Accordingly, there are inherent limitations on the applicability of such companies to the illustrative analysis of Miragen. These selected companies, which are referred to as the Early Stage IPO Companies, were:

Ra Pharmaceuticals, Inc.

Protagonist Therapeutics, Inc.

AveXis, Inc.

Voyager Therapeutics, Inc.

MyoKardia, Inc.

Nivalis Therapeutics, Inc.

Cantor observed a range of implied pre-money equity valuations for the selected Early Stage IPO Companies of between $106 million and $353 million, with a mean and median implied pre-money equity valuation of $213 million $198 million, respectively. Cantor then compared the implied equity values attributable to the 3.1% of the combined company to be held immediately following the Merger by holders of Signal common stock at the time of Cantor s opinion of approximately $6.6 million and $6.2 million based on the mean and median, respectively, implied pre-money equity valuations for the selected Early Stage IPO Companies to Signal s estimated liquidation value, per Signal management, of negative $559,000.

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Selected Companies Analysis

Oncology Companies. Using publicly available information, Cantor reviewed selected financial data of six selected publicly-traded companies that had aggregate market capitalizations under $500 million and which had a therapeutic focus on oncology. Cantor noted that, although such companies were deemed relevant for comparative purposes, they may differ from Miragen in one or more ways, including, but not limited to, indications for technology, size and competitive nature of targeted markets, number of compounds, scientific evidence, attractiveness of pre-clinical and clinical data, perceived quality of management, the boards of directors and investors, intellectual property, cash resources or financial position, and partnerships. Accordingly, there are inherent limitations on the applicability of such companies to the illustrative analysis of Miragen. These selected companies, which are referred to as the Oncology Companies, were:

Bellicum Pharmaceuticals, Inc.

CytomX Therapeutics, Inc.

Lion Biotechnologies, Inc.

Curis, Inc.

Adaptimmune Therapeutics plc

Idera Pharmaceuticals, Inc.

Cantor observed a range of implied equity valuations for the selected Oncology Companies of between $312 million and $467 million, with a mean and median implied equity valuation of $384 million and $377 million, respectively. Cantor then compared the implied equity values attributable to the 3.1% of the combined company to be held immediately following the Merger by holders of Signal common stock at the time of Cantor s opinion of approximately $12.0 million and $11.7 million based on the mean and median, respectively, implied equity valuations for the selected Oncology Companies to Signal s estimated liquidation value, per Signal management, of negative $559,000.

Early Stage Companies. Using publicly available information, Cantor reviewed selected financial data of three selected publicly-traded companies that had aggregate market capitalizations under $500 million and which were considered early stage because they had no product candidate beyond Phase 1 clinical trials (with the exception of Regulus Therapeutics Inc., which has one program in Phase 2 clinical development with two indications). Cantor noted that, although such companies were deemed relevant for the comparative purposes, they may differ from Miragen in one or more ways, including, but not limited to, indications for technology, size and competitive nature of targeted markets, number of compounds, scientific evidence, attractiveness of pre-clinical and clinical data, perceived quality of management, the boards of directors and investors, intellectual property, cash resources or financial position, and partnerships. Accordingly, there are inherent limitations on the applicability of such companies to the illustrative analysis of Miragen. These selected companies, which are referred to as the Early Stage Companies, were:

Regulus Therapeutics Inc.

ProQR Therapeutics N.V.

ContraFect Corporation

Cantor observed a range of implied equity valuations for selected the Early Stage Companies of between $89 million and $141 million, with a mean and median implied equity valuation of $119 million and $128 million, respectively. Cantor then compared the implied equity values attributable to the 3.1% of the combined company to be held immediately following the Merger by holders of Signal common stock at the time of Cantor s opinion of approximately $3.7 million and $4.0 million based on the mean and median, respectively, implied equity valuations for the selected Early Stage Companies to Signal s estimated liquidation value, per Signal management, of negative $559,000.

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Selected Transactions Analysis

Cantor reviewed publicly available information relating to six selected acquisition transactions, announced since the beginning of 2013, of companies in the biopharmaceutical industry which had either a therapeutic focus on oncology or no products beyond Phase 1 at the time of announcement of the transaction, in each case with an aggregate transaction valuation (based solely upon upfront payments and excluding contingent value rights or other post-closing payments) of less than $1 billion. Cantor noted that, although the companies that were acquired in the selected acquisitions had certain financial and operating characteristics that could be considered similar to those of Miragen, none of these companies had the same management, make-up, technology, size or mix of business as Miragen. Accordingly, there are inherent limitations on the applicability of such companies to the illustrative analysis of Miragen. Additionally, based on publicly available information, none of the target companies in such acquisitions was in the process of winding down operations at the time of the acquisition. Cantor also noted that there have been varying market conditions over the time periods during which the selected acquisitions were announced. These acquisitions, which are referred to as the Selected Transactions, were:

acquisition of Vitae Pharmaceuticals, Inc. by Allergan plc (announced September 14, 2016)

acquisition of Admune Therapeutics LLC by Novartis AG (announced October 21, 2015)

acquisition of OnCore Biopharma, Inc. by Arbutus Biopharma Inc. (fka. Tekmira Pharmaceuticals) (announced January 11, 2015)

acquisition of iPierian, Inc. by Bristol-Myers Squibb Company (announced April 29, 2014)

acquisition of Sirna Therapeutics, Inc. by Alnylam Pharmaceuticals, Inc. (announced January 12, 2014)

acquisition of Amplimmune, Inc. by MedImmune, LLC (announced August 26, 2013)

Cantor observed a range of the disclosed upfront consideration at the time of announcement for the Selected Transactions, not adjusted for stock price differences since announcement of between $140.0 million and $639.0 million, with a mean and median of upfront consideration of $289.3 million and $200.0 million, respectively. Cantor then compared the implied equity values attributable to the 3.1% of the combined company to be held immediately following the Merger by holders of Signal common stock at the time of Cantor s opinion of approximately $9.0 million and $6.2 million based on the mean and median, respectively, upfront consideration paid in the Selected Transactions to Signal s estimated liquidation value, per Signal management, of negative $559,000.

General

Cantor acted as a financial advisor to Signal in connection with the Merger and Signal agreed to pay Cantor a fee of approximately $750,000, $250,000 of which was paid upon delivery of Cantor s opinion. In addition, Signal agreed to reimburse Cantor for certain expenses and to indemnify Cantor against certain liabilities arising out of its engagement.

Cantor had been engaged during the two years preceding the date of its opinion by Signal to provide certain investment banking and other services on matters unrelated to the Merger, for which it has received fees of approximately $178,000. Cantor may seek to provide Signal and its affiliates with certain investment banking and other services unrelated to the Merger in the future.

Consistent with applicable legal and regulatory requirements, Cantor adopted certain policies and procedures to establish and maintain the independence of Cantor s research departments and personnel. As a result, Cantor s research analysts may hold views, make statements or investment recommendations and/or publish research reports with respect to Signal, the Merger and other participants in the Merger that differ from the views of Cantor s investment banking personnel.

In the ordinary course of business, Cantor and its affiliates may actively trade (for their own accounts and for the accounts of their customers) certain equity and debt securities, bank debt and/or other financial instruments

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issued by Signal and affiliates, as well as derivatives thereof, and, accordingly, may at any time hold long or short positions in such securities, bank debt, financial instruments and derivatives.

Interests of the Signal Directors and Executive Officers in the Merger

In considering the recommendation of Signal s board of directors with respect to issuing shares of Signal common stock as contemplated by the Merger Agreement and the other matters to be acted upon by Signal stockholders at the Signal special meeting, Signal stockholders should be aware that certain members of the board of directors and executive officers of Signal have interests in the Merger that may be different from, or in addition to, the interests of Signal stockholders. These interests relate to or arise from the matters described below. The board of directors of each of Signal and Miragen were aware of these potential conflicts of interest and considered them, among other matters, in reaching their respective decisions to approve the Merger Agreement and the Merger, and to recommend, as applicable, that the Signal stockholders approve the Signal proposals to be presented to the Signal stockholders for consideration at the Signal special meeting as contemplated by this proxy statement/prospectus/information statement, and that the Miragen stockholders sign and return the written consent as contemplated by this proxy statement/prospectus/information statement.

Severance and Bonus Payments

Under the original terms of the employment agreements for each of Samuel D. Riccitelli, Signal s president and chief executive officer, and Tamara A. Seymour, Signal s chief financial officer, upon the executive s termination without Cause, or in connection with executive s resignation for Good Reason, each as defined in the employment agreements, each executive officer was eligible to receive continued base salary payments (less all applicable withholdings) and COBRA premium payments for twelve months following termination payable each month in monthly installments over the applicable period in accordance with Signal s payroll period. Neither executive officer was required to mitigate the amount of any severance payments received by seeking other employment during the term of his or her severance period. However, if the executive officer were to obtain other employment during the term of the severance period, Signal would have only needed to pay such executive officer, for the remaining length of the severance period, the difference between such executive officer s new salary and base salary (as in effect at the time of termination), if the new salary is less than such executive officer s base salary (i.e., Signal would not have been obligated to make any severance payments to such executive officer if his or her new salary was greater than his or her applicable base salary). Signal was also obligated to reimburse each executive officer for premiums for COBRA coverage for the applicable executive officer (and to the extent he or she has family coverage, his or her family), provided such executive officer elects such coverage, during the applicable period when such executive officer is receiving severance payments, until such time as such executive officer obtains other employment and is entitled to comparable health coverage from his or her new employer.

The employment of Mr. Riccitelli and Ms. Seymour is expected to terminate no later than the consummation of the Merger. The compensation committee of the board of directors deemed it advisable and in the best interests of Signal stockholders to permit lump sum payment of the severance arrangements of Mr. Riccitelli and Ms. Seymour upon his or her termination to the extent permitted under Section 409A of the Code, as opposed to the monthly payments originally contemplated therein to avoid a potential acquirer from having to make continued payments following the closing of a merger. Therefore, on October 11, 2016, the compensation committee of Signal s board of directors approved modifications to the severance arrangements of Mr. Riccitelli and Ms. Seymour to allow for the payment of severance in a lump sum to the extent such payments can be made in compliance with Section 409A of the Code.

2015 Bonus Payments

The employment agreements for Mr. Riccitelli and Ms. Seymour allow for annual incentive compensation bonus payments to be awarded in the sole discretion of the compensation committee of Signal s board of directors. The

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incentive compensation for Mr. Riccitelli may be paid on the terms established from time to time by the compensation committee of Signal and Ms. Seymour is eligible to receive a bonus payment of up to 30% of her base salary then in effect, which bonus payment will be awarded in the sole discretion of the compensation committee based upon performance goals established by the compensation committee and paid subject to her continued employment through the date of payment.

On March 28, 2016, the compensation committee of Signal s board of directors approved bonuses for Mr. Riccitelli and Ms. Seymour of up to $135,000 and $105,000, respectively, for the 2015 performance of such executive officers. Of the awarded amounts, $33,750 and $26,250 were paid to Mr. Riccitelli and Ms. Seymour, respectively, in April 2016. The remainder of these amounts, consisting of $101,250 for Mr. Riccitelli and $78,750 for Ms. Seymour would be paid upon the completion of a strategic transaction of Signal and subject to the availability of funds. On October 11, 2016, the compensation committee of Signal s board of directors approved the payment of the remainder of such bonuses to Mr. Riccitelli and Ms. Seymour of $101,250 and $78,750, respectively, upon the closing of the Merger.

2016 Bonus Payments

As discussed above, incentive compensation for Mr. Riccitelli may be paid on the terms established from time to time by, and at the discretion of, the compensation committee of Signal, and Ms. Seymour is eligible to receive a bonus payment of up to 30% of her base salary then in effect. Such bonus payments are awarded in the sole discretion of the compensation committee based upon performance goals established by the compensation committee. In the event the compensation committee determines that funds are available to provide for the payment of incentive compensation bonus payments for the 2016 performance of Mr. Riccitelli and Ms. Seymour, Mr. Riccitelli and Ms. Seymour are eligible to receive an amount to be determined by the compensation committee. If approved by the compensation committee of Signal s board of directors, the bonus amounts are expected to be $178,200 for Mr. Riccitelli and $138,600 for Ms. Seymour, and will be paid upon closing of the Merger.

Acceleration of Unvested RSU Awards

The restricted stock unit awards held by the executive officers allowed for vesting acceleration in full upon a Change in Control of Signal, as such term is defined in the 2014 Stock Incentive Plan of Signal. As contemplated under the Merger Agreement, the lab business of Signal is expected to be wound down or sold prior to the closing of the Merger. Therefore, the compensation committee of the board of directors recognized that holders of restricted stock unit awards may be terminated prior to the closing of the Merger, or a deemed Change in Control under the 2014 Stock Incentive Plan, without obtaining the benefit of their restricted stock unit awards. Therefore, on October 11, 2016, the compensation committee of the board of directors approved the acceleration in full of the unvested portions of the restricted stock unit awards held by the executive officers, subject to the signing of the Merger Agreement and the signing of a non-binding letter of intent for the sale of Signal s lab business. The acceleration in full of such unvested portions of such restricted stock unit awards occurred as of the business day prior to the signing of the Merger Agreement on October 28, 2016.

Acceleration of Unvested Option Awards

On October 11, 2016, the compensation committee of Signal s board of directors approved the acceleration in full of the unvested portions of the stock options held by the Signal directors and Ms. Seymour in connection with the signing of the Merger Agreement. All stock option awards held by Ms. Seymour are currently out-of-the-money. As of December 31, 2016, all vested stock options to purchase shares of common stock held by Signal directors were out-of-the-money.

Named Executive Officer Compensation

The following table and the related footnotes present information about the compensation payable to Signal s named executive officers included in Signal s most recent filing under the Exchange Act that required disclosure

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pursuant to Item 402(c) of Regulation S-K. The compensation shown in the table below is intended to comply with Item 402(t) of Regulation S-K, which requires disclosure of information about compensation for each named executive officer that is based on or otherwise relates to the Merger.

The named executive officers are not entitled to any pension or non-qualified deferred compensation benefits enhancements or any tax reimbursements in connection with the Merger. Further, all stock options held by the named executive officers of Signal are currently out-of-the-money.

Golden Parachute Compensation

Name	Cash(1)	Perquisites/ Benefits(2)	Other(3)	Total
Samuel D. Riccitelli	$ 551,250	$ 26,762	$ 178,200	$ 756,212
Tamara A. Seymour	$ 428,750	$ 9,880	$ 138,600	$ 577,230

(1) The amount in this column for Mr. Riccitelli represents $450,000 in severance payments and reflects the $101,250 remaining payment under his 2015 performance bonus described above under Severance and Bonus Payments. The amount in this column for Ms. Seymour represents $350,000 in severance payments and reflects the $78,750 remaining payment under her 2015 performance bonus described above under Severance and Bonus Payments.

(2) The amounts in this column reflect 12 months of health insurance premium payments for Mr. Riccitelli and 12 months of health insurance premium payments for Ms. Seymour.

(3) The amount in this column represents an estimated amount of cash payments Mr. Riccitelli and Ms. Seymour are eligible to receive pursuant to Signal s incentive bonus program for 2016 described above under Severance and Bonus Payments. Payments under Signal s incentive bonus program are paid in the sole discretion of the compensation committee of the board of directors. To date, the compensation committee has not approved the payment of any such payments for the 2016 performance of such executive officers.

Amendment to the Bennet S. Lebow Promissory Note

On March 6, 2015, Signal originally issued the Note to Bennett S. LeBow, a member of Signal s Board of Directors and Signal s largest stockholder. When issued, the terms of the Note provided (i) for a principal amount of $1,105,009, which accrued interest computed on the basis of the actual number of days elapsed in a 360-day year, at a rate per annum of 8%, (ii) that at any time on or after June 30, 2015, Mr. LeBow may demand payment of the entire outstanding principal of the Note and all unpaid interest accrued thereon and (iii) that upon the occurrence and during the continuance of any event of default by Signal under the Note, the principal balance of the Note shall accrue interest at a rate of 11%.

Given its cash position, Signal would have difficulty operating its business until the closing of a potential merger with a net positive cash position and repaying the outstanding amount due under the Note with Mr. LeBow. Therefore, on October 31, 2016, the board of directors deemed it advisable and in the best interests of Signal stockholders to approve the Note Amendment.

On October 31, 2016, prior to the execution of the Merger Agreement, Signal and Mr. LeBow entered into the Note Amendment. The Note Amendment (i) makes the outstanding principal balance and all accrued interest on the Note, plus a premium of 11% on the outstanding balance, automatically convertible into shares of Signal s common stock

immediately prior to the effective time of the Merger at a conversion price of $5.39 per share, which is the closing price of Signal s common stock on the effective date of the Note Amendment, after giving effect to Signal s one-for-15 reverse stock split effected on November 4, 2016, and (ii) modifies the principal amount of the Note to $1,045,000, the original amount advanced to Signal as of June 17, 2014, and the interest of the Note to a rate per annum of 11% commencing on June 17, 2014, with interest computed on the basis of the actual number of days in a 360-day year.

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The conversion price is subject to appropriate adjustment in the event of any reverse stock split, forward stock split, stock dividend, combination or other similar recapitalization with respect to Signal s common stock. Conversion of the Note is subject to and conditioned upon Signal obtaining stockholder approval of any such conversion.

If conversion of the Note is not approved by Signal stockholders at the special meeting, or if the Merger Agreement is terminated prior to completion of the Merger, the outstanding balance due under the Note will not be converted into Signal common stock and the Note will remain outstanding. Moreover, because conversion of the outstanding balance of the Note into shares of Signal common stock is a closing condition of the Merger Agreement, success of the Merger is also dependent upon stockholder approval of conversion of the Note.

Ownership Interests

As of December 31, 2016, directors and executive officers of Signal owned or controlled 26% of the outstanding shares of Signal common stock. Signal directors and executives have entered into support agreements in connection with the Merger. For a more detailed discussion of the support agreements see the section titled *Agreements Related to the Merger Support Agreements* in this proxy statement/prospectus/information statement.

Indemnification and Insurance for the Signal Officers and Directors

Under the Merger Agreement, from the closing of the Merger through the sixth anniversary of the closing, Signal and the surviving corporation agree that all rights to indemnification, exculpation or advancement of expenses now existing in favor of, and all limitations on the personal liability of, each present and former director or officer, of Signal or Miragen provided for in the respective organizational documents of Miragen and Signal in effect as of October 31, 2016, shall continue to be honored and in full force and effect.

Under the Merger Agreement, the certificate of incorporation and bylaws of Signal and the surviving corporation in the Merger, will contain provisions no less favorable with respect to indemnification, advancement of expenses and exculpation of present and former directors and officers of each of Signal and Miragen than are presently set forth in the certificate of incorporation and bylaws of Signal and Miragen, as applicable, which provisions shall not be amended, modified or repealed for a period of six years time from the closing of the Merger in a manner that would materially and adversely affect the rights thereunder of individuals who, at or prior to the closing, were officers or directors of Signal and Miragen.

The Merger Agreement also provides that Signal shall purchase an insurance policy in effect for six years from the closing, providing at least the same coverage as the current directors and officers liability insurance policies maintained by Miragen and Signal and containing terms and conditions that are not materially less favorable to current and former officers and directors of Miragen and Signal.

Interests of Miragen Directors and Executive Officers in the Merger

In considering the recommendation of Miragen s board of directors with respect to adopting the Merger Agreement, Miragen stockholders should be aware that certain members of the board of directors and executive officers of Miragen have interests in the Merger that may be different from, or in addition to, interests they may have as Miragen stockholders. Miragen s board of directors was aware of these potential conflicts of interest and considered them, among other matters, in reaching their respective decisions to approve the Merger Agreement, the Merger and related transactions, and to recommend that the Miragen stockholders sign and return the written consent as contemplated by this proxy statement/prospectus/information statement.

Ownership Interests

Some of Miragen s directors and executive officers currently hold shares of Miragen s common stock or shares of convertible preferred stock, of which each share will convert into one share of Miragen common stock prior to

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the closing of the Merger. Each one share of Series A convertible preferred stock, Series B convertible preferred stock and Series C convertible preferred stock converts into one share of common stock. The table below sets forth the anticipated ownership of Miragen s common stock by Miragen s directors and executive officers immediately prior to the closing of the Merger based on their ownership of Miragen s capital stock as of December 31, 2016, without giving effect to any shares of common stock that each director, executive officer or any affiliates thereof may purchase in Miragen s concurrent financing in connection with the Merger.

Stockholder Name	Number of Shares of Miragen Common Stock Immediately Prior to the Closing of the Merger
William S. Marshall, Ph.D.(1)	211,319
Jason A. Leverone(2)	
Adam S. Levy(3)	
Paul D. Rubin, M.D.(4)	
Bruce L. Booth, Ph.D.(5)	
Reza Halse, Ph.D.(6)	
John W. Creecy(7)	
Thomas E. Hughes, Ph.D.(8)	20,000
Kyle A. Lefkoff (9)	
Kevin Koch, Ph.D.(10)	
Joseph L. Turner(11)	

(1) Consists of 150,000 shares of common stock, 37,586 shares of Series A convertible preferred stock, 6,470 shares of Series B convertible preferred stock and 17,263 shares of Series C convertible preferred stock. Dr. Marshall is Miragen s president and chief executive officer and a member of its board of directors. For additional information regarding shares of Miragen s common stock issuable to Dr. Marshall upon exercise of outstanding options, please see the table below.

(2) Mr. Leverone is Miragen s chief financial officer. For additional information regarding shares of Miragen s common stock issuable to Mr. Leverone upon exercise of outstanding options, please see the table below.

(3) Mr. Levy is Miragen s chief business officer. For additional information regarding shares of Miragen s common stock issuable to Mr. Levy upon exercise of outstanding options, please see the table below.

(4) Dr. Rubin is Miragen s executive vice president, research and development. For additional information regarding shares of Miragen s common stock issuable to Dr. Rubin upon exercise of outstanding options, please see the table below.

(5) Dr. Booth is a member of Miragen s board of directors and a director of Atlas Venture Associates VII, Inc., which is the general partner of Atlas Venture Associates VII, L.P. which is the general partner of Atlas Venture VII, L.P., with each referred to as an Atlas Entity and, collectively, the Atlas Entities. For additional information regarding ownership of Miragen capital stock by the Atlas Entities, please see the table below.

(6) Dr. Halse is a member of Miragen s board of directors and a partner of MRL Ventures Fund, LLC. For additional information regarding ownership of Miragen capital stock by MRL Ventures Fund, LLC, please see the table below. Dr. Halse has informed Miragen that he will resign as a member of Miragen s board of directors immediately prior to the effectiveness of the Merger.

(7) Mr. Creecy is a member of Miragen s board of directors and the chief executive officer of Remeditex Ventures LLC. For additional information regarding ownership of Miragen capital stock by Remeditex Ventures LLC, please see the table below.

(8) Consists of 20,000 shares of common stock. Dr. Hughes is a member of Miragen s board of directors. For additional information regarding shares of Miragen s common stock issuable to Dr. Hughes upon exercise of outstanding options, please see the table below.

(9) Mr. Lefkoff is a member of Miragen s board of directors and a managing member of BV Partners VI, L.L.C., which is the general partner of Boulder Ventures VI, L.P., and a managing member of BV

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Partners V, L.L.C., which is the general partner of Boulder Ventures V, L.P., with each referred to as a BV Entity and, collectively, the BV Entities. For additional information regarding ownership of Miragen capital stock by the BV Entities, please see the table below.

(10) Mr. Koch is a member of Miragen s board of directors. For additional information regarding shares of Miragen s common stock issuable to Mr. Koch upon exercise of outstanding options, please see the table below.

(11) Mr. Turner is designated by Miragen to be appointed as a member of the combined company s board of directors effective as of the closing of the Merger.

Some of Miragen s other stockholders affiliated with Miragen s directors also currently hold shares of Miragen s common stock or shares of convertible preferred stock, of which each share will convert into one share of Miragen common stock prior to the closing of the Merger. The table below sets forth the anticipated ownership of Miragen s common stock by other affiliates of Miragen s directors immediately prior to the closing of the Merger based on their ownership of Miragen s capital stock as of December 31, 2016, without giving effect to any shares of common stock that stockholder may purchase in Miragen s concurrent financing in connection with the Merger.

Stockholder Name	Number of Shares of Miragen Common Stock Immediately Prior to the Closing of the Merger
Atlas Entities(1)	4,469,607
Remeditex Ventures LLC(2)	3,052,163
BV Entities(3)	2,850,548
MRL Ventures Fund, LLC(4)	1,580,135

(1) Consists of 83,250 shares of common stock, 2,661,454 shares of Series A convertible preferred stock, 479,401 shares of Series B convertible preferred stock and 1,245,502 shares of Series C convertible preferred stock. All shares are held directly by Atlas Venture VII, L.P., or Atlas Venture VII. Atlas Venture Associates VII, L.P., or AVA VII LP, is the general partner of Atlas Venture VII, and Atlas Venture Associates VII, Inc., or AVA VII Inc., is the general partner of AVA VII LP. Peter Barrett, Bruce L. Booth, Ph.D., Jean-Francois Formela and Jeff Fagnan is each a director of AVA VII Inc. Dr. Booth is a member of Miragen s board of directors.

(2) Consists of 1,083,333 shares of Series B Preferred Stock and 1,968,830 shares of Series C convertible preferred stock. All shares are held directly by Remeditex Ventures LLC, or Remeditex. John H. Creecy is the chief executive officer of Remeditex and may be deemed to be the indirect beneficial owner of the shares owned by Remeditex. Mr. Creecy is a member of Miragen s board of directors.

(3) Consists of 55,500 shares of common stock, 1,691,598 shares of Series A convertible preferred stock, 306,027 shares of Series B convertible preferred stock and 797,423 shares of Series C convertible preferred stock. Includes shares held by Boulder Ventures V, L.P., or Boulder Ventures V, and shares held by Boulder Ventures VI, L.P., or Boulder Ventures VI and, collectively with Boulder Ventures V, the Boulder Ventures Funds. BV Partners V, L.L.C., or BV V, is the general partner of Boulder Ventures V. BV Partners VI, L.L.C., or BV VI, is the general partner of Boulder Ventures VI. BV V may be deemed to indirectly beneficially own the shares owned by Boulder Ventures V and BV VI may be deemed to indirectly beneficially own the shares owned by Boulder Ventures VI. Kyle A. Lefkoff, Peter A. Roshko and Jonathan L. Perl are managing members of BV V and Mr. Lefkoff, Mr. Roshko and Mr. Perl are managing members of BV VI. Mr. Lefkoff is a member of Miragen s board of directors.

(4) Consists of 1,580,135 shares of Series C convertible preferred stock. All shares are held directly by MRL Ventures Fund, LLC, or MRL Ventures. Reza Halse is a partner of MRL Ventures and may be deemed to be the indirect beneficial owner of the shares owned by MRL Ventures. Dr. Halse is a member of Miragen s board of directors. Dr. Halse has informed Miragen that he will resign as a member of Miragen s board of directors immediately prior to the effectiveness of the Merger.

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Stock Options

Two of Miragen s directors, Dr. Hughes and Mr. Koch, and Miragen s executive officers hold options to purchase shares of Miragen common stock, which, pursuant to the Merger Agreement, will be converted into and become options to purchase shares of Signal common stock. In connection with the conversion of the options, the number of shares subject to the options and the option exercise prices will be adjusted pursuant to the terms of the Merger Agreement. The number of shares subject to each option will be multiplied by the Exchange Ratio, rounding any resulting fractional shares down to the nearest whole share, and the exercise price of each option will be divided by the Exchange Ratio, rounding up to the nearest whole cent. The option terms will remain the same, including any vesting terms. The table below sets forth certain information with respect to the options.

Optionholder Name	Grant Date	Expiration Date	Exercise Price ($)	Number of Shares of Common Stock Underlying Option as of December 31, 2016	Number Vested as of December 31, 2016
William S. Marshall, Ph.D.	7/31/2008	7/30/2018	0.40	164,726	164,726
	6/15/2012	6/14/2022	0.86	328,500	328,500
	2/22/2016	2/21/2016	0.74	223,000	46,458
Jason A. Leverone	12/10/2008	12/09/2018	0.40	42,000	42,000
	9/24/2009	9/23/2019	0.40	4,400	4,400
	3/16/2010	3/15/2020	0.40	16,000	16,000
	6/15/2012	6/14/2022	0.86	66,300	66,300
	2/22/2016	2/21/2026	0.74	50,000	10,416
Adam S. Levy	6/15/2016	6/14/2026	0.74	230,883	0
Paul D. Rubin	11/30/2016	11/29/2026	4.00	288,604	0
Thomas E. Hughes, Ph.D.	6/15/2012	6/14/2022	0.86	16,000	16,000
	2/22/2016	2/21/2026	0.74	19,500	4,875
Kevin Koch, Ph.D.	8/18/2016	8/17/2026	0.74	41,600	3,466

Private Placement of Common Stock.

In October 2016, Miragen entered into the Subscription Agreement with certain current stockholders of Miragen and certain new investors in Miragen pursuant to which the purchasers agreed to purchase an aggregate of 9,045,126 shares of Miragen s common stock at a price per share of $4.50 for an aggregate consideration of approximately $40.7 million immediately prior to, and conditioned upon, the consummation of the Merger. The table below sets forth the number of shares of Miragen s common stock agreed to be purchased and the purchase price for the shares of common stock for each purchaser that is a director or executive officer of Miragen or are their affiliates.

Name of Purchaser	Shares of Common Stock	Purchase Price ($)

	(#)	
Atlas Venture Fund X, L.P.(1)	1,145,835	$ 5,156,257.50
Boulder Ventures VI, L.P.(2)	147,419	$ 663,385.50
MRL Ventures Fund, LLC (3)	412,774	$ 1,857,483.00
Remeditex Ventures LLC(4)	797,308	$ 3,587,886.00

(1) The Atlas Entities, together, hold more than 5% of Miragen s outstanding capital stock. Bruce L. Booth is a member of Miragen s board of directors and a director of Atlas Venture Associates VII, Inc. and Atlas Venture Associates X, Inc., which are affiliated with the Atlas Entities.

(2) Boulder Ventures holds more than 5% of Miragen s outstanding capital stock. Kyle A. Lefkoff is a member of Miragen s board of directors and a managing member of BV Partners V, L.L.C. and BV Partners VI, L.L.C., which are each affiliated with Boulder Ventures.

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(3) MRL Ventures Fund, LLC holds more than 5% of Miragen s outstanding capital stock. Reza Halse is a member of Miragen s board of directors and a partner MRL Ventures Fund, LLC. Dr. Halse has informed Miragen that he will resign as a member of Miragen s board of directors immediately prior to the effectiveness of the Merger.
(4) Remeditex Ventures LLC holds more than 5% of Miragen s outstanding capital stock. John H. Creecy is a member of Miragen s board of directors and the chief executive officer of Remeditex Ventures LLC.

Management Following the Merger

As described elsewhere in this joint proxy statement/prospectus/information statement, including in *Management Following the Merger* beginning on page 247, Miragen s directors and executive officers are expected to become directors and executive officers of the combined company upon the closing of the Merger.

Employment Agreements

As described elsewhere in this joint proxy statement/prospectus/information statement, including in *Management Following the Merger Executive Compensation Employment Agreements and Potential Payments Upon Termination of Employment or Change in Control* beginning on page 258, Miragen s executive officers are party to employment agreements which become effective only upon closing of the Merger.

Indemnification and Insurance for the Miragen Officers and Directors

Under the Merger Agreement, from the closing of the Merger through the sixth anniversary of the closing, Signal and the surviving corporation agree that all rights to indemnification, exculpation or advancement of expenses now existing in favor of, and all limitations on the personal liability of, each present and former director or officer, of Signal or Miragen provided for in the respective organizational documents of Miragen and Signal in effect as of October 31, 2016, shall continue to be honored and in full force and effect.

Under the Merger Agreement, the certificate of incorporation and bylaws of Signal and the surviving corporation in the Merger, will contain provisions no less favorable with respect to indemnification, advancement of expenses and exculpation of present and former directors and officers of each of Signal and Miragen than are presently set forth in the certificate of incorporation and bylaws of Signal and Miragen, as applicable, which provisions shall not be amended, modified or repealed for a period of six years time from the closing of the Merger in a manner that would materially and adversely affect the rights thereunder of individuals who, at or prior to the closing, were officers or directors of Signal and Miragen.

The Merger Agreement also provides that Signal shall purchase an insurance policy in effect for six years from the closing, providing at least the same coverage as the current directors and officers liability insurance policies maintained by Miragen and Signal and containing terms and conditions that are not materially less favorable to current and former officers and directors of Miragen and Signal.

Limitations on Liability and Indemnification.

In addition to the indemnification required in the Merger Agreement, Miragen has entered into indemnification agreements with each of its directors and executive officers. These agreements provide for the indemnification of the directors and executive officers of Miragen for all reasonable expenses and liabilities incurred in connection with any action or proceeding brought against them by reason of the fact that they are or were agents of Miragen. Miragen anticipates that the directors and officers of the combined company will enter into substantially similar agreements with the combined company, effective upon consummation of the Merger.

Form of the Merger

The Merger Agreement provides that at the effective time, Merger Sub will be merged with and into Miragen. Upon the consummation of the Merger, Miragen will continue as the surviving corporation and will be a wholly-owned subsidiary of Signal.

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After completion of the Merger, assuming Signal Proposal No. 6 is approved by Signal stockholders at the Signal special meeting, Signal will be renamed Miragen Therapeutics, Inc. and expects to trade on The NASDAQ Capital Market under the symbol MGEN.

Merger Consideration and Exchange Ratio

Immediately prior to the effective time of the Merger, each outstanding shares of preferred stock of Miragen will be converted into common stock. At the effective time of the Merger:

- each outstanding share of common stock of Miragen will be converted into the right to receive that number of shares of Signal common stock as determined pursuant to the Exchange Ratio described in more detail below;
- each outstanding option to purchase shares of Miragen common stock will be assumed by Signal and will be converted into an option to purchase shares of Signal common stock; and
- each outstanding warrant to purchase shares of Miragen capital stock will be assumed by Signal and will be converted into a warrant to purchase shares of Signal common stock.

No fractional shares of Signal common stock will be issued in connection with the Merger. Instead, each Miragen stockholder who otherwise would be entitled to receive a fractional share of Signal common stock (after aggregating all fractional shares of Signal common stock issuable to such holder) will be entitled to receive an amount in cash representing such holder s proportionate interest, if any, in the proceeds from the sale of the aggregated fractional shares by the exchange agent (reduced by any fees of the exchange agent attributable to such sale) at the then prevailing prices on the NASDAQ Capital Market.

The Exchange Ratio is calculated using a formula intended to allocate existing Miragen securityholders (on a fully-diluted basis), a percentage of the combined company. Based on Miragen s and Signal s capitalization as of December 31, 2016, the Exchange Ratio is estimated to be (i) approximately 0.6995 pre-split shares of Signal common stock, subject to adjustment to account for the effect of a reverse stock split of Signal common stock, within a range of one new share for every one to 15 shares outstanding, to be implemented prior to the consummation of the Merger as discussed in this proxy statement/prospectus/information statement or (ii), post-split, between approximately 0.6995 and 0.0466 shares of Signal common stock. These estimates are subject to adjustment prior to closing of the Merger, including (i) adjustments to account for the issuance of any additional shares of Miragen or Signal common stock, as applicable, prior to the consummation of the Merger, provided that, the issuance of Miragen common stock in the concurrent financing will not impact the Exchange Ratio, or (ii) an upward adjustment to the extent that Signal s net cash at the effective time of the Merger is less than negative $100,000 (and as a result, Signal securityholders could own less, and Miragen securityholders could own more, of the combined company).

Based on the estimates set forth above, immediately after the Merger, Miragen securityholders would own approximately 96% of the fully-diluted common stock of the combined company and Signal securityholders would own approximately 4% of the fully-diluted common stock of the combined company, each assuming that Miragen closes its concurrent financing immediately prior to the effective time of the Merger. If the concurrent financing does not close, then Miragen securityholders would own approximately 94% of the fully-diluted common stock of the combined company and Signal securityholders would own approximately 6% of the fully-diluted common stock of the

combined company.

The Exchange Ratio formula is the quotient obtained by dividing the number of Miragen merger shares (defined below) by the Miragen fully-diluted outstanding shares (defined below), where:

Miragen merger shares is the product determined by ***multiplying*** (i) the post-closing Signal shares *by* (ii) the Miragen allocation percentage.

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Miragen fully-diluted outstanding shares is the total number of shares of Miragen common stock outstanding immediately prior to the effective time of the Merger on a fully-diluted and an as-converted to common stock basis, assuming the exercise of each outstanding Miragen option and Miragen warrant to purchase Miragen capital stock and the effectiveness of the conversion of all of Miragen s outstanding preferred stock into Miragen common stock; provided, however, that all shares of Miragen common stock issued in its concurrent financing will be excluded from such amount.

Post-closing Signal shares is the quotient determined by *dividing (i) the Signal fully-diluted outstanding shares by* (ii) the Signal allocation percentage.

Signal fully-diluted outstanding shares is the total number of shares of Signal common stock outstanding immediately prior to the effective time of the Merger on a fully-diluted and an as-converted to common stock basis, assuming (i) the exercise of each outstanding Signal option to purchase Signal common stock (to the extent such option will not be cancelled pursuant to the Merger Agreement), (ii) the settlement in shares of Signal common stock of each outstanding Signal restricted stock unit (to the extent such restricted stock until will not be cancelled pursuant to the Merger Agreement), (iii) the exercise of each outstanding Signal warrant to purchase common stock, and (iv) the conversion of the indebtedness into Signal common stock in accordance with the terms and conditions of the Note Amendment.

Miragen allocation percentage is 1.00 *minus* the Signal allocation percentage.
Signal allocation percentage is 0.06; *provided, however, solely* to the extent that the net cash determined pursuant to the Merger Agreement is less than negative $100,000, then 0.06 shall be reduced by 0.00000002 for each $1.00 that the Net Cash as so determined is less than negative $100,000 (for example, the Signal allocation percentage would be 0.055 if Signal s net cash is negative $350,000).

Stock Options and Warrants

All warrants to purchase shares of Signal s common stock that are outstanding immediately prior to the effective time of the Merger will remain outstanding following the effective time of the Merger. All options to purchase shares of Signal common stock and restricted stock units that are not exercised or settled, as applicable, prior to the effective time will be cancelled and terminated upon the effectiveness of the Merger.

At the effective time of the Merger, each outstanding option and warrant, whether or not vested, to purchase shares of Miragen capital stock unexercised immediately prior to the effective time of the Merger will be converted into an option or warrant to purchase shares of Signal common stock. All rights with respect to each Miragen option or warrant will be assumed by Signal in accordance with its terms. Accordingly, from and after the effective time of the Merger each option or warrant assumed by Signal may be exercised solely for shares of Signal common stock.

The number of shares of Signal common stock subject to each outstanding Miragen option or warrant assumed by Signal will be determined by multiplying the number of shares of Miragen capital stock that were subject to such option or warrant, as applicable, by the Exchange Ratio and rounding the resulting number down to the nearest whole number of shares of Signal common stock. The per share exercise price for the shares of Signal common stock issuable upon exercise of each Miragen option or warrant assumed by Signal will be determined by dividing the per share exercise price of Miragen capital stock subject to such option or warrant, as applicable, by the Exchange Ratio and rounding the resulting exercise price up to the nearest whole cent. Any restriction on the exercise of any option or

warrant will continue in full force and effect and the term, exercisability, vesting schedule and other provisions of such option or warrant will otherwise remain unchanged.

Effective Time of the Merger

The Merger Agreement requires the parties to consummate the Merger after all of the conditions to the consummation of the Merger contained in the Merger Agreement are satisfied or waived, including the approval

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by the Signal stockholders of Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 9. The Merger will become effective upon the filing of a certificate of Merger with the Secretary of State of the State of Delaware or at such later time as is agreed by Signal and Miragen and specified in the certificate of Merger. Neither Signal nor Miragen can predict the exact timing of the consummation of the Merger.

Regulatory Approvals

Signal must comply with applicable federal and state securities laws and the rules and regulations of The NASDAQ Capital Market in connection with the issuance of shares of Signal common stock and the filing of this proxy statement/prospectus/information statement with the SEC.

Tax Treatment of the Merger

Signal and Miragen intend the Merger to qualify as a reorganization within the meaning of Section 368(a) of the Internal Revenue Code of 1986, as amended, or the Code. Each of Signal and Miragen will use its commercially reasonable efforts to cause the Merger to qualify as a reorganization within the meaning of Section 368(a) of the Code, and not to permit or cause any affiliate or any subsidiary of Signal or Miragen to, take any action or cause any action to be taken which would cause the Merger to fail to qualify as a reorganization under Section 368(a) of the Code. For a description of material U.S. federal income tax consequences of the Merger, see the section titled *The Merger Material U.S. Federal Income Tax Consequences of the Merger* below.

Material U.S. Federal Income Tax Consequences of the Merger

The following is a discussion of material U.S. federal income tax consequences of the Merger applicable to U.S. Holders (as defined below) who exchange their Miragen common stock for Signal common stock in the Merger assuming the Merger is consummated as contemplated herein. The effects of other U.S. federal tax laws, such as estate and gift tax laws, and any applicable state, local, or non-U.S. tax laws are not discussed. This discussion is based on the Code, U.S. Treasury Regulations promulgated thereunder, judicial decisions, and published rulings and administrative pronouncements of the Internal Revenue Service, or the IRS, each as in effect as of the date of the Merger. These authorities are subject to differing interpretations or change. Any such change, which may or may not be retroactive, could alter the tax consequences to holders of Miragen common stock as described herein.

This discussion does not address all U.S. federal income tax consequences relevant to the particular circumstances of a Miragen common stockholder. In addition, it does not address consequences relevant to holders of Miragen common stock that are subject to particular U.S. or non-U.S. tax rules, including, without limitation:

- persons who hold their Miragen common stock in a functional currency other than the U.S. dollar;
- persons who hold Miragen common stock that constitutes qualified small business stock under Section 1202 of the Code or as Section 1244 stock for purposes of Section 1244 of the Code;
- persons holding Miragen common stock as part of an integrated investment (including a straddle, pledge against currency risk, constructive sale or conversion transaction or other integrated or risk reduction transactions) consisting of shares of Miragen common stock and one or more other positions;

persons who are not U.S. Holders as defined below;

banks, insurance companies, mutual funds, tax-exempt entities, financial institutions, broker-dealers, real estate investment trusts or regulated investment companies;

persons who do not hold their Miragen common stock as a capital asset within the meaning of Section 1221 of the Code;

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partnerships or other entities classified as partnerships or disregarded entities for U.S. federal income tax purposes, S corporations or other pass-through entities (including hybrid entities);

persons who acquired their Miragen common stock pursuant to the exercise of compensatory options or in other compensatory transactions;

persons who acquired their Miragen common stock pursuant to the exercise of warrants or conversion rights under convertible instruments;

persons holding Miragen common stock who exercise dissenters rights;

persons who acquired their Miragen common stock in a transaction subject to the gain rollover provisions of Section 1045 of the Code; and

persons who hold their Miragen common stock through individual retirement accounts or other tax-deferred accounts.

For purposes of this discussion, a U.S. Holder is a beneficial owner of Miragen common stock that, for U.S. federal income tax purposes, is or is treated as:

an individual who is a citizen or resident of the United States;

a corporation (or other entity taxable as a corporation for U.S. federal income tax purposes) created or organized in or under the laws of the United States, any state thereof, or the District of Columbia;

an estate, the income of which is subject to U.S. federal income taxation regardless of its source; or

a trust if either (i) a court within the United States is able to exercise primary supervision over the administration of such trust and one or more United States persons (within the meaning of Section 7701(a)(30) of the Code) are authorized or have the authority to control all substantial decisions of such trust, or (ii) the trust was in existence on August 20, 1996 and has a valid election in effect under applicable Treasury Regulations to be treated as a United States person for U.S. federal income tax purposes.

If an entity treated as a partnership for U.S. federal income tax purposes holds Miragen common stock, the tax treatment of a partner in the partnership will depend on the status of the partner, the activities of the partnership and certain determinations made at the partner level. If you are a partnership or a partner of a partnership holding Miragen common stock or any other person excluded from this discussion, you should consult your tax advisor regarding the tax consequences of the Merger.

In addition, the following discussion does not address (i) any U.S. federal non-income tax consequences of the Merger, including estate, gift or other tax consequences, (ii) any state, local or non-U.S. tax consequences of the Merger, (iii) the Medicare contribution tax on net investment income or the alternative minimum tax, (iv) the tax consequences of transactions effectuated before, after or at the same time as the Merger (whether or not they are in connection with the Merger), including, without limitation, transactions in which Miragen common stock is acquired (including, but not limited to, pursuant to the Subscription Agreement) or Miragen preferred stock is converted to Miragen common stock, and (v) the tax consequences to holders of options, warrants or similar rights to purchase Miragen common stock.

IN LIGHT OF THE FOREGOING, HOLDERS OF MIRAGEN COMMON STOCK SHOULD CONSULT THEIR OWN TAX ADVISORS REGARDING THE TAX CONSEQUENCES TO THEM OF THE MERGER, INCLUDING THE APPLICABLE U.S. FEDERAL, STATE, LOCAL AND NON-U.S. INCOME AND OTHER TAX CONSEQUENCES, AND ANY TAX REPORTING REQUIREMENTS OF THE MERGER AND RELATED TRANSACTIONS IN LIGHT OF THEIR PARTICULAR CIRCUMSTANCES.

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In connection with the filing of the registration statement of which this proxy statement/prospectus/information statement is a part, Pillsbury will deliver to Signal and Cooley will deliver to Miragen opinions that the statements under the caption *The Merger Material U.S. Federal Income Tax Consequences of the Merger* constitute the opinions of Pillsbury and Cooley, respectively. In rendering their opinions, counsel assume that the statements and facts concerning the Merger set forth in this proxy statement/prospectus/information statement and in the Merger Agreement, are true and accurate in all respects, and that the Merger will be completed in accordance with this proxy statement/prospectus/information statement and the Merger Agreement. Counsels opinions also assume the truth and accuracy of certain representations and covenants as to factual matters made by Signal, Miragen and Merger Sub in tax representation letters provided to counsel. In addition, counsel base their tax opinions on the law in effect on the date of the opinions and assume that there will be no change in applicable law between such date and the time of the Merger. If any of these assumptions is inaccurate, the tax consequences of the Merger could differ from those described in this proxy statement/prospectus/information statement.

No ruling from the IRS has been or will be requested with respect to the tax consequences of the Merger. Opinions of counsel do not bind the courts or the IRS, nor will they preclude the IRS from adopting a position contrary to those expressed in the opinions. Subject to the qualifications and assumptions described in this proxy statement/prospectus/information statement, the Merger will be treated for U.S. federal income tax purposes as a reorganization within the meaning of Section 368(a) of the Code. Accordingly, the tax consequences to U.S. Holders of Miragen common stock will be as follows:

- a U.S. Holder will not recognize gain or loss upon the exchange of Miragen common stock for Signal common stock pursuant to the Merger, except to the extent of cash received in lieu of a fractional share of Signal common stock as described below;

- a U.S. Holder who receives cash in lieu of a fractional share of Signal common stock in the Merger will recognize capital gain or loss in an amount equal to the difference between the amount of cash received instead of a fractional share and the stockholder s tax basis allocable to such fractional share;

- a U.S. Holder s aggregate tax basis for the shares of Signal common stock received in the Merger (including any fractional share interest for which cash is received) will equal the stockholder s aggregate tax basis in the shares of Miragen common stock surrendered in the Merger; and

- the holding period of the shares of Signal common stock received by a U.S. Holder in the Merger will include the holding period of the shares of Miragen common stock surrendered in exchange therefor.

Gain or loss recognized by a U.S. Holder who receives cash in lieu of a fractional share of Signal common stock will constitute capital gain or loss and any such gain or loss will constitute long-term capital gain or loss if the U.S. Holder s holding period in the Miragen common stock surrendered in the Merger is more than one year as of the effective date of the Merger. Under current law, long-term capital gains of non-corporate taxpayers are taxed at a reduced U.S. federal income tax rate. Under current law, the deductibility of capital losses is subject to limitations. In addition, for purposes of the above discussion of the bases and holding periods for shares of Miragen common stock and Signal common stock, U.S. Holders who acquired different blocks of Miragen common stock at different times for different prices must calculate their gains and losses and holding periods separately for each identifiable block of such stock exchanged in the Merger.

As provided in Treasury Regulations Section 1.368-3(d), each U.S. Holder who receives shares of Signal common stock in the Merger is required to retain permanent records pertaining to the Merger, and make such records available to any authorized IRS officers and employees. Such records should specifically include information regarding the amount, basis, and fair market value of all transferred property, and relevant facts regarding any liabilities assumed or extinguished as part of such reorganization. Additionally, U.S. Holders who owned immediately before the Merger at least one percent (by vote or value) of the total outstanding stock of Miragen are required to attach a statement to their tax returns for the year in which the Merger is consummated that contains the information listed in Treasury Regulation Section 1.368-3(b). Such statement must include the

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U.S. Holder s tax basis in such holder s Miragen common stock surrendered in the Merger, the fair market value of such stock, the date of the Merger and the name and employer identification number of each of Miragen and Signal.

If the Merger fails to qualify as a reorganization within the meaning of Section 368(a) of the Code, then a U.S. Holder would recognize gain or loss upon the exchange of Miragen common stock for Signal common stock equal to the difference between the fair market value, at the time of the Merger, of the Signal common stock received in the Merger (including any cash received in lieu of a fractional share of Signal common stock) and such U.S. Holder s tax basis in the Miragen common stock surrendered in the Merger. Such gain or loss would be long-term capital gain or loss if the Miragen common stock was held for more than one year at the time of the Merger. In such event, the aggregate tax basis of Signal common stock received in the Merger would equal its fair market value at the time of the closing of the Merger, and the holding period of such Signal common stock would commence the day after the closing of the Merger.

Information Reporting and Backup Withholding

A U.S. Holder of Miragen common stock may be subject to information reporting and backup withholding for U.S. federal income tax purposes on cash paid in lieu of fractional shares in connection with the Merger. The current backup withholding rate is 28 percent. Backup withholding will not apply, however, to a holder who (i) furnishes a correct taxpayer identification number and certifies the holder is not subject to backup withholding on IRS Form W-9 or a substantially similar form, (ii) provides a certification of foreign status on an appropriate IRS Form W-8 or successor form or (iii) certifies the holder is otherwise exempt from backup withholding. U.S. Holders of Miragen common stock should consult their tax advisors regarding their qualification for an exemption from backup withholding and the procedures for obtaining such an exemption. If a U.S. Holder does not provide a correct taxpayer identification number on IRS Form W-9 or other proper certification, the stockholder may be subject to penalties imposed by the IRS. Any amounts withheld under the backup withholding rules may be refunded or allowed as a credit against a U.S. Holder of Miragen common stock s federal income tax liability, if any, provided the required information is timely furnished to the IRS. In the event of backup withholding see your tax advisor to determine if you are entitled to any tax credit, tax refund or other tax benefit as a result of such backup withholding.

U.S. HOLDERS OF MIRAGEN COMMON STOCK SHOULD CONSULT THEIR TAX ADVISORS AS TO THE SPECIFIC TAX CONSEQUENCES TO THEM OF THE MERGER, INCLUDING THE APPLICABLE U.S. FEDERAL, STATE, LOCAL AND NON-U.S. INCOME AND OTHER TAX CONSEQUENCES, AND ANY TAX REPORTING REQUIREMENTS OF THE MERGER AND RELATED TRANSACTIONS IN LIGHT OF THEIR PARTICULAR CIRCUMSTANCES.

Anticipated Accounting Treatment

The Merger will be treated by Signal as a reverse merger under the acquisition method of accounting in accordance with U.S. GAAP. For accounting purposes, Miragen is considered to be acquiring Signal in this transaction. Management of Signal and Miragen have made a preliminary estimate of the purchase price calculated as described in Note 2 to the unaudited pro forma condensed combined financial statements. The net tangible assets acquired and liabilities assumed in connection with the transaction are recorded at their estimated acquisition date fair values. The acquisition method of accounting is dependent upon certain valuations and other studies that have yet to commence or progress to a stage where there is sufficient information for a definitive measurement. A final determination of these estimated fair values, which cannot be made prior to the completion of the transaction, will be based on the actual net tangible assets of Signal that exist as of the date of completion of the transaction.

NASDAQ Stock Market Listing

Signal common stock currently is listed on The NASDAQ Capital Market under the symbol SGNL. Signal has agreed to use commercially reasonable efforts to (i) maintain its existing listing on The NASDAQ Capital Market

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and to obtain approval of the listing of the combined company on The NASDAQ Capital Market, (ii) prepare and submit to The NASDAQ Capital Market a notification form for the listing of the shares of Signal common stock to be issued to Miragen stockholders pursuant to the Merger and the reverse split, (iii) cause such shares to be approved for listing and (iv) the extent required by NASDAQ Marketplace Rule 5110, file an initial listing application for the combined company on The NASDAQ Capital Market and to cause such listing application to be approved for listing. In addition, under the Merger Agreement, each of Miragen s and Signal s obligation to complete the Merger is subject to the satisfaction or waiver by each of the parties, at or prior to the Merger, of various conditions, including that the existing shares of Signal common stock must have been continually listed on The NASDAQ Capital Market, Signal must have caused the shares of Signal common stock to be issued in the Merger to be approved for listing on The NASDAQ Capital Market as of the effective time of the Merger and, to the extent required by NASDAQ Marketplace Rule 5110, the initial listing application for the combined company must be approved for listing. If such application is accepted, Signal anticipates that its common stock will be listed on The NASDAQ Capital Market following the closing of the Merger under the trading symbol MGEN.

Appraisal Rights and Dissenters Rights

Delaware Law

If the Merger is completed, Miragen stockholders who do not deliver a written consent approving the Merger are entitled to appraisal rights under Section 262 of the DGCL, or Section 262, provided that they comply with the conditions established by Section 262. Holders of Signal common stock are not entitled to appraisal rights under Delaware law in connection with the Merger.

The discussion below is not a complete summary regarding a Miragen stockholder s appraisal rights under Delaware law and is qualified in its entirety by reference to the text of the relevant provisions of Delaware law, which are attached to this proxy statement/prospectus/information statement as *Annex J*. Stockholders intending to exercise appraisal rights should carefully review *Annex J*. Failure to follow precisely any of the statutory procedures set forth in *Annex J* may result in a termination or waiver of these rights. This summary does not constitute legal or other advice, nor does it constitute a recommendation that Miragen stockholders exercise their appraisal rights under Delaware law.

Under Section 262, where a Merger is adopted by stockholders by written consent in lieu of a meeting of stockholders pursuant to Section 228 of the DGCL, either the constituent corporation before the effective date of the Merger or the surviving corporation, within 10 days after the effective date of the Merger, must notify each stockholder of the constituent corporation entitled to appraisal rights of the approval of the Merger, the effective date of the Merger and that appraisal rights are available.

If the Merger is completed, within 10 days after the effective date of the Merger Miragen will notify its stockholders that the Merger has been approved, the effective date of the Merger and that appraisal rights are available to any stockholder who has not approved the Merger. Holders of shares of Miragen capital stock who desire to exercise their appraisal rights must deliver a written demand for appraisal to Miragen within 20 days after the date of mailing of that notice, and that stockholder must not have delivered a written consent approving the Merger. A demand for appraisal must reasonably inform Miragen of the identity of the stockholder and that such stockholder intends thereby to demand appraisal of the shares of Miragen capital stock held by such stockholder. Failure to deliver a written consent approving the Merger will not in and of itself constitute a written demand for appraisal satisfying the requirements of Section 262. All demands for appraisal should be addressed to Miragen Therapeutics, Inc., 6200 Lookout Road, Boulder, CO 80301, Attention: Corporate Secretary, and should be executed by, or on behalf of, the record holder of shares of Miragen capital stock. ALL DEMANDS MUST BE RECEIVED BY MIRAGEN WITHIN 20 DAYS

AFTER THE DATE MIRAGEN MAILS A NOTICE TO ITS STOCKHOLDERS NOTIFYING THEM THAT THE MERGER HAS BEEN APPROVED, THE EFFECTIVE DATE OF THE MERGER AND THAT APPRAISAL RIGHTS ARE AVAILABLE TO ANY STOCKHOLDER WHO HAS NOT APPROVED THE MERGER.

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If you fail to deliver a written demand for appraisal within the time period specified above, you will be entitled to receive the Merger consideration for your shares of Miragen capital stock as provided for in the Merger Agreement, but you will have no appraisal rights with respect to your shares of Miragen capital stock.

To be effective, a demand for appraisal by a holder of shares of Miragen capital stock must be made by, or in the name of, the registered stockholder, fully and correctly, as the stockholder s name appears on the stockholder s stock certificate(s). Beneficial owners who do not also hold the shares of record may not directly make appraisal demands to Miragen. The beneficial owner must, in these cases, have the registered owner, such as a broker, bank or other custodian, submit the required demand in respect of those shares. If shares are owned of record in a fiduciary capacity, such as by a trustee, guardian or custodian, execution of a demand for appraisal should be made by or for the fiduciary; and if the shares are owned of record by more than one person, as in a joint tenancy or tenancy in common, the demand should be executed by or for all joint owners. An authorized agent, including an authorized agent for two or more joint owners, may execute the demand for appraisal for a stockholder of record; however, the agent must identify the record owner or owners and expressly disclose the fact that, in executing the demand, he or she is acting as agent for the record owner. A record owner, such as a broker, who holds shares as a custodian for others, may exercise the record owner s right of appraisal with respect to the shares held for one or more beneficial owners, while not exercising this right for other beneficial owners. In that case, the written demand should state the number of shares as to which appraisal is sought. Where no number of shares is expressly mentioned, the demand will be presumed to cover all shares held in the name of the record owner. In addition, the stockholder must continuously hold the shares of record from the date of making the demand through the effective time of the Merger.

If you hold your shares of Miragen capital stock in a brokerage account or in other custodian form and you wish to exercise appraisal rights, you should consult with your bank, broker or other custodian to determine the appropriate procedures for the making of a demand for appraisal by the custodian.

At any time within 60 days after the effective time of the Merger, any stockholder who has demanded an appraisal, but has neither commenced an appraisal proceeding or joined an appraisal proceeding as a named party, has the right to withdraw such stockholder s demand and accept the terms of the Merger by delivering a written withdrawal to Miragen. If, following a demand for appraisal, you have withdrawn your demand for appraisal in accordance with Section 262, you will have the right to receive the Merger consideration for your shares of Miragen capital stock.

Within 120 days after the effective date of the Merger, any stockholder who has delivered a demand for appraisal in accordance with Section 262 will, upon written request to the surviving corporation, be entitled to receive a written statement setting forth the aggregate number of shares not voted in favor of the Merger Agreement and with respect to which demands for appraisal rights have been received and the aggregate number of holders of these shares. This written statement will be mailed to the requesting stockholder within 10 days after the stockholder s written request is received by the surviving corporation or within 10 days after expiration of the period for delivery of demands for appraisal, whichever is later. Within 120 days after the effective date of the Merger, either the surviving corporation or any stockholder who has delivered a demand for appraisal in accordance with Section 262 may file a petition in the Delaware Court of Chancery demanding a determination of the fair value of the shares held by all such stockholders. Upon the filing of the petition by a stockholder, service of a copy of the petition must be made upon the surviving corporation. The surviving corporation has no obligation to file a petition in the Delaware Court of Chancery in the event there are dissenting stockholders, and Miragen, which is expected to be the surviving corporation, has no present intent to file a petition in the Delaware Court of Chancery. Accordingly, the failure of a stockholder to file a petition within the period specified could nullify the stockholder s previously written demand for appraisal.

If a petition for appraisal is duly filed by a stockholder and a copy of the petition is delivered to the surviving corporation, the surviving corporation will then be obligated, within 20 days after receiving service of a copy of the

petition, to provide the Delaware Court of Chancery with a duly verified list containing the names and

addresses of all stockholders who have demanded an appraisal of their shares and with whom agreements as to the value of their shares have not been reached by the surviving corporation. After notice to dissenting stockholders who demanded appraisal of their shares, the Delaware Court of Chancery is empowered to conduct a hearing upon the petition, and to determine those stockholders who have complied with Section 262 and who have become entitled to the appraisal rights provided thereby. The Delaware Court of Chancery may require the stockholders who have demanded appraisal for their shares to submit their stock certificates to the Register in Chancery for notation thereon of the pendency of the appraisal proceedings; and if any stockholder fails to comply with that direction, the Delaware Court of Chancery may dismiss the proceedings as to that stockholder.

After determination of the stockholders entitled to appraisal of their shares, the Delaware Court of Chancery will appraise the fair value of the shares owned by those stockholders. This value will be exclusive of any element of value arising from the accomplishment or expectation of the Merger, but may include a fair rate of interest, if any, upon the amount determined to be the fair value. When the value is determined, the Delaware Court of Chancery will direct the payment of the value, with interest thereon accrued during the pendency of the proceeding, if the Delaware Court of Chancery so determines, to the stockholders entitled to receive the same, upon surrender by the holders of the certificates representing those shares. At any time before the entry of judgment in the proceedings, the surviving corporation may pay to each stockholder entitled to appraisal an amount in cash, in which case interest shall accrue thereafter only upon the sum of (i) the difference, if any, between the amount so paid and the fair value of the shares subject to appraisal as determined by the Delaware Court of Chancery and (ii) interest theretofore accrued, unless paid at that time.

In determining fair value, and, if applicable, a fair rate of interest, the Delaware Court of Chancery is required to take into account all relevant factors. In *Weinberger v. UOP, Inc.*, the Delaware Supreme Court discussed the factors that could be considered in determining fair value in an appraisal proceeding, stating that proof of value by any techniques or methods which are generally considered acceptable in the financial community and otherwise admissible in court should be considered, and that fair price obviously requires consideration of all relevant factors involving the value of a company.

Section 262 provides that fair value is to be exclusive of any element of value arising from the accomplishment or expectation of the Merger. In *Cede & Co. v. Technicolor, Inc.*, the Delaware Supreme Court stated that this exclusion is a narrow exclusion [that] does not encompass known elements of value, but which rather applies only to the speculative elements of value arising from such accomplishment or expectation. In *Weinberger*, the Delaware Supreme Court construed Section 262 to mean that elements of future value, including the nature of the enterprise, which are known or susceptible of proof as of the date of the Merger and not the product of speculation, may be considered.

You should be aware that the fair value of your shares as determined under Section 262 could be more than, the same as, or less than the value that you are entitled to receive under the terms of the Merger Agreement.

Costs of the appraisal proceeding may be imposed upon the surviving corporation and the stockholders participating in the appraisal proceeding by the Delaware Court of Chancery as the Court deems equitable in the circumstances. Upon the application of a stockholder, the Delaware Court of Chancery may order all or a portion of the expenses incurred by any stockholder in connection with the appraisal proceeding, including, without limitation, reasonable attorneys fees and the fees and expenses of experts, to be charged pro rata against the value of all shares entitled to appraisal. In the absence of such a determination of assessment, each party bears its own expenses. Any stockholder who had demanded appraisal rights will not, after the effective time of the Merger, be entitled to vote shares subject to that demand for any purpose or to receive payments of dividends or any other distribution with respect to those shares, other than with respect to payment as of a record date prior to the effective time; however, if no petition for appraisal

is filed within 120 days after the effective time of the Merger, or if the stockholder delivers a written withdrawal of his or her demand for appraisal and an acceptance of the terms of the Merger within 60 days after the effective time of the Merger, then the right of that stockholder to appraisal will cease and that stockholder will be entitled to receive the Merger consideration for shares of his

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or her Miragen capital stock pursuant to the Merger Agreement. Any withdrawal of a demand for appraisal made more than 60 days after the effective time of the Merger may only be made with the written approval of the surviving corporation. No appraisal proceeding in the Delaware Court of Chancery will be dismissed as to any stockholder without the approval of the court.

Failure to follow the steps required by Section 262 for perfecting appraisal rights may result in the loss of appraisal rights. In view of the complexity of Section 262, stockholders who may wish to dissent from the Merger and pursue appraisal rights should consult their legal advisors.

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THE MERGER AGREEMENT

The following is a summary of the material terms of the Merger Agreement. A copy of the Merger Agreement is attached as Annex A to this proxy statement/prospectus/information statement and is incorporated by reference into this proxy statement/prospectus/information statement. The Merger Agreement has been attached to this proxy statement/prospectus/information statement to provide you with information regarding its terms. It is not intended to provide any other factual information about Signal, Miragen or Merger Sub. The following description does not purport to be complete and is qualified in its entirety by reference to the Merger Agreement. You should refer to the full text of the Merger Agreement for details of the Merger and the terms and conditions of the Merger Agreement.

The Merger Agreement contains representations and warranties that Signal and Merger Sub, on the one hand, and Miragen, on the other hand, have made to one another as of specific dates. These representations and warranties have been made for the benefit of the other parties to the Merger Agreement and may be intended not as statements of fact but rather as a way of allocating the risk to one of the parties if those statements prove to be incorrect. In addition, the assertions embodied in the representations and warranties are qualified by information in confidential disclosure schedules exchanged by the parties in connection with signing the Merger Agreement. While Signal and Miragen do not believe that these disclosure schedules contain information required to be publicly disclosed under the applicable securities laws, other than information that has already been so disclosed, the disclosure schedules do contain information that modifies, qualifies and creates exceptions to the representations and warranties set forth in the attached Merger Agreement. Accordingly, you should not rely on the representations and warranties as current characterizations of factual information about Signal or Miragen, because they were made as of specific dates, may be intended merely as a risk allocation mechanism between Signal and Merger Sub, and Miragen and are modified by the disclosure schedules.

Structure

Under the Merger Agreement, Merger Sub will merge with and into Miragen, with Miragen surviving as a wholly-owned subsidiary of Signal.

Completion and Effectiveness of the Merger

The Merger will be completed as promptly as practicable after all of the conditions to completion of the Merger are satisfied or waived, including the approval of the stockholders of Signal and Miragen. Signal and Miragen are working to complete the Merger as quickly as practicable. However, Signal and Miragen cannot predict the exact timing of the completion of the Merger because it is subject to various conditions.

Merger Consideration and Exchange Ratio

Immediately prior to the effective time of the Merger, each outstanding shares of preferred stock of Miragen will be converted into common stock. At the effective time of the Merger,

- each outstanding share of common stock of Miragen will be converted into the right to receive that number of shares of Signal common stock as determined pursuant to the Exchange Ratio described in more detail below;

each outstanding option to purchase shares of Miragen common stock will be assumed by Signal and will be converted into an option to purchase shares of Signal common stock; and

each outstanding warrant to purchase shares of Miragen capital stock will be assumed by Signal and will be converted into a warrant to purchase shares of Signal common stock.

No fractional shares of Signal common stock will be issued in connection with the Merger. Instead, each Miragen stockholder who otherwise would be entitled to receive a fractional share of Signal common stock

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(after aggregating all fractional shares of Signal common stock issuable to such holder) will be entitled to receive an amount in cash representing such holder s proportionate interest, if any, in the proceeds from the sale of the aggregated fractional shares by the exchange agent (reduced by any fees of the exchange agent attributable to such sale) at the then prevailing prices on the NASDAQ Capital Market.

The Exchange Ratio is calculated using a formula intended to allocate existing Miragen securityholders (on a fully-diluted basis), a percentage of the combined company. Based on Miragen s and Signal s capitalization as of December 31, 2016, the Exchange Ratio is currently estimated to be (i) approximately 0.6995 pre-split shares of Signal common stock, subject to adjustment to account for the effect of a reverse stock split of Signal common stock, within a range of one new share for every one to 15 shares outstanding, to be implemented prior to the consummation of the Merger as discussed in this proxy statement/prospectus/information statement or (ii), post-split, between approximately 0.6995 and 0.0466 shares of Signal common stock. These estimates are subject to adjustment prior to closing of the Merger, including (i) adjustments to account for the issuance of any additional shares of Miragen or Signal common stock, as applicable, prior to the consummation of the Merger, provided that, the issuance of Miragen common stock in the concurrent financing will not impact the Exchange Ratio, or (ii) an upward adjustment to the extent that Signal s net cash at the effective time of the Merger is less than negative $100,000 (and as a result, Signal securityholders could own less, and Miragen securityholders could own more, of the combined company).

Based on the estimates set forth above, following the completion of the Merger, Miragen securityholders would own approximately 96% of the fully-diluted common stock of the combined company and Signal securityholders would own approximately 4% of the fully-diluted common stock of the combined company, each assuming that Miragen closes its concurrent financing immediately prior to the effective time of the Merger. If the concurrent financing does not close, then Miragen securityholders would own approximately 94% of the fully-diluted common stock of the combined company and Signal securityholders would own approximately 6% of the fully-diluted common stock of the combined company.

The Exchange Ratio formula is the quotient obtained by dividing the number of Miragen merger shares (defined below) by the Miragen fully-diluted outstanding shares (defined below), where:

Miragen merger shares is the product determined by *multiplying* (i) the post-closing Signal shares *by* (ii) the Miragen allocation percentage.

Miragen fully-diluted outstanding shares is the total number of shares of Miragen common stock outstanding immediately prior to the effective time of the Merger on a fully-diluted and an as-converted to common stock basis, assuming the exercise of each outstanding Miragen option and Miragen warrant to purchase Miragen capital stock and the effectiveness of the conversion of all of Miragen s outstanding preferred stock into Miragen common stock; provided, however, that all shares of Miragen common stock issued in its concurrent financing will be excluded from such amount.

Post-closing Signal shares is the quotient determined by *dividing (i) the Signal fully-diluted outstanding shares by* (ii) the Signal allocation percentage.

Signal fully-diluted outstanding shares is the total number of shares of Signal common stock outstanding immediately prior to the effective time of the Merger on a fully-diluted and an as-converted to common stock basis, assuming (i) the exercise of each outstanding Signal option to purchase Signal common stock (to the extent such option will not be cancelled pursuant to the Merger Agreement), (ii) the settlement in shares of Signal common stock of each outstanding Signal restricted stock unit (to the extent such restricted stock until will not be cancelled pursuant to the Merger Agreement), (iii) the exercise of each outstanding Signal warrant to purchase common stock, and (iv) the conversion of the indebtedness into Signal common stock in accordance with the terms and conditions of the Note Amendment.

Miragen allocation percentage is 1.00 ***minus*** the Signal allocation percentage.

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Signal allocation percentage is 0.06; *provided, however, solely* to the extent that the net cash determined pursuant to the Merger Agreement is less than negative $100,000, then 0.06 shall be reduced by 0.00000002 for each $1.00 that the Net Cash as so determined is less than negative $100,000 (for example, the Signal allocation percentage would be 0.055 if Signal s net cash is negative $350,000).

Determination of Signal s Net Cash

For purposes of determining the Exchange Ratio and determining whether Signal has satisfied the condition to closing, Signal must have at least negative $300,000 in net cash as of the closing date (as calculated pursuant to the terms of the Merger Agreement). Signal s net cash will be calculated shortly before the closing date of the Merger. The closing of the Merger could be delayed if Miragen and Signal are not able to agree upon the amount of Signal s net cash as of Signal s cash determination date.

Under the Merger Agreement, Signal s net cash is defined as (i) the sum of Signal s cash and cash equivalents, marketable securities, accounts, interest and other receivables (to the extent determined to be collectible), and deposits (to the extent refundable to Signal), in each case as of the anticipated closing date, determined in a manner consistent with the manner in which such items were historically determined and in accordance with Signal s audited financial statements and Signal s unaudited interim balance sheet, *minus* (ii) the sum of Signal s accounts payable and accrued expenses (without duplication of any expenses accounted for below), in each case as of such date and determined in a manner consistent with the manner in which such items were historically determined and in accordance with Signal s audited financial statements and Signal s unaudited interim balance sheet, *minus* (iii) the cash cost of any unpaid change of control payments or severance, termination or similar payments that are or become due to any current or former employee, director or independent contractor of Signal, or any other third party *minus* (iv) the cash cost of any accrued and unpaid retention payments or other bonuses due to any current or former employee, director or independent contractor of Signal as of the closing date, *minus* (v) the cash cost of any other payments to terminated Signal employees not set forth in clauses (iii) or (iv), *minus* (vi) all payroll, employment or other withholding taxes incurred by Signal and any Signal employee (to the extent paid or to be paid by Signal on the behalf of such employee) in connection with any payment amounts set forth in clauses (iii), (iv) or (v) and the exercise of any Signal option or settlement of any Signal restricted stock unit on or prior to the effective time, *minus* (vii) any remaining unpaid fees and expenses (including any attorney s, accountant s, financial advisor s or finder s fees) as of such date for which Signal is liable incurred by Signal in connection with the Merger Agreement and the Merger and other transactions contemplated by the Merger Agreement or otherwise, *minus* (viii) any bona fide current liabilities payable in cash, in each case to the extent not cancelled at or prior to the anticipated closing date, *minus* (ix) any fees and expenses payable by Signal pursuant to the Merger Agreement, *minus* (x) any unpaid amounts payable by Signal in satisfaction of its obligations under the Merger Agreement for the period after the closing (including any expenses incurred in connection with the tail policy), *minus* (xi) the cash cost of any unpaid retention payment amounts due under any insurance policy with respect to any legal proceeding against Signal or Merger Sub, *minus* (xii) the cash cost of repurchasing any shares of Signal common stock to the extent Signal has agreed to purchase such shares and the purchase price for such shares has not been fully paid by Signal as of the determination date, *plus* or *minus* (as applicable) (xiii) the net amount of any transaction expense reimbursements owed to, or transaction expense payment owed by, Signal pursuant to the Merger Agreement, *plus* (xiv) the amount of any payments due to Signal within 30 days of the closing date pursuant to the sale or other disposition of all or a portion of Signal s lab business, *plus* (xv) any amounts paid or payable by Signal for activities requested by Miragen in respect of the audit of Signal s financial statements at and for the year ended December 31, 2016, as well as for the preparation of Signal s Annual Report on Form 10-K for 2016.

Signal s net cash balance at the determination date is subject to numerous factors, many of which are outside of Signal s control. If Signal s net cash at the closing date is less than negative $300,000, based on the manner of

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calculating net cash pursuant to the Merger Agreement, Signal would be unable to satisfy a closing condition for the Merger, and Miragen could elect to waive the condition or not affect the Merger. Furthermore, the Exchange Ratio at the closing will be subject to an upward adjustment to the extent that Signal s net cash at the effective time of the Merger is less than negative $100,000 (and as a result, Signal securityholders could own less, and Miragen securityholders could own more, of the combined company), as described under *The Merger Agreement Merger Consideration and Exchange Ratio*.

Signal Common Stock

Prior to giving effect to the reverse stock split, each share of Signal common stock issued and outstanding at the time of the Merger will remain issued and outstanding and those shares will be unaffected by the Merger. After giving effect to the reverse stock split, each one to 15 shares (or any number in between) of Signal common stock issued and outstanding would be combined and reclassified into one share of Signal common stock. Signal stock options and restricted stock units that remain unexercised or unsettled, as applicable, as of the effective time will be cancelled and terminated. Immediately after the Merger, Signal securityholders will own approximately 4% of the fully-diluted common stock of the combined company, assuming that Miragen closes its concurrent financing immediately prior to the effective time of the Merger. If the concurrent financing does not close, then Signal s securityholders would own the approximately 6% of the fully-diluted common stock of the combined company.

Procedures for Exchanging Miragen Stock Certificates

Promptly after the effective time of the Merger, VStock Transfer LLC, as the exchange agent for the Merger, will establish an exchange fund to hold the shares of Signal common stock to be issued to Miragen stockholders in connection with the Merger.

As promptly as practicable following the completion of the Merger, the exchange agent will mail to each holder of record of Miragen capital stock a letter of transmittal and instructions for surrendering the record holder s stock certificates in exchange for the shares of Signal common stock. Upon proper surrender of Miragen stock certificates together with a properly completed and duly executed letter of transmittal in accordance with the exchange agent s instructions, the holder of such Miragen stock certificates will be entitled to receive shares representing the number of whole shares of Signal common stock issuable to such holder pursuant to the Merger and cash in lieu of any fractional share of Signal common stock issuable to such holder. The surrendered certificates representing Miragen capital stock will be cancelled.

After the effective time of the Merger, each certificate representing shares of Miragen capital stock that has not been surrendered will represent only the right to receive shares of Signal common stock issuable pursuant to the Merger and cash in lieu of any fractional share of Signal common stock to which the holder of any such certificate is entitled. No interest will be paid or accrued on any cash in lieu of fractional shares payable to holders of Miragen stock certificates.

Any holder or former holder of Miragen capital stock may be subject to withholding under the Code, or under another provision of state, local or foreign tax law. To the extent such amounts are withheld and paid to the appropriate governmental entity, they will be treated as having been paid to the person to whom such amounts would otherwise have been paid.

HOLDERS OF MIRAGEN CAPITAL STOCK SHOULD NOT SEND IN THEIR MIRAGEN STOCK CERTIFICATES UNTIL THEY RECEIVE A LETTER OF TRANSMITTAL FROM THE EXCHANGE AGENT WITH INSTRUCTIONS FOR THE SURRENDER OF MIRAGEN STOCK CERTIFICATES.

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Fractional Shares

No fractional shares of Signal common stock will be issuable pursuant to the Merger to Miragen stockholders. Instead, each Miragen stockholder who would otherwise be entitled to receive a fraction of a share of Signal common stock, after aggregating all fractional shares of Signal common stock issuable to such stockholder, will be entitled to receive a cash payment in lieu of such fractional shares representing such holder s proportionate interest, if any, in the proceeds from the sale by the exchange agent (reduced by any fees attributable to such sale) in one or more transactions of shares of Signal common stock equal to the excess of (i) the aggregate number of shares of Signal common stock issuable in exchange for all outstanding shares of Miragen capital stock over (ii) the aggregate number of whole shares of Signal common stock to be distributed to holders of Miragen stock certificates.

Representations and Warranties

The Merger Agreement contains customary representations and warranties made by Signal, Merger Sub and Miragen relating to their respective businesses, as well as other facts pertinent to the Merger. These representations and warranties are subject to materiality, knowledge and other similar qualifications in many respects and expire at the effective time of the Merger or termination of the Merger Agreement, as further described below. The representations and warranties of each of Signal, Merger Sub and Miragen have been made solely for the benefit of the other parties and those representations and warranties should not be relied on by any other person. In addition, those representations and warranties may be intended not as statements of actual fact, but rather as a way of allocating risk among the parties, may have been modified by the disclosure schedules delivered in connection with the Merger Agreement, are subject to the materiality standard described in the Merger Agreement, which may differ from what may be viewed as material by you, will not survive completion of the Merger and cannot be the basis for any claims under the Merger Agreement by the other parties after termination of the Merger Agreement, and were made only as of the date of the Merger Agreement or another date as is specified in the Merger Agreement.

Miragen made a number of representations and warranties to Signal and Merger Sub in the Merger Agreement, including representations and warranties relating to the following matters:

- subsidiaries; due organization; organizational documents;
- authority; vote required;
- non-contravention; consents;
- capitalization;
- financial statements;
- absence of changes;

title to assets;

real property; leaseholds;

intellectual property;

material contracts;

undisclosed liabilities;

compliance; permits; restrictions;

tax matters;

employee and labor matters; benefit plans;

environmental matters;

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insurance;

legal proceedings; orders;

inapplicability of anti-takeover statutes;

no financial advisor;

subscription agreement;

disclosure; and

exclusivity of representations; reliance.

Significant portions of Miragen s representations and warranties are qualified as to materiality or material adverse effect. Under the Merger Agreement, a material adverse effect with respect to Miragen means any effect, change, event, circumstance or development that has occurred prior to the date of determination of the occurrence of such material adverse effect, that is or would reasonably be expected to be materially adverse to or has or would reasonably be expected to have or result in a material adverse or effect on (i) the business, condition (financial or otherwise), capitalization, assets, operations or financial performance of Miragen and its subsidiaries, taken as a whole or (ii) the ability of Miragen to consummate the transactions contemplated by the Merger Agreement or perform any of its covenants or obligations under the Merger Agreement in all material respects, except that none of the following, as they apply to Miragen and its subsidiaries, will be taken into account in determining whether there has been a material adverse effect:

any rejection by a governmental body of a registration or filing by Miragen relating to Miragen s intellectual property rights;

any change in the cash position of Miragen that results from operations in the ordinary course of business;

conditions generally affecting the industries in which Miragen and its subsidiaries participate or the U.S. or global economy or capital markets as a whole, to the extent that such conditions do not have a disproportionate impact on Miragen and its subsidiaries, taken as a whole;

any failure by Miragen or any of its subsidiaries to meet internal projections or forecasts on or after the date of the Merger Agreement, provided that any such effect, change, event, circumstance or development causing or contributing to any such failure to meet projections or forecasts may constitute a material adverse effect of Miragen and may be taken into account in determining whether a material adverse effect has

occurred;

the execution, delivery, announcement or performance of obligations under the Merger Agreement or the announcement, pendency or anticipated consummation of the Merger or Miragen s concurrent financing;

the failure to close Miragen s concurrent financing;

any natural disaster or any acts of terrorism, sabotage, military action or war or any escalation or worsening thereof; or

any changes after the date of the Merger Agreement in U.S. GAAP or applicable laws.

Signal and Merger Sub made a number of representations and warranties to Miragen in the Merger Agreement, including representations and warranties relating to the following subject matters:

subsidiaries; due organization; organizational documents;

authority; vote required;

non-contravention; consents;

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capitalization;

SEC filings; financial statements;

absence of changes;

title to assets;

real property; leaseholds;

intellectual property;

material contracts;

undisclosed liabilities;

compliance; permits; restrictions;

tax matters;

employee and labor matters; benefit plans;

environmental matters;

insurance;

legal proceedings; orders;

inapplicability of anti-takeover statutes;

no financial advisor;

disclosure;

bank accounts; deposits;

transactions with affiliates;

valid issuance;

code of ethics;

opinion of financial advisor;

shell company status; and

exclusivity of representations; reliance.

Similar to Miragen s representations and warranties, significant portions of Signal s representations and warranties are qualified as to materiality or material adverse effect. Under the Merger Agreement, a material adverse effect with respect to Signal means any effect, change, event, circumstance or development that has occurred prior to the date of determination of the occurrence of such material adverse effect, that is or would reasonably be expected to be materially adverse to or has or would reasonably be expected to have or result in a material adverse or effect on (i) the business, condition (financial or otherwise), capitalization, assets, operations or financial performance of Signal or (ii) the ability of Signal to consummate the transactions contemplated by the Merger Agreement or perform any of its covenants or obligations under the Merger Agreement in all material respects , except that none of the following, as they apply to Signal, will be taken into account in determining whether there has been a material adverse effect:

any rejection by a governmental body of a registration or filing by Signal relating to Signal s intellectual property rights;

any change in the cash position of Signal that results from operations in the ordinary course of business;

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conditions generally affecting the industries in which Signal and its subsidiaries participate or the U.S. or global economy or capital markets as a whole, to the extent that such conditions do not have a disproportionate impact on Signal;

any failure by Signal to meet internal projections or forecasts or third-party revenue or earnings predictions for any period ending (or for which revenues or earnings are released) on or after the date of the Merger Agreement or any change in the price or trading volume of Signal s common stock, provided that any such effect, change, event, circumstance or development causing or contributing to any such failure to meet projections or forecasts may constitute a material adverse effect of Miragen and may be taken into account in determining whether a material adverse effect has occurred;

the sale and/or winding down of Signal s lab business and other operations;

the execution, delivery, announcement or performance of obligations under the Merger Agreement or the announcement, pendency or anticipated consummation of the Merger or Miragen s concurrent financing;

any natural disaster or any acts of terrorism, sabotage, military action or war or any escalation or worsening thereof; or

any changes after the date of the Merger Agreement in U.S. GAAP or applicable laws.

Covenants; Conduct of Business Pending the Merger

During the period commencing on October 31, 2016 and ending at the earlier of the date of termination of the Merger Agreement and the effective time of the Merger, each party agreed that it will conduct its business in the ordinary course and in compliance with all applicable laws, rules, regulations, and certain material contracts and will provide the other party with prompt notice upon the occurrence of certain events or discovery of certain conditions, facts or circumstances.

Miragen also agreed that prior to the earlier of termination and the effective time of the Merger, subject to certain limited exceptions set forth in the Merger Agreement, without the consent of Signal, it would not and would not permit any of its subsidiaries to:

declare, accrue, set aside or pay any dividend or make any other distribution in respect of any shares of Miragen capital stock or repurchase, redeem or otherwise reacquire any shares of its capital stock or other securities except pursuant to Miragen contracts existing as of the date of the Merger Agreement;

sell, issue or grant, or authorize the issuance of any capital stock or other security (except in connection with the concurrent financing and for shares of Miragen common stock issued upon the valid exercise of Miragen options or Miragen warrants outstanding as of the date of the Merger Agreement), any option, warrant or right to purchase any capital stock or any other security (except for the grant of options to purchase up to an

aggregate 379,524 shares of Miragen common stock and except for any warrants issued to Silicon Valley Bank pursuant to the terms of Miragen s existing credit facility), any equity-based award or instrument convertible into or exchangeable for any capital stock or other security, or any debt securities or any rights to acquire any debt securities;

amend the certificate of incorporation, bylaws or other charter or organizational documents of Miragen (other than in connection with Miragen s concurrent financing), or effect or be a party to any Merger, consolidation, share exchange, business combination, recapitalization, reclassification of shares, stock split, reverse stock split or similar transaction;

form any subsidiary or acquire any equity interest or other interest in any other entity;

lend money to any person, incur or guarantee any indebtedness for borrowed money, other than in the ordinary course of business or under Miragen s existing credit facility with Silicon Valley Bank, guarantee any debt securities of others, or make any capital expenditure or commitment in excess of $250,000;

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enter into any contract with a labor union or collective bargaining agreement;

acquire any material asset nor sell, lease, or otherwise irrevocably dispose of any of its assets or properties, or grant any encumbrance with respect to such assets or properties, in each case, other than in the ordinary course of business;

make, change or revoke any material tax election, file any material amendment to any tax return, adopt or change any accounting method in respect of taxes, change any annual tax accounting period, enter into any tax allocation agreement, tax sharing agreement or tax indemnity agreement, other than commercial contracts entered into in the ordinary course of business with vendors, customers or landlords, enter into any closing agreement with respect to any tax, settle or compromise any claim, notice, audit report or assessment in respect of material taxes, apply for or enter into any ruling from any tax authority with respect to taxes, surrender any right to claim a material tax refund, or consent to any extension or waiver of the statute of limitations period applicable to any material tax claim or assessment; or

agree, resolve or commit to do any of the foregoing.

Signal also agreed that prior to the earlier of termination and the effective time of the Merger, subject to certain limited exceptions set forth in the Merger Agreement, without the consent of Miragen, it would not:

declare, accrue, set aside or pay any dividend or make any other distribution in respect of any shares of Signal capital stock or repurchase, redeem or otherwise reacquire any shares of its capital stock or other securities;

sell, issue or grant, or authorize the issuance of any capital stock or other security (except for shares of Signal common stock issued upon the settlement of Signal restricted stock units or upon the valid exercise of Signal options or Signal warrants outstanding as of the date of the Merger Agreement), any option, warrant or right to purchase any capital stock or any other security, any equity-based award or instrument convertible into or exchangeable for any capital stock or other security, or any debt securities or any rights to acquire any debt securities;

amend the certificate of incorporation, bylaws or other charter or organizational documents of Signal or Merger Sub, or effect or be a party to any merger, consolidation, share exchange, business combination, recapitalization, reclassification of shares, stock split, reverse stock split or similar transaction;

form any subsidiary or acquire any equity interest or other interest in any other entity;

lend money to any person, incur or guarantee any indebtedness for borrowed money, other than in the ordinary course of business, guarantee any debt securities of others, or make any capital expenditure or commitment;

adopt, establish or enter into any Signal employee plan, cause or permit any Signal employee plan to be amended other than as required by law, including in order to make amendments for the purposes of Section 409A of the Code, subject to prior review and approval (with such approval not to be unreasonably withheld, conditioned or delayed) by Miragen, hire any additional employees or independent contractors or enter into or amend the term of any employment or consulting agreement with any employee or independent contractor other than as reasonably necessary for the completion of the transactions contemplated by the Merger Agreement, enter into any contract with a labor union or collective bargaining agreement, pay any bonus or make any profit-sharing or similar payment to (other than in the ordinary course of business), or increase the amount of the wages, salary, commissions, fringe benefits or other compensation or remuneration payable to, any of its directors or employees, accelerate the vesting of or entitlement to any payment, award, compensation or benefit with respect to any current or former Signal employee, pay or increase the severance or change of control benefits offered to any Signal Associate, or provide or make any Tax-related gross-up payment,

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provided, that Signal may pay payments to certain terminated employees in connection with their termination of employment or service;

enter into any material transaction outside the ordinary course of business;

acquire any material asset nor sell, lease, or otherwise irrevocably dispose of any of its assets or properties, or grant any encumbrance with respect to such assets or properties, other than in the ordinary course of business;

make, change or revoke any material tax election, file any material amendment to any tax return, adopt or change any accounting method in respect of taxes, change any annual tax accounting period, enter into any tax allocation agreement, tax sharing agreement or tax indemnity agreement, other than commercial contracts entered into in the ordinary course of business with vendors, customers or landlords, enter into any closing agreement with respect to any tax, settle or compromise any claim, notice, audit report or assessment in respect of material taxes, apply for or enter into any ruling from any tax authority with respect to taxes, surrender any right to claim a material tax refund, or consent to any extension or waiver of the statute of limitations period applicable to any material tax claim or assessment;

enter into, amend or terminate any Signal contract that, if effective as of the date hereof, would constitute a Signal material contract;

initiate or settle any legal proceeding;

after the net cash calculation is finalized pursuant to the Merger Agreement, incur any liabilities or otherwise take any actions other than in the ordinary course of business so as to cause the final net cash calculation to differ materially from actual net cash as of the closing; or

agree, resolve or commit to do any of the foregoing.

Non-Solicitation

The Merger Agreement contains provisions prohibiting Signal and Miragen from seeking a competing transaction, subject to specified exceptions described below. Under these non-solicitation provisions, each of Signal and Miragen has agreed that neither it nor its subsidiaries, nor any of its officers, directors, employees, representatives, affiliates, advisors or agents shall directly or indirectly: (i) solicit, initiate, respond to or take any action to facilitate or encourage any inquiries or the communication, making, submission or announcement of any competing proposal or take any action that could reasonably be expected to lead to a competing proposal; (ii) enter into or participate in any discussions or negotiations with any person with respect to any competing proposal; (iii) furnish any information regarding such party to any person in connection with, in response to, relating to or for the purpose of assisting with or facilitating a competing proposal; (iv) approve, endorse or recommend any competing proposal (subject to the terms and conditions of the Merger Agreement); (v) execute or enter into any letter of intent or similar document or any contract contemplating or otherwise relating to any competing proposal; or (vi) grant any waiver or release under any

confidentiality, standstill or similar agreement (other than to the other party).

However, prior to the approval of the proposals relating to the Merger set forth in this proxy statement/prospectus/information statement at the meeting of the stockholders of either Signal or by written consent of Miragen stockholders, as the case may be, (i) either Signal or Miragen may enter into discussions or negotiations with, any person that has made (and not withdrawn) a bona fide, unsolicited, competing proposal, which such party s board of directors determines in good faith, after consultation with its independent financial advisor, if any, and its outside legal counsel, constitutes, or would reasonably be expected to result in, a superior competing proposal, and (ii) thereafter furnish to such person non-public information regarding such party pursuant to an executed confidentiality agreement containing provisions (including nondisclosure provisions, use restrictions, non-solicitation provisions, no hire provisions and standstill provisions) at least as favorable to such party as

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those contained in the confidentiality agreement, but in each case of the foregoing clauses (i) and (ii), only if: (A) neither such party nor any representative of such party has breached its non-solicitation obligations; (B) the board of directors of such party determines in good faith based on the advice of outside legal counsel, that the failure to take such action would reasonably be expected to result in a breach of the fiduciary duties of the board of directors of such party under applicable laws; (C) at least five business days prior to furnishing any such non-public information to, or entering into discussions with, such person, such party gives the other party written notice of the identity of such person and of such party s intention to furnish nonpublic information to, or enter into discussions with, such person; and (D) at least five business days prior to furnishing any such non-public information to such person, such party furnishes such non-public information to Miragen or Signal, as applicable (to the extent such non-public information has not been previously furnished by such party to Miragen or Signal, as applicable). Without limiting the generality of the foregoing, each party has acknowledged and agreed that, in the event any representative of such party (whether or not such representative is purporting to act on behalf of such party) takes any action that, if taken by such party, would constitute a breach of the non-solicitation obligations of such party, the taking of such action by such representative shall be deemed to constitute a breach of these non-solicitation obligations of such party for purposes of the Merger Agreement.

Signal and Miragen will notify the other no later than 24 hours after receipt of any inquiries, discussions, negotiations, proposals or expressions of interest with respect to a competing proposal, and any such notice will be made orally and in writing and will indicate in reasonable detail the terms and conditions of such proposal, inquiry or contact, including price, and the identity of the offeror. Both Signal and Miragen will keep the other informed, on a current basis, of the status and material developments (including any changes to the terms) of such competing proposal.

A competing proposal is any of the following proposals, indications of interest or offers, other than transactions contemplated by the Merger Agreement:

- any merger, consolidation, amalgamation, share exchange, business combination, issuance of securities, acquisition of securities, reorganization, recapitalization, tender offer, exchange offer or other similar transaction involving a party to the Merger Agreement or any of its subsidiaries, except for Miragen s concurrent financing;

- any sale, lease, exchange, transfer, license, acquisition or disposition of any business or businesses or assets that constitute or account for 20% or more of the consolidated book value or the fair market value of the assets of a party and its subsidiaries, taken as a whole (other than the sale, divestiture and/or winding down of Signal s lab business in accordance with the terms and conditions of the Merger Agreement and any lease, exchange, transfer, license, disposition, partnership or collaboration involving less than substantially all of the assets of Miragen or any Miragen Subsidiary pursuant to a collaboration agreement, partnership agreement or similar arrangement); or

- any tender offer or exchange offer that if consummated would result in any person beneficially owning 20% or more of the outstanding equity securities of a party to the Merger Agreement or any of its subsidiaries.

A superior competing proposal is any unsolicited bona fide competing proposal (with all references to 20% in the definition of competing proposal being treated as references to 50% for these purposes) made by a third party that the board of directors of either Signal or Miragen, as the case may be, determines, in its reasonable, good faith judgment, after obtaining and taking into account such matters that its board of directors deems relevant following consultation

with its outside legal counsel and financial advisor, if any (i) is more favorable, from a financial point of view, to the Signal stockholders or the Miragen stockholders, as applicable, than the terms of the Merger; and (ii) is reasonably capable of being consummated; *provided*, *however*, that any such offer shall not be deemed to be a superior competing proposal if (A) any financing required to consummate the transaction contemplated by such offer is not committed and is not reasonably capable of being obtained by such third party or (B) if the consummation of such transaction is contingent on any such financing being obtained.

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Either Signal or Miragen, as the case may be, may terminate the Merger Agreement if the board of directors, and/or any committee of the board of directors, of the other party has (each such action, a change of recommendation by the board of directors and/or any committee of the board of directors of Signal or Miragen, as the case may be):

- failed to include its approval and recommendation to stockholders relating to the Merger in this proxy statement/prospectus/information statement;
- approved, endorsed or recommended a competing proposal; or
- entered into a definitive agreement for a competing proposal.

Either Signal or Miragen, as the case may be, may also terminate the Merger Agreement if it enters into a definitive agreement to effect a superior competing proposal. If the Merger Agreement is terminated in connection with these provisions, (i) Signal has agreed to pay Miragen a fee of $300,000, plus up to $100,000 as reimbursement for reasonable expenses, if the termination is a result of Signal entering into a definitive agreement to effect a superior competing proposal and (ii) Miragen has agreed to pay Signal a fee of $300,000, plus up to $100,000 as reimbursement for reasonable expenses if the termination is a result of Miragen entering into a definitive agreement to effect a superior competing proposal. See *The Merger Agreement Termination of the Merger Agreement and Termination Fee* below for a more complete discussion of the termination fees.

Disclosure Documents

As promptly as practicable following the date of the Merger Agreement, Signal agreed to prepare and file with the SEC this proxy statement/prospectus/information statement and Signal, in cooperation with Miragen, agreed to prepare and file with the SEC a registration statement on Form S-4, of which this proxy statement/prospectus/information statement is a part, in connection with the registration under the Securities Act of the shares of Signal common stock to be issued pursuant to the Merger. Each of Signal and Miragen agreed to use their commercially reasonable efforts to cause the registration statement to become effective as promptly as practicable, and take all or any action required under any applicable federal and state securities and other laws in connection with the issuance of shares of Signal common stock pursuant to the Merger. Each of Signal and Miragen agreed to use their commercially reasonable efforts to cause all documents that it is respectively responsible for filing with the SEC in connection with the transactions contemplated by the Merger Agreement to comply as to form and substance in all material respects with the applicable requirements of the Securities Act and the Securities Exchange Act of 1934, as amended, or the Exchange Act. Miragen agreed to ensure that its financial statements will comply as to form in all material respects, prior to the filing of the registration statement on Form S-4, with the published rules and regulations of the SEC with respect thereto. Each of Signal, Merger Sub and Miragen agreed to furnish all information concerning itself and its subsidiaries, as applicable, to the other parties as the other parties may reasonably request in connection with such actions and the preparation of the registration statement on Form S-4 and proxy statement/prospectus/information statement. Signal agreed to use commercially reasonable efforts to cause this proxy statement/prospectus/information statement to be mailed to its stockholders as promptly as practicable after the registration statement on Form S-4 is declared effective by the SEC.

Meeting of Signal Stockholders and Written Consent of Miragen s Stockholders

Signal is obligated under the Merger Agreement to call, give notice of and hold a meeting of its stockholders for the purposes of voting on the Signal Proposals. The Signal stockholders meeting will be held (on a date selected by Signal in consultation with Miragen) not later than 60 days after the effective date of the registration statement on Form S-4 pursuant to the Merger Agreement. If on the scheduled date of the Signal stockholders meeting, Signal has not obtained the requisite approval of its stockholders, Signal will have the right, after consultation with Miragen, to adjourn the stockholder meeting to a later date or dates, such later date or dates not to exceed 30 days from the original date that the stockholder meeting was scheduled.

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Miragen is obligated under the Merger Agreement to take all action necessary in accordance with the Merger Agreement, applicable law, and Miragen s restated certificate of incorporation and bylaws, to obtain, promptly after receiving written notice from Signal that the registration statement on Form S-4 registration statement has been declared effective under the Securities Act, and in any event no later than five business days after receiving such notice, adoption of the Merger Agreement and approval of the Merger by written consent of Miragen s stockholders.

Regulatory Approvals

Neither Signal nor Miragen is required to make any filings or to obtain approvals or clearances from any antitrust regulatory authorities in the United States or other countries to complete the Merger. In the United States, Signal must comply with applicable federal and state securities laws and the rules and regulations of The NASDAQ Stock Market LLC in connection with the issuance of shares of Signal s common stock in the Merger, including the filing with the SEC of this proxy statement/prospectus/information statement. The Merger Agreement provides that Miragen and Signal shall respond as promptly as is practicable in compliance with: (i) any inquiries or requests received from the Federal Trade Commission or the Department of Justice for information or documentation; and (ii) any inquiries or requests received from any other governmental body in connection with antitrust or competition matters.

Miragen Stock Options and Miragen Warrants

At the effective time of the Merger, each outstanding option and warrant, whether or not vested, to purchase Miragen capital stock unexercised immediately prior to the effective time of the Merger will be converted into an option or warrant to purchase Signal common stock. All rights with respect to each Miragen option or warrant will be assumed by Signal in accordance with its terms. Accordingly, from and after the effective time of the Merger each option or warrant assumed by Signal may be exercised solely for shares of Signal common stock.

The number of shares of Signal common stock subject to each outstanding Miragen option or warrant assumed by Signal will be determined by multiplying the number of shares of Miragen capital stock that were subject to such option or warrant, as applicable, by the Exchange Ratio and rounding the resulting number down to the nearest whole number of shares of Signal common stock. The per share exercise price for the Signal common stock issuable upon exercise of each Miragen option or warrant assumed by Signal will be determined by dividing the per share exercise price of Miragen capital stock subject to such option or warrant, as applicable, by the Exchange Ratio and rounding the resulting exercise price up to the nearest whole cent. Any restriction on the exercise of any option or warrant will continue in full force and effect and the term, exercisability, vesting schedule and other provisions of such option or warrant will otherwise remain unchanged.

Indemnification and Insurance for Officers and Directors

Under the Merger Agreement, from the closing of the Merger through the sixth anniversary of the closing, Signal and the surviving corporation agree that all rights to indemnification, exculpation or advancement of expenses now existing in favor of, and all limitations on the personal liability of, each present and former director or officer, of Signal or Miragen provided for in the respective organizational documents of Miragen and Signal in effect as of October 31, 2016, shall continue to be honored and in full force and effect.

Under the Merger Agreement, the certificate of incorporation and bylaws of Signal and the surviving corporation in the Merger, will contain provisions no less favorable with respect to indemnification, advancement of expenses and exculpation of present and former directors and officers of each of Signal and Miragen than are presently set forth in the certificate of incorporation and bylaws of Signal and Miragen, as applicable, which provisions shall not be amended, modified or repealed for a period of six years time from the closing of the Merger in a manner that would

materially and adversely affect the rights thereunder of individuals who, at or prior to the closing, were officers or directors of Signal and Miragen.

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The Merger Agreement also provides that Signal shall purchase an insurance policy in effect for six years from the closing, providing at least the same coverage as the current directors and officers liability insurance policies maintained by Miragen and Signal and containing terms and conditions that are not materially less favorable to current and former officers and directors of Miragen and Signal.

Additional Agreements

Each of Miragen and Signal has agreed to, among other things:

- use its commercially reasonable efforts to cause to be taken all actions necessary to consummate the Merger and any other transaction contemplated by the Merger Agreement;
- reasonably cooperate with the other parties and provide the other parties with such assistance as may be reasonably requested for the purpose of facilitating the performance by each party of its respective obligations under the Merger Agreement and to enable the surviving corporation to continue to meet its obligations under the Merger Agreement following the closing;
- make all filings and other submissions (if any) and give all notices (if any) required to be made and given by such party in connection with the Merger and any other transaction contemplated by the Merger Agreement;
- use its commercially reasonable efforts to lift any injunction prohibiting, or any other legal bar to, the Merger and any other transaction contemplated by the Merger Agreement;
- use its commercially reasonable efforts to satisfy the conditions precedent to the consummation of the Merger Agreement; and
- use its reasonable best efforts to cause the Merger to qualify as a reorganization under Section 368(a) of the Code.

NASDAQ Stock Market Listing

Signal common stock currently is listed on The NASDAQ Capital Market under the symbol SGNL. Signal has agreed to use commercially reasonable efforts to (i) maintain its existing listing on The NASDAQ Capital Market and to obtain approval of the listing of the combined company on The NASDAQ Capital Market, (ii) prepare and submit to The NASDAQ Capital Market a notification form for the listing of the shares of Signal common stock to be issued to Miragen stockholders pursuant to the Merger and the reverse split, (iii) cause such shares to be approved for listing and (iv) as required by NASDAQ Marketplace Rule 5110, file an initial listing application for the combined company on The NASDAQ Capital Market and to cause such listing application to be approved for listing. In addition, under the Merger Agreement, each of Miragen s and Signal s obligation to complete the Merger is subject to the satisfaction or waiver by each of the parties, at or prior to the Merger, of various conditions, including that the existing shares of Signal common stock must have been continually listed on The NASDAQ Capital Market, Signal must have caused the shares of Signal common stock to be issued in the Merger to be approved for listing on The NASDAQ Capital

Market as of the effective time of the Merger and, to the extent required by NASDAQ Marketplace Rule 5110, the initial listing application for the combined company must be approved for listing. If such application is accepted, Signal anticipates that its common stock will be listed on The NASDAQ Capital Market following the closing of the Merger under the trading symbol MGEN.

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Conditions to the Completion of the Merger

The respective obligations of Signal and Miragen to complete the Merger and the other transactions contemplated by the Merger Agreement are subject to the satisfaction or waiver of various conditions that (i) do not include the closing of Miragen s concurrent financing and (ii) do include, in addition to other customary closing conditions, the following:

- the registration statement on Form S-4, of which this proxy statement/prospectus/information statement is a part, must have been declared effective by the SEC in accordance with the Securities Act and must not be subject to any stop order or proceeding, or any proceeding threatened by the SEC, seeking a stop order;

- there must not have been issued any temporary restraining order, preliminary or permanent injunction or other order preventing the consummation of the Merger by any court of competent jurisdiction or other governmental entity of competent jurisdiction, and no law, statute, rule, regulation, ruling or decree shall be in effect which has the effect of making the consummation of the Merger illegal;

- the holders of a majority of the outstanding Miragen common stock and preferred stock, voting together as one class on an as-converted to common stock basis and 70% of the shares of Miragen preferred stock, voting together as one class on an as-converted to common stock basis, must have adopted and approved the Merger Agreement and the Merger;

- the holders of a majority of the shares of outstanding Signal common stock entitled to vote on the record date must have approved Signal Proposal Nos. 6, 7, 8 and 9;

- the holders of a majority of the shares having voting power and present in person or represented by proxy at the Signal special meeting must have approved Signal Proposal Nos. 1, 2, 3, 4, and 5;

- any waiting period applicable to the consummation of the Merger under the Hart-Scott-Rodino Antitrust Improvements Act of 1976, as amended, or HSR Act, must have expired or been terminated, and there must not be in effect any voluntary agreement by any party to the Merger Agreement and the U.S. Federal Trade Commission, the U.S. Department of Justice or any foreign governmental body, pursuant to which such party has agreed not to consummate the Merger for any period of time; and

- the existing shares of Signal common stock must have been continually listed on The NASDAQ Capital Market through the closing of the Merger, the shares of Signal common stock to be issued in the Merger must be approved for listing on The NASDAQ Capital Market (subject to official notice of issuance) as of the effective time of the Merger, and the initial listing application of Miragen has been approved for listing.

In addition, each of Miragen s and Signal s obligation to complete the Merger is further subject to the satisfaction or waiver by that party of the following additional conditions:

the representations and warranties regarding capitalization matters of the other party in the Merger Agreement must be true and correct in all but de minimis respects on the date of the Merger Agreement and on the closing date of the Merger with the same force and effect as if made on the closing date, or, if such representations and warranties address matters as of a particular date, then as of that particular date;

all other representations and warranties of the other party in the Merger Agreement must be true and correct on the date of the Merger Agreement and on the closing date of the Merger with the same force and effect as if made on the date on which the Merger is to be completed or, if such representations and warranties address matters as of a particular date, then as of that particular date, except where the failure of these representations and warranties to be true and correct would not have a material adverse effect on the other party;

the other party to the Merger Agreement must have performed or complied with in all material respects all covenants and obligations in the Merger Agreement required to be performed or complied with by it on or before the closing of the Merger;

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the other party to the Merger Agreement has not experienced a material adverse effect; and

the other party must have delivered certain certificates and other documents required under the Merger Agreement for the closing of the Merger.

In addition, the obligation of Signal and Merger Sub to complete the Merger is further subject to the satisfaction or waiver of the following conditions:

Miragen must have effected a conversion of all of its outstanding preferred stock into shares of Miragen common stock;

Miragen must have terminated certain investor agreements; and

Miragen must have delivered a certificate setting forth the allocation of the Merger consideration to its securityholders.

In addition, the obligation of Miragen to complete the Merger is further subject to the satisfaction or waiver of the following conditions:

Signal must have terminated all contracts, subject to certain exceptions;

Signal must have appointed the directors and officers designated by Miragen;

either the principal executive officer or the principal financial officer of Signal must have provided, with respect to any document filed with the SEC on or after October 31, 2016, any necessary certification required under Rule 13a-14 under the Exchange Act, as amended;

the Signal Net Cash must be greater than or equal to negative $300,000. Net Cash means (i) the sum of Signal s cash and cash equivalents, marketable securities, accounts, interest and other receivables (to the extent determined to be collectible), and deposits (to the extent refundable to Signal), in each case as of the anticipated closing date, determined in a manner consistent with the manner in which such items were historically determined and in accordance with Signal s audited financial statements and Signal s unaudited interim balance sheet, *minus* (ii) the sum of Signal s accounts payable and accrued expenses (without duplication of any expenses accounted for below), in each case as of such date and determined in a manner consistent with the manner in which such items were historically determined and in accordance with Signal s audited financial statements and Signal s unaudited interim balance sheet, *minus* (iii) the cash cost of any unpaid change of control payments or severance, termination or similar payments that are or become due to any current or former employee, director or independent contractor of Signal, or any other third party *minus* (iv) the cash cost of any accrued and unpaid retention payments or other bonuses due to any current or former employee, director or independent contractor of Signal as of the closing date, *minus* (v) the cash cost

of any other payments to terminated Signal employees not set forth in clauses (iii) or (iv), *minus* (vi) all payroll, employment or other withholding taxes incurred by Signal and any Signal employee (to the extent paid or to be paid by Signal on the behalf of such employee) in connection with any payment amounts set forth in clauses (iii), (iv) or (v) and the exercise of any Signal option or settlement of any Signal restricted stock unit on or prior to the effective time, *minus* (vii) any remaining unpaid fees and expenses (including any attorney s, accountant s, financial advisor s or finder s fees) as of such date for which Signal is liable incurred by Signal in connection with the Merger Agreement and the Merger and other transactions contemplated by the Merger Agreement or otherwise, *minus* (viii) any bona fide current liabilities payable in cash, in each case to the extent not cancelled at or prior to the anticipated closing date, *minus* (ix) any fees and expenses payable by Signal pursuant to the Merger Agreement, *minus* (x) any unpaid amounts payable by Signal in satisfaction of its obligations under the Merger Agreement for the period after the closing (including any expenses incurred in connection with the tail policy), *minus* (xi) the cash cost of any unpaid retention payment amounts due under any insurance policy with respect to any legal proceeding against Signal or Merger Sub, *minus* (xii) the cash cost of repurchasing any shares of Signal common stock to the extent Signal has agreed to purchase such shares and the

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purchase price for such shares has not been fully paid by Signal as of the determination date, *plus* or *minus* (as applicable) (xiii) the net amount of any transaction expense reimbursements owed to, or transaction expense payment owed by, Signal pursuant to the Merger Agreement, *plus* (xiv) the amount of any payments due to Signal within 30 days of the closing date pursuant to the sale or other disposition of all or a portion of Signal s lab business, *plus* (xv) any amounts paid or payable by Signal for activities requested by Miragen in respect of the audit of Signal s financial statements at and for the year ended December 31, 2016, as well as for the preparation of Signal s Annual Report on Form 10-K for 2016;

Signal must have completed the sale, divestiture and/or winding down of its lab business such that there are no post-closing obligations of Signal remaining;

Signal must have satisfied all of its liabilities and received payoff letters authorizing the release of liens on its assets;

Signal must have effected the reverse stock split described in Signal Proposal No. 7;

Signal must have effected the conversion of the Note into shares of Signal common stock;

Signal s board of directors must have approved an amendment to the bylaws of Signal to prohibit the ability of Signal stockholders to act by written consent;

Signal must have delivered to Miragen written resignations of the officers and directors of Signal; and

Signal must have delivered a certificate setting forth and certifying the number of outstanding shares of its capital stock.

Termination of the Merger Agreement and Termination Fee

The Merger Agreement may be terminated at any time before the closing of the Merger, whether before or after the required stockholder approvals to complete the Merger have been obtained, as set forth below:

(1) By mutual agreement of Miragen and Signal;

(2) By either Miragen or Signal if the Merger has not closed by April 30, 2017 (other than in cases in which such failure to close is due to a breach by the party wishing to terminate), which date may be extended in certain circumstances;

(3) By either Miragen or Signal if there is any law or order that prohibits the completion of the Merger;

(4) By Signal if Miragen has not obtained the required vote from Miragen stockholders within five business days of the registration statement on Form S-4 of which this proxy statement/prospectus/information statement being is a part declared effective by the SEC;

(5) By either Miragen or Signal if the Signal special meeting has been held and completed and the required proposals have not been approved (other than in cases in which such failure has been caused by Signal s action or failure to act and such action or failure to act is a material breach by Signal);

(6) By Miragen (any time prior to obtaining the required from Signal stockholders) if (i) Signal failed to include its board recommendation of the proposals in this proxy statement/prospectus/information statement, (ii) the Signal board has approved, endorsed or recommended any competing proposal, (iii) Signal has failed to hold the Signal special meeting within 60 days of this proxy statement/prospectus/information statement being declared effective, (iv) Signal has entered into any definitive agreement for a competing proposal or (v) Signal has willfully and intentionally breached the non-solicitation obligations in the Merger Agreement;

(7) By Signal (any time prior to obtaining the required vote from Miragen stockholders) if (i) the Miragen board fails to include its board recommendation of the proposals in this proxy statement/prospectus/information statement, (ii) the Miragen board has approved, endorsed or recommended any competing

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proposal, (iii) Miragen has entered into any definitive agreement for a competing proposal or (iv) Miragen has willfully and intentionally breached the non-solicitation obligations in the Merger Agreement;

(8) By Miragen if Signal breaches any of its representations, warranties, covenants or agreements in the Merger Agreement that would prevent Signal from satisfying its closing conditions (with a 15 calendar day cure period);

(9) By Signal if Miragen breaches any of its representations, warranties, covenants or agreements in the Merger Agreement that would prevent Miragen from satisfying its closing conditions (with a 15 calendar day cure period);

(10) By Signal (prior to obtaining the required vote from Signal stockholders) if the Signal board authorizes Signal to enter into any definitive for a competing proposal that constitutes a superior competing proposal (so long as (i) Signal has complied with the non-solicitation and notification provisions in the Merger Agreement, (ii) Signal pays Miragen the termination fee and expenses reimbursable under the Merger Agreement and (iii) a copy of such agreement has been delivered to Miragen); or

(11) By Miragen (prior to obtaining the required vote by Miragen stockholders) if the Miragen board authorizes Miragen to enter into any definitive for a competing proposal that constitutes a superior competing proposal (so long as (i) Miragen has complied with the non-solicitation and notification provisions in the Merger Agreement, (ii) Miragen pays Signal the termination fee and any expenses reimbursable under the Merger Agreement and (iii) a copy of such agreement has been delivered to Signal).

Miragen is required to pay Signal a termination fee of $300,000 and expense reimbursements of up to $100,000, if the Merger Agreement is terminated by Signal pursuant to clauses 4, 7, or 11 above. Miragen is also required to pay Signal expense reimbursements of up to $100,000 if the Merger Agreement is terminated pursuant to clause 9 above or if there is a material adverse effect with respect to Miragen.

Signal is required to pay Miragen a termination fee of $300,000, and expense reimbursements of up to $100,000, if the Merger Agreement is terminated by Miragen pursuant to clauses 5, 6, or 10 above. Signal is also required to pay Miragen expense reimbursements of up to $100,000 if the Merger Agreement is terminated pursuant to clause 8 above or if there is material adverse effect with respect to Signal.

Any termination of the Merger Agreement shall not relieve any party of liability for any willful and material breach of any representation, warranty, covenant, obligation or other provision contained in the Merger Agreement.

Amendment

The Merger Agreement may be amended by an instrument in writing signed on behalf of each of Signal and Miragen with the approval of the respective boards of directors of Signal and Miragen at any time, except that after the Merger Agreement has been adopted by the stockholders of Signal or Miragen, no amendment which by law requires further approval by the stockholders of Signal or Miragen, as the case may be, shall be made without such further approval.

Expenses

The Merger Agreement provides all fees and expenses incurred in connection with the Merger Agreement and the transactions contemplated thereby shall be paid by the party incurring such expenses, except as described above under Termination of the Merger Agreement and Termination Fee and except that Miragen and Signal shall share equally in any fees and expenses incurred by the engagement of the exchange agent and in relation to printing and filing with the SEC of this proxy statement/prospectus/information statement.

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Directors and Officers of Signal Following the Merger

Pursuant to the Merger Agreement, effective as of the effective time of the Merger, the initial size of the board of directors of the combined company will be seven and the initial directors will be William S. Marshall, Ph.D., Bruce L. Booth, Ph.D., John W. Creecy, Thomas E. Hughes, Ph.D., Kevin Koch, Ph.D., Kyle A. Lefkoff and Joseph L. Turner.

The Merger Agreement also provides that, effective as of the effective time of the Merger, Signal shall appoint the following persons as officers of Signal: William S. Marshall, Ph.D. as president and chief executive officer, Jason A. Leverone as chief financial officer, treasurer and secretary, Adam S. Levy as chief business officer and Paul D. Rubin, M.D., as executive vice president, research and development.

Amendments to the Certificate of Incorporation of Signal

Signal agreed to submit to its stockholders, amendments to its certificate of incorporation, to, among other things:

change the name from Signal Genetics, Inc. to Miragen Therapeutics, Inc. ;

effect a reverse stock split of the outstanding shares of Signal common stock; and

eliminate the ability of Signal stockholders to act by written consent.

Each amendment to Signal s certificate of incorporation is subject to and conditioned upon the approval and completion of the Merger.

Special Meeting of Signal Stockholders

Signal is obligated under the Merger Agreement to call, give notice of and hold a special meeting of its stockholders for the purpose of considering the issuance of shares of Signal common stock, the Merger and the stockholder proposals discussed herein.

Miragen Written Consent

Miragen is obligated under the Merger Agreement to obtain written consents of its stockholders sufficient to adopt the Merger Agreement thereby approving the Merger and related transactions within five business days of the registration statement on Form S-4, of which this proxy statement/prospectus/information statement is a part, being declared effective by the SEC.

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AGREEMENTS RELATED TO THE MERGER

Subscription Agreement

On October 31, 2016, prior to the execution of the Merger Agreement, Miragen entered into the Subscription Agreement with certain current stockholders of Miragen and certain new investors in Miragen pursuant to which Miragen agreed to sell, and the purchasers listed therein agreed to purchase, an aggregate of 9,045,126 shares of Miragen common stock at a purchase price of $4.50 per share prior to the closing of the Merger for an aggregate purchase price of $40.7 million.

The consummation of the financing contemplated by the Subscription Agreement is subject to certain conditions, including the satisfaction or waiver of each of the conditions to the consummation of the Merger set forth in the Merger Agreement and the parties to the Merger Agreement being ready, willing and able to consummate the Merger immediately after the closing of the financing, which include, among other items, (i) the SEC having declared effective the registration statement on Form S-4 of which this proxy statement/prospectus/information statement is a part and no stop order suspending the effectiveness of the registration statement on Form S-4 of which this proxy statement/prospectus/information statement is a part having been issued and remain pending, and (ii) the approval of Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8, and 9 by Signal stockholders.

The Subscription Agreement contains representations and warranties of Miragen comparable to the representations and warranties of Miragen in the Merger Agreement. The Subscription Agreement also contains customary representations and warranties of the purchasers.

Each purchaser s obligation to purchase shares of Miragen common stock from Miragen pursuant to the Subscription Agreement is subject to the satisfaction or waiver of certain conditions, including:

- Miragen s representations and warranties in the Subscription Agreement being true and correct in all respects as of October 31, 2016 and as of the closing date for the financing, except where the failure of such representations to be so true and correct would not have a material adverse effect on Miragen;
- Miragen having performed, satisfied and complied in all material respects with all covenants, agreements and conditions required to be performed, satisfied or complied with by it under the Subscription Agreement;
- the absence of any statute, rule, regulation, executive order, decree, ruling or injunction that prohibits the consummation of the sale of the shares to be sold in the financing;
- Miragen has obtained all consents and waivers necessary for the sale of the shares to be sold in the financing;
- Miragen has delivered to the purchasers, certain items at or prior to the closing of the financing;

each of the conditions to the consummation of the Merger set forth in the Merger Agreement having been satisfied or waived and the parties to the Merger Agreement being ready, willing and able to consummate the Merger immediately after the closing of the financing on the terms and conditions set forth therein; and

the actual subscription amount for each other purchaser under the Subscription Agreement having been released to Miragen in accordance with the Subscription Agreement.

Miragen s obligation to sell shares of Miragen common stock to each purchaser pursuant to the Subscription Agreement is subject to the satisfaction or waiver of certain conditions, including:

the representations and warranties made by such purchaser being true and correct in all material respects as of October 31, 2016 and as of the closing date for the financing, subject to certain exceptions;

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such purchaser having performed, satisfied and complied in all material respects with all covenants, agreements and conditions required to be performed, satisfied or complied with by such purchaser under the Subscription Agreement;

the absence of any statute, rule, regulation, executive order, decree, ruling or injunction that prohibits the consummation of the sale of the shares to be sold in the financing;

such purchaser s delivery to Miragen of certain items at or prior to the closing of the financing;

each of the conditions to the consummation of the Merger set forth in the Merger Agreement having been satisfied or waived and the parties to the Merger Agreement being ready, willing and able to consummate the Merger immediately after the closing of the financing on the terms and conditions set forth therein;

the actual subscription amount for each purchaser under the Subscription Agreement having been released to Miragen in accordance with the Subscription Agreement; and

the delivery to Miragen by Wedbush Securities Inc., Miragen s placement agent in the financing, of a questionnaire at or prior to the closing of the financing.

The representations and warranties contained in the Subscription Agreement will terminate at the closing of the financing and only the agreements and covenants that by their terms survive the closing of the financing will survive.

The Subscription Agreement may be amended and its provisions waived by Miragen and the purchasers party to the Subscription Agreement.

At any time prior to the closing of the financing, the Subscription Agreement may be terminated by any purchaser (with respect to itself only) by the mutual written consent of Miragen and such purchaser. The Subscription Agreement may also be terminated by any purchaser (with respect to itself only) if the closing of the financing or the Merger has not been consummated on or prior to 5:00 p.m., New York City time, on April 30, 2017, subject to certain exceptions. In addition, Miragen or any purchaser (with respect to itself only) may terminate the Subscription Agreement if the purchase and sale of the shares pursuant to the Subscription Agreement would violate any nonappealable order, degree or judgment of any governmental authority having competent jurisdiction.

Support Agreements

In connection with the execution of the Merger Agreement, Miragen s officers, directors and some stockholders of Miragen who collectively beneficially own or control approximately 78% of the voting power of Miragen s outstanding capital stock on an as-converted to common stock basis as of December 31, 2016 entered into support agreements with Signal under which such stockholders have agreed to vote in favor of the Merger and the Merger Agreement and against any competing transaction.

In connection with the execution of the Merger Agreement, Signal s officers, directors and some stockholders of Signal, who collectively beneficially own or control approximately 26% of Signal common stock as of December 31, 2016, also entered into support agreements with Miragen under which such stockholder has agreed to vote in favor of

the Signal Proposals and against any competing transaction.

Each stockholder executing a support agreement has made representations and warranties to Signal or Miragen, as applicable, regarding ownership and unencumbered title to the shares subject to such agreement, such stockholder s power and authority to execute the support agreement, due execution and enforceability of the support agreement, and ownership and unencumbered title to the shares. Unless otherwise waived, all of these support agreements prohibit the transfer, sale, assignment, gift or other disposition by the stockholder of their

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respective shares of Signal or Miragen capital stock, or the entrance into an agreement or commitment to do any of the foregoing, subject to specified exceptions. Each Miragen stockholder executing a support agreement has also waived its statutory appraisal rights in connection with the Merger.

The support agreements will terminate at the earlier of the effective time of the Merger or the termination of the Merger Agreement in accordance with its terms.

Lock-up Agreements

Miragen s officers, directors and certain other securityholders of Miragen also entered into lock-up agreements, pursuant to which such securityholders have agreed not to, except in limited circumstances, offer, pledge, sell, contract to sell, sell any option to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, or otherwise transfer or dispose of, any Miragen securities or shares of Signal common stock, including, as applicable, shares received in the Merger and issuable upon exercise of certain warrants and options, until 180 days after the closing date of the Merger.

The Miragen stockholders who have executed lock-up agreements as of December 31, 2016 owned, in the aggregate, approximately 98% of the shares of Miragen s outstanding capital stock on an as-converted to common stock basis.

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MATTERS BEING SUBMITTED TO A VOTE OF SIGNAL STOCKHOLDERS

Signal Proposal No. 1: Approval of the Issuance of Common Stock in the Merger

At the Signal special meeting, Signal stockholders will be asked to approve the issuance of Signal common stock pursuant to the Merger Agreement. Immediately following the Merger, it is expected that Miragen securityholders will own approximately 96% of the fully-diluted common stock of the combined company, with Signal securityholders owning approximately 4% of the fully-diluted common stock of the combined company, each assuming that Miragen closes its concurrent financing immediately prior to the effective time of the Merger. If the concurrent financing does not close, then Miragen securityholders would own approximately 94% of the fully-diluted common stock of the combined company and Signal securityholders would own approximately 6% of the fully-diluted common stock of the combined company. These estimates are based on the anticipated pre-split Exchange Ratio and post-split Exchange Ratios and are subject to adjustment.

The terms of, reasons for and other aspects of the Merger Agreement, the Merger and the issuance of Signal common stock pursuant to the Merger Agreement are described in detail in the sections titled *The Merger Agreement* and *The Merger*.

Required Vote

The affirmative vote of the holders of a majority of the shares of Signal common stock having voting power present in person or represented by proxy at the Signal special meeting is required to approve Signal Proposal No. 1. **Each of Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 9 are conditioned upon each other. Therefore, the Merger cannot be consummated without the approval of Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 9.**

Recommendation of Board of Directors

SIGNAL S BOARD OF DIRECTORS RECOMMENDS THAT THE SIGNAL STOCKHOLDERS VOTE FOR SIGNAL PROPOSAL NO. 1 TO APPROVE THE ISSUANCE OF SIGNAL COMMON STOCK PURSUANT TO THE MERGER AGREEMENT.

Signal Proposal No. 2: Approval of the Change of Control Resulting from the Merger

At the Signal special meeting, Signal stockholders will be asked to approve the change of control resulting from the Merger. Immediately following the Merger, it is expected that the Miragen securityholders will own approximately 96% of the fully-diluted common stock of the combined company, with Signal securityholders owning approximately 4% of the fully-diluted common stock of the combined company, each assuming that Miragen closes its concurrent financing immediately prior to the effective time of the Merger. If the concurrent financing does not close, then Miragen securityholders would own approximately 94% of the fully-diluted common stock of the combined company and Signal securityholders would own approximately 6% of the fully-diluted common stock of the combined company. These estimates are based on the anticipated pre-split Exchange Ratio and post-split Exchange Ratios and are subject to adjustment.

The terms of, reasons for and other aspects of the Merger Agreement, the Merger and the change of control resulting from the Merger are described in detail in the sections titled *The Merger Agreement* and *The Merger*.

Required Vote

The affirmative vote of the holders of a majority of the shares of Signal common stock having voting power present in person or represented by proxy at the Signal special meeting is required to approve Signal Proposal

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No. 2. **Each of Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 9 are conditioned upon each other. Therefore, the Merger cannot be consummated without the approval of Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 9.**

Recommendation of Board of Directors

SIGNAL S BOARD OF DIRECTORS RECOMMENDS THAT THE SIGNAL STOCKHOLDERS VOTE FOR SIGNAL PROPOSAL NO. 2 TO APPROVE THE CHANGE IN CONTROL RESULTING FROM THE MERGER.

Signal Proposal No. 3: Approval of the Conversion of the Note

At the Signal special meeting, Signal stockholders will be asked to approve the Note Amendment. Signal and Mr. LeBow entered into the Note Amendment in order to make the outstanding principal balance and accrued interest under the note convertible into shares of Signal common stock immediately prior to the effective time of the Merger. The conversion price is equal to the closing price of Signal s common stock on The NASDAQ Capital Market on October 31, 2016, the date that Signal and Mr. LeBow entered into the Note Amendment. By amending the Note to make it convertible into shares of Signal common stock, it eliminates the need for Signal to use its cash resources to pay the Note and allows Signal to better manage its cash resources to meet the closing net cash requirement contained in the Merger Agreement. Because the Note Amendment is a related party transaction, Signal is seeking stockholder approval and ratification of the conversion feature of the Note Amendment to comply with the listing rules of The NASDAQ Capital Market requiring stockholder approval of specified related party transactions.

Background of the Note

In connection with Signal s initial public offering in 2014, Mr. LeBow advanced $1,000,000 to Signal to pay for certain offering expenses. Following the offering, this amount, along with an additional $45,000, which was advanced to pay for certain additional offering expenses, was reclassified as amounts due to related party on Signal s consolidated balance sheet. This aggregate amount was non-interest bearing and due on demand.

On March 6, 2015, Signal s amounts due to a related party, an aggregate of $1,045,000, were converted into an unsecured note payable-related party bearing interest at 8% per annum and due on demand. The principal amount of the Note was also increased by $60,000 over the amounts due to related party to $1,105,009 to provide the equivalent of 8% per annum interest for the period of time the amounts due to related party were held as a payable in exchange for a provision that the related party would not call the Note prior to June 30, 2015. The increase in the principal amount of the Note was deferred and amortized to interest expense over the initial term of the Note to June 30, 2015. When issued, the terms of the original promissory note provided (i) for a principal amount of $1,105,009 which accrued interest computed on the basis of the actual number of days elapsed in a 360-day year, at a rate per annum of 8%, (ii) that at any time on or after June 30, 2015, Mr. LeBow may demand payment of the entire outstanding principal of the Note and all unpaid interest accrued thereon and (iii) that upon the occurrence and during the continuance of any event of default by Signal under the Note, the principal balance of the Note will accrue interest at a rate of 11%. The Note also contains customary representations and warranties of Signal, the breach of which would be among an event of default therein.

Interest expense related to this note during the three months and nine months ended September 30, 2016 was $22,000 and $66,000, respectively. The Note balance at September 30, 2016 was $1,105,009. Accrued interest payable of $139,000 is included in accrued liabilities in the balance sheet at September 30, 2016. No interest has been paid and as of the date of this proxy statement/prospectus/information statement, the Note has not been called.

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Note Amendment

On October 31, 2016, prior to the execution of the Merger Agreement, Signal and Mr. LeBow entered into the Note Amendment. The Note Amendment (i) makes the outstanding principal balance and all accrued interest on the note, plus a premium of 11% on the outstanding balance, automatically convertible into shares of Signal s common stock immediately prior to the effective time of the Merger at a conversion price of $5.39 per share, which is the closing price of Signal s common stock on The NASDAQ Capital Market on the effective date of the Note Amendment and (ii) modifies the principal amount of the original note to $1,045,000, the original amount advanced to Signal as of June 17, 2014, and the interest of the original note to a rate per annum of 11% commencing on June 17, 2014, with interest computed on the basis of the actual number of days in a 360-day year.

The conversion price is subject to appropriate adjustment in the event of any reverse stock split, forward stock split, stock dividend, combination or other similar recapitalization with respect to Signal s common stock. Conversion of the Note is subject to and conditioned upon Signal obtaining stockholder approval of any such conversion.

If conversion of the Note is not approved by Signal stockholders at the special meeting, or if the Merger Agreement is terminated prior to completion of the Merger, the outstanding balance due under the note will not be converted into Signal common stock and the note will remain outstanding. Moreover, because conversion of the outstanding balance of the note into shares of Signal common stock is a closing condition of the Merger Agreement, success of the Merger is also dependent upon stockholder approval of conversion of the Note.

Signal s board of directors, including the members of the board s audit committee who review and consider all related party transactions, determined that the Note Amendment was in Signal s best interest and approved the terms thereof. See the section titled *Principal Stockholders of Signal* in this proxy statement/prospectus/information statement for more information regarding the Signal common stock beneficially owned by Mr. LeBow.

Required Vote

The affirmative vote of the holders of a majority of the shares of Signal common stock having voting power present in person or represented by proxy at the Signal special meeting is required to approve Signal Proposal No. 3. **Each of Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 9 are conditioned upon each other. Therefore, the Merger cannot be consummated without the approval of Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 9.**

Recommendation of Board of Directors

SIGNAL S BOARD OF DIRECTORS RECOMMENDS THAT THE SIGNAL STOCKHOLDERS VOTE FOR SIGNAL PROPOSAL NO. 3 TO APPROVE THE CONVERSION OF THE NOTE INTO SHARES OF SIGNAL COMMON STOCK.

Signal Proposal No. 4: Approval of the Signal 2016 Equity Incentive Plan

The board of directors of Signal has approved the adoption of the Signal 2016 Equity Incentive Plan, or the 2016 Plan, subject to approval by Signal stockholders. In this Signal Proposal No. 4, Signal s board of directors is requesting stockholder approval of the 2016 Plan.

Approval of the 2016 Plan by Signal stockholders is required, among other things, in order to: (i) comply with NASDAQ rules requiring stockholder approval of equity compensation plans; (ii) allow the grant of incentive stock options to participants in the 2016 Plan and (iii) give the compensation committee of the combined company the

ability to grant awards intended to qualify as performance-based compensation, thereby potentially preserving combined company s tax deduction under Code Section 162(m).

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The discussion that follows is qualified in all respects to the terms of the 2016 Plan. A copy of the 2016 Plan is attached as *Annex B* to this proxy statement/prospectus/information statement. Signal stockholders should refer to the 2016 Plan for more complete and detailed information about the terms and conditions of the 2016 Plan.

If this Signal Proposal No. 4 is approved by Signal stockholders, the 2016 Plan will become effective as of the date of the closing of the Merger, and no further grants will be made under Signal s 2014 Stock Incentive Plan, or the 2014 Plan, or the Miragen Therapeutics, Inc. 2008 Equity Incentive Plan, or the Miragen 2008 Plan. In the event that Signal stockholders do not approve this proposal, the 2016 Plan will not become effective and the 2014 Plan and the Miragen 2008 Plan will continue to be effective in accordance with their terms and the combined company may continue to make awards under such plans, subject to the limits thereunder. Approval of the 2016 Plan by Signal stockholders will allow the combined company to grant stock options, restricted stock unit awards and other awards at levels determined appropriate by its board of directors or compensation committee following the closing of the Merger. The 2016 Plan will also allow the combined company to utilize a broad array of equity incentives and performance cash incentives in order to secure and retain the services of its employees, directors and consultants, and to provide long-term incentives that align the interests of its employees, directors and consultants with the interests of its stockholders following the closing of the Merger.

The combined company s employee equity compensation program, as implemented under the 2016 Plan, will allow the combined company to remain competitive with comparable companies in its industry by giving it the resources to attract and retain talented individuals to continue to achieve its business objectives and build stockholder value. Approval of the 2016 Plan will provide the combined company with the flexibility it needs to use equity compensation and other incentive awards to attract, retain and motivate talented employees, directors and independent contractors who are important to the combined company s long-term growth and success.

Best Practices Integrated into Signal s Equity Compensation Program and the 2016 Plan

The 2016 Plan includes provisions that are designed to protect the interests of the stockholders of the combined company and to reflect corporate governance best practices including:

No single trigger accelerated vesting upon change in control. The 2016 Plan does not provide for automatic vesting of awards upon a change in control.

Awards subject to forfeiture/clawback. Awards granted under the 2016 Plan will be subject to recoupment in accordance with any clawback policy that the combined company is required to adopt pursuant to the listing standards of any national securities exchange or association on which its securities are listed or as is otherwise required by the Dodd-Frank Wall Street Reform and Consumer Protection Act or other applicable law. In addition, the combined company may impose other clawback, recovery or recoupment provisions in an award agreement, including a reacquisition right in respect of previously acquired shares or other cash or property upon the occurrence of cause.

Repricing is not allowed. The 2016 Plan prohibits the repricing of outstanding stock options and stock appreciation rights and the cancellation of any outstanding stock options or stock appreciation rights that have an exercise or strike price greater than the then-current fair market value of a share of common stock in exchange for cash or other stock awards under the 2016 Plan without prior stockholder approval.

No liberal change in control definition. The change in control definition in the 2016 Plan is not a liberal definition. A change in control transaction must actually occur in order for the change in control provisions in the 2016 Plan to be triggered.

No discounted stock options or stock appreciation rights. All stock options and stock appreciation rights granted under the 2016 Plan must have an exercise or strike price equal to or greater than the fair market value of a share of common stock on the date the stock option or stock appreciation right is granted.

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Administration by independent committee. The 2016 Plan will be administered by the members of the combined company s compensation committee, all of whom are non-employee directors within the meaning of Rule 16b-3 under the Exchange Act and independent within the meaning of the listing standards of The NASDAQ Capital Market. In addition, all of the members of the combined company s compensation committee, which has been delegated certain authorities with respect to awards that are intended to qualify as performance-based compensation under Section 162(m) of the Code, are outside directors within the meaning of Section 162(m) of the Code.

Material amendments require stockholder approval. Consistent with the rules and regulations of The NASDAQ Stock Market LLC, the 2016 Plan requires stockholder approval of any material revisions to the 2016 Plan. In addition, certain other amendments to the 2016 Plan require stockholder approval.

Limit on non-employee director awards and other awards. Except in extraordinary circumstances, the maximum number of shares subject to stock awards granted under the 2016 Plan or otherwise during any calendar year to any of Signal s non-employee directors, taken together with any cash fees paid by the combined company to such non-employee director during such calendar year for service on the combined company s board of directors, may not exceed $500,000 in total value (calculating the value of any such stock awards based on the grant date fair value of such stock awards for financial reporting purposes), or with respect to the calendar year in which a non-employee director is first appointed or elected to the board, $1,000,000. The 2016 Plan also contains other annual per-participant limits on stock options, stock appreciation rights and performance-based stock and cash awards.

Information Regarding Equity Incentive Program

As discussed above, all outstanding stock options and restricted stock units held by Signal employees, directors and consultants, will be cancelled and terminated at the effective time of the Merger. In addition, all outstanding options with respect to shares of Miragen common stock will be assumed by Signal at the effective time of the Merger. As employees, directors and consultants of Miragen will continue in service with the combined company following the closing date of the Merger, Signal s board of directors believes that information regarding Miragen s equity grant practices may be most beneficial to Signal stockholders in connection with considering whether to approve the 2016 Plan.

It is critical to the combined company s long-term success that the interests of its employees, directors and consultants are tied to its success as owners of the business. Approval of the 2016 Plan will allow the combined company to continue to grant stock options and other equity awards at levels it determines to be appropriate in order to attract new employees and directors, retain existing employees and directors and to provide incentives for such persons to exert maximum efforts for the combined company s success and ultimately increase stockholder value. The 2016 Plan allows the combined company to continue to utilize a broad array of equity incentives with flexibility in designing equity incentives, including traditional stock option grants, stock appreciation rights, restricted stock awards, restricted stock unit awards, other stock awards and performance stock awards to offer competitive equity compensation packages in order to retain and motivate the talent necessary

If Signal s request to approve the 2016 Plan is approved by Signal stockholders, the combined company will have approximately 1,681,294 shares, subject to adjustment for specified changes in the combined company s capitalization and for the reverse stock split available for grant under the 2016 Plan as of the effective time of the closing of the Merger. In addition, as further described below under the section titled *Description of the 2016 Equity Incentive*

Plan Shares Available for Awards, up to an additional 2,501,110 shares, subject to adjustment for specified changes in the combined company s capitalization and for the reverse stock split, of the combined company s common stock that are subject to previously granted and outstanding awards under the Miragen 2008 Plan may become available for issuance under the 2016 Plan following the closing date if those awards are forfeited or the shares are not issued pursuant to the awards, and the share reserve is subject to annual increases each January 1 of up to 4% of shares of the combined company s common stock outstanding (or a lesser number

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determined by the combined company s board of directors). This pool size is necessary to provide sufficient reserved shares for a level of grants that will attract, retain, and motivate employees and other participants.

Performance-Based Awards

Approval of the 2016 Plan by Signal stockholders will also constitute approval of terms and conditions set forth therein that will permit the combined company to grant stock options, stock appreciation rights and performance-based stock and cash awards under the 2016 Plan that may qualify as performance-based compensation within the meaning of Section 162(m) of the Code. Section 162(m) of the Code disallows a deduction to any publicly held corporation and its affiliates for certain compensation paid to covered employees in a taxable year to the extent that compensation to a covered employee exceeds $1 million. However, some kinds of compensation, including qualified performance-based compensation, are not subject to this deduction limitation. For compensation awarded under a plan to qualify as performance-based compensation under Section 162(m) of the Code, among other things, the following terms must be disclosed to and approved by the stockholders before the compensation is paid: (i) a description of the employees eligible to receive such awards; (ii) a per-person limit on the number of shares subject to stock options, stock appreciation rights and performance-based stock awards, and the amount of cash subject to performance-based cash awards, that may be granted to any employee under the plan in any year; and (iii) a description of the business criteria upon which the performance goals for performance-based awards may be granted (or become vested or exercisable). Accordingly, Signal is requesting that Signal stockholders approve the 2016 Plan, which includes terms and conditions regarding eligibility for awards, annual per-person limits on awards and the business criteria for performance-based awards granted under the 2016 Plan (as described in the summary below).

Signal believes it is in the best interests of Signal stockholders to preserve the ability to grant performance-based compensation under Section 162(m) of the Code. However, in certain circumstances, the combined company may determine to grant compensation to covered employees that is not intended to qualify as performance-based compensation for purposes of Section 162(m) of the Code. Moreover, even if the combined company grants compensation that is intended to qualify as performance-based compensation for purposes of Section 162(m) of the Code, neither Signal nor the combined company can guarantee that such compensation ultimately will be deductible by Signal or the combined company.

Description of the 2016 Equity Incentive Plan

The material features of the 2016 Plan are described below. The following description of the 2016 Plan is a summary only and is qualified in its entirety by reference to the complete text of the 2016 Plan. Stockholders are urged to read the actual text of the 2016 Plan in its entirety.

Purpose

The 2016 Plan is designed to secure and retain the services of the combined company s employees, directors and consultants, provide incentives for Signal employees, directors and consultants to exert maximum efforts for the success of the combined company and its affiliates, and provide a means by which the combined company s employees, directors and consultants may be given an opportunity to benefit from increases in the value of its common stock. If the 2016 Plan is approved by Signal stockholders, no additional awards will be granted under the 2014 Plan or the Miragen 2008 Plan following the effective date of the 2016 Plan.

Types of Awards

The terms of the 2016 Plan provide for the grant of incentive stock options, nonstatutory stock options, stock appreciation rights, restricted stock awards, restricted stock unit awards, other stock awards, and performance awards that may be settled in cash, stock, or other property.

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Shares Available for Awards

Subject to adjustment for specified changes in the combined company s capitalization and for the reverse stock split, the aggregate number of shares of Signal common stock that may be issued under the 2016 Plan, or the Share Reserve, will not exceed 4,182,404 shares, which number is the sum of (i) 1,681,294 shares, plus (ii) the number of shares subject to outstanding stock awards that were granted under the Miragen 2008 Plan that, from and after the closing date of the Merger, expire or terminate for any reason prior to exercise or settlement, are forfeited because of the failure to meet a contingency or condition required to vest such shares, or are reacquired, withheld or not issued to satisfy a tax withholding obligation in connection with an award or to satisfy the purchase price or exercise price of a stock award, if any, as such shares become available from time to time. In addition, the share reserve will automatically increase on January 1st of each year, for a period of not more than ten years, commencing on January 1st of the year following the year in which the effective date of the 2016 Plan occurs, and ending on (and including) January 1, 2026, in an amount equal to 4% of the shares of common stock outstanding on December 31st of the preceding calendar year; however the board of directors or compensation committee may act prior to January 1st of a given year to provide that there will be no January 1st increase in the share reserve for such year or that the increase in the share reserve for such year will be a lesser number of shares of common stock than would otherwise occur pursuant to the automatic increase.

The following shares of common stock will become available again for issuance under the 2016 Plan: (i) any shares subject to a stock award that are not issued because such stock award expires or otherwise terminates without all of the shares covered by such stock award having been issued; (ii) any shares subject to a stock award that are not issued because such stock award is settled in cash; (iii) any shares issued pursuant to a stock award that are forfeited back to or repurchased by Signal because of the failure to meet a contingency or condition required for the vesting of such shares; and (iv) any shares reacquired by the combined company in satisfaction of tax withholding obligations on a stock award or as consideration for the exercise or purchase price of a stock award.

Eligibility

All of the combined company s (including its affiliates) approximately 45 employees and six non-employee directors as of December 31, 2016 will be eligible to participate in the 2016 Plan following the closing of the Merger and may receive all types of awards other than incentive stock options. Incentive stock options may be granted under the 2016 Plan only to the combined company s employees (including officers) and employees of its affiliates.

Section 162(m) Limits

Under the 2016 Plan, subject to adjustment for specified changes in the combined company s capitalization and for the reverse stock split, no participant will be eligible to be granted performance-based compensation during any calendar year more than: (i) a maximum of 1,500,000 shares of common stock subject to stock options and stock appreciation rights whose value is determined by reference to an increase over an exercise or strike price of at least 100% of the fair market value of a share of common stock on the date of grant; (ii) a maximum of 1,500,000 shares of common stock subject to performance stock awards; and (iii) a maximum of $3,000,000 subject to performance cash awards. These limits are designed to allow the combined company to grant awards that are intended to be exempt from the $1 million limitation on the income tax deductibility of compensation paid per covered employee imposed by Section 162(m) of the Code, and will not apply to awards that the combined company s board of directors determines will not be treated as performance-based compensation.

Non-Employee Director Compensation Limit

Under the 2016 Plan, the maximum number of shares of Signal common stock subject to stock awards granted under the 2016 Plan or otherwise during any one calendar year to any non-employee director, taken together with

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any cash fees paid by the combined company to such non-employee director during such calendar year for services on its board of directors, will not exceed $500,000 in total value (calculating the value of any such stock awards based on the grant date fair value of such stock awards for financial reporting purposes), or, with respect to the calendar year in which a non-employee director is first appointed or elected to the combined company s board of directors, $1,000,000.

Administration

The 2016 Plan will be administered by the combined company s board of directors, which may in turn delegate authority to administer the 2016 Plan to a committee. The combined company s board of directors will delegate concurrent authority to administer the 2016 Plan to its compensation committee, but may, at any time, revest in itself some or all of the power delegated to its compensation committee. The combined company s board of directors and its compensation committee are each considered to be a Plan Administrator for purposes of this Signal Proposal No. 4. Subject to the terms of the 2016 Plan, the Plan Administrator may determine the recipients, the types of awards to be granted, the number of shares of common stock subject to or the cash value of awards, and the terms and conditions of awards granted under the 2016 Plan, including the period of their exercisability and vesting. The Plan Administrator also has the authority to provide for accelerated exercisability and vesting of awards. Subject to the limitations set forth below, the Plan Administrator also determines the fair market value applicable to a stock award and the exercise or strike price of stock options and stock appreciation rights granted under the 2016 Plan.

The Plan Administrator may also delegate to one or more officers the authority to designate employees who are not officers to be recipients of certain stock awards and the number of shares of common stock subject to such stock awards. Under any such delegation, the Plan Administrator will specify the total number of shares of common stock that may be subject to the stock awards granted by such officer. The officer may not grant a stock award to himself or herself.

Repricing; Cancellation and Re-Grant of Stock Awards

Under the 2016 Plan, the Plan Administrator does not have the authority to reprice any outstanding stock option or stock appreciation right by reducing the exercise or strike price of the stock option or stock appreciation right or to cancel any outstanding stock option or stock appreciation right that has an exercise or strike price greater than the then-current fair market value of a share of common stock in exchange for cash or other stock awards without obtaining the approval of the combined company s stockholders. Such approval must be obtained within 12 months prior to such an event.

Stock Options

Stock options may be granted under the 2016 Plan pursuant to stock option agreements. The 2016 Plan permits the grant of stock options that are intended to qualify as incentive stock options, or ISOs, and nonstatutory stock options, or NSOs.

The exercise price of a stock option granted under the 2016 Plan may not be less than 100% of the fair market value of the common stock subject to the stock option on the date of grant and, in some cases (see *Limitations on Incentive Stock Options* below), may not be less than 110% of such fair market value.

The term of stock options granted under the 2016 Plan may not exceed ten years and, in some cases (see *Limitations on Incentive Stock Options* below), may not exceed five years. Except as otherwise provided in a participant s stock option agreement or other written agreement with the combined company or one of its affiliates, if a participant s service relationship with combined company or any of its affiliates, referred to in this Signal Proposal No. 4 as

continuous service, terminates (other than for cause and other than upon the participant s death or disability), the participant may exercise any vested stock options for up to three months

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following the participant s termination of continuous service. Except as otherwise provided in a participant s stock option agreement or other written agreement with the combined company or one of its affiliates, if a participant s continuous service terminates due to the participant s disability or death (or the participant dies within a specified period, if any, following termination of continuous service), the participant, or his or her beneficiary, as applicable, may exercise any vested stock options for up to 12 months following the participant s termination due to the participant s disability or for up to 18 months following the participant s death. Except as explicitly provided otherwise in a participant s stock option agreement or other written agreement with the combined company or one of its affiliates, if a participant s continuous service is terminated for cause (as defined in the 2016 Plan), all stock options held by the participant will terminate upon the participant s termination of continuous service and the participant will be prohibited from exercising any stock option from and after such termination date. Except as otherwise provided in a participant s stock option agreement or other written agreement with the combined company or one of its affiliates, the term of a stock option may be extended if the exercise of the stock option following the participant s termination of continuous service (other than for cause and other than upon the participant s death or disability) would be prohibited by applicable securities laws or if the sale of any common stock received upon exercise of the stock option following the participant s termination of continuous service (other than for cause) would violate Signal s insider trading policy. In no event, however, may a stock option be exercised after its original expiration date.

Acceptable forms of consideration for the purchase of common stock pursuant to the exercise of a stock option under the 2016 Plan will be determined by the Plan Administrator and may include payment: (i) by cash, check, bank draft or money order payable to the combined company; (ii) pursuant to a program developed under Regulation T as promulgated by the Federal Reserve Board; (iii) by delivery to the combined company of shares of common stock (either by actual delivery or attestation); (iv) by a net exercise arrangement (for NSOs only); or (v) in other legal consideration approved by the Plan Administrator.

Stock options granted under the 2016 Plan may become exercisable in cumulative increments, or vest, as determined by the Plan Administrator at the rate specified in the stock option agreement. Shares covered by different stock options granted under the 2016 Plan may be subject to different vesting schedules as the Plan Administrator may determine.

The Plan Administrator may impose limitations on the transferability of stock options granted under the 2016 Plan in its discretion. Generally, a participant may not transfer a stock option granted under the 2016 Plan other than by will or the laws of descent and distribution or, subject to approval by the Plan Administrator, pursuant to a domestic relations order or an official marital settlement agreement. However, the Plan Administrator may permit transfer of a stock option in a manner that is not prohibited by applicable tax and securities laws. In addition, subject to approval by the Plan Administrator, a participant may designate a beneficiary who may exercise the stock option following the participant s death.

Limitations on Incentive Stock Options

The aggregate fair market value, determined at the time of grant, of shares of common stock with respect to ISOs that are exercisable for the first time by a participant during any calendar year under all of the combined company s stock plans may not exceed $100,000. The stock options or portions of stock options that exceed this limit or otherwise fail to qualify as ISOs are treated as NSOs. No ISO may be granted to any person who, at the time of grant, owns or is deemed to own stock possessing more than 10% of Signal s total combined voting power or that of any affiliate unless the following conditions are satisfied:

the exercise price of the ISO must be at least 110% of the fair market value of the common stock subject to the ISO on the date of grant; and

the term of the ISO must not exceed five years from the date of grant.

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Subject to adjustment for specified changes in capitalization and for the reverse stock split, the aggregate maximum number of shares of common stock that may be issued pursuant to the exercise of ISOs under the 2016 Plan is 20,912,020 shares.

Stock Appreciation Rights

Stock appreciation rights may be granted under the 2016 Plan pursuant to stock appreciation right agreements. Each stock appreciation right is denominated in common stock share equivalents. The strike price of each stock appreciation right will be determined by the Plan Administrator, but will in no event be less than 100% of the fair market value of the common stock subject to the stock appreciation right on the date of grant. The Plan Administrator may also impose restrictions or conditions upon the vesting of stock appreciation rights that it deems appropriate. The appreciation distribution payable upon exercise of a stock appreciation right may be paid in shares of Signal common stock, in cash, in a combination of cash and stock, or in any other form of consideration determined by the Plan Administrator and set forth in the stock appreciation right agreement. Stock appreciation rights will be subject to the same conditions upon termination of continuous service and restrictions on transfer as stock options under the 2016 Plan.

Restricted Stock Awards

Restricted stock awards may be granted under the 2016 Plan pursuant to restricted stock award agreements. A restricted stock award may be granted in consideration for cash, check, bank draft or money order payable to the combined company, the participant s services performed for the combined company or any of its affiliates, or any other form of legal consideration acceptable to the Plan Administrator. Shares of common stock acquired under a restricted stock award may be subject to forfeiture to or repurchase by the combined company in accordance with a vesting schedule to be determined by the Plan Administrator. Rights to acquire shares of common stock under a restricted stock award may be transferred only upon such terms and conditions as are set forth in the restricted stock award agreement. A restricted stock award agreement may provide that any dividends paid on restricted stock will be subject to the same vesting conditions as apply to the shares subject to the restricted stock award. Upon a participant s termination of continuous service for any reason, any shares subject to restricted stock awards held by the participant that have not vested as of such termination date may be forfeited to or repurchased by the combined company.

Restricted Stock Unit Awards

Restricted stock unit awards may be granted under the 2016 Plan pursuant to restricted stock unit award agreements. Payment of any purchase price may be made in any form of legal consideration acceptable to the Plan Administrator. A restricted stock unit award may be settled by the delivery of shares of Signal common stock, in cash, in a combination of cash and stock, or in any other form of consideration determined by the Plan Administrator and set forth in the restricted stock unit award agreement. Restricted stock unit awards may be subject to vesting in accordance with a vesting schedule to be determined by the Plan Administrator. Dividend equivalents may be credited in respect of shares of common stock covered by a restricted stock unit award, provided that any additional shares credited by reason of such dividend equivalents will be subject to all of the same terms and conditions of the underlying restricted stock unit award. Except as otherwise provided in a participant s restricted stock unit award agreement or other written agreement with the combined company or one of its affiliates, restricted stock units that have not vested will be forfeited upon the participant s termination of continuous service for any reason.

Performance Awards

The 2016 Plan allows the combined company to grant performance stock and cash awards, including such awards that may qualify as performance-based compensation that is not subject to the $1 million limitation on the income tax deductibility of compensation paid per covered employee imposed by Section 162(m) of the Code.

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A performance stock award is a stock award that is payable (including that may be granted, may vest, or may be exercised) contingent upon the attainment of pre-determined performance goals during a performance period. A performance stock award may require the completion of a specified period of continuous service. The length of any performance period, the performance goals to be achieved during the performance period, and the measure of whether and to what degree such performance goals have been attained will be determined by the compensation committee of the combined company s board of directors, except that the Plan Administrator also may make any such determinations to the extent that the award is not intended to qualify as performance-based compensation under Section 162(m) of the Code. In addition, to the extent permitted by applicable law and the performance stock award agreement, the Plan Administrator may determine that cash may be used in payment of performance stock awards.

A performance cash award is a cash award that is payable contingent upon the attainment of pre-determined performance goals during a performance period. A performance cash award may require the completion of a specified period of continuous service. The length of any performance period, the performance goals to be achieved during the performance period, and the measure of whether and to what degree such performance goals have been attained will be determined by the compensation committee of the combined company s board of directors, except that the Plan Administrator also may make any such determinations to the extent that the award is not intended to qualify as performance-based compensation under Section 162(m) of the Code. The Plan Administrator may specify the form of payment of performance cash awards, which may be cash or other property, or may provide for a participant to have the option for his or her performance cash award to be paid in cash or other property.

In granting a performance stock or cash award intended to qualify as performance-based compensation under Section 162(m) of the Code, the compensation committee of the combined company s board of directors will set a period of time, or a performance period, over which the attainment of one or more goals, or performance goals, will be measured. Within the time period prescribed by Section 162(m) of the Code (no later than the earlier of the 90th day of a performance period and the date on which 25% of the performance period has elapsed, and in any event at a time when the achievement of the performance goals remains substantially uncertain), the compensation committee of the combined company s board of directors will establish the performance goals, based upon one or more criteria, or performance criteria, enumerated in the 2016 Plan and described below. As soon as administratively practicable following the end of the performance period, the compensation committee of the combined company s board of directors will certify in writing whether the performance goals have been satisfied.

Performance goals under the 2016 Plan will be based on any one or more of the following performance criteria: (i) earnings (including earnings per share and net earnings); (ii) earnings before interest, taxes and depreciation; (iii) earnings before interest, taxes, depreciation and amortization; (iv) earnings before interest, taxes, depreciation, amortization and legal settlements; (v) earnings before interest, taxes, depreciation, amortization, legal settlements and other income (expense); (vi) earnings before interest, taxes, depreciation, amortization, legal settlements, other income (expense) and stock-based compensation; (vii) earnings before interest, taxes, depreciation, amortization, legal settlements, other income (expense), stock-based compensation and changes in deferred revenue; (viii) earnings before interest, taxes, depreciation, amortization, legal settlements, other income (expense), stock-based compensation, other non-cash expenses and changes in deferred revenue; (ix) total stockholder return; (x) return on equity or average stockholder s equity; (xi) return on assets, investment, or capital employed; (xii) stock price; (xiii) margin (including gross margin); (xiv) income (before or after taxes); (xv) operating income; (xvi) operating income after taxes; (xvii) pre-tax profit; (xviii) operating cash flow; (xix) sales or revenue targets; (xx) increases in revenue or product revenue; (xxi) expenses and cost reduction goals; (xxii) improvement in or attainment of working capital levels; (xxiii) economic value added (or an equivalent metric); (xxiv) market share; (xxv) cash flow; (xxvi) cash flow per share; (xxvii) cash balance; (xxviii) cash burn; (xxix) cash collections; (xxx) share price performance; (xxxi) debt reduction; (xxxii) implementation or completion of projects or processes (including, without limitation, clinical trial initiation, clinical trial enrollment and dates, clinical trial results, regulatory filing submissions, regulatory filing

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acceptances, regulatory or advisory committee interactions, regulatory approvals, new and supplemental indications for existing products, and product supply); (xxxiii) stockholders equity; (xxxiv) capital expenditures; (xxxv) debt levels; (xxxvi) operating profit or net operating profit; (xxxvii) workforce diversity; (xxxviii) growth of net income or operating income; (xxxix) billings; (xl) bookings; (xli) employee retention; (xlii) initiation of phases of clinical trials and/or studies by specific dates; (xliii) acquisition of new customers, including institutional accounts; (xliv) customer retention and/or repeat order rate; (xlv) number of institutional customer accounts (xlvi) budget management; (xlvii) improvements in sample and test processing times; (xlviii) regulatory milestones; (xlix) progress of internal research or clinical programs; (l) progress of partnered programs; (li) partner satisfaction; (lii) milestones related to samples received and/or tests run; (liii) expansion of sales in additional geographies or markets; (liv) research progress, including the development of programs; (lv) submission to, or approval by, a regulatory body (including, but not limited to the U.S. Food and Drug Administration) of an applicable filing or a product; (lvi) timely completion of clinical trials; (lvii) milestones related to samples received and/or tests or panels run; (lviii) expansion of sales in additional geographies or markets; (lix) research progress, including the development of programs; (lx) patient samples processed and billed; (lxi) sample processing operating metrics (including, without limitation, failure rate maximums and reduction of repeat rates); (lxii) strategic partnerships or transactions (including in-licensing and out-licensing of intellectual property); (lxiii) pre-clinical development related to compound goals; (lxiv) customer satisfaction; and (lxv) and to the extent that an award is not intended to comply with Section 162(m) of the Code, other measures of performance selected by the board of directors of the combined company.

Performance goals may be based on a company-wide basis, with respect to one or more business units, divisions, affiliates or business segments, and in either absolute terms or relative to the performance of one or more comparable companies or the performance of one or more relevant indices. The compensation committee of the combined company s board of directors (or, to the extent that an award is not intended to qualify as performance-based compensation under Section 162(m) of the Code, the Plan Administrator) is authorized to make appropriate adjustments in the method of calculating the attainment of performance goals for a performance period as follows; *provided, however*, that to the extent that an award is intended to qualify as performance-based compensation under Section 162(m) of the Code, any such adjustment may be made only if such adjustment is objectively determinable and specified in the award agreement at the time the award is granted or in such other document setting forth the performance goals for the award at the time the performance goals are established: (i) to exclude restructuring and/or other nonrecurring charges; (ii) to exclude exchange rate effects; (iii) to exclude the effects of changes to U.S. GAAP; (iv) to exclude the effects of any statutory adjustments to corporate tax rates; (v) to exclude the effects of items that are unusual in nature or occur infrequently as determined under U.S. GAAP; (vi) to exclude the dilutive effects of acquisitions or joint ventures; (vii) to assume that any business divested by the combined company achieved performance objectives at targeted levels during the balance of a performance period following such divestiture; (viii) to exclude the effect of any change in the outstanding shares of common stock of the combined company by reason of any stock dividend or split, stock repurchase, reorganization, recapitalization, merger, consolidation, spin-off, combination or exchange of shares or other similar corporate change, or any distributions to common stockholders other than regular cash dividends; (ix) to exclude the effects of stock based compensation and the award of bonuses under the combined company s bonus plans; (x) to exclude costs incurred in connection with potential acquisitions or divestitures that are required to be expensed under U.S. GAAP; and (xi) to exclude the goodwill and intangible asset impairment charges that are required to be recorded under U.S. GAAP.

In addition, the compensation committee of the combined company s board of directors (or, to the extent that an award is not intended to qualify as performance-based compensation under Section 162(m) of the Code, the Plan Administrator) retains the discretion to reduce or eliminate the compensation or economic benefit due upon the attainment of any performance goals and to define the manner of calculating the performance criteria it selects to use for a performance period.

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Other Stock Awards

Other forms of stock awards valued in whole or in part by reference to, or otherwise based on, common stock may be granted either alone or in addition to other stock awards under the 2016 Plan. The Plan Administrator will have sole and complete authority to determine the persons to whom and the time or times at which such other stock awards will be granted, the number of shares of common stock to be granted and all other terms and conditions of such other stock awards.

Clawback Policy

Awards granted under the 2016 Plan will be subject to recoupment in accordance with any clawback policy that the combined company is required to adopt pursuant to the listing standards of any national securities exchange or association on which Signal s securities are listed or as is otherwise required by the Dodd-Frank Wall Street Reform and Consumer Protection Act or other applicable law. In addition, the Plan Administrator may impose other clawback, recovery or recoupment provisions in an award agreement as the Plan Administrator determines necessary or appropriate, including a reacquisition right in respect of previously acquired shares of common stock or other cash or property upon the occurrence of cause.

Changes to Capital Structure

In the event of certain capitalization adjustments, the Plan Administrator will appropriately adjust: (i) the class(es) and maximum number of securities subject to the 2016 Plan and by which the share reserve may increase automatically each year; (ii) the class(es) and maximum number of securities that may be issued pursuant to the exercise of ISOs; (iii) the class(es) and maximum number of securities that may be awarded to any participant pursuant to Section 162(m) limits; (iv) the class and maximum number of shares that may be awarded to any non-employee director; and (v) the class(es) and number of securities and price per share of stock subject to outstanding stock awards.

Corporate Transaction

In the event of a corporate transaction (as defined in the 2016 Plan and described below), the Plan Administrator may take one or more of the following actions with respect to stock awards, contingent upon the closing or consummation of the corporate transaction, unless otherwise provided in the instrument evidencing the stock award, in any other written agreement between the combined company or one of its affiliates and the participant or in Signal s director compensation policy, or unless otherwise provided by the Plan Administrator at the time of grant of the stock award:

arrange for the surviving or acquiring corporation (or its parent company) to assume or continue the stock award or to substitute a similar stock award for the stock award (including an award to acquire the same consideration paid to the combined company s stockholders pursuant to the corporate transaction);

arrange for the assignment of any reacquisition or repurchase rights held by the combined company in respect of common stock issued pursuant to the stock award to the surviving or acquiring corporation (or its parent company);

accelerate the vesting (and, if applicable, the exercisability) of the stock award to a date prior to the effective time of the corporate transaction as determined by the Plan Administrator (or, if the Plan Administrator does not determine such a date, to the date that is five days prior to the effective date of the corporate transaction), with the stock award terminating if not exercised (if applicable) at or prior to the effective time of the corporate transaction; *provided, however*, that the Plan Administrator may require participants to complete and deliver to Signal a notice of exercise before the effective date of a corporate transaction, which is contingent upon the effectiveness of the corporate transaction;

arrange for the lapse of any reacquisition or repurchase rights held by the combined company with respect to the stock award;

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cancel or arrange for the cancellation of the stock award, to the extent not vested or not exercised prior to the effective time of the corporate transaction, and pay such cash consideration (including no consideration) as the Plan Administrator may consider appropriate; and

cancel or arrange for the cancellation of the stock award, to the extent not vested or not exercised prior to the effective time of the corporate transaction, in exchange for a payment, in such form as may be determined by the combined company s board of directors equal to the excess, if any, of (i) the per share amount payable to holders of common stock in connection with the corporate transaction, over (ii) the per share exercise price under the applicable award. For clarity, this payment may be zero if the value of the property is equal to or less than the exercise price. In addition, any escrow, holdback, earnout or similar provisions in the definitive agreement for the corporate transaction may apply to such payment to the same extent and in the same manner as such provisions apply to the holders of common stock.

The Plan Administrator is not required to take the same action with respect to all stock awards or portions of stock awards or with respect to all participants. The Plan Administrator may take different actions with respect to the vested and unvested portions of a stock award.

In the event of a corporate transaction, unless otherwise provided in the instrument evidencing a performance cash award or any other written agreement between the combined company or one of its affiliates and the participant, or unless otherwise provided by the Plan Administrator, all performance cash awards will terminate prior to the effective time of the corporate transaction.

For purposes of the 2016 Plan, a corporate transaction generally will be deemed to occur in the event of the consummation of: (i) a sale or other disposition of all or substantially all of the combined company s consolidated assets; (ii) a sale or other disposition of more than 50% of Signal s outstanding securities; (iii) a merger, consolidation or similar transaction following which the combined company is not the surviving corporation; or (iv) a merger, consolidation or similar transaction following which the combined company is the surviving corporation but the shares of common stock outstanding immediately prior to the transaction are converted or exchanged into other property by virtue of the transaction.

Change in Control

Under the 2016 Plan, a stock award may be subject to additional acceleration of vesting and exercisability upon or after a change in control (as defined in the 2016 Plan and described below) as may be provided in the participant s stock award agreement, in any other written agreement with the combined company or one of its affiliates or in any director compensation policy, but in the absence of such provision, no such acceleration will occur.

For purposes of the 2016 Plan, a change in control generally will be deemed to occur in the event: (i) a person, entity or group acquires, directly or indirectly, Signal s securities representing more than 50% of the combined voting power of the combined company s then outstanding securities, other than by virtue of a merger, consolidation, or similar transaction; (ii) there is consummated a merger, consolidation, or similar transaction and, immediately after the consummation of such transaction, the combined company s stockholders immediately prior thereto do not own, directly or indirectly, more than 50% of the combined outstanding voting power of the surviving entity or the parent of the surviving entity in substantially the same proportions as their ownership of the combined company s outstanding voting securities immediately prior to such transaction; (iii) there is consummated a sale or other disposition of all or substantially all of the combined company s consolidated assets, other than a sale or other disposition to an entity in which more than 50% of the entity s combined voting power is owned by the combined company s stockholders in substantially the same proportions as their ownership of the combined company s outstanding voting securities

immediately prior to such sale or other disposition; or (iv) a majority of the combined company s board of directors becomes comprised of individuals whose nomination, appointment, or election was not approved by a majority of the board members or their approved successors.

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Plan Amendments and Termination

The Plan Administrator will have the authority to amend or terminate the 2016 Plan at any time. However, except as otherwise provided in the 2016 Plan or an award agreement, no amendment or termination of the 2016 Plan may materially impair a participant s rights under his or her outstanding awards without the participant s consent.

The combined company will obtain stockholder approval of any amendment to the 2016 Plan as required by applicable law and listing requirements. No incentive stock options may be granted under the 2016 Plan after the tenth anniversary of the date the 2016 Plan was adopted by Signal s board of directors.

U.S. Federal Income Tax Consequences

The following is a summary of the principal U.S. federal income tax consequences to participants and the combined company with respect to participation in the 2016 Plan, which will not become effective until the date of the closing of the Merger. No awards will be issued under the 2016 Plan prior to the date of the closing of the Merger. This summary is not intended to be exhaustive and does not discuss the income tax laws of any local, state or foreign jurisdiction in which a participant may reside. The information is based upon current federal income tax rules and therefore is subject to change when those rules change. Because the tax consequences to any participant may depend on his or her particular situation, each participant should consult the participant s tax adviser regarding the federal, state, local and other tax consequences of the grant or exercise of an award or the disposition of stock acquired the 2016 Plan. The 2016 Plan is not qualified under the provisions of Section 401(a) of the Code and is not subject to any of the provisions of the Employee Retirement Income Security Act of 1974. The combined company s ability to realize the benefit of any tax deductions described below depends on the combined company s generation of taxable income as well as the requirement of reasonableness, the provisions of Section 162(m) of the Code and the satisfaction of Signal s tax reporting obligations.

Nonstatutory Stock Options

Generally, there is no taxation upon the grant of a NSO if the stock option is granted with an exercise price equal to the fair market value of the underlying stock on the grant date. Upon exercise, a participant will recognize ordinary income equal to the excess, if any, of the fair market value of the underlying stock on the date of exercise of the stock option over the exercise price. If the participant is employed by the combined company or one of its affiliates, that income will be subject to withholding taxes. The participant s tax basis in those shares will be equal to their fair market value on the date of exercise of the stock option, and the participant s capital gain holding period for those shares will begin on that date.

Subject to the requirement of reasonableness, the provisions of Section 162(m) of the Code and the satisfaction of a tax reporting obligation, the combined company will generally be entitled to a tax deduction equal to the taxable ordinary income realized by the participant.

Incentive Stock Options

The 2016 Plan provides for the grant of stock options that are intended to qualify as incentive stock options, as defined in Section 422 of the Code. Under the Code, a participant generally is not subject to ordinary income tax upon the grant or exercise of an ISO. If the participant holds a share received upon exercise of an ISO for more than two years from the date the stock option was granted and more than one year from the date the stock option was exercised, which is referred to as the required holding period, the difference, if any, between the amount realized on a sale or other taxable disposition of that share and the participant s tax basis in that share will be long-term capital gain or loss.

If, however, a participant disposes of a share acquired upon exercise of an ISO before the end of the required holding period, which is referred to as a disqualifying disposition, the participant generally will recognize

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ordinary income in the year of the disqualifying disposition equal to the excess, if any, of the fair market value of the share on the date of exercise of the stock option over the exercise price. However, if the sales proceeds are less than the fair market value of the share on the date of exercise of the stock option, the amount of ordinary income recognized by the participant will not exceed the gain, if any, realized on the sale. If the amount realized on a disqualifying disposition exceeds the fair market value of the share on the date of exercise of the stock option, that excess will be short-term or long-term capital gain, depending on whether the holding period for the share exceeds one year.

For purposes of the alternative minimum tax, the amount by which the fair market value of a share of stock acquired upon exercise of an ISO exceeds the exercise price of the stock option generally will be an adjustment included in the participant s alternative minimum taxable income for the year in which the stock option is exercised. If, however, there is a disqualifying disposition of the share in the year in which the stock option is exercised, there will be no adjustment for alternative minimum tax purposes with respect to that share. In computing alternative minimum taxable income, the tax basis of a share acquired upon exercise of an ISO is increased by the amount of the adjustment taken into account with respect to that share for alternative minimum tax purposes in the year the stock option is exercised.

The combined company is not allowed a tax deduction with respect to the grant or exercise of an ISO or the disposition of a share acquired upon exercise of an ISO after the required holding period. If there is a disqualifying disposition of a share, however, the combined company will generally be entitled to a tax deduction equal to the taxable ordinary income realized by the participant, subject to the requirement of reasonableness and the provisions of Section 162(m) of the Code, and provided that either the employee includes that amount in income or the combined company timely satisfies its reporting requirements with respect to that amount.

Restricted Stock Awards

Generally, the recipient of a restricted stock award will recognize ordinary income at the time the stock is received equal to the excess, if any, of the fair market value of the stock received over any amount paid by the recipient in exchange for the stock. If, however, the stock is not vested when it is received (for example, if the employee is required to work for a period of time in order to have the right to sell the stock), the recipient generally will not recognize income until the stock becomes vested, at which time the recipient will recognize ordinary income equal to the excess, if any, of the fair market value of the stock on the date it becomes vested over any amount paid by the recipient in exchange for the stock. A recipient may, however, file an election with the Internal Revenue Service, within 30 days following his or her receipt of the stock award, to recognize ordinary income, as of the date the recipient receives the award, equal to the excess, if any, of the fair market value of the stock on the date the award is granted over any amount paid by the recipient for the stock.

The recipient s basis for the determination of gain or loss upon the subsequent disposition of shares acquired from a restricted stock award will be the amount paid for such shares plus any ordinary income recognized either when the stock is received or when the stock becomes vested.

Subject to the requirement of reasonableness, the provisions of Section 162(m) of the Code and the satisfaction of a tax reporting obligation, the combined company will generally be entitled to a tax deduction equal to the taxable ordinary income realized by the recipient of the restricted stock award.

Restricted Stock Unit Awards

Generally, the recipient of a restricted stock unit award structured to comply with the requirements of Section 409A of the Code or an exception to Section 409A of the Code will recognize ordinary income at the time the stock is delivered equal to the excess, if any, of the fair market value of the stock received over any amount paid by the recipient in exchange for the stock. To comply with the requirements of Section 409A of the Code, the stock subject to a restricted stock unit award may generally only be delivered upon one of the

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following events: a fixed calendar date (or dates), separation from service, death, disability or a change in control. If delivery occurs on another date, unless the restricted stock unit award otherwise complies with or qualifies for an exception to the requirements of Section 409A of the Code (including delivery upon achievement of a performance goal), in addition to the tax treatment described above, the recipient will owe an additional 20% federal tax and interest on any taxes owed.

The recipient s basis for the determination of gain or loss upon the subsequent disposition of shares acquired from a restricted stock unit award will be the amount paid for such shares plus any ordinary income recognized when the stock is delivered.

Subject to the requirement of reasonableness, the provisions of Section 162(m) of the Code and the satisfaction of a tax reporting obligation, the combined company will generally be entitled to a tax deduction equal to the taxable ordinary income realized by the recipient of the restricted stock unit award.

Stock Appreciation Rights

Generally, if a stock appreciation right is granted with an exercise price equal to the fair market value of the underlying stock on the grant date, the recipient will recognize ordinary income equal to the fair market value of the stock or cash received upon such exercise. Subject to the requirement of reasonableness, the provisions of Section 162(m) of the Code, and the satisfaction of a tax reporting obligation, the combined company will generally be entitled to a tax deduction equal to the taxable ordinary income realized by the recipient of the stock appreciation right.

New Plan Benefits

Awards granted under the 2016 Plan to Signal s executive officers and other employees are discretionary and are not subject to set benefits or amounts under the terms of the 2016 Plan. The 2016 Plan will not become effective until the closing of the Merger and neither Signal s board of directors nor Signal s compensation committee has granted any awards under the 2016 Plan subject to stockholder approval of this Signal Proposal No. 4. Accordingly, the benefits or amounts that will be received by or allocated to Signal s (or the combined company s) executive officers and other employees under the 2016 Plan, as well as the benefits or amounts which would have been received by or allocated to Signal s (or the combined company s) executive officers and other employees for fiscal year ended December 31, 2015 if the 2016 Plan had been in effect, are not determinable.

Required Vote

The affirmative vote of the holders of a majority of the shares of Signal common stock having voting power present in person or represented by proxy at the Signal special meeting is required to approve Signal Proposal No. 4. **Each of Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 9 are conditioned upon each other. Therefore, the Merger cannot be consummated without the approval of Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 9.**

Recommendation of Board of Directors

SIGNAL S BOARD OF DIRECTORS RECOMMENDS THAT SIGNAL STOCKHOLDERS VOTE FOR SIGNAL PROPOSAL NO. 4 TO APPROVE THE 2016 PLAN.

Signal Proposal No. 5: Approval of the Signal 2016 Employee Stock Purchase Plan

The board of directors of Signal has approved adoption of the Signal 2016 Employee Stock Purchase Plan, or the ESPP, subject to approval by Signal stockholders. In this Signal Proposal No. 5, Signal s board of directors is requesting stockholder approval of the ESPP.

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The discussion that follows is qualified in all respects to the terms of the ESPP. A copy of the ESPP is attached as *Annex C* to this proxy statement/prospectus/information statement. Signal stockholders should refer to the ESPP for more complete and detailed information about the terms and conditions of the ESPP.

If this Signal Proposal No. 5 is approved by Signal stockholders, the ESPP will become effective as of the date of the closing of the Merger. In the event that Signal stockholders do not approve this proposal, the ESPP will not become effective. Signal does not maintain any other employee stock purchase plans. Approval of the ESPP by Signal stockholders will allow the combined company to provide its employees with the opportunity to acquire an ownership interest in the combined company through their participation in the ESPP, thereby encouraging them to remain in service and more closely aligning their interests with those of the combined company s stockholders.

Description of the ESPP

The material features of the ESPP are described below. The following description of the ESPP is a summary only and is qualified in its entirety by reference to the text of the ESPP.

Purpose

The purpose of the ESPP is to provide a means by which the combined company s employees may be given an opportunity to purchase shares of common stock following the closing of the Merger, to assist the combined company in retaining the services of its employees, to secure and retain the services of new employees and to provide incentives for such persons to exert maximum efforts for Signal s success. The rights to purchase common stock granted under the ESPP are intended to qualify as options issued under an employee stock purchase plan as that term is defined in Section 423(b) of the Code.

Administration

The combined company s board of directors will have the power to administer the ESPP and may also delegate administration of the ESPP to a committee comprised of one or more members of its board of directors. The combined company s board of directors will delegate concurrent authority to administer the 2016 Plan to its compensation committee, but may, at any time, revest in itself some or all of the power delegated to its compensation committee. The combined company s board of directors and its compensation committee will each be considered to be a Plan Administrator for purposes of this proposal. The Plan Administrator has the final power to construe and interpret both the ESPP and the rights granted under it. The Plan Administrator has the power, subject to the provisions of the ESPP, to determine when and how rights to purchase common stock will be granted, the provisions of each offering of such rights (which need not be identical), and whether employees of any parent or subsidiary companies will be eligible to participate in the ESPP.

Stock Subject to ESPP

Subject to adjustment for specified changes in Signal s capitalization and for the reverse stock split, the maximum number of shares of common stock that may be issued under the ESPP is 210,162 shares, plus the number of shares of common stock that are automatically added on January 1st of each year for a period of up to ten years, commencing on January 1 following the effective date of the ESPP and ending on (and including) January 1, 2026, in an amount equal to the lesser of (i) 1% of the total number of shares of Signal s common stock outstanding on December 31st of the preceding calendar year, and (ii) 367,784 shares of common stock; provided, that prior to the date of any annual increase, the board of directors of the combined company may determine that such increase will be less than the amount set forth in clauses (i) or (ii). If any rights granted under the ESPP terminate without being exercised in full,

the shares of common stock not purchased under such rights again become available for issuance under the ESPP. The shares of common stock issuable under the ESPP will be shares of authorized but unissued or reacquired common stock, including shares repurchased by Signal on the open market.

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Offerings

The ESPP will be implemented by offerings of rights to purchase common stock to all eligible employees. The Plan Administrator will determine the duration of each offering period, provided that in no event may an offering period exceed 27 months. The Plan Administrator may establish separate offerings which vary in terms (although not inconsistent with the provisions of the ESPP or the requirements of applicable laws). Each offering period will have one or more purchase dates, as determined by the Plan Administrator prior to the commencement of the offering period. The Plan Administrator has the authority to alter the terms of an offering prior to the commencement of the offering period, including the duration of subsequent offering periods. When an eligible employee elects to join an offering period, he or she is granted a right to purchase shares of common stock on each purchase date within the offering period. On the purchase date, all contributions collected from the participant are automatically applied to the purchase of Signal s common stock, subject to certain limitations (which are described further below under *Eligibility*).

The Plan Administrator has the discretion to structure an offering so that if the fair market value of a share of common stock on any purchase date during the offering period is less than or equal to the fair market value of a share of common stock on the first day of the offering period, then that offering will terminate immediately following the purchase of shares of common stock on such purchase date, and the participants in such terminated offering will be automatically enrolled in a new offering that begins immediately after such purchase date.

Eligibility

Any individual who is employed by the combined company (or by any of its parent or subsidiary companies if such company is designated by the Plan Administrator as eligible to participate in the ESPP) may participate in offerings under the ESPP, provided such individual has been employed by the combined company (or its parent or subsidiary, if applicable) for such continuous period preceding the first day of the offering period as the Plan Administrator may require, but in no event may the required period of continuous employment be equal to or greater than two years. In addition, the Plan Administrator may provide that an employee will not be eligible to be granted purchase rights under the ESPP unless such employee is customarily employed for more than 20 hours per week and five months per calendar year. The Plan Administrator may also provide in any offering that certain of the combined company s employees who are highly compensated as defined in the Code are not eligible to participate in the ESPP.

No employee will be eligible to participate in the ESPP if, immediately after the grant of purchase rights, the employee would own, directly or indirectly, stock possessing 5% or more of the total combined voting power or value of all classes of Signal s stock or of any of Signal s parent or subsidiary companies, including any stock which such employee may purchase under all outstanding purchase rights and options. In addition, no employee may purchase more than $25,000 worth of Signal s common stock (determined based on the fair market value of the shares at the time such rights are granted) under all Signal s employee stock purchase plans and any employee stock purchase plans of the combined company s parent or subsidiary companies for each calendar year during which such rights are outstanding.

Participation in the ESPP

An eligible employee may enroll in the ESPP by delivering, prior to the date selected by the Plan Administrator as the beginning of an offering period, an agreement authorizing contributions which may not exceed the maximum amount specified by the Plan Administrator, but in any case which may not exceed 15% of such employee s earnings during the offering period. Each participant will be granted a separate purchase right for each offering in which he or she participates. Unless an employee s participation is discontinued, his or her purchase right will be exercised automatically at the end of each purchase period at the applicable purchase price.

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Purchase Price

The purchase price per share at which shares of common stock are sold on each purchase date during an offering period will not be less than the lower of (i) 85% of the fair market value of a share of common stock on the first day of the offering period or (ii) 85% of the fair market value of a share of common stock on the purchase date. As of January 5, 2017, the closing price of Signal s common stock as reported on The NASDAQ Capital Market was $5.33 per share.

Payment of Purchase Price; Payroll Deductions

The purchase of shares during an offering period generally will be funded by a participant s payroll deductions accumulated during the offering period. A participant may change his or her rate of contributions, as determined by the Plan Administrator in the offering. All contributions made for a participant are credited to his or her account under the ESPP and deposited with the combined company s general funds.

Purchase Limits

In connection with each offering made under the ESPP, the Plan Administrator may specify (i) a maximum number of shares of common stock that may be purchased by any participant pursuant to such offering, (ii) a maximum number of shares of common stock that may be purchased by any participant on any purchase date pursuant to such offering, (iii) a maximum aggregate number of shares of common stock that may be purchased by all participants pursuant to such offering, and/or (iv) a maximum aggregate number of shares of common stock that may be purchased by all participants on any purchase date pursuant to such offering. If the aggregate purchase of shares of common stock issuable upon exercise of purchase rights granted under such offering would exceed any such maximum aggregate number, then the Plan Administrator will make a pro rata allocation of available shares in a uniform and equitable manner.

Withdrawal

Participants may withdraw from an offering by delivering a withdrawal form to the combined company and terminating their contributions. Such withdrawal may be elected at any time prior to the end of an offering, except as otherwise provided by the Plan Administrator. Upon such withdrawal, the combined company will distribute to the employee his or her accumulated but unused contributions without interest, and such employee s right to participate in that offering will terminate. However, an employee s withdrawal from an offering does not affect such employee s eligibility to participate in any other offerings under the ESPP.

Termination of Employment

A participant s rights under any offering under the ESPP will terminate immediately if the participant either (i) is no longer employed by the combined company or any of its parent or subsidiary companies (subject to any post-employment participation period required by law) or (ii) is otherwise no longer eligible to participate. In such event, the combined company will distribute to the participant his or her accumulated but unused contributions without interest.

Restrictions on Transfer

Rights granted under the ESPP are not transferable except by will, by the laws of descent and distribution, or if permitted by the combined company, by a beneficiary designation. During a participant s lifetime, such rights may

only be exercised by the participant.

Changes in Capitalization

In the event of certain changes in the combined company s capitalization, the Plan Administrator will appropriately adjust: (i) the class(es) and maximum number of securities subject to the ESPP; (ii) the class(es)

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and maximum number of securities by which the share reserve it to increase automatically each year; (iii) the class(es) and number of securities subject to, and the purchase price applicable to, outstanding offerings and purchase rights; and (iv) the class(es) and number of securities that are the subject of any purchase limits under each ongoing offering.

Effect of Certain Corporate Transactions

In the event of a corporate transaction (as defined in the ESPP and described below), (i) any surviving or acquiring corporation (or its parent company) may assume or continue outstanding purchase rights granted under the ESPP or may substitute similar rights (including a right to acquire the same consideration paid to the stockholders in the corporate transaction) for such outstanding purchase rights, or (ii) if any surviving or acquiring corporation (or its parent company) does not assume or continue such outstanding purchase rights or does not substitute similar rights for such outstanding purchase rights, then the participants accumulated contributions will be used to purchase shares of common stock within ten business days prior to the corporate transaction under such purchase rights, and such purchase rights will terminate immediately after such purchase.

For purposes of the ESPP, a corporate transaction generally will be deemed to occur in the event of the consummation of: (i) a sale or other disposition of all or substantially all of the combined company s consolidated assets; (ii) a sale or other disposition of at least 50% of the combined company s outstanding securities; (iii) a merger, consolidation or similar transaction following which the combined company is not the surviving corporation; or (iv) a merger, consolidation or similar transaction following which the combined company is the surviving corporation but the shares of its common stock outstanding immediately prior to such transaction are converted or exchanged into other property by virtue of such transaction.

Duration, Amendment and Termination

The Plan Administrator may amend or terminate the ESPP at any time. However, except in regard to certain capitalization adjustments, any such amendment must be approved by the combined company s stockholders if such approval is required by applicable law or listing requirements.

Any outstanding purchase rights granted before an amendment or termination of the ESPP will not be materially impaired by any such amendment or termination, except (i) with the consent of the employee to whom such purchase rights were granted, (ii) as necessary to comply with applicable laws, listing requirements or governmental regulations (including Section 423 of the Code), or (iii) as necessary to obtain or maintain favorable tax, listing or regulatory treatment.

Notwithstanding anything in the ESPP or any offering to the contrary, the Plan Administrator will be entitled to: (i) establish the Exchange Ratio applicable to amounts withheld in a currency other than U.S. dollars; (ii) permit contributions in excess of the amount designated by a participant in order to adjust for mistakes in the processing of properly completed contribution elections; (iii) establish reasonable waiting and adjustment periods and/or accounting and crediting procedures to ensure that amounts applied toward the purchase of common stock for each participant properly correspond with amounts withheld from the participant s contributions; (iv) amend any outstanding purchase rights or clarify any ambiguities regarding the terms of any offering to enable such purchase rights to qualify under and/or comply with Section 423 of the Code; and (v) establish other limitations or procedures as the Plan Administrator determines in its sole discretion advisable that are consistent with the ESPP. Any such actions by the Plan Administrator will not be considered to alter or impair any purchase rights granted under an offering as they are part of the initial terms of each offering and the purchase rights granted under each offering.

Federal Income Tax Information

The following is a summary of the principal U.S. federal income tax consequences to participants and the combined company with respect to participation in the ESPP. This summary is not intended to be exhaustive and

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does not discuss the income tax laws of any local, state or foreign jurisdiction in which a participant may reside. The information is based upon current federal income tax rules and therefore is subject to change when those rules change. Because the tax consequences to any participant may depend on his or her particular situation, each participant should consult the participant s tax adviser regarding the federal, state, local, and other tax consequences of the grant or exercise of a purchase right or the sale or other disposition of common stock acquired under the ESPP. The ESPP is not qualified under the provisions of Section 401(a) of the Code and is not subject to any of the provisions of the Employee Retirement Income Security Act of 1974, as amended.

Rights granted under the ESPP are intended to qualify for favorable federal income tax treatment associated with rights granted under an employee stock purchase plan which qualifies under the provisions of Section 423 of the Code.

A participant will be taxed on amounts withheld for the purchase of shares of common stock as if such amounts were actually received. Otherwise, no income will be taxable to a participant as a result of the granting or exercise of a purchase right until a sale or other disposition of the acquired shares. The taxation upon such sale or other disposition will depend upon the holding period of the acquired shares.

If the shares are sold or otherwise disposed of more than two years after the beginning of the offering period and more than one year after the shares are transferred to the participant, then the lesser of the following will be treated as ordinary income: (i) the excess of the fair market value of the shares at the time of such sale or other disposition over the purchase price; or (ii) the excess of the fair market value of the shares as of the beginning of the offering period over the purchase price (determined as of the beginning of the offering period). Any further gain or any loss will be taxed as a long-term capital gain or loss.

If the shares are sold or otherwise disposed of before the expiration of either of the holding periods described above, then the excess of the fair market value of the shares on the purchase date over the purchase price will be treated as ordinary income at the time of such sale or other disposition. The balance of any gain will be treated as capital gain. Even if the shares are later sold or otherwise disposed of for less than their fair market value on the purchase date, the same amount of ordinary income is attributed to the participant, and a capital loss is recognized equal to the difference between the sales price and the fair market value of the shares on such purchase date. Any capital gain or loss will be short-term or long-term, depending on how long the shares have been held.

There are no federal income tax consequences to the combined company by reason of the grant or exercise of rights under the ESPP. The combined company is entitled to a deduction to the extent amounts are taxed as ordinary income to a participant for shares sold or otherwise disposed of before the expiration of the holding periods described above (subject to the requirement of reasonableness and the satisfaction of tax reporting obligations).

New Plan Benefits

Participation in the ESPP is voluntary and each eligible employee will make his or her own decision regarding whether and to what extent to participate in the ESPP. In addition, Signal s board of directors and Signal s compensation committee have not granted any purchase rights under the ESPP that are subject to stockholder approval of this proposal. The ESPP will not become effective until the date of the closing of the Merger. Accordingly, the benefits or amounts that will be received by or allocated to Signal s (or the combined company s) executive officers and other employees under the ESPP, as well as the benefits or amounts which would have been received by or allocated to Signal s (or the combined company s) executive officers and other employees for the fiscal year ended December 31, 2015 if the ESPP had been in effect, are not determinable. No non-employee directors will be eligible to participate in the ESPP.

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Required Vote

The affirmative vote of the holders of a majority of the shares of Signal common stock having voting power present in person or represented by proxy at the Signal special meeting is required to approve Signal Proposal No. 5. **Each of Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 9 are conditioned upon each other. Therefore, the Merger cannot be consummated without the approval of Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 9.**

Recommendation of Board of Directors

SIGNAL S BOARD OF DIRECTORS RECOMMENDS THAT SIGNAL STOCKHOLDERS VOTE FOR SIGNAL PROPOSAL NO. 5 TO APPROVE THE ESPP.

Signal Proposal No. 6: Approval of Name Change

At the Signal special meeting, holders of Signal common stock will be asked to approve the amendment to the certificate of incorporation of Signal to change the name of the corporation from Signal Genetics, Inc. to Miragen Therapeutics, Inc. by filing an amendment to the certificate of incorporation at the effective time of the Merger. A copy of the proposed amendment to Signal s certificate of incorporation is attached as *Annex D* to this proxy statement/prospectus/information statement. The primary reason for the corporate name change is that management believes this will allow for brand recognition of Miragen product candidates and product candidate pipeline following the consummation of the Merger. Signal management believes that the current name will no longer accurately reflect the business of Signal and the mission of Signal subsequent to the consummation of the Merger.

Required Vote

The affirmative vote of holders of a majority of the outstanding shares of Signal common stock entitled to vote on the record date for the Signal special meeting is required to approve Signal Proposal No. 6. **Each of Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 9 are conditioned upon each other. Therefore, the Merger cannot be consummated without the approval of Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 9.**

Recommendation of Board of Directors

SIGNAL S BOARD OF DIRECTORS RECOMMENDS THAT SIGNAL STOCKHOLDERS VOTE FOR SIGNAL PROPOSAL NO. 6 TO APPROVE THE NAME CHANGE.

Signal Proposal No. 7: Approval of the Amendment to the Certificate of Incorporation of Signal Effecting the Reverse Stock Split.

General

At the Signal special meeting, Signal stockholders will be asked to approve an amendment to its certificate of incorporation effecting the reverse stock split of all issued and outstanding shares of Signal common stock, which will reduce the number of shares of outstanding Signal common stock in accordance with a ratio to be determined by Signal s board of directors within a range of one new share for every one to 15 shares of outstanding Signal common stock (or any number in between). A copy of the proposed amendment to Signal s certificate of incorporation is attached as *Annex E* to this proxy statement/prospectus/information statement. This proposal is referred to as the reverse stock split proposal. Signal s board of directors has declared such proposed amendment to be advisable and has unanimously recommended that this proposed amendment be presented to Signal stockholders for approval.

Assuming the stockholders approve the proposal, Signal s board of directors will have the sole discretion under Section 242(c) of the General Corporation Law of the State of Delaware as it determines to be in the best interest

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of Signal and its stockholders, both to select the specific exchange ratio within the designated range of one to 15 (or any number in between) and also to decide whether or not to proceed to effect a reverse stock split or instead to abandon the proposed certificate of amendment altogether. If a certificate of amendment is filed with the Secretary of State of the State of Delaware, the certificate of amendment to the certificate of incorporation will affect the reverse stock split by reducing the outstanding number of shares of the Signal common stock by the ratio to be determined by Signal s board of directors, but will not increase the par value of the Signal common stock, and will not change the number of authorized shares of Signal common stock. Signal s board of directors decision to effect a reverse stock split is based on a number of factors, including market conditions, existing and expected trading prices for Signal common stock and the applicable listing requirements of The NASDAQ Capital Market.

Upon the effectiveness of the proposed amendment effecting the reverse stock split, or the reverse split effective time, every one to 15 shares (or any number in between) of Signal common stock outstanding immediately prior to the reverse split effective time will be combined and reclassified into one share of Signal common stock. The actions taken in connection with the reverse stock split will reduce the number of outstanding shares of Signal common stock.

Purpose

Signal s board of directors believes that a reverse stock split is desirable for the following reasons:

- the board of directors believes effecting the reverse stock split may be an effective means of maintaining the compliance with the listing requirements of The NASDAQ Capital Market in the future; and

- the board of directors believes that a higher stock price may help generate investor interest in Signal s common stock.

Signal s common stock is currently listed on The NASDAQ Capital Market. Signal has filed an initial listing application with NASDAQ to seek listing for the combined company on The NASDAQ Capital Market upon the closing of the Merger. According to the applicable rules and regulations of The NASDAQ Stock Market LLC, an issuer must apply for initial listing following a transaction in which the issuer combines with a non-NASDAQ listed entity, resulting in a change of control of the issuer and potentially allowing the non-NASDAQ listed entity to obtain a NASDAQ listing. Furthermore, the listing standards of The NASDAQ Capital Market will require Signal to have, among other things, a $4.00 per share minimum bid price upon the closing of the Merger. Signal s board of directors expects that a reverse stock split of Signal common stock will increase the market price of Signal common stock so that Signal is able to maintain compliance with the relevant listing requirements of The NASDAQ Capital Market upon completion of the Merger.

On January 5, 2017, the closing price of Signal common stock was $5.33 per share. Signal s board of directors also believes that an increase in the market price of Signal common stock expected as a result of implementing a reverse stock split will improve the marketability and liquidity of Signal common stock and will encourage interest and trading in Signal common stock. Because of the trading volatility often associated with low-priced stocks, many brokerage houses and institutional investors have internal policies and practices that either prohibit them from investing in low-priced stocks or tend to discourage individual brokers from recommending low-priced stocks to their customers. Some of those policies and practices may function to make the processing of trades in low-priced stocks economically unattractive to brokers. Moreover, investors may also be dissuaded from purchasing lower priced stock because the brokerage commissions, as a percentage of the total transaction, tend to be higher. Signal s board of directors believes that the anticipated higher market price expected to result from a reverse stock split will reduce, to

some extent, the negative effects of the policies and practices of institutional investors and brokerage houses described above on the liquidity and marketability of Signal common stock.

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Signal cannot predict whether the reverse stock split will increase the market price of Signal common stock. Furthermore, there can be no assurance that: (i) the market price per share following the reverse stock split would rise in proportion to the reduction in the number of shares of Signal common stock outstanding due to the reverse stock split; (ii) the market price per share following the reverse stock split would meet the minimum bid price required for continued listing on The NASDAQ Capital Market or, if met, that the price would remain above the minimum for a sustained period of time; (iii) Signal would otherwise meet the requirements of The NASDAQ Stock Market LLC for listing on The NASDAQ Capital Market even if the per share market price of Signal common stock after the reverse stock split meets the required minimum price; (iv) the reverse stock split would result in a per share price that would attract brokers and investors who do not trade in lower-priced stock; and (v) the liquidity of Signal common stock would not be harmed by the reduced number of shares outstanding after the reverse stock split.

The market price of Signal common stock will also be based on Signal s performance and other factors, some of which are unrelated to the number of shares outstanding. If the reverse stock split is effected and the market price of Signal common stock declines, the percentage decline as an absolute number and as a percentage of Signal overall market capitalization may be greater than would occur in the absence of the proposed reverse stock split.

Signal s Discretion to Effect the Reverse Stock Split

If the reverse stock split proposal is approved by the Signal stockholders, the proposed amendment will be effected, if at all, only upon a determination by Signal s board of directors that a reverse stock split within a range of one for every one to 15 shares of Signal common stock (or any number in between) remains in the best interests of Signal and its stockholders based on the factors described above. Notwithstanding stockholders approval of the reverse stock split proposal, Signal s board of directors may, in its sole discretion, abandon the proposed amendment and determine prior to the effectiveness of any filing with the Secretary of State of the State of Delaware not to effect the reverse stock split of Signal common stock, as permitted under Section 242(c) of the DGCL.

Principal Effects of the Reverse Stock Split

The proposed form of amendment to the certificate of incorporation of Signal effecting the reverse stock split is set forth in *Annex E* to this proxy statement/prospectus/information statement.

If the reverse stock split is effected, it will be effected simultaneously for all outstanding shares of Signal common stock and the reverse stock split ratio will be the same for all shares of Signal common stock. The reverse stock split will affect all of Signal stockholders uniformly and will not affect any stockholder s percentage ownership interests in Signal, except to the extent that the reverse stock split results in any of Signal stockholders owning a fractional share. Common stock combined pursuant to the reverse stock split will remain fully paid and nonassessable. The number of stockholders of record will not be affected by the proposed reverse stock split (except to the extent that any stockholder holds only a fractional share interest after the application of the reverse stock split and receives cash for such interest). The reverse stock split will not affect the number of authorized shares of Signal common stock, which will continue to be authorized pursuant to the certificate of incorporation of Signal. Because the number of authorized shares of common stock will not be proportionally reduced by the reverse stock split, one of the effects of the reverse stock split will be to effectively increase the proportion of authorized shares that are unissued relative to those that are issued. This could result in Signal s management being able to issue more shares without further stockholder approval, unless required by applicable law.

The table below sets forth the anticipated effects of the reverse stock split at various reverse split ratios and Exchange Ratios. The number of shares in the table below are approximated, do not reflect the fractional shares that will result from the reverse stock split and assumes that Miragen s shares will be converted at various Exchange Ratios based on

the reverse split ratio, which gives effect to the reverse stock split and is estimated as

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of December 31, 2016, and assumes the issuance of shares of Miragen common stock in the concurrent financing.

	Number of shares outstanding after the Merger	Number of shares reserved under the terms of all convertible securities(1)	Number of authorized shares that will be available and unreserved(2)
With no reverse stock split	21,177,498	4,438,745	24,383,757
After 2-for-1 reverse stock split(3)	10,588,729	2,219,372	37,191,899
After 3-for-1 reverse stock split	7,509,146	1,479,581	41,011,273
After 4-for-1 reverse stock split	5,294,334	1,109,687	43,595,979
After 5-for-1 reverse stock split	4,235,439	887,748	44,876,813
After 6-for-1 reverse stock split	3,529,543	739,791	45,730,666
After 7-for-1 reverse stock split	3,025,316	634,105	46,340,579
After 8-for-1 reverse stock split	2,647,126	554,842	46,798,032
After 9-for-1 reverse stock split	2,353,008	493,192	47,153,800
After 10-for-1 reverse stock split	2,117,710	443,873	47,438,417
After 11-for-1 reverse stock split	1,925,194	403,523	47,671,283
After 12-for-1 reverse stock split	1,764,732	369,895	47,865,373
After 13-for-1 reverse stock split	1,629,026	341,441	48,029,533
After 14-for-1 reverse stock split	1,512,639	317,053	48,170,308
After 15-for-1 reverse stock split	1,411,793	295,916	48,292,291

(1) This column includes any shares of common stock reserved for issuance under (i) outstanding options issued under the Miragen 2008 Plan as of December 31, 2016, (ii) outstanding warrants of Miragen to be assumed by Signal in connection with the Merger as of December 31, 2016, (iii) outstanding warrants of Signal as of December 31, 2016, (iv) the 2016 Plan and (v) the ESPP.

(2) The number of authorized shares of Signal common stock that will be available and unreserved immediately following the reverse stock split effective time assumes that the authorized number of shares of Signal s common stock is 50,000,000 and does not give effect to the proposed increase of the authorized number of shares of Signal common stock under Signal Proposal No. 8. After giving effect to this proposed increase to the authorized number of shares of Signal common stock to 100,000,000 under Signal Proposal No. 8, the number of authorized shares of Signal common stock that will be available and unreserved immediately following the reverse stock split effective time would be between 74,383,757 and 98,292,291.

(3) Provided to illustrate the potential range of shares in the event the reverse split ratio is determined to be a number between 1-for-1 and 2-for-1.

Signal has no current plans, arrangements or understandings to issue shares that will be available and unreserved after the completion of the Merger and the other transactions described in this proxy statement/prospectus/information statement, other than in connection with the Merger and to satisfy obligations under the combined company s warrants and employee stock options from time to time as such warrants and options are exercised.

Signal will continue to be subject to the periodic reporting requirements of the Exchange Act after the reverse stock split. Signal common stock will continue to be listed on The NASDAQ Capital Market under the symbol SGNL. After completion of the Merger, Signal expects to trade on The NASDAQ Capital Market under the symbol MGEN.

Procedure for Effecting Reverse Stock Split and Exchange of Stock Certificates

If the certificate of amendment is approved by Signal stockholders, and if Signal still believes that a reverse stock split is in the best interests of Signal and its stockholders, Signal will file the certificate of amendment with the Secretary of State of the State of Delaware at such time as Signal may determine to be the appropriate effective time for the reverse stock split. The reverse split would become effective at immediately upon filing of the

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certificate of amendment on the date of filing of the certificate of amendment. Signal may delay effecting the reverse stock split without resoliciting stockholder approval.

Beginning at the reverse split effective time, each certificate representing pre-split shares will be deemed for all corporate purposes to evidence ownership of post-split shares. Except as explained below with respect to fractional shares, at the reverse split effective time, shares of Signal common stock issued and outstanding immediately prior to the reverse split effective time will be combined and reclassified, automatically and without any action on the part of the stockholders, into a lesser number of new shares of Signal common stock in accordance with the reverse stock split ratio within a range of one to 15 shares of Signal common stock (or any number in between) for every one outstanding share of Signal common stock.

As soon as practicable after the effective date of the reverse split, Signal stockholders will be notified that the reverse stock split has been effected. Signal expects that its transfer agent will act as exchange agent for purposes of implementing the exchange of stock certificates. Holders of pre-split shares will be asked to surrender to the exchange agent certificates representing their pre-split shares in exchange for certificates representing post-split shares in accordance with the procedures to be set forth in a letter of transmittal to be sent by Signal. No new certificates will be issued to a stockholder until such stockholder has surrendered such stockholder s outstanding certificate(s) together with the properly completed and executed letter of transmittal to the exchange agent. Any pre-split shares submitted for transfer, whether pursuant to a sale or other disposition, or otherwise, will automatically be exchanged for post-split shares.

SIGNAL STOCKHOLDERS SHOULD NOT DESTROY ANY STOCK CERTIFICATE(S) AND SHOULD NOT SUBMIT ANY CERTIFICATE(S) UNTIL REQUESTED TO DO SO.

Fractional Shares

No fractional shares will be issued in connection with the reverse stock split. Signal stockholders of record who otherwise would be entitled to receive fractional shares because they hold a number of pre-split shares not evenly divisible by the number of pre-split shares for which each post-split share is to be exchanged will be entitled, upon surrender to the exchange agent of certificates representing such shares, to a cash payment in lieu thereof at a price equal to the fraction to which the stockholder would otherwise be entitled multiplied by the closing price of the common stock on The NASDAQ Capital Market on the last trading day prior to the effective date of the reverse split or, if such price is not available, the average of the last bid and asked prices of the common stock on such day or other price determined by Signal s board of directors. The ownership of a fractional share will not give the holder thereof any voting, dividend or other rights except to receive payment therefor as described herein.

Stockholders should be aware that, under the escheat laws of the various jurisdictions where stockholders reside, where Signal is domiciled, and where the funds will be deposited, sums due for fractional interests that are not timely claimed after the effective date of the split may be required to be paid to the designated agent for each such jurisdiction, unless correspondence has been received by Signal or the exchange agent concerning ownership of such funds within the time permitted in such jurisdiction. Thereafter, stockholders otherwise entitled to receive such funds will have to seek to obtain them directly from the state to which they were paid.

Accounting Consequences

The par value per share of Signal common stock will remain unchanged at $0.01 per share after the reverse stock split. As a result, at the effective time of the reverse split, the stated capital on Signal s balance sheet attributable to Signal common stock will be reduced proportionately based on the reverse stock split ratio, from its present amount, and the

additional paid-in capital account will be increased for the amount by which the stated capital is reduced. After the reverse stock split (and disregarding the impact of shares of Signal common stock issued in the Merger), net income or loss per share, and other per share amounts will be increased because there will be fewer shares of Signal common stock outstanding. In future financial statements, net income or loss per share

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and other per share amounts for periods ending before the reverse stock split will be recast to give retroactive effect to the reverse stock split.

Potential Anti-Takeover Effect

Although the increased proportion of unissued authorized shares to issued shares could, under certain circumstances, have an anti-takeover effect (for example, by permitting issuances that would dilute the stock ownership of a person seeking to effect a change in the composition of Signal s board of directors or contemplating a tender offer or other transaction for the combination of Signal with another company), the reverse stock split proposal is not being proposed in response to any effort of which Signal is aware to accumulate shares of Signal common stock or obtain control of Signal, nor is it part of a plan by management to recommend a series of similar amendments to Signal s board of directors and stockholders, other than to complete the Merger with Miragen. Other than the reverse stock split proposal and the other proposals set forth in this proxy statement/prospectus/information statement pertaining to the Merger, Signal s board of directors does not currently contemplate recommending the adoption of any other actions that could be construed to affect the ability of third parties to take over or change control of Signal.

No Appraisal Rights

Under the DGCL, Signal stockholders are not entitled to appraisal rights with respect to the reverse stock split, and Signal will not independently provide stockholders with any such right.

Material U.S. Federal Income Tax Consequences of the Reverse Stock Split

In the opinion of Pillsbury, counsel to Signal, and Cooley, counsel to Miragen, the following is a discussion of material U.S. federal income tax consequences of the reverse stock split to holders of Signal common stock. The effects of other U.S. federal tax laws, such as estate and gift tax laws, and any applicable state, local, or foreign tax laws are not discussed. This discussion is based on the Code, U.S. Treasury Regulations promulgated thereunder, judicial decisions, and published rulings and administrative pronouncements of the IRS each as in effect as of the date of the Merger. These authorities are subject to differing interpretations or change. Any such change, which may or may not be retroactive, could alter the tax consequences to holders of Signal common stock.

This discussion does not address all U.S. federal income tax consequences relevant to the particular circumstances of a Signal common stockholder. In addition, it does not address consequences relevant to holders of Signal common stock that are subject to particular rules, including, without limitation:

- persons who hold their Signal common stock in a functional currency other than the U.S. dollar;
- persons who hold Signal common stock that constitutes qualified small business stock under Section 1202 of the Code or as Section 1244 stock for purposes of Section 1244 of the Code;
- persons holding Signal common stock as part of an integrated investment (including a straddle, pledge against currency risk, constructive sale or conversion transaction or other integrated or risk reduction transactions) consisting of shares of Signal common stock and one or more other positions;

persons who are not U.S. Holders as defined below;

banks, insurance companies, mutual funds, tax-exempt entities, financial institutions, broker-dealers;

real estate investment trusts or regulated investment companies;

persons who do not hold their Signal common stock as a capital asset within the meaning of Section 1221 of the Code;

partnerships or other entities classified as partnerships or disregarded entities for U.S. federal income tax purposes, S corporations or other pass-through entities (including hybrid entities);

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persons who acquired their Signal common stock pursuant to the exercise of compensatory options or in other compensatory transactions;

persons who acquired their Signal common stock pursuant to the exercise of warrants or conversion rights under convertible instruments;

persons who acquired their Signal common stock in a transaction subject to the gain rollover provisions of Section 1045 of the Code; and

persons who hold their Signal common stock through individual retirement accounts or other tax-deferred accounts.

This discussion is limited to holders of Signal common stock that are U.S. Holders. For purposes of this discussion, a U.S. Holder is a beneficial owner of Signal common stock that, for U.S. federal income tax purposes, is or is treated as:

an individual who is a citizen or resident of the United States;

a corporation (or other entity taxable as a corporation for U.S. federal income tax purposes) created or organized in or under the laws of the United States, any state thereof, or the District of Columbia;

an estate, the income of which is subject to U.S. federal income taxation regardless of its source; or

a trust if either (i) a court within the United States is able to exercise primary supervision over the administration of such trust and one or more United States persons (within the meaning of Section 7701(a)(30) of the Code) are authorized or have the authority to control all substantial decisions of such trust, or (ii) the trust was in existence on August 20, 1996 and has a valid election in effect under applicable Treasury Regulations to be treated as a United States person for U.S. federal income tax purposes.

If an entity treated as a partnership for U.S. federal income tax purposes holds Signal common stock, the tax treatment of a partner in the partnership will depend on the status of the partner, the activities of the partnership and certain determinations made at the partner level. If you are a partnership or a partner of a partnership you should consult your tax advisor regarding the tax consequences to you.

In addition, the following discussion does not address (i) any U.S. federal non-income tax consequences of the reverse stock split, including estate, gift or other tax consequences, (ii) any state, local or non-U.S. tax law consequences of the reverse stock split, (iii) the Medicare contribution tax on net investment income or the alternative minimum tax, (iv) the tax consequences of transactions effectuated before, after or at the same time as the reverse stock split (whether or not they are in connection with the reverse stock split), and (v) the tax consequences to holders of options, warrants or similar rights to purchase Signal common stock.

IN LIGHT OF THE FOREGOING HOLDERS OF SIGNAL COMMON STOCK SHOULD CONSULT THEIR OWN TAX ADVISORS REGARDING THE TAX CONSEQUENCES TO THEM OF THE REVERSE STOCK SPLIT, INCLUDING THE APPLICABLE U.S. FEDERAL, STATE, LOCAL AND NON-U.S. INCOME AND OTHER TAX CONSEQUENCES IN LIGHT OF THEIR PARTICULAR CIRCUMSTANCES.

Tax Consequences of the Reverse Stock Split

The reverse stock split should constitute a recapitalization for U.S. federal income tax purposes. As a result, a U.S. Holder of Signal common stock generally should not recognize gain or loss upon the reverse stock split, except with respect to cash received in lieu of a fractional share of Signal common stock, as discussed below. A U.S. Holder s aggregate tax basis in the shares of Signal common stock received pursuant to the reverse stock split should equal the aggregate tax basis of the shares of the Signal common stock surrendered (excluding any portion of such basis that is allocated to any fractional share of Signal common stock), and such U.S. Holder s holding period in the shares of Signal common stock received should include the holding period in the shares of Signal common stock surrendered. Treasury Regulations provide detailed rules for allocating the tax basis and

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holding period of the shares of Signal common stock surrendered to the shares of Signal common stock received in a recapitalization pursuant to the reverse stock split. U.S. Holders of shares of Signal common stock acquired on different dates and at different prices should consult their tax advisors regarding the allocation of the tax basis and holding period of such shares.

Cash in Lieu of Fractional Shares

A U.S. Holder of Signal common stock that receives cash in lieu of a fractional share of Signal common stock pursuant to the reverse stock split should recognize capital gain or loss in an amount equal to the difference between the amount of cash received and the U.S. Holder s tax basis in the shares of Signal common stock surrendered that is allocated to such fractional share of Signal common stock. Such capital gain or loss should be long-term capital gain or loss if the U.S. Holder s holding period for Signal common stock surrendered exceeded one year at the effective time of the reverse stock split.

Information Reporting and Backup Withholding

A U.S. Holder of Signal common stock may be subject to information reporting and backup withholding on cash paid in lieu of fractional shares in connection with the reverse stock split. The current backup withholding rate is 28 percent. Backup withholding will not apply, however, to a holder who (i) furnishes a correct taxpayer identification number and certifies the holder is not subject to backup withholding on IRS Form W-9 or a substantially similar form, (ii) provides a certification of foreign status on an appropriate IRS Form W-8 or successor form or (iii) certifies the holder is otherwise exempt from backup withholding. U.S. Holders of Signal common stock should consult their tax advisors regarding their qualification for an exemption from backup withholding and the procedures for obtaining such an exemption. If a U.S. Holder does not provide a correct taxpayer identification number on IRS Form W-9 or other proper certification, the stockholder may be subject to penalties imposed by the IRS. Any amounts withheld under the backup withholding rules may be refunded or allowed as a credit against a U.S. Holder of Signal common stock s federal income tax liability, if any, provided the required information is timely furnished to the IRS. In the event of backup withholding see your tax advisor to determine if you are entitled to any tax credit, tax refund or other tax benefit as a result of such backup withholding.

Required Vote

The affirmative vote of holders of a majority of the outstanding shares of Signal common stock entitled to vote on the record date for the Signal special meeting is required to approve Signal Proposal No. 7. **Each of Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 9 are conditioned upon each other. Therefore, the Merger cannot be consummated without the approval of Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 9.**

Recommendation of Board of Directors

SIGNAL S BOARD OF DIRECTORS RECOMMENDS THAT SIGNAL STOCKHOLDERS VOTE FOR SIGNAL PROPOSAL NO. 7 TO APPROVE THE REVERSE STOCK SPLIT.

Signal Proposal No. 8: Approval of the Amendment to the Certificate of Incorporation of Signal to Increase the Number of Authorized Shares of Signal Common Stock.

At the Signal special meeting, Signal stockholders will be asked to approve a proposal to amend Signal s certificate of incorporation to increase the number of authorized shares of Signal common stock from 50,000,000 shares to 100,000,000 shares. A copy of the proposed amendment to Signal s certificate of incorporation is attached as *Annex F*

to this proxy statement/prospectus/information statement.

As of the close of business on the record date, January 9, 2017, Signal had no shares of preferred stock and 742,293 shares of Signal common stock issued and outstanding. As of the close of business on the record date,

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January 9, 2017, there were approximately 315,678 shares of Signal common stock reserved for issuance upon exercise or settlement, as applicable, of outstanding options and restricted stock units and upon conversion of the Note. Based on the number of shares of Miragen preferred stock and common stock outstanding as of such date, if the Merger is completed, Signal would be required to issue approximately 20,156,992 additional shares of Signal common stock to the Miragen stockholders, assuming the closing of Miragen s concurrent financing, as consideration for the Merger, or between 20,156,992 and 1,343,761 shares after giving effect to the reverse stock split. In addition, upon completion of the Merger, Signal would reserve for issuance approximately 4,438,745 additional shares of Signal common stock to cover, among other things, warrants, shares issuable pursuant to the ESPP and stock options, restricted stock, and other stock-based awards assumed from Miragen by Signal, or between 4,438,745 and 295,916 shares after giving effect to the reverse stock split. Signal has determined that the 50,000,000 shares of common stock currently authorized under its certificate of incorporation will be insufficient to satisfy the needs of Signal on a post-Merger basis. It is estimated that following completion of the Merger, Signal will have approximately 24,383,757 shares of common stock available for issuance, or between 24,383,757 to 48,292,291 shares after giving effect to the reverse stock split within a range of one to 15 shares (or any number in between) for every one share of outstanding Signal common stock. Signal s board of directors believes that it is advisable to have additional authorized shares of common stock available for important corporate purposes, such as to provide the ability to react quickly to strategic opportunities and to attract and retain talented employees through the use of equity incentive compensation. Although there are no present plans or commitments for the issuance of any of the additional shares that would be authorized upon approval of this amendment, other than the issuance of shares in connection with the Merger, such additional shares would be available for equity incentive plans, possible future stock splits and dividends, public or private offerings of common stock or securities convertible into common stock, equity-based acquisitions and other corporate purposes that might be proposed. The additional shares of Signal common stock will not be entitled to preemptive rights nor will existing stockholders have any preemptive right to acquire any of those shares when issued.

Required Vote

The affirmative vote of holders of a majority of the outstanding shares of Signal common stock entitled to vote on the record date for the Signal special meeting is required to approve Signal Proposal No. 8. **Each of Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 9 are conditioned upon each other. Therefore, the Merger cannot be consummated without the approval of Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 9.**

Recommendation of Board of Directors

SIGNAL S BOARD OF DIRECTORS RECOMMENDS THAT SIGNAL STOCKHOLDERS VOTE FOR SIGNAL PROPOSAL NO. 8 TO APPROVE THE INCREASE IN THE NUMBER OF AUTHORIZED SHARES OF SIGNAL COMMON STOCK.

Proposal No. 9: Approval of the Sale of All of Signal s Intellectual Property Assets Related to its MyPRS Test to Quest Diagnostics Investments LLC

General

At the Signal special meeting, Signal stockholders will be asked to approve an agreement, or the Intellectual Property Purchase Agreement, pursuant to which Signal will sell to Quest Diagnostics Investments LLC the intellectual property assets related to Signal s MyPRS test. These assets are referred to collectively as the MyPRS Assets and they include substantially all of the intellectual property assets through which Signal currently operates its lab business. The sale of the MyPRS Assets will constitute the sale of substantially all of Signal s lab business.

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The Parties

Signal Genetics, Inc.

Signal is a commercial stage, molecular genetic diagnostic company focused on providing innovative diagnostic services that help physicians in the care of their patients suffering from multiple myeloma. Its MyPRS test (included in the MyPRS Assets), a microarray-based gene expression profile assay, is performed in Signal s laboratory located in Little Rock, Arkansas, which is certified under the Clinical Laboratory Improvement Amendments of 1988 and accredited by the College of American Pathologists.

Quest Diagnostics Investments LLC

Quest Diagnostics Investments LLC is a wholly-owned subsidiary of Quest. Quest is the world s leading provider of diagnostic information services. Quest was incorporated in Delaware in 1990; its predecessor companies date back to 1967. Quest conducts business through its headquarters in Madison, New Jersey, and its laboratories, patient service centers, offices and other facilities around the United States and in selected locations outside the United States.

Background and Reasons for the Sale of the MyPRS Assets

Signal is currently marketing and selling its MyPRS test to physicians treating patients suffering from multiple myeloma in academic institutions in all 50 states. Signal has been operating at a net loss since inception, based upon a business plan that anticipated raising additional funds through debt or equity financing to operate beyond the second quarter of 2017. Signal s board of directors considered various factors impacting the financial condition, results and operations for Signal, including Signal s strategic alternatives, the consequences of current market conditions, Signal s current liquidity position, its depressed stock price and continuing net operating losses, the likelihood that the resulting circumstances would not change for the benefit of Signal stockholders in the foreseeable future, and the risks of continuing to operate Signal on a stand-alone basis, including the need to continue building the MyPRS test services menu, infrastructure and management team to support the laboratory services business with insufficient capital resources. Signal came to believe it would be difficult to obtain additional equity or debt financing on acceptable terms, if at all. Therefore, Signal s board of directors began discussing and evaluating its strategic opportunities to maximize stockholder value beginning near the end of 2015. Signal s management provided Signal s board of directors with management s preliminary assessment of a variety of strategic alternatives that Signal could pursue to maximize stockholder value, including engaging in a sale of the company or a merger transaction.

After an extensive process reviewing potential strategic alternatives, as more fully described in *The Merger Background of the Merger*, Signal s board of directors concluded that Signal should pursue a combination with Miragen as such combination would provide the existing Signal stockholders with an opportunity to participate in the potential increase in value of the combined company following the Merger. The wind down of Signal s lab business or divestiture of the MyPRS Assets was also a condition to consummating the Merger in the Merger Agreement.

During the period of July 31, 2016 through October 6, 2016, Mr. Riccitelli and Ms. Seymour met with, either in person or by phone, multiple parties, multiple times for diligence discussions regarding potential acquisition of the MyPRS Assets. All parties were given access to Signal s virtual data room for the purpose of reviewing due diligence materials. During such time, several parties notified Signal management or representatives of Cantor on behalf of Signal that they would not be submitting a proposal to acquire the MyPRS business or any other transaction. The primary reason cited by these parties for not submitting proposals was the additional cash burn required in the near term to continue to offer the MyPRS test commercially.

On August 5, 2016, Mr. Riccitelli and Dr. Bender, Signal s chief medical officer, met with management and medical team personnel from Quest at Quest s Orange County, California facility for an in-depth review of MyPRS.

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On September 30, 2016, Quest submitted an initial LOI to purchase the lab business from Signal, and then submitted a revised LOI on October 10, 2016 to purchase the intellectual property assets related to MyPRS. After a few revisions of the LOI between the parties, on October 19, 2016, Signal s board of directors approved the draft Quest LOI received from Quest on October 18, 2016 and reaffirmed its prior instruction to management to negotiate an asset purchase agreement with Quest, subject to the board s further review of such agreement.

Cantor did not render or express any opinion with respect to, and was not requested to render or express any opinion with respect to, and Cantor s opinion does not address, the sale of the MyPRS Assets, the consideration thereunder or any other aspect thereof.

Between October 27, 2016 and November 23, 2016, there were various teleconferences, in-person meetings, facility tours and email communications among Mr. Riccitelli, Ms. Seymour and Dr. Sur and representatives from Quest s business development, informatics, operations and management teams regarding Quest s due diligence review of Signal s MyPRS test.

During November 2016, Signal was provided a draft intellectual property purchase agreement from Quest that covered the terms of the proposed transaction. Throughout the following weeks, Signal negotiated the terms of the Intellectual Property Purchase Agreement with Quest, and on November 29, 2016, Signal and Quest finalized the terms of the proposed Intellectual Property Purchase Agreement. On November 29, 2016, Signal s board of directors approved by unanimous written consent the final proposed Intellectual Property Purchase Agreement and sale of the MyPRS Assets. Signal s board of directors determined that entering into the Intellectual Property Purchase Agreement and completing the proposed sale of the MyPRS Assets to Quest, subject to stockholder approval and satisfaction of the conditions contained therein, were in the best interests of Signal and its stockholders. Signal s board of directors then approved the Intellectual Property Purchase Agreement and the proposed sale of the MyPRS Assets on the terms set forth in such agreement, and authorized management to execute the Intellectual Property Purchase Agreement on Signal s behalf. On November 29, 2016, Signal and Quest Diagnostics Investments LLC executed the Intellectual Property Purchase Agreement.

Effect of the Sale of the MyPRS Assets

If Signal stockholders approve the sale of the MyPRS Assets to Quest, Signal will seek to complete the sale immediately prior to closing of the Merger with Miragen. The cash proceeds of the proposed sale are $825,000, plus certain expenses, which is expected to be roughly equivalent to Signal s Operating expenses from the time of the LOI to closing of the sale of the MyPRS Assets. Quest has the option to require Signal to operate the lab beyond December 31, 2016 (and through January 14, 2017) for an additional $100,000. The sale is intended to allow Signal to cover its liabilities and other obligations, and is also anticipated to allow Signal to operate until the completion of the Merger and meet the net cash requirement contained in the Merger Agreement.

If Signal stockholders do not approve the sale of the MyPRS Assets to Quest, Signal will be unable to complete the sale pursuant to the Intellectual Property Purchase Agreement with Quest and the lab business will continue to be owned by Signal. Moreover, because the sale, divestiture and/or winding down of Signal s lab business is a closing condition of the Merger Agreement, success of the Merger is also dependent upon stockholder approval of the sale of the MyPRS Assets to Quest. Further, if Signal stockholders do not approve the sale of the MyPRS Assets to Quest and Signal is therefore unable to complete the sale and receive the anticipated cash proceeds, then Signal may incur additional expenses which may not allow Signal to satisfy the closing net cash requirement contained in the Merger Agreement. As a consequence, Miragen will have the right to terminate the Merger Agreement.

The Intellectual Property Purchase Agreement

The following is a description of the material terms of the Intellectual Property Purchase Agreement. The following description does not purport to describe all of the terms and conditions of the Intellectual Property

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Purchase Agreement. The full text of the Intellectual Property Purchase Agreement is attached to this proxy statement/prospectus/information statement as *Annex G* and is incorporated by reference. You are urged to read the Intellectual Property Purchase Agreement in its entirety because it is the legal document that governs the terms and conditions of the proposed sale of the MyPRS Assets.

Included Assets and Retained Liabilities

Pursuant to the Intellectual Property Purchase Agreement, Signal has agreed to sell all of its rights to the MyPRS test, including all of Signal s rights, title and interests to intellectual property assets therein. As part of the sale of MyPRS Assets, Signal will assign all of its rights, interests and obligations under certain agreements, including that certain License Agreement effective as of April 1, 2010, made by and between the Board of Trustees of the University of Arkansas acting for and on behalf of the University of Arkansas for Medical Sciences, a public institution of higher education, and Myeloma Health LLC, a Delaware limited liability company, as amended, collectively referred to herein as the UAMS License Agreement. Signal will also provide to Quest certain information technology, software and firmware related or required for the use of the MyPRS test. As part of the Intellectual Property Purchase Agreement, Signal retains rights to Signal s accounts receivables as of the date the sale of the MyPRS Assets is closed, or the Asset Sale Closing Date. While Quest will not assume any liabilities of Signal, Quest is responsible for all liabilities arising after the Asset Sale Closing Date related to the assigned contracts, other than liabilities arising after the Asset Sale Closing Date due to a breach by Signal of any assigned contracts.

Purchase Price

As consideration for the sale of the MyPRS Assets, Quest will pay to Signal $825,000, plus an additional $100,000 if Quest exercises the option to require Signal to operate the lab until January 14, 2017. Such purchase price will be wire transferred to Signal on or immediately prior to the Asset Sale Closing Date.

Effective Time

The closing of this transaction is anticipated to occur as promptly as practicable after Signal obtains stockholder approval and Signal and Quest satisfy all other conditions to closing.

Representations and Warranties of Signal

The Intellectual Property Purchase Agreement contains representations and warranties customarily included for a seller in similar transactions of this nature relating to, among other things:

Signal s due organization and good standing;

due authorization and corporate authority (including stockholder approval) to enter into the Intellectual Property Purchase Agreement and to consummate the transactions contemplated thereby;

the absence of conflicts or consents required (other than stockholder approval) for Signal to enter into the Intellectual Property Purchase Agreement and related agreements and to consummate the transactions contemplated thereby (including the assignment of the UAMS License Agreement);

the ownership and history of the intellectual property for the MyPRS Assets, including, to Signal s knowledge, the validity and enforceability of the intellectual property for the MyPRS Assets and its absence of infringement;

Signal s exclusive ownership of its rights, title and interest to the MyPRS Assets;

the absence of certain litigation or proceedings with respect to the MyPRS Assets and compliance with applicable laws;

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that Signal s entering into the Intellectual Property Purchase Agreement will not adversely affect Quest s ownership rights with respect to the MyPRS Assets;

the protection and preservation of the chain of title for the MyPRS Assets and the confidential information and trade secrets related thereto;

the lack of contracts providing for the license, sale or encumbrance of the MyPRS Assets and the validity and enforceability of the agreements assigned to Quest (including the UAMS License Agreement);

taxes with respect to the MyPRS Assets;

the value of the MyPRS Assets and the consideration being paid by Quest;

the solvency of Signal (taking into consideration the payment of the purchase price); and

that Signal is not obligated to pay fees to any brokers other than Cantor.

The assertions embodied in the representations and warranties made by Signal are qualified by Signal s knowledge in certain instances and information set forth in a confidential schedule delivered in connection with the Intellectual Property Purchase Agreement. While Signal does not believe that the schedule contains information that securities laws require it to publicly disclose, other than information that is being disclosed in this proxy statement/prospectus/information statement, the schedule may contain information that modifies, qualifies and creates exceptions to the representations and warranties set forth in the Intellectual Property Purchase Agreement. Accordingly, you should not rely on any of these representations and warranties as characterizations of the actual state of facts, since they may be modified in important respects by the underlying schedule.

Representations and Warranties of Quest

The Intellectual Property Purchase Agreement contains representations and warranties customarily included for a buyer in similar transactions of this nature relating to, among other things:

Quest s due organization and good standing;

due authorization and limited liability company authority to enter into the Intellectual Property Purchase Agreement and to consummate the transactions contemplated thereby;

the consents required to enter into the Intellectual Property Purchase Agreement and to consummate the transactions contemplated thereby;

the enforceability of the Intellectual Property Purchase Agreement against Quest; and

that Quest entering into the Intellectual Property Purchase Agreement and consummating the transactions contemplated thereby will not result in a conflict with its charter documents, certain legal requirements or certain agreements.

Non-Solicitation

From November 29, 2016 until the Asset Sale Closing Date, Signal is prohibited from directly or indirectly soliciting, initiating, encouraging, accepting or entertaining any inquiries, offers or proposals from any other person or entity relating to any asset sale or similar transaction involving the MyPRS Assets (with the exception of operating the MyPRS test in the ordinary course of its business).

Assignment of Agreements

As part of the sale of the MyPRS Assets, Signal will assign to Quest various agreements, including the UAMS License Agreement. Quest agrees to be bound by the terms, obligations and conditions as a licensee under the UAMS License Agreement pursuant to an assignment and assumption agreement.

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Closing Conditions

Under the terms of the Intellectual Property Purchase Agreement, there are several conditions to closing. Among such conditions, neither Signal nor Quest is obligated to close the sale of the MyPRS Assets if there is a court order or injunction prohibiting the sale of the MyPRS Assets, or if Signal has not obtained stockholder approval for the sale of the MyPRS Assets or the Merger Agreement.

Signal s and Quest s obligation to close are contingent upon additional customary closing conditions including, without limitation, the following: (i) accuracy of certain representations and warranties as set forth in the Intellectual Property Purchase Agreement; (ii) performance of other agreements, covenants and conditions under the Intellectual Property Purchase Agreement; (iii) execution of certain documents by the parties and delivery of certain closing certificates specified in the Intellectual Property Purchase Agreement.

Termination

The Intellectual Property Purchase Agreement may be terminated due to a number of reasons, including: (i) by mutual written consent of Quest and Signal; (ii) if there has been a material breach, inaccuracy or failure to perform any of the representations, warranties, covenants or agreements of a party as set forth in the Intellectual Property Purchase Agreement; (iii) the Asset Sale Closing Date has not occurred on or before April 30, 2017 (unless agreed to otherwise); (iv) the Merger Agreement has been terminated; (v) any law makes such sale illegal or otherwise prohibited; (vi) a governmental authority issues an order preventing or enjoining the consummation of the transaction; or (vii) a proceeding or investigation seeks material damages in connection with the Merger or the sale of the MyPRS Assets.

Expenses

Signal and Quest are each responsible for their respective costs and expenses that Signal or Quest incur in connection with the proposed sale of the MyPRS Assets.

Indemnification

Certain of Signal s representations and warranties survive the closing for a period of 12 months and others remain in force and effect for 18 months. Under the Intellectual Property Purchase Agreement, Signal is required to indemnify Quest for any breaches of Signal s representations, warranties, covenants and agreements during the applicable survival period and with respect to any retained liabilities and therefore Signal will have continuing potential liability to Quest following the closing. Quest agrees to indemnify Signal under the Intellectual Property Purchase Agreement for any breaches of Quest s representations, warranties or covenants and any assumed liabilities.

The Intellectual Property Purchase Agreement limits Signal s aggregate liability for indemnification with respect to the breach of certain representations and warranties to $825,000 and $206,250 of this amount for the breach of other representations and warranties and such indemnification is subject to a nuisance provision such that Signal s indemnification obligations are not triggered unless the aggregate amount of a claim, demand or loss exceeds $41,250, after which Signal will be obligated for the full amount of losses.

Accounting Treatment

Signal will record the sale of the MyPRS Assets in accordance with U.S. GAAP.

Government Approvals

Signal is not aware of any federal or state regulatory requirements that must be complied with or approvals that must be obtained to complete the sale of the MyPRS Assets, other than the filing of this proxy statement/

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prospectus/information statement with the SEC. If any additional approvals or filings are required, Signal will use commercially reasonable efforts to obtain those approvals and make any required filings before completing the transactions.

No Appraisal Rights

Signal stockholders do not have appraisal rights under the DGCL in connection with the sale of the MyPRS Assets.

Required Vote

The affirmative vote of holders of a majority of the outstanding shares of Signal common stock entitled to vote on the record date for the Signal special meeting is required to approve Signal Proposal No. 9. **Each of Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 9 are conditioned upon each other. Therefore, the Merger cannot be consummated without the approval of Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 9.**

Recommendation of Board of Directors

SIGNAL S BOARD OF DIRECTORS RECOMMENDS THAT THE SIGNAL STOCKHOLDERS VOTE FOR SIGNAL PROPOSAL NO. 9 TO APPROVE THE SALE OF ALL OF SIGNAL S INTELLECTUAL PROPERTY ASSETS RELATED TO ITS MYPRS TEST TO QUEST DIAGNOSTICS INVESTMENTS LLC.

Signal Proposal No. 10: Approval of the Amendment to the Certificate of Incorporation of Signal to Eliminate the Ability of Signal Stockholders to Act by Written Consent.

At the Signal special meeting, Signal stockholders will be asked to approve a proposal to amend Signal s certificate of incorporation to eliminate the ability of stockholders to act by written consent. A copy of the proposed amendment to Signal s certificate of incorporation is attached as *Annex H* to this proxy statement/prospectus/information statement. The Merger Agreement requires that Signal seek stockholder approval to eliminate the ability of stockholders to act by written consent, although obtaining such stockholder approval is not a condition to closing the Merger.

Section 228 of the DGCL provides that, unless otherwise provided in a company s certificate of incorporation, any action that may be taken at any annual or special meeting of stockholders may be taken without a meeting, without prior notice to all stockholders and without holding a vote, if a consent in writing is signed by stockholders representing the minimum number of votes necessary to approve the action at a meeting at which all shares entitled to vote thereon were present and voted. Signal stockholders currently have the ability to act by written consent because Signal s certificate of incorporation does not contain a provision eliminating the right of stockholders to act by written consent. If Signal stockholders adopt this proposed amendment to Signal s certificate of incorporation, the power of its stockholders to act without a meeting by written consent will be eliminated. Signal s board of directors has determined that removing the ability of the stockholders to act by written consent without a meeting is in the best interests of Signal and its stockholders.

Signal s board of directors values the exchange of thoughts and views with all of its stockholders, is committed to being highly responsive to stockholder interests and concerns and has carefully considered the advantages and disadvantages of eliminating the ability of stockholders to act by written consent and has determined that it is appropriate to adopt this proposed amendment to Signal s certificate of incorporation. In particular, Signal s board of directors has noted that the written consent process, by its nature, is not conducive to an orderly and transparent discussion on the merits of a proposed action, as would occur if the action were raised at a meeting of stockholders. Even if Signal eliminates the ability of its stockholders to act by written consent, proposals for stockholder action,

such as proposed amendments to Signal s bylaws or the removal of one or more of Signals

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directors, could still take place at the Signal annual meeting of stockholders. The process for proposing and discussing matters at an annual meeting is well-established and specifically designed to provide stockholders and Signal s board of directors adequate time to review, evaluate, discuss and consider a proposed action. The written consent process does not foster these characteristics and can be subject to abuse. For example, a dissident stockholder holding a small number of Signal s outstanding common stock would be able to launch an unsolicited consent solicitation to change the make-up of Signal s board of directors. Because Signal s certificate of incorporation permits stockholders to take action by written consent, this dissident stockholder would be able to commence this process without ever approaching Signal or Signal s board of directors to express any concerns or ideas. The consent solicitation could result in an expensive and time-consuming distraction to Signal s operational efforts, even if only a small number of shares ultimately support the dissident s proposals.

The proposed amendment also provides various additional benefits. For example, the amendment could reduce the time and effort Signal s board of directors and management would need to devote to stockholder proposals, which time and effort could distract its directors and management from other important company business. In addition, the amendment would make it difficult for a person who acquires a majority of the outstanding common stock of Signal to approve a merger or sale of Signal or take other action normally requiring a vote of stockholders without providing notice to all stockholders and convening a meeting to vote on the proposed action. Signal s board of directors believes that the benefits of discouraging hostile bidders and dissident stockholders seeking to further their own special interests from conducting potentially expensive and disruptive consent solicitations outweigh the inconvenience of needing to act at the Signal annual meeting of stockholders.

In light of the foregoing, as well as the covenant in the Merger Agreement requiring Signal to seek stockholder approval, Signal s board of directors believes that amending its certificate of incorporation to eliminate stockholder action by written consent is a prudent corporate governance measure. The proposed text relating to the amendment to Signal s certificate of incorporation to eliminate the ability of stockholders to act by written consent as it is proposed to be amended is attached as *Annex H* to this proxy statement/prospectus/information statement.

If Signal stockholders approve this proposal, Signal anticipates that its board of directors will approve a corresponding amendment to Signal s bylaws.

Potential Anti-Takeover Effect and Other Provisions

The proposal to eliminate the ability of Signal stockholders to act by written consent could have a potential anti-takeover effect. The effect of the proposal might render more difficult or discourage a merger, tender offer, proxy contest or change in control and the removal of management, which Signal stockholders might otherwise deem favorable. The proposal, if adopted, may be disadvantageous to Signal stockholders to the extent that it has the effect of delaying or discouraging a future takeover attempt that is not approved by Signal s board of directors but which a majority of Signal stockholders may deem to be in their best interests. The amendment to Signal s certificate of incorporation is not being proposed in response to any attempt to acquire control of Signal, to obtain representation on Signal stockholders, or to take significant corporate action and Signal is not aware of any such plans, other than the Merger. Signal s board of directors does not currently have any plans to implement additional measures that may have an anti-takeover effect other than those actions described in this proxy statement/prospectus/information statement.

Required Vote

The affirmative vote of holders of a majority of the outstanding shares of Signal common stock entitled to vote on the record date for the Signal special meeting is required to approve Signal Proposal No. 10.

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Recommendation of Board of Directors

SIGNAL S BOARD OF DIRECTORS RECOMMENDS THAT SIGNAL STOCKHOLDERS VOTE FOR SIGNAL PROPOSAL NO. 10 TO APPROVE THE ELIMINATION OF THE ABILITY OF SIGNAL STOCKHOLDERS TO ACT BY WRITTEN CONSENT.

Signal Proposal No. 11: Approval of Possible Adjournment of the Signal Special Meeting

If Signal fails to receive a sufficient number of votes to approve Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10, Signal may propose to adjourn the Signal special meeting, for a period of not more than 30 days, for the purpose of soliciting additional proxies to approve Signal Proposal Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10. Signal currently does not intend to propose adjournment at the Signal special meeting if there are sufficient votes to approve Signal Proposal 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10.

Required Vote

The affirmative vote of the holders of a majority of the shares of Signal common stock having voting power present in person or represented by proxy at the Signal special meeting is required to approve Signal Proposal No. 11.

Recommendation of Board of Directors

SIGNAL S BOARD OF DIRECTORS RECOMMENDS THAT THE SIGNAL STOCKHOLDERS VOTE FOR SIGNAL PROPOSAL NO. 10 TO ADJOURN THE SIGNAL SPECIAL MEETING, IF NECESSARY, TO SOLICIT ADDITIONAL PROXIES IF THERE ARE NOT SUFFICIENT VOTES IN FAVOR OF SIGNAL PROPOSAL NOS. 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10.

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SIGNAL BUSINESS

Overview

Signal is a commercial stage, molecular genetic diagnostic company focused on providing innovative diagnostic services that help physicians make better-informed decisions concerning the care of their patients suffering from cancer. Its mission is to develop, validate and deliver innovative diagnostic services that enable better patient-care decisions. The patient-care decisions include the field of personalized medicine, wherein diagnostic tests guide treatment decisions with genetically-targeted therapies as well as traditional chemotherapy regimens. Signal holds an exclusive license in its licensed field to the intellectual property stemming from the renowned research on multiple myeloma, or MM, performed at the University of Arkansas for Medical Sciences, or UAMS.

Signal is currently marketing and selling its MyPRS test to physicians treating patients suffering from MM in academic institutions in all 50 states. Its MyPRS test is performed in Signal s approximately 2,800 square foot laboratory located in Little Rock, Arkansas, which is certified under CLIA and accredited by CAP to perform high complexity testing. Signal s MyPRS test is a microarray-based Gene Expression Profiling, or GEP, assay that tests for the presence of specific groups of genes that can predict low or high level risk of early relapse in patients suffering from MM. The information provided by Signal s MyPRS test aids physicians in selecting the optimal treatment regimen for each patient s unique MM condition. To Signal s knowledge, it is the only company marketing a GEP test for assessing the status of MM in the United States. The MyPRS test is protected by a substantial patent portfolio of issued and pending patents.

Signal has been operating at a net loss since inception, based upon a business plan that anticipated raising additional funds through debt or equity financing to operate beyond the second quarter of 2017. Due to current market conditions, Signal s current liquidity position and its depressed stock price, Signal came to believe it would be difficult to obtain additional equity or debt financing on acceptable terms, if at all. Therefore, Signal s board of directors began discussing and evaluating its strategic opportunities to maximize stockholder value beginning near the end of 2015, including engaging in a sale of the company or a merger transaction.

In April 2016, Signal engaged Cantor as its exclusive financial advisor in connection with exploring and assessing strategic opportunities in connection with a possible sale or merger, as well as its exclusive financial advisor and placement agent in connection with a potential capital raise for equity or debt capital. Cantor was selected by Signal due to its substantial experience with the healthcare industry and transactions similar to this transaction. Signal conducted a process of identifying and evaluating potential strategic combinations or the sale of substantially all of its assets. On October 31, 2016, Signal, Merger Sub and Miragen entered into the Merger Agreement, pursuant to which, among other things, subject to the satisfaction or waiver of the conditions set forth in the Merger Agreement, Merger Sub will merge with and into Miragen, with Miragen becoming a wholly-owned subsidiary of Signal and the surviving corporation of the Merger. If the Merger is completed, the business of Signal will become the business of Miragen as described in this proxy statement/prospectus/information statement under the caption *Miragen Business*.

On October 31, 2016, Signal also announced that it had entered into a non-binding letter of intent with a large global diagnostic laboratory for the sale of intellectual property assets related to Signal s MyPRS test. Subsequently on November 29, 2016, Signal and Quest Diagnostics Investments LLC entered into the Intellectual Property Purchase Agreement. Pursuant to the Intellectual Property Purchase Agreement, upon closing of the sale of the MyPRS asset transaction, Signal will receive $825,000 in cash from Quest. These net proceeds are currently expected to be approximately equal to the anticipated costs of operating the MyPRS business from the date of signing of the letter intent through the projected closing date of the Merger with Miragen (resulting, from a cash perspective, in an outcome similar to an immediate cessation of the MyPRS business). Completion of the MyPRS asset sale is subject to

satisfaction of the conditions contained in the definitive asset purchase agreement and approval of the sale by Signal stockholders, as further described in this proxy statement/prospectus/information statement.

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If the Merger and the sale of intellectual property assets related to Signal s MyPRS test are not completed, Signal will reconsider its strategic alternatives and would likely dissolve and liquidate its assets. In such event, Signal would be required to pay all of its debts and contractual obligations, and to set aside certain reserves for potential future claims, and there can be no assurances as to the amount or timing of available cash remaining to distribute to stockholders after paying the Signal obligations and setting aside funds for reserves.

Signal s Intellectual Property

Signal uses its trademark of Signal Genetics, Inc.™ and registered trademark MyPRS® in this proxy statement/prospectus/information statement.

Signal currently licenses, or owns outright, 14 issued patents (12 issued U.S. patents, one issued European patent validated in 9 countries: Switzerland, Germany, Denmark, Spain, France, United Kingdom, Italy, Netherlands, and Sweden, and one issued Japanese patent with various expiration dates ranging from 2022 to 2030) and 11 pending patent applications, many of which protect and defend its exclusive ability to market the MyPRS test as well as additional proprietary tests and treatments. Signal also has six registered U.S. trademarks to further differentiate its products and services in the marketplace.

There are two issued U.S. patents related to the MyPRS test, which form the basis of Signal s right to exclude others from practicing the MyPRS test. The patents claim methods of gene expression-based classification for MM using RNA from plasma cells, methods of identifying groups of genes that can distinguish normal and MM plasma cells by isolating RNA from CD138 positive plasma cells and identifying differentially expressed genes, methods of diagnosing MM by examining mRNA levels or chromosomal translocations of particular genes from plasma cells, methods of determining the prognosis of a human multiple myeloma patient by measuring gene expression levels of multiple genes from plasma cells, and methods of determining the prognosis of a MM patient by determining the copy number of the CKS1B gene in plasma cells. CKS1B is one of the genes in the 70 gene signature.

In addition to the issued U.S. patents, Signal has one issued Japanese patent and several pending patent applications in the United States and abroad directed to other aspects of the MyPRS test. For example, the Japanese patent provides methods for examining the susceptibility of a subject for transformation from a low-risk to a high-risk MM by measuring gene expression levels of multiple genes expressed from plasma cells isolated from the subject. A Canadian application and an issued European counterpart patent of one of the five issued U.S. patents (U.S. Patent No. 8,843,320) describe the full 70 gene signature used in the MyPRS test. Another pending U.S. application provides methods of prognosing subjects with MGUS using the 70 gene signature.

Competition

The primary competition for the MyPRS test stems from the use of older diagnostic technologies to assess patient prognosis and to define high risk and low risk MM patients. These older technologies include various serum markers, karyotype analysis and FISH probes. Several independent groups have assessed the use of GEP versus various conventional methodologies and these studies have been published in peer-reviewed journals.

Another source of competition for the MyPRS test stems from other scientific teams attempting to develop GEP signatures utilizing other genes or a subset of the genes utilized in the MyPRS test. Two signatures of note include the French IFM-15 gene signature and the Netherlands EMC-92 gene signature which have been studied by independent groups and compared to the UAMS GEP test, MyPRS. Signal is not currently aware of any company attempting to bring GEP based tests into the U.S. market.

Signal s actual and potential competitors in the United States and abroad may include biotechnology, genomic and diagnostic companies such as Novartis, Cancer Genetics, Inc. and NeoGenomics, Inc., Bio-Reference Laboratories (a division of OPKO Health, Inc.)., Integrated Genetics (a LabCorp Specialty Testing Group) and Foundation Medicine, Inc., large clinical laboratories, universities and other research institutions.

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University of Arkansas License Agreement

In April 2010, Signal entered into a licensing agreement with UAMS for the exclusive use, in Signal s licensed field, of intellectual property developed at the Myeloma Institute of UAMS consisting of patents used in the GEP assay, MyPRS and its related technology through April 2020. The agreement is effective through the earlier of the expiration of the related patents or termination of the agreement pursuant to its terms. Signal may terminate the agreement for any reason upon 90 days written notice. UAMS may terminate the agreement with 90 days written notice upon a material breach of the agreement by Signal or if Signal challenges the validity of any licensed patent in a court of competent jurisdiction. Under the terms of the license agreement, Signal is required to pay $30,000 in annual minimum royalties on sales to customers other than UAMS unless sales, as defined in the agreement, exceed certain thresholds in which case the additional royalties would range from 2% 4%. Total royalty expense during each of the years ended December 31, 2015 and 2014 was $30,000.

Revenue sourced from or through UAMS accounted for 54% and 84% of Signal s net revenue for the years ended December 31, 2015 and 2014, respectively, and accounted for 22% and 64% of Signal s net revenue during the nine months ended September 30, 2016 and 2015, respectively. The decrease is due to the decrease in research funds available at UAMS for such programs. Signal expects continued declining revenue from the UAMS research programs.

Government Regulation

Clinical Laboratory Improvement Amendments

Signal is subject to CLIA, which is administered by the Center for Medicare and Medicaid Services, or CMS, and extends federal oversight to virtually all clinical laboratories by requiring certification by the federal government or by a federally-approved accreditation agency.

New York State Laboratory Licensing

New York state laws and regulations also establish standards for the day-to-day operations of clinical laboratories, including physical facility requirements and equipment and quality control. New York standards include proficiency testing requirements, even for a laboratory not located within the state. In addition, the New York Department of Health separately approves certain Laboratory Developed Test, or LDT, offered in New York State. In June 2014, following Signal s initial public offering, it obtained the requisite approvals for its LDT in New York. Such license expires in June 2017.

Other States Laboratory Testing

In addition to New York, certain other states, including California, Florida, Maryland, Pennsylvania, and Rhode Island require that Signal hold licenses to test specimens from patients residing in those states even though Signal s laboratory is physically located in Arkansas. Signal has obtained licenses in these states and believes it is in material compliance with its applicable licensing laws.

Other Laboratory Regulations

Signal s clinical operations are also subject to regulation under state laws that may be more stringent than CLIA. State clinical laboratory laws generally require that laboratories and/or laboratory personnel meet certain qualifications. State clinical laboratory laws also generally require laboratories to specify certain quality controls and maintain

certain records.

HIPAA Compliance and Privacy Protection and the HITECH Act

HIPAA and its implementing regulations established comprehensive federal protection for the privacy and security of health information. The HIPAA standards apply to three types of organizations, or Covered

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Entities : health plans, health care clearing houses, and health care providers who conduct certain health care transactions electronically, or Standard Transactions. Covered Entities must have in place administrative, physical and technical safeguards to protect against the misuse of individually identifiable health information, or PHI. Additionally, some state laws impose privacy and security protections more stringent than HIPAA s and some states impose privacy and security obligations specifically applicable to clinical laboratories. Additionally, many states have implemented data breach laws requiring additional security measures for certain types of PHI and also public notification of the theft, breach or other loss of personal information. Signal is a Covered Entity subject to the HIPAA regulations because its testing services are reimbursable by insurance payors and it conducts Standard Transactions. Signal has an active program designed to address HIPAA regulatory compliance.

Additionally, the HITECH Act and the regulations promulgated thereunder by the HHS require HIPAA covered entities, including clinical laboratories, to provide notification to affected individuals and to the Secretary of HHS, following discovery of a breach of unsecured PHI. In some cases, the HITECH Act requires covered entities to provide notification to the media of breaches. In the case of a breach of unsecured PHI at or by a business associate of a covered entity, the HITECH Act requires the business associate to notify the covered entity of the breach. The HITECH Act requires the Secretary of HHS to post on the HHS website a list of covered entities that experience breaches of unsecured PHI involving more than 500 individuals. The HITECH Act made other changes relating to the HIPAA privacy and security rules, including, among others, establishing that, effective February 17, 2010, the HIPAA security and certain privacy regulations apply directly to business associates and, consequently, that a business associate s violation of the HIPAA regulations may result in government enforcement action directly against the business associate or the covered entity with whom the business associate contracts depending upon the nature of that business relationship. Signal contracts with business associates to provide certain services regulated by the HIPAA regulations and therefore must comply with the HIPAA regulations governing those business relationships.

In summary, Signal is required to comply with laws governing the transmission, security and privacy of health information that require significant compliance costs, and any failure to comply with these laws could result in material criminal and civil penalties.

Research and Development Program

Signal s research and development expenses were $1.0 million and $347,000 for the years ended December 31, 2015 and 2014, respectively, representing 39% and 8% of its net revenue for the years ended December 31, 2015 and 2014, respectively. Signal s research and development expenses were $226,000 and $253,000 for the nine months ended September 30, 2016 and 2015, respectively, representing 34% and 29% of its net revenue for the nine months ended September 30, 2016 and 2015, respectively.

Employees

As of December 31, 2016, Signal had 17 employees, all of whom are full-time employees. None of its employees is represented by a labor union, and Signal considers its relationship with its employees to be good.

Properties

Signal currently leases 5,560 square feet of office space in Carlsbad, California, for its corporate headquarters. This lease expires in October 2017. Signal also leases 2,800 square feet of space in Little Rock, Arkansas for use as a clinical reference laboratory. This lease terminates in January 2017.

Legal Proceedings

Signal is not currently a party to any legal proceedings.

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MIRAGEN BUSINESS

Overview

Miragen is a clinical-stage biopharmaceutical company discovering and developing proprietary RNA-targeted therapeutics with a specific focus on microRNAs and their role in diseases where there is a high unmet medical need. microRNAs are short RNA molecules, or oligonucleotides, that regulate gene expression or activity and play a vital role in influencing the pathways responsible for many disease processes. Miragen believes its experience in microRNA biology and chemistry, drug discovery, bioinformatics, and translational medicine provide it with a potential competitive advantage to identify and develop microRNA-targeted drugs designed to regulate gene pathways to result in disease modification. Miragen uses its expertise in systems biology and oligonucleotide chemistry to discover and develop a pipeline of product candidates. Miragen s two lead product candidates, MRG-106 and MRG-201, are currently in Phase 1 clinical trials. Miragen s clinical product candidate for the treatment of certain cancers, MRG-106, is an inhibitor of microRNA-155, or miR-155, which is found at abnormally high levels in several blood cancers. Miragen s clinical product candidate for the treatment of pathological fibrosis, MRG-201, is a replacement for miR-29, which is found at abnormally low levels in a number of pathological fibrotic conditions, including cardiac, renal, hepatic, and pulmonary fibrosis, as well as systemic sclerosis. In addition to Miragen s clinical programs, it is developing a pipeline of pre-clinical product candidates. The goal of Miragen s translational medicine strategy is to progress rapidly to first in human studies once it has established the pharmacokinetics (the movement of drug into, through, and out of the body), pharmacodynamics (the effect and mechanism of action of a drug) and safety of the product candidate in pre-clinical studies.

In February 2016, Miragen administered MRG-106 to the first patient in a multi-site, open-label, dose-ranging Phase 1 clinical trial that seeks to enroll up to 50 patients with a confirmed diagnosis of mycosis fungoides, or MF, which is a subtype of cutaneous T-cell lymphoma, or CTCL, in which malignant T-cells move to the skin and form patches (palpable flat lesions) or plaques and tumors. MRG-106 has been generally safe and well tolerated in the six patients who received the product candidate in Part A, with no significant injection site reactions or dose limiting toxicities. In addition, molecular analyses of patient tissue samples demonstrated changes in gene expression in the tumors consistent with what Miragen believes is the expected mechanism of action of MRG-106 in CTCL lesions. Miragen believes that these data demonstrate the potential of MRG-106 to regulate gene pathways to provide clinical benefit in MF patients. MRG-106 has been generally safe and well tolerated in the eight patients who have received the product candidate in Part B, with no significant injection site reactions.

In November 2015, Miragen initiated a single-center Phase 1, double-blind, placebo-controlled, single and multiple dose-escalation clinical trial of MRG-201 enrolling up to 70 healthy volunteers. Forty-seven volunteers have enrolled in the trial, 40 of whom have received MRG-201. MRG-201 has been generally safe and well-tolerated in all volunteers, with no significant injection site reactions. Biomarker analysis demonstrated on-target molecular activity for MRG-201 in human skin, with an apparent dose-dependent effect after a single dose. Preliminary histological analysis indicates that incisions treated with MRG-201 generally showed a decrease in formation of fibrous tissue, or fibroplasia, with no apparent detrimental effect on wound healing. Miragen believes these data suggest that MRG-201 may be able to reduce pathological fibrosis and scar formation in human skin.

In addition to MRG-106 and MRG-201, Miragen has a pipeline of wholly-owned, pre-clinical product candidates that target individual microRNAs thought to be at abnormally high or low levels in particular diseases. Miragen believes its experience in microRNA biology and chemistry, drug discovery, bioinformatics, and translational medicine allows it to identify and develop RNA-targeted drugs that are designed to regulate gene pathways to return diseased cells to a healthy state. Miragen believes that its drug discovery and development strategy will enable it to progress its product candidates from pre-clinical discovery to demonstration of mechanism of action in humans quickly and efficiently.

The elements of this strategy include identification of biomarkers that may predict clinical benefit and monitoring outcomes in early-stage clinical trials to help guide later clinical development.

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The following table illustrates Miragen s most advanced programs:

Product Candidate	Target	Disease Area	Development Status
Clinical			
MRG-106	miR-155	Blood Cancers	Phase 1 clinical trial
MRG-201	miR-29	Pathological Fibrosis	Phase 1 clinical trial
Pre-Clinical			
MRG-107	miR-155	Neuro-Inflammation	IND Enabling
MRG-110	miR-92	Revascularization	IND Enabling
Unnamed	TBA	Cardiovascular	Lead Optimization

Miragen s Strategy

Miragen seeks to use its expertise and understanding of microRNA biology, oligonucleotide chemistry and product development to create novel products that have the potential to transform the treatment of patients with serious diseases. The key components of Miragen s strategy are as follows:

Continue to develop MRG-106 in blood cancers. Miragen s ongoing Phase 1 clinical trial of MRG-106 for the treatment of patients with MF is designed to deliver the necessary data and mechanistic proof-of-concept to support further development of miR-155 inhibitor, MRG-106, in multiple cancer indications in which elevated levels of miR-155 has been observed. Miragen plans to expand its clinical program to explore the broader utility of MRG-106 in patients with other blood cancers, such as diffuse large B cell lymphoma and virally induced lymphomas. Miragen also intends to initiate a Phase 2 clinical trial of MRG-106 in CTCL using a dose, schedule and route of administration selected based on results obtained in the Phase 1 clinical trial.

Continue to develop MRG-201 in pathological fibrosis. Miragen s ongoing Phase 1 clinical trial of MRG-201 in healthy volunteers, in addition to being a safety and tolerability trial, is designed to serve as a human mechanistic proof-of-concept assessment that helps reduce the risk associated with further development of the product candidate for other forms of pathological fibrosis such as pulmonary, retinal, hepatic and renal fibrosis. This clinical trial may serve as a prelude to a Phase 2 clinical trial in skin manifestations of pathological fibrosis. Miragen may pursue additional development of MRG-201 independently or through a strategic alliance.

Utilize rare disease development pathways at the FDA and comparable foreign regulatory agencies to accelerate progression to late stage development and early approval. For wholly-owned programs, Miragen intends to focus on rare and genetically stratified diseases where RNA modulation may produce clinical benefit so that Miragen can take advantage of regulatory programs intended to expedite drug development. Miragen plans to apply for the regulatory programs for orphan drug designation, fast track, breakthrough therapy designation, and/or priority review when available to potentially reduce clinical trial expense and increase speed to commercialization.

Collaborate with other biotechnology and pharmaceutical companies to develop additional product candidates. Miragen intends to seek out collaborations for additional microRNA targets and development of compounds in Miragen s pipeline that require larger clinical trials or extensive commercial infrastructure. For example, Miragen has a multi-target strategic collaboration with Servier to develop product candidates for the treatment of cardiovascular diseases.

Use its in-house research and translational expertise to further develop its product candidate pipeline. Miragen s in-house research team investigates novel microRNA targets identified through internal efforts and academic collaborations. It then seeks to establish evidence that the microRNA is implicated in certain diseases. Miragen believes that this internal research and expertise could provide a foundation to develop product candidates for the treatment of a variety of diseases in which microRNA is implicated.

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Selectively build focused commercial capabilities and establish commercial collaborations to maximize the value of Miragen s pipeline. To date, Miragen has retained all U.S. and Japanese rights to its product candidates in the strategic collaboration with Servier and global rights in all other programs. While Miragen has not yet defined its sales, marketing or product distribution strategy for MRG-106, MRG-201 or any of its other product candidates, its commercial strategy may include the use of strategic alliances, distributors, a contract sales force, or the establishment of its own commercial and specialty sales force to maximize the value of its pipeline.

Miragen s Product Candidates

MRG-106

MRG-106, is an inhibitor of miR-155. Miragen is conducting a Phase 1 clinical trial of MRG-106 in patients with MF. Scientific literature identifies miR-155 as a cancer-causing microRNA, or oncomiR with a central role in the development of multiple blood cancers. miR-155 controls a number of validated disease targets, including Bruton s Tyrosine Kinase and nuclear factor kappa-light-chain-enhancer of activated B cells. In certain B-cell lymphomas, improvement of clinical outcomes has been associated with normalization of miR-155 levels, and poor prognosis, resistance to treatment and recurrence of the disease are associated with elevated levels of miR-155. In addition to playing a role in B-cell malignancies, miR-155 is elevated in malignant white blood cells, called T-cells, found in skin lesions of patients with MF. Miragen screened a library of locked nucleic acid modified oligonucleotides, and identified MRG-106 as having what Miragen believed was the best potential efficacy and drug-like properties including improved pharmacodynamics in human T- and B-cell lymphoma cell lines.

Mycosis Fungoides

MF is the most common form of a type of blood cancer called CTCL. CTCL occurs when T-cells become cancerous. These types of cancers cause different types of skin lesions. Although the skin is involved, the skin cells themselves are not cancerous. According to the National Institutes of Health, or NIH, MF usually occurs in adults over age 50, although the disease may occur in children.

Miragen believes the total population of patients with cutaneous lymphoma in the United States and Canada is approximately 30,000. In a 2012 publication, the Lymphoma Research Foundation estimated the prevalence of MF to be 16,000-20,000 cases in the United States. According to the Leukemia and Lymphoma Society in a 2014 publication, approximately 70% to 80% of patients are diagnosed with early stage MF that impacts only the skin. In these patients, the disease typically has a slow progression, but is accompanied by serious quality of life detriments such as severe itchiness, pain and disfiguration. The five-year survival rate for newly diagnosed patients with CTCL is approximately 90%. In later stage MF and in some early stage patients whose disease progresses, the cancer may involve the lymph nodes, blood and internal organs. The five-year survival rate in later stage patients with CTCL (stages IIB, III, IV) is approximately 20-60% depending on stage.

There are currently no curative therapies for CTCL, and concurrent and consecutive treatments, many with significant adverse events, tend to be given until loss of response. There is a need for new and improved therapies in CTCL to treat the disease and eliminate symptoms such as itchiness and painful skin lesions and to prolong survival in patients with aggressive disease. Most drugs for CTCL have response rates between 30 and 40%, and response durations tend to be less than a year.

There is no standard of care for treatment of MF. Treatment is dependent on stage of disease and responsiveness to previous therapy and is divided into skin-directed therapy and whole body treatments. For certain patients with advanced disease, allogeneic stem cell transplantation may offer prolonged survival, but the five-year survival is only

around 50%.

In addition to MF, the elevation of miR-155 has been implicated in several other blood cancers and certain solid tumors. Miragen believes there is a potential opportunity to develop a companion diagnostic that could detect and

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quantify levels of miR-155 in malignant cells. Miragen believes this approach may then allow for the selection of patients with elevated miR-155 levels who may be more likely to benefit from MRG-106 treatment and allow the drug to be used selectively in multiple cancers. There are several types of cancer in which high levels of miR-155 have been discovered, including subsets of diffuse large B-cell lymphoma, acute myeloid leukemia, certain virally induced lymphomas such as HTLV-1 associated lymphoma and Burkitt s lymphoma, Down Syndrome-associated acute lymphocytic leukemia, and other types of cancer. Miragen plans to evaluate additional types of lymphoma and leukemia in Phase 1 clinical trials and intends to explore other potential applications for MRG-106 through additional clinical studies in other tumor types.

MRG-106 Phase 1 Clinical Trial

Trial Design

Miragen is conducting a multi-site, open-label, dose-ranging Phase 1 clinical trial of MRG-106 for the treatment of MF at 11 U.S.-based clinical sites. This clinical trial consists of two parts and is expected to enroll up to 50 patients with MF. Patients may be allowed to be on other medications or background therapies so long as they have had no change in treatment regimen for CTCL, including drug and dose, for more than four weeks prior to enrollment and, in the opinion of the investigator, the patient is currently clinically stable and is likely to remain clinically stable for a minimum of three months after screening.

The primary objectives of this clinical trial are safety and tolerability. Secondary objectives include pharmacokinetic assessments, including measurement of absorption and clearance of MRG-106 from the blood. Additionally, there are several exploratory measures to assess any changes in lesion severity before and after treatment as well as pharmacodynamic and histology assessments. The clinical trial utilizes two validated measures of lesion severity: (i) CAILS, which is a composite measure that assesses the severity of one or more lesions on a patient and (ii) modified Severity Weighted Assessment Tool, or mSWAT, which is an assessment tool that is used to analyze the disease severity over a patient s entire body.

Part A of the clinical trial tested the effect of direct injections of 75 mg of MRG-106 intratumorally. Part A of the clinical trial enrolled six patients, five of whom completed dosing. One patient was withdrawn from the trial due to disease progression. In four patients, saline placebo was injected into a separate skin lesion at the same time. After eight to 14 days of treatment, in five patients, injections sites were biopsied and analyzed for drug concentration, molecular evidence of drug activity on target gene expression, and histological evidence of alterations in malignant cell numbers and other immune cell populations. Additionally, as an exploratory endpoint, CAILS scoring was used to assess clinical response.

Part B of the clinical trial is enrolling patients and is designed to assess whole body administration of MRG-106. The first group, or cohort, of patients in Part B started receiving doses of MRG-106 in August 2016 as a subcutaneous injection of 300 mg/dose for four weeks. The next two cohorts of three patients each received injections of 600 mg or 900 mg/doses of MRG-106. One patient in the 900 mg dose cohort was withdrawn from the trial due to disease progression. Later cohorts will be dosed intravenously and dose escalation is planned to occur adaptively in increments from 100 mg to 300 mg, depending on the safety results of the drug in prior cohorts. In addition, some patients may receive the drug by a combination of routes, including subcutaneous, intravenous or intratumoral. Based on safety and tolerability, the cohort sizes may be increased to up to 10 patients. In addition to safety, tolerability and pharmacokinetics, exploratory pharmacodynamic endpoint assessments and clinical scoring using CAILS and mSWAT is being performed.

Safety, Pharmacokinetics and Pharmacodynamics

As of the end of 2016, 15 MF patients have been treated with MRG-106. MRG-106 was generally safe and well tolerated in patients at all dose levels tested, with no significant injection site reactions. Two patients did not receive all the scheduled treatments due to disease progression. No drug-related serious adverse events have been reported.

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Six patients in Part A were administered MRG-106 intratumorally, with up to five 75 mg doses of MRG-106 administered to the same tumor over a period of up to two weeks. Four of these patients were simultaneously treated in a second lesion with a saline placebo solution. All patients who received MRG-106 generally tolerated the administrations well with only minimal redness, or erythema, at the site of injection noted in one patient. One patient was discontinued from the trial after receiving three doses of MRG-106 due to rapid progression of disease, which began shortly before the initiation of dosing and was considered unrelated to MRG-106. The remaining five patients have completed the dosing and follow-up periods. Adverse events for these patients noted by the treating physician as possibly or definitely related to MRG-106, included erythema, itchiness, pain, burning or tingling at the injection site, nausea, skin inflammation and a hand sore. All possibly or definitely related adverse events were judged as mild or moderate in severity. Abnormal lab values possibly related to use of the product candidate were observed in two patients and included moderately decreased white blood cell count and neutropenia, both of which resolved while continuing MRG-106, and prolonged partial thromboplastin time.

In Part B of the clinical trial, three patients each in the 300 mg, 600 mg, and 900 mg cohorts were to receive a total of six subcutaneous doses of MRG-106 administered over a 26-day period. All three dose levels were generally well tolerated in the eight patients that completed dosing. The treating physicians for these patients noted the following adverse events, which were possibly or definitely related to MRG-106: (i) four patients experienced mild to moderate pain at the site of injections on five total occasions, (ii) one patient experienced purpura, or a rash, at an injection site, (iii) one patient experienced tenderness and bruising at injection sites, as well as intermittent blurred vision; and (iv) one patient experienced erythema around an injection site. One patient in the 900 mg dose cohort had progressive disease associated with itching, which changed from mild to severe after receiving three doses of 900 mg. This patient stopped receiving MRG-106 and was treated with prednisone, and the patient s symptoms improved. No serious adverse events have been reported in Part B. Abnormal lab values possibly related to the administration of MRG-106 included mild, transient increases in liver enzymes and creatine kinase (an indicator of muscle stress) for a single patient dosed at the 600 mg dose level and transient neutropenia in two patients dosed at the 900 mg dose level (concluded to be temporally related to treatment with gemcitabine for one patient). The change in these lab values was transient during the course of the dosing and returned to normal by the end of the dosing period. In addition, one patient in the 300 mg cohort experienced increases in liver function tests prior to dosing, which decreased during dosing and increased again to the pre-dosing levels at the measurement 30-days post-dosing.

Pharmacokinetic analysis of the plasma collected from Part A of the clinical trial indicated that MRG-106 was quickly absorbed into the systemic circulation with the highest concentrations being observed 10 minutes to one hour after MRG-106 administration. Preliminary pharmacokinetic data from Part B of the clinical trial in the first three patients dosed subcutaneously with 300 mg MRG-106 demonstrate this route of administration increases the time required to reach maximal concentrations of drug in the systemic circulation (approximately 3 hours) compared to intratumoral administration.

In Part A of the clinical trial, high levels of MRG-106 (48 -204 µg per gram of tissue) were detected in injected tumors. Miragen also observed accumulation of MRG-106 in lesions distant from the site of injection at low levels (4 µg per gram of tissue). Preliminary analysis of injected tumors also indicated an increased expression of several direct targets of miR-155, suggesting that the drug is inhibiting its intended molecular target. Biopsies were not collected in Part B patients and therefore, the pharmacodynamic effect of MRG-106 in skin lesions was not assessed.

Efficacy

All patients who received MRG-106 in Part A of the clinical trial demonstrated a beneficial clinical response. Exploratory assessment of clinical response to therapy was performed for both MRG-106-treated and saline-treated lesions based on the change from baseline in the CAILS scores. Four of the five patients who completed dosing had

their scores evaluated in the MRG-106 treated lesions. In the fifth patient, CAILS scores were monitored in two untreated lesions, instead of the treated lesions. The lesions in these four patients showed a

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50% or greater reduction in the baseline CAILS score, which was maintained to the end of study visit (either 28 days or 35 days after the first dose). In contrast, a greater than 50% reduction was observed in only one saline treated lesion. The CAILS scores for patients in Part A of the clinical trial are set forth below.

Part A: Lesion CAILS

				MRG-106 Treated Lesions			Untreated or Saline Treated Lesions		
Patient Number	Number of Doses	Dose	Duration of Treatment (Days)	First CAILS Score	Lowest CAILS Score	Maximal % Reduction in CAILS	First CAILS Score	Lowest CAILS Score	Maximal % Reduction in CAILS
1 (early termination)	3	75mg	9	18	12	33%	18	14	22%
2	4	75mg	8	16	8	50%	NA	NA	NA
3	4	75mg	8	12	6	50%	8	5	37%
4 Lesion 1	4	75mg	8	NA	NA	NA	15	8	47%
4 Lesion 2	4	75mg	8	NA	NA	NA	36	25	31%
5	5	75mg	15	26	6	77%	20	5	75%
6	5	75mg	15	12	4	67%	9	5	44%

Histological examination of pre-treatment and post-treatment tumor biopsies of the same lesion injected with MRG-106 was conducted in five patients. At baseline, these biopsies typically showed evidence of cancer and high cancer cell density. After treatment, histology revealed fewer cancerous cells or a reduction in cancer cell density or depth in most patients. One patient who received MRG-106 injections in a small tumor showed a complete absence of cancerous T-cells in the post-treatment biopsy. Another patient had a lower percentage of CD30+ large atypical cells after MRG-106 treatment, which is indicative of a reduction in the number of cells with malignant characteristics.

Part B of the clinical trial has enrolled nine patients, three in each of the 300 mg, 600 mg and 900 mg dose level cohorts, eight of whom received six doses of MRG-106 over a 26-day period. No serious adverse events have been reported in Part B. As noted above, one patient in the 900 mg dose cohort experienced disease progression and discontinued treatment. Patients in the 300 mg and 600 mg dose cohorts have completed the clinical trial, including a follow-up visit on or about the 56th day of the clinical trial. Patients in the 900 mg dose cohort are still participating in the clinical trial and are in the 30-day follow-up period.

Exploratory assessment of clinical response to therapy in Part B was performed by assessing the CAILS score for up to five lesions for each patient (one patient had only one lesion). The mSWAT and CAILS scores for each patient are shown in the table below. Because the patients who receive 900 mg doses of MRG-106 have not yet completed all assessments, the maximal reduction in mSWAT and CAILS scores are not yet available for these patients. Two patients from the 300 mg dose group demonstrated reductions in their baseline mSWAT of 50% or greater and one patient had a 75% reduction in the combined CAILS score. The reductions in both these patients were maintained to the end of study visit (56 days after the first dose). One patient in the 600 mg dose cohort showed a 53% reduction in the combined CAILS score and a 39% reduction in the overall mSWAT.

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Part B: CAILS and mSWAT

				Combined CAILS Score			mSWAT Score		
Patient Number	Number of Doses	Dose	Duration of Treatment (Days)	First CAILS Score	Lowest CAILS Score	Maximal % Reduction in CAILS	First mSWAT Score	Lowest mSWAT Score	Maximal % Reduction in mSWAT
1	6	300 mg	26	10	9	10%	2	1	50%
2	6	300 mg	26	40	10	75%	47	23	51%
3	6	300 mg	26	44	40	9%	1.5	1.1	27%
4	6	600 mg	26	45	21	53%	22	13.5	39%
5	6	600 mg	26	58	49	16%	20.3	18.8	7%
6	6	600 mg	26	82	70	15%	42.7	40.1	6%
7	6	900 mg	26	68	*	*	17.2	*	*
8	6	900 mg	26	18	*	*	5.75	*	*
9	3	900 mg	5	30	*	*	103	*	*

* Only partial data is available for patients in the 900 mg dose cohort. Patient 7 showed a 1% increase in the CAILS score on day 17 of the trial and a 28% increase in the mSWAT from baseline values on day 25 of the trial. Patient 8 showed a 22% increase in the CAILS score and a 9% increase in the mSWAT from baseline values on day 18 of the trial. Patient 9 only received three doses due to disease progression and CAILS and mSWAT scores are not yet available.

Biomarker Analysis

Biomarkers were analyzed to assess the ability of MRG-106 to regulate the expression of gene pathways that are associated with elevated levels of miR-155 in MF. Miragen identified a set of biomarkers based on MRG-106 activity in cell lines derived from MF patients. In Part A of the clinical trial, Miragen assessed the expression of these biomarker genes in lesions before and after treatment with MRG-106. Retrospective analysis of a subset of the genes from the cell line data demonstrated that MRG-106 treatment decreased expression of some genes associated with cellular proliferation and increased expression of some genes associated with cell death. The expression of these genes appears to correspond to the level of drug measured in the lesion biopsy. Miragen also believes these data illustrate the potential of its approach to identify molecular biomarkers that translate from pre-clinical studies to predict product candidate activity in clinical trials.

MRG-201

MRG-201 is a replacement for miR-29 that is intended to increase miR-29-like activity in the setting of fibrotic disease. Miragen is currently studying MRG-201 in a single-center, Phase 1, double-blind, placebo-controlled, single and multiple dose-escalation clinical trial enrolling up to 70 healthy volunteers.

Miragen believes that the miR-29 family of miRNAs is consistently present at abnormally low levels during fibrotic disease progression. Miragen initially discovered the role of miR-29 in pathological cardiac fibrosis. Since this initial discovery, miR-29 has been implicated in pathological fibrosis in multiple organs including the skin, eye, lung, liver

and kidney. miR-29 is understood by the scientific community to play a role in the regulation of certain processes that contribute to fibrosis, including the initiation and maintenance of fibrosis through transforming growth factor beta, or TGF-ß, signaling and the deposition of the components that make up fibrotic tissue, including collagen and extracellular matrix, or ECM, proteins. Furthermore, both fibrotic ECM and TGF-ß are believed to down-regulate miR-29 levels, leading to continuously increased TGF-ß expression and uncontrolled ECM production. miR-29 levels are abnormally low in multiple fibrotic indications, and lower levels of miR-29 are correlated with increased severity of fibrosis. Although various fibrotic indications are potentially distinct, they share a number of features, including the activation of the cells that initiate the deposition of fibrotic tissue or fibroblast activation, excessive deposition of collagen and other fibrosis-associated pathways, and resulting organ dysfunction. Miragen believes the functions and biomarkers regulated by miR-29 might be shared among multiple fibrotic indications and increasing miR-29-like activity may provide potential benefit in any of these.

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To demonstrate mechanistic proof-of-concept and as a potential initial indication, Miragen is initially focused on skin fibrosis. Miragen believes the data derived from skin fibrosis trials may facilitate development of a product candidate intended for the treatment for Idiopathic Pulmonary Fibrosis, or IPF, and other major organ pathological fibrosis.

There are three primary objectives that Miragen intends to address prior to potentially initiating a trial in a major organ fibrosis disease, such as lung or liver fibrosis;

Demonstrate mechanistic proof of concept in humans for MRG-201. In Miragen s Phase 1 clinical trial of MRG-201, skin fibrosis was induced by making incisions in the volunteers skin and biomarkers of fibrosis, including collagens and other fibrosis-associated genes were monitored to measure active gene regulation by MRG-201. Skin manifestation of pathological fibrosis, such as keloids that are abnormal proliferation of scar tissue that can form at the site of a skin injury and other forms of raised or hypertrophic scarring, may be an area in which Miragen conducts additional development work, depending on the data from the Phase 1 clinical trial.

Demonstrate the correlation of biological pathways between skin fibrosis and other major organ fibrosis. Miragen has identified a subset of biomarker genes that it believes are regulated by MRG-201 in pre-clinical models of skin fibrosis, including mouse, rat, and rabbit, as well as in human skin fibroblasts in culture. This subset of biomarker genes includes multiple collagens and additional fibrosis-associated genes that appear to be implicated in fibrosis. The expression of these genes is generally increased in pathological fibrosis in humans, including skin fibrosis (an example of which is scleroderma) and pulmonary fibrosis (an example of which is IPF or systemic sclerosis). This gene signature appears to be regulated in common in skin fibrosis and IPF.

Develop strategies for delivery of miR-29 replacements to allow for treatment of the lung and other major organs. Miragen is collaborating with the Lovelace Respiratory Research Institute and a laboratory at Yale University under a grant from NIH to evaluate and develop potential inhaled delivery of MRG-201. Inhaled delivery has the potential to deliver more active drug to the tissue of interest which in this case is the lung. In pre-clinical models, Miragen delivered MRG-201 to the lung and demonstrated reversal of pulmonary fibrosis in rodents which was induced by the administration of bleomycin, a chemotherapy agent known to induce lung fibrosis. In addition, MRG-201 was able to reduce pulmonary fibrosis that was induced in rodents by TGF-ß over-expression. Furthermore, a recently published study demonstrated the ability to reverse liver fibrosis in rodents through the use of an engineered virus that expresses miR-29. The viral expression of miR-29 in the study occurred in the chief functional cells of the liver. Miragen has shown in pre-clinical testing that miR-29 replacements, delivered using two different methods reduced the expression of biomarkers of fibrosis in the post-exposure animal model of liver fibrosis induced by carbon tetrachloride. Finally, Miragen believes injecting a miR-29 mimic into the eye may allow for a local administration for reduction of retinal fibrosis.

Pathological Fibrosis

Fibrosis describes the development of fibrous connective tissue as a response to injury or damage. Fibrosis may refer to the deposition of connective tissue that occurs as part of normal healing or to the excess tissue deposition that occurs as a disease process. When fibrosis occurs in response to injury, the term scarring is used. Pathological fibrosis can occur in many tissues of the body as a result of inflammation or damage. In pathological fibrosis, collagen build

up occurs, which can result in scarring of vital organs such as the skin, lung, liver, eye, kidney and heart leading to irreparable damage and eventual organ failure. Miragen believes there is a significant need for additional clinically satisfactory therapeutic approaches to treating pathological fibrosis.

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Below is a description of several types of pathological fibrosis that Miragen may seek to develop a product candidate based on a replacement for miR-29:

Type of Pathological Fibrosis	Description
Skin Fibrosis	Scarring is a result of an over production of collagen in a healing wound. Scarring may continue to thicken for up to six months or may overgrow the site of the wound, even after the wound has healed.
	Hypertrophic scars and keloids are abnormal wound responses, and represent an excessive connective tissue response to skin trauma, inflammation, surgery, or burns.
	Hypertrophic scars and keloids are characterized by local fibroblast proliferation and overproduction of collagen. Both hypertrophic scars and keloids are diseases that tend to be painful and itchy, restrict mobility, and are resistant to treatment.
Pulmonary Fibrosis	Pulmonary fibrosis, also known as lung fibrosis, refers to a number of conditions that cause lung damage in the tissue between and supporting the air sacs or interstitial tissue, followed by fibrosis and eventually loss of lung elasticity. These conditions lead to symptoms such as persistent cough, chest pain, difficulty breathing and fatigue. Pulmonary fibrosis may occur as a secondary condition in various other diseases, but in many cases the underlying cause is not clear, and is referred to as IPF.
	IPF is a chronic, progressive lung disease which ultimately leads to death in many of the patients. This condition causes scar tissue to build up in the lungs, which makes the lungs unable to transport oxygen into the bloodstream effectively.
Liver Fibrosis	Liver fibrosis refers to the scar tissue and nodules that replace liver tissue and disrupt liver function. Major causes of liver fibrosis are alcohol, chronic hepatitis B virus, hepatitis C virus infection along with the metabolic disorders non-alcoholic fatty liver disease and non-alcoholic steatohepatitis. Liver fibrosis is a major global problem driven by increasing rates of obesity and diabetes.
Eye Fibrosis	Infection or inflammation of the eye results in impairment of visual function. Chronic inflammation can ultimately lead to fibrosis.

Eye fibrosis diseases include retinal fibrosis such as diabetic retinopathy and proliferative vitreoretinopathy, corneal fibrosis, glaucoma trabeculectomy, age related macular degeneration, and Fuch s endothelial corneal dystrophy.

MRG-201 Phase 1 Clinical Trial

Trial Design

Miragen is conducting a single-center Phase 1, double-blind, placebo-controlled, single and multiple dose-escalation clinical trial of MRG-201. MRG-201 is designed to mimic the activity of a molecule called miR-29 that has been shown to decrease the expression of collagen and other proteins that are involved in scar formation. MRG-201 is being studied to determine if it can limit the formation of fibrous scar tissue that leads to pathologic fibrosis. This four-part clinical trial is expected to enroll up to 70 healthy volunteers in which:

Part A studied the expression of biomarker genes in skin at different time points following an incision, and was performed without product candidate administration;

Part B studied a single ascending dose of 0.5 to 14 mg of MRG-201 in intact skin;

Part C studied a single ascending dose of 4, 7 or 14mg of MRG-201 administered around skin incisions; and

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Part D is studying multiple ascending doses of MRG-201 ranging from 4 mg to 14 mg administered around skin incisions.

The primary objectives in this clinical trial are safety and tolerability of MRG-201 injected into the skin via intradermal injections. A secondary objective is to characterize local skin and systemic exposure to MRG-201 following intradermal injection. Exploratory endpoints include the pharmacodynamic effects of MRG-201 on the expression of miR-29 gene targets in skin wound biopsies and to evaluate changes in histology from skin wounds treated with MRG-201.

Safety and Pharmacokinetics

As of the end of 2016, 47 volunteers have participated in the clinical trial, 40 of whom have been administered MRG-201 and seven of whom were incised without receiving a dose of MRG-201.

Nineteen volunteers in Part B received a single dose of 0.5 mg, 1 mg, 2 mg, 4 mg, 7 mg or 14 mg of MRG-201 in unincised skin. In these volunteers, MRG-201 was generally well tolerated. Three incidents of injection site reactions were reported, which were generally moderate. Three additional adverse events of mild severity were reported as possibly related to receiving MRG-201, and included erythema and sensation of warmth on limbs and back, both of which resolved within 24 hours, as well as fatigue which resolved by day seven.

Nine volunteers in Part C received a single dose of either 4 mg, 7 mg or 14 mg MRG-201 around an incision (three volunteers per group). In these volunteers, MRG-201 was generally well tolerated at all dose levels evaluated. One incident of injection site reaction was reported, which was moderate and resolved within 48 hours.

Nine volunteers in the dose-escalation portion of Part D received six total doses each of 4 mg, 7 mg or 14 mg MRG-201 around an incision. In these volunteers, MRG-201 was generally well tolerated at all dose levels evaluated. There were two injection site reactions of moderate severity reported. Five adverse events of mild severity reported by the treating physicians as possibly or definitely related to receiving MRG-201 included itching or pain at the injection site, fatigue, headache, and microscopic hematuria (blood in the urine), which had all resolved by the end of the study.

An additional three volunteers were enrolled in Part D to understand drug diffusion. Subjects received six total doses each of 14 mg MRG-201 at one end of a 4 cm incision. The other end of the incision is untreated. Both ends of the incision will be biopsied to measure the potential for diffusion and pharmacodynamic activity of MRG-201 away from the site of injection. In these volunteers, MRG-201 was generally well tolerated at all dose levels evaluated. One volunteer had an injection site reaction of moderate severity.

Preliminary pharmacokinetic analysis of plasma collected from the MRG-201 volunteers in Part B, Part C, and Part D (data available for 4 mg cohort only) of the clinical trial revealed that very little drug (less than 100 ng/mL) is generally detectable in the blood when MRG-201 is injected intradermally into the skin.

Biomarker Analysis

In Part A of the clinical trial in which volunteers were incised without receiving any product candidate or placebo, molecular analysis confirmed that miR-29 expression decreased in incised skin compared to unincised skin, as expected for fibrosis. In addition, gene expression of miR-29/MRG-201 biomarkers, including collagens and fibrosis-related genes, was increased approximately two-to-20-fold in incised skin, and was correlated with the decrease in miR-29 expression. The magnitude of the change in the expression of miR-29 and the biomarker genes was ~30-85% greater 16 days after administration than it was nine days after administration, indicating a time-dependent effect on gene expression. Miragen believes these data indicate the role of miR-29 in potentially

regulating the biological pathways implicated in fibrosis in human skin.

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In Part C of the clinical trial, biomarkers were analyzed to assess the ability of MRG-201 to regulate the expression of genes that are associated with reduced miR-29 expression in human skin. Miragen identified a set of biomarkers based on MRG-201 activity in pre-clinical models of skin fibrosis, including mouse, rat, and rabbit skin *in vivo*, as well as human skin fibroblasts *in vitro*. The biomarker panel consists of direct targets for miR-29 and downstream genes Miragen believes are indicative of an impact on miR-29 expression in wound healing and fibrosis, particularly collagens and other genes important in fibrosis. Miragen assessed the expression of these biomarkers in biopsies taken from the site of the incision 24 hours after a single MRG-201 dose compared to saline-treated lesions. Analysis of the biomarker data indicated that MRG-201 decreased expression of collagens and fibrosis-associated genes, consistent with the role Miragen believes miR-29 plays in regulating these fibrosis-related genes. The change in expression of collagens and fibrosis-related genes appeared to be correlated with the amount of MRG-201 administered. Miragen believes these data demonstrate an effect of MRG-201 on fibrosis-associated genes, and provide an indication that MRG-201 has the potential to reduce fibrosis and scar formation in human skin. Miragen also believes these data highlight the potential of its approach to identify molecular biomarkers that translate from pre-clinical studies to assessing the activity of MRG-201 in human clinical trials.

Part D of the clinical trial is currently in progress. Four cohorts of three volunteers each received six total doses of 4 mg, 7 mg or 14 mg MRG-201 and have completed dosing and the follow-up process. Based on biomarker analysis, the collagen and fibrosis-related genes were decreased in four of the six drug-treated incisions compared to the saline control that have been analyzed to date. Additionally, preliminary histological analysis indicated that incisions treated with multiple administrations of MRG-201 showed a reduction in the area and depth of fibroplasia, a marker of fibrosis or scar formation. Miragen believes these data may suggest that MRG-201 has the potential to reduce fibrosis and scar formation in human skin. The collagens and extracellular matrix genes regulated by MRG-201 in human skin have also been implicated in pulmonary fibrosis, including IPF. Miragen believes the molecular and histological data for MRG-201 in human skin support additional development of a miR-29 mimic for IPF and additional fibrotic indications.

Histopathology

Biopsies taken on day 16 from MRG-201 or saline treated incisions were assessed by a pathologist for the depth, width and overall area of fibroplasia. Histological analysis of the first nine volunteers biopsies in Part D indicated that incisions treated with multiple administrations of MRG-201 generally showed a reduction in the area and depth of fibroplasia. Miragen believes an effect of MRG-201 on fibroplasia during normal wound healing to be potentially predictive of a treatment effect for a replacement for miR-29 in excessive fibrotic diseases. Miragen believes these data suggest that MRG-201 may be able to reduce pathological fibrosis and scar formation in human skin.

MRG-201 Pre-Clinical Activities

Correlation of Biological Pathways Between Skin Fibrosis and Other Major Organ Fibrosis

The biomarkers that Miragen believes are regulated by MRG-201 in human skin represent biological pathways that are associated with skin fibrosis, but are also fundamental processes involved in pathologic fibrosis in general. Increased expression of collagens and additional fibrosis-associated genes that Miragen believes are down-regulated by MRG-201 have been associated with multiple fibrotic indications, including scleroderma, keloids, hypertrophic scarring, IPF, systemic sclerosis, pulmonary fibrosis, fibrosis of the eye (retinal and corneal fibrosis), kidney fibrosis, and cardiac fibrosis. Miragen believes the potential ability of MRG-201 to reduce the expression of these fibrosis-associated biomarkers in human skin suggests that a miR-29 mimic could also provide anti-fibrotic activity in multiple fibrotic indications.

Work done by Miragen, as well as published data indicate that a set of biomarkers showing increased expression in response to incision-induced fibrosis in human skin also show increased expression in multiple fibrotic indications including pulmonary fibrosis.

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Delivery of miR-29 Mimic to the Lung

Together with Yale University and Lovelace Respiratory Research Institute, Miragen was awarded a Centers for Advanced Diagnostics and Experimental Therapeutics in Lung Disease Stage II Grant from the NIH in 2014. The objective of the grant is to develop miR-29 mimicry as an efficient and personalized anti-fibrotic therapy. The collaboration is currently in year three of the five-year grant. During the first two years of the grant, the group compared intravenous and aerosolized delivery routes for the amount of miR-29 mimic that enters circulation, distribution, pharmacokinetics, pharmacodynamics, and efficacy. In one of its laboratories, Yale University also established a blood assay for miR-29 detection in IPF patients. During years three through five of the grant, Miragen plans to perform potential IND-enabling activities including additional development of an aerosolized formulation and dose of miR-29 mimic, good manufacturing practice, or GMP, manufacturing of the product candidate, and complete good laboratory practice, or GLP, toxicology studies. In addition, the collaboration plans to further develop its blood miR-29 diagnostic and assess correlations to tissue and lung cells collected through a procedure called bronchoalveolar lavage.

Delivery of miR-29 Mimic to the Liver

miR-29 family members are expressed at less than normal levels in pre-clinical models of liver fibrosis as well as in biopsies from human fibrotic livers. Delivery of miR-29 to liver cells using Adeno-Associated Virus, or AAV, has been shown to reverse liver fibrosis induced by carbon tetrachloride in a rodent model. Miragen is currently assessing liver delivery of several miR-29 replacements with varying conjugates. Initial data from such assessments has shown liver delivery in rodent models. Miragen is studying multiple compounds in an efficacy study in rodents with the AAV-delivered miR-29 in a carbon tetrachloride model of liver fibrosis. Miragen believes the results of these studies will assist Miragen s potential compound selection for IND-enabling activities with novel miR-29 replacements or the use of AAV for the delivery of miR-29 in hepatic fibrosis.

Delivery of miR-29 Mimic to the Eye

Miragen is exploring miR-29 as a therapeutic for ocular indications including ocular fibrosis. RNA-based therapeutics can be administered to the eye via eye drops for diseases affecting the front of the eye (e.g., the cornea and anterior chamber), and via injection into the eye for diseases affecting the back of the eye (which is commonly referred to as the retina). Both routes of administration have been established to be generally well-tolerated for oligonucleotide therapeutics. Miragen believes that the direct application of Miragen s microRNA therapeutic candidate to the eye may have the advantage of a greater than one-week duration, as the posterior chamber of the eye is a closed compartment, and is devoid of the usual clearance mechanisms present in the rest of the body. Historically, this mode of drug delivery potentially allows infrequent dosing, and also provides the potential advantage of reduced systemic exposure. Preliminary pre-clinical studies investigated direct injection into the eye of a double-stranded RNA molecule structurally similar to the design of MRG-201, and demonstrated decreased expression of the targeted gene. These data demonstrated functional delivery of double-stranded RNA molecules to the retina in the absence of a delivery vehicle.

Cardiovascular Disease

Miragen is also developing RNA therapeutics in three cardiovascular programs through Miragen s collaboration with Servier. Under this collaboration, Miragen granted Servier exclusive licenses to three cardiovascular product candidates. Servier may fund development through Phase 2 clinical trials, while Miragen retains all commercial rights to these programs in the United States and Japan.

Miragen has additional pre-clinical cardiovascular programs in which it is collaborating with academic institutions. In 2015 Miragen was designated as a collaborating institution for a grant that provides more than 2 million over a three-year period (2015-2017) funded by the German Federal Ministry of Education and Research.

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Other Pre-Clinical Programs

In 2016, Miragen was awarded a milestone-driven grant by The ALS Association of up to $0.4 million to advance the development of MRG-107. MRG-107 is an inhibitor of miR-155 intended to be developed for the treatment of amyotrophic lateral sclerosis, or ALS.

Miragen is also evaluating and developing additional microRNA-targeted, pre-clinical product candidates in a variety of disease indications where an abnormal level of one or more microRNAs has been implicated in disease pathology. Miragen s inhibitor programs, including these product candidates, were created using the locked nucleic acid technology that Miragen exclusively licensed from Santaris Pharma A/S (now a wholly-owned subsidiary of Roche), on a target-by-target basis. Miragen believes combining this technology with Miragen s internal expertise may allow it to create unique product candidates that possess desirable drug-like properties capable of entering diseased cells without the need for additional delivery technologies. Miragen has a broad patent portfolio intended to protect these product candidates.

Background on microRNA

microRNAs are transcribed from the genome and unlike messenger RNA, or mRNA, they do not encode proteins. microRNAs function by preventing the translation of mRNAs into proteins and/or by triggering degradation of these mRNAs. Studies have shown that microRNA gene regulation is often not a decisive on and off switch but a subtle function that fine-tunes cellular phenotypes that becomes more pronounced during stress or disease conditions. microRNAs were first discovered in 1993 and have since been found in nearly every biological system examined since that time. They are highly conserved across species, demonstrating their importance to biological functions and cellular processes. According to the Sanger Institute, over 1,000 microRNAs have been identified in humans.

A body of evidence has shown that inappropriate levels of particular microRNAs are directly linked to a range of serious diseases, many of which are poorly served by existing therapies. microRNAs can affect the balance of protein expression and serve as command and control nodes that directly coordinate multiple critical systems simultaneously. This effect on systems biology is a naturally occurring homeostatic process that becomes disrupted in certain disease states. As a result, developing microRNA therapeutics is fundamentally different from the single-protein, single-target approach that is the foundation of traditional small and large molecule drugs.

Miragen s Approach to Drug Discovery and Development

Miragen believes that its drug discovery and development strategy will enable it to progress its product candidates from pre-clinical discovery to achievement of a plausible link to clinical benefit in humans relatively quickly and efficiently.

Discovery

Although there are over 1,000 identified human microRNAs, not all of them have been shown to be causal in disease. Miragen s approach to drug discovery and development begins with the identification of potentially pathological microRNAs.

Miragen applies three general approaches to the identification of potentially pathological, or disease causing, microRNAs (i) profiling of microRNA expression in diseased tissue versus normal tissue to identify microRNAs that are found at abnormally high or low levels (ii) identification of microRNAs that are located within genes (typically in non-protein coding segments) of validated disease relevant genes and thus simultaneously expressed with the disease

associated gene and (iii) evaluation of microRNAs that are predicted to directly modulate the expression of specific disease relevant genes.

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Miragen has biased its programs to develop therapeutic microRNA inhibitors as opposed to microRNA replacements. Miragen believes the inhibitor candidates face lower delivery hurdles and have better drug-like properties in regards to affinity to their target, stability, drug distribution and pharmacodynamics. To improve their therapeutic potential, Miragen chemically modifies these compounds with changes such as locked nucleic acid (known as LNA) substitution of the ribose sugar in many of the nucleosides and deoxyribonucleoside (known as DNA).

In conditions where a deficit in microRNA expression has been identified as disease causing, microRNA replacements, which are modified double-stranded RNA structures that are recognized by the RNA-induced silencing complex, or RISC, can serve as chemically synthesized replacements for microRNAs.

Historically, the delivery of double stranded RNA s, such as microRNA replacements, has been a significant hurdle to overcome for drug development because these molecules are very rapidly degraded, and because uptake into cells can be inefficient. Miragen s delivery approach for microRNA replacements is to append a conjugate to the molecule to enhance cellular uptake. The selection of the conjugate is dependent on the intended therapeutic use. Miragen has deployed hydrophobic conjugates, such as cholesterol that are able to improve pharmacokinetics and allow for enhanced cellular uptake. Miragen is also exploring a range of conjugates that help in targeting specific tissues and cells. Miragen s strategy with microRNA replacements has centered on opportunities for efficient delivery of the molecules with an emphasis on local and topical applications, such as injections in the skin or lung, respectively. For organs where topical or local applications are not feasible, such as the liver, Miragen has employed conjugates that have demonstrated successful delivery after systemic administration.

Development

Miragen s approach to translational medicine is focused on rapidly testing the molecular hypothesis in human cell lines and animal models to demonstrate safety, pharmacokinetics, and pharmacodynamics, and finally designing and conducting small, efficient and targeted human Phase 1 clinical trials. Miragen typically selects an initial indication that is genetically defined or is a rare disease where abnormal levels of a microRNA have been implicated. These early stage Phase 1 clinical trials are designed to test the mechanistic relevance or develop mechanistic proof-of-concept in humans in a setting that provides the opportunity to develop a biomarker toolkit for a mechanism of action that Miragen believes has broader disease relevance.

The mechanistic proof-of-concept studies are designed to provide relevant information that helps to reduce development risks in humans. Miragen s aim is to demonstrate that the expression levels of the microRNA could potentially serve as a diagnostic indicator that allows for better patient selection for later clinical trials and in additional indications. At the same time, Miragen seeks to confirm molecular activity of the drug.

By measuring the pharmacodynamics of target engagement, Miragen is able to show that the product candidate effectively enters the appropriate cell and binds to its intended target. This process is particularly important for oligonucleotide drugs. Miragen can also measure the effects on a series of downstream genes that create a plausible link between target engagement and a mechanism of disease.

For some diseases, Miragen believes that local administration allows it to achieve a variety of concentrations of drug at the site of action and facilitates the development of dose / response relationships. Miragen believes understanding the dose necessary to show target engagement, with concomitant surrogate marker alterations provides the basis for which a systemic dose can be defined that will be necessary to potentially achieve a therapeutic effect.

Exploratory endpoints can provide Miragen with verification of the pharmacodynamic effects of the drug based on biomarker readouts and morphological alterations. This translational strategy allows Miragen to answer many

questions about the drug target pair and provides improved confidence that the molecular basis of drug action is

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relevant in humans. Having built confidence in the drug mechanism and demonstrated an acceptable safety profile, later stage clinical trials will be designed to establish appropriate dose and therapeutic efficacy.

Miragen s Strategic Collaborations and License Agreements

Strategic Alliance and Collaboration with Servier

In October 2011, Miragen entered into the Servier Collaboration Agreement with Servier for the research, development, and commercialization of RNA-targeting therapeutics in cardiovascular disease, which was subsequently amended in May 2013, May 2014, May 2015 and September 2016. Under the Servier Collaboration Agreement, Miragen granted Servier an exclusive license to research, develop, and commercialize RNA-targeting therapeutics for three targets in the cardiovascular field. As of December 31, 2016, three named targets exist under the Servier Collaboration Agreement, two of which are replaceable by Servier.

Servier s rights to each of the targets are limited to therapeutics in the cardiovascular field in their territory, which is worldwide except for the United States and Japan. Miragen retains all rights for each named target in the United States and Japan and for any products or product candidates outside of the cardiovascular field.

In connection with entering into the strategic alliance with Servier, Miragen received a nonrefundable upfront payment of $8.4 million (6.0 million) in 2011 and an additional $4.0 million (3.0 million) in 2013 when Servier exercised their right to name a third target under the agreement. Miragen is also eligible to receive development milestone payments of 5.8 million to 13.8 million ($6.5 million to $15.5 million as of September 30, 2016) and regulatory milestone payments of 10.0 million to 40.0 million ($11.2 million to $44.8 million as of September 30, 2016) for each target. Additionally, Miragen may receive up to 175 million ($196 million as of September 30, 2016) in commercialization milestones as well as quarterly royalty payments between the low-double digits to the mid-teens (subject to reductions for patent expiration, generic competition, third-party royalty and costs of goods) on the net sales of any licensed product commercialized by Servier. Additionally, if Miragen undergoes a change of control in specified circumstances, Servier has agreed to increase this royalty by an additional percentage in the low-single digits if it seeks to use any of the acquiror s intellectual property in the development of product candidates under the Servier Collaboration Agreement. Servier is obligated to make any such royalty payment for a specified period under the Servier Collaboration Agreement.

As part of the Servier Collaboration Agreement, Miragen established a multiple-year research collaboration, under which Miragen jointly performs agreed upon research activities directed to the identification and characterization of named targets and oligonucleotides in the cardiovascular field, which Miragen refers to as the Research Collaboration. The initial three-year term of the Research Collaboration was extended by two additional years in May 2014 and again by one additional year in September 2016 through October 2017. Servier is responsible for funding all of the costs of the Research Collaboration, as defined under the Servier Collaboration Agreement. During the nine months ended September 30, 2016 and 2015, Miragen recognized as revenue amounts reimbursable to Miragen under the Servier Collaboration Agreement for research and development activities of $2.1 million and $3.0 million, respectively.

The development of each product candidate (commencing with registration enabling toxicology studies) under the Servier Collaboration Agreement is performed pursuant to a mutually agreed upon development plan to be conducted by the parties as necessary to generate data useful for both parties to obtain regulatory approval of such product candidates. Servier is responsible for a specified percentage of the cost of research and development activities through the completion of one or more Phase 2 clinical trials and will reimburse Miragen for a specified portion of such costs Miragen incurs. The costs of Phase 3 clinical trials for each product candidate will be allocated between the parties at a specied percentage of costs between the parties upon the occurrence of specified events under the Servier

Colloboration Agreement, including if Miragen enters into a third-party agreement for the development and/or commercialization of a product in the United States at least 180 days before the initiation of the first Phase 3 clinical trial or if Miragen subsequently enters into a U.S. partner

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agreement or if Miragen does not enter into a U.S. partner agreement, but files for approval in the United States using data from the Phase 3 clinical trial. Miragen is responsible, by itself or through a third-party manufacturer, for the manufacture and supply of all licensed oligonucleotides during the pre-clinical phase of development under the Sevier Collaboration Agreement while Servier is primarily responsible for manufacture and supply of all licensed oligonucleotides and product during the clinical phase of development under the Servier Collaboration Agreement. The parties are each responsible for the commercial supply of any licensed product to be sold in each s respective territory under the Servier Collaboration Agreement.

Under the Servier Collaboration Agreement, Miragen also granted Servier a royalty-free, non-exclusive license to develop a companion diagnostic for any therapeutic product which may be developed by Servier under the Servier Collaboration Agreement. Miragen also granted Servier an exclusive, royalty free license to commercialize such a companion diagnostic for use in connection with such therapeutic product in its territory.

The Servier Collaboration Agreement will expire as to each underlying product candidate when Servier s royalty obligations as to such product candidate have expired. Servier may also terminate the Servier Collaboration Agreement for (i) convenience upon a specified number of days prior notice to Miragen or (ii) upon determination of a safety issue relating to development under the agreement upon a specified number of days prior notice to Miragen. Either party may terminate the Servier Collaboration Agreement upon a material breach by the other party which is not cured within a specified number of days. Miragen may also terminate the agreement if Servier challenges any of the patents licensed by Miragen to Servier.

License Agreements with the University of Texas

As of September 30, 2016, Miragen had five exclusive patent license agreements, or the UT License Agreements, with the Board of Regents of The University of Texas System, or the University of Texas. Under each of the UT License Agreements, the University of Texas granted Miragen exclusive and nonexclusive licenses to certain patent and technology rights. The University of Texas is a minority stockholder of Miragen.

In consideration of rights granted by the University of Texas, Miragen agreed to (i) pay a nonrefundable upfront license documentation fee in the amount of $10 thousand per license, (ii) pay an annual license maintenance fee in the amount of $10 thousand per license starting one year from the date of each agreement, (iii) reimburse the University of Texas for actual costs incurred in conjunction with the filing, prosecution, enforcement, and maintenance of patent rights prior to the effective date, and (iv) bear all future costs of and manage the filing, prosecution, enforcement, and maintenance of patent rights. In 2015 and 2014, Miragen incurred upfront and maintenance fees under the UT License Agreements totaling $0.1 million, and recorded the amounts as research and development expense. All costs related to the filing, prosecution, enforcement, and maintenance of patent and technology rights are recorded as general and administrative expense when incurred.

Under the terms of the UT License Agreements, Miragen may be obligated to make the following future milestone payments for each licensed product candidate: (i) up to $0.6 million upon the initiation of defined clinical trials, (ii) $2.0 million upon regulatory approval in the United States, and (iii) $0.5 million per region upon regulatory approval in other specified regions. Additionally, if Miragen successfully commercializes any product candidate subject to the UT License Agreements, Miragen is responsible for royalty payments in the low-single digits and payments up to a percentage in the mid-teens of any sublicense income, subject to specified exceptions, based upon net sales of such licensed products. UT s right to these royalty payments will expire as to each license agreement upon the expiration of the last patent claim subject to the applicable UT License Agreement.

The license term extends on a country by country basis until the expiration of the last to expire of the licensed patents that covers such product in such country. Upon expiration of the royalty payment obligation, Miragen will have a fully paid license in such country. Miragen may also terminate each UT License Agreement for convenience upon a specified number of days prior notice to the University of Texas. The University of Texas

also has the right to earlier terminate the UT License Agreements after a defined date under specified circumstances where Miragen has effectively abandoned its research and development efforts or has no sales. The UT License Agreements will terminate under customary termination provisions including Miragen s bankruptcy or insolvency, material breach, and upon mutual written consent. Miragen has expensed all charges incurred under the UT License Agreements to date, due to the uncertainty as to future economic benefit from the acquired rights.

License Agreement with Roche Innovation Center Copenhagen A/S (formerly Santaris Pharma A/S)

In June 2010, Miragen entered into a license agreement with the Santaris Pharma A/S, which subsequently changed its name to Roche Innovation Center Copenhagen A/S, or RICC, which was subsequently amended in October 2011 and amended and restated in December 2012, or the RICC License Agreement. In 2014, Santaris Pharma A/S was acquired by F. Hoffmann-La Roche Ltd, or Roche, and has become a wholly-owned subsidiary of Roche.

Under the RICC License Agreement, Miragen received exclusive and nonexclusive licenses from RICC to use specified technology of RICC, or the RICC Technology, for specified uses including research, development, and commercialization of pharmaceutical products using this technology worldwide. Under the RICC License Agreement, Miragen has the right to develop and commercialize the RICC Technology directed to four specified targets and the option to obtain exclusive product licenses for up to six additional targets. The acquisition of Santaris Pharma A/S by Roche was considered a change-of-control under the RICC License Agreement, and as such, certain terms and conditions of the RICC License Agreement changed, as contemplated and in accordance with the RICC License Agreement. These changes primarily relate to milestone payments reflected in the disclosures below. As consideration for the grant of the license and option, Miragen previously paid RICC $2.3 million and issued RICC 856,806 shares of Miragen s Series A convertible preferred stock, which are now owned by Roche Finance Ltd, an affiliate of Roche. If Miragen exercises its option to obtain additional product licenses or to replace the target families, Miragen will be required to make additional payments to RICC.

Under the terms of the RICC License Agreement, milestone payments were previously decreased by a specified percentage as a result of the change of control by RICC referenced above. Miragen is obligated to make future milestone payments for each licensed product for up to $5.2 million. Certain of these milestones will be increased by a specified percentage if Miragen undergoes a change in control during the term of the RICC License Agreement. If Miragen grants a third party a sublicense to the RICC Technology, in lieu of the fixed milestone payments noted above, Miragen is required to remit to Roche up to a specified percentage of the upfront and milestone payments Miragen receives under its sublicense.

If Miragen successfully commercializes any product candidate subject to the RICC License Agreements, then RICC is entitled to royalty payments in the mid-single digits on the net sales of such product, provided that if such net sales are made by a sublicensee under the RICC License Agreement, RICC is entitled to royalty payments equal to the lesser of a percentage in the mid-single digits on the net sales of such product or a specified percentage of the royalties paid to Miragen by such sublicensee, subject to specified restrictions. Miragen is obligated to make any such royalty payments until the later of (i) a specified anniversary of the first commercial sale of the applicable product or (ii) the expiration of the last valid patent claim licensed by RICC under the RICC License Agreement underlying such product. Upon the occurrence of specified events, the royalty owed to RICC will be decreased by a specified percentage.

The RICC License Agreement will terminate upon the latest of the expiration of all of RICC s royalty rights, the termination of the last Miragen target or the expiration of its right to obtain a product license for a new target under the RICC License Agreement. Miragen may also terminate the RICC License Agreement for convenience upon a specified number of days prior notice to RICC, subject to specified terms and conditions. Either party may terminate

the RICC License Agreement upon an uncured material breach by the other party and RICC may terminate the RICC License Agreement upon the occurrence of other specified events that are not cured within a specified number of days.

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License Agreements with the t2cure GmbH

In October 2010, Miragen entered into a license and collaboration agreement, or the t2cure Agreement, with t2cure GmbH, or t2cure, which was subsequently amended in July 2014. Under the t2cure Agreement, Miragen received a worldwide, royalty bearing, and exclusive license to specified patent and technology rights to develop and commercialize product candidates targeted at miR-92.

In consideration of rights granted by t2cure, Miragen paid a onetime upfront fee of $46 thousand and agreed to: (i) pay an annual license maintenance fee in the amount of 3 thousand ($3 thousand at September 30, 2016), and (ii) reimburse t2cure for 100% of actual costs incurred in conjunction with the filing, prosecution, enforcement, and maintenance of patent rights prior to the effective date. All costs related to the filing, prosecution, enforcement, and maintenance of patent and technology rights are recorded as general and administrative expense when incurred.

Under the terms of the t2cure Agreement, Miragen is obligated to make the following future milestone payments for each licensed product: (i) up to $0.7 million upon the initiation of certain defined clinical trials, (ii) $2.5 million upon regulatory approval in the United States and (iii) up to $1.5 million per region upon regulatory approval in the European Union or Japan. Additionally, if Miragen successfully commercializes any product candidate subject to the t2cure Agreement, Miragen is responsible for royalty payments in the low-single digits upon net sales of licensed products and sublicense fees equal to a percentage in the low-twenties of sublicensed income to Miragen. Miragen is obligated to make any such royalty payment until the later of (i) the tenth anniversary of the first commercial sale of the applicable product or (ii) the expiration of the last valid claim to a patent licensed by t2cure under the t2cure Agreement covering such product. If such patent claims expire prior to the end of the ten-year term, then the royalty owed to t2cure will be decreased by a specified percentage.

The license term extends on a country by country basis until the later of: (i) the tenth anniversary of the first commercial sale of a licensed product in a country, and (ii) the expiration of the last to expire valid claim that claims such licensed product in such country. Upon expiration of the royalty payment obligation, Miragen will have a fully paid license in such country. Miragen has the right to terminate the t2cure Agreement at will, on a country-by-country basis, after 60 days written notice.

Patent License Agreement with The Brigham and Women s Hospital

In May 2016, Miragen entered into an exclusive patent license agreement, or the BWH License Agreement, with The Brigham and Women s Hospital, or BWH.

Under the BWH License Agreement, BWH granted Miragen an exclusive, worldwide license, including a right to sublicense, to specified technology and patent rights of BWH. As consideration for this exclusive license, Miragen paid BWH a specified issue fee and is obligated to pay a specified annual license fee. BWH is also entitled to milestone payments of up to $2.6 million for any of Miragen s product candidates developed based on the patent rights subject to the BWH License Agreement plus a one-time sales milestone payment of $0.25 million for all product candidates developed based on the patent rights subject to the BWH License Agreement. If Miragen were to successfully commercialize any product candidate subject to the BWH License Agreement, then BWH is entitled to royalty payments in the low-single digits on the net sales of such product. BWH s right to these royalty payments will expire upon the expiration of the last patent claim subject to BWH License Agreement. BWH is also entitled to a percentage in the low-double digits of any sublicense income from such product, subject to specified exceptions. Miragen is also responsible for all costs associated with the preparation, filing, prosecution and maintenance of the patent rights subject to the BWH License Agreement.

Additionally, Miragen is obligated to use commercially reasonable efforts to develop a product under the BWH License Agreement and to meet specified diligence milestones thereunder.

The BWH License Agreement will terminate upon the expiration of all issued patents and patent applications subject to the patent rights under the agreement. Miragen may also terminate the BWH License Agreement for

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convenience upon a specified number of days prior notice to BWH. BWH may terminate the BWH License Agreement upon a material breach by Miragen of its payment obligations and upon the occurrence of other specified events that are not cured within a specified number of days.

Subcontract Agreement with Yale University

In October 2014, Miragen entered into a subcontract agreement, or the Yale Agreement, with Yale which was subsequently amended in February 2016 and November 2016. Under the Yale Agreement, Miragen agreed to provide specified services regarding the development of a proprietary compound that targets microRNA-29 in the indication of idiopathic pulmonary fibrosis. Yale entered into the Yale Agreement in connection with a grant that Yale received from the National Institutes of Health, or NIH, for the development a microRNA-29 mimicry as a potential therapy for pulmonary fibrosis.

In consideration of Miragen s services under the Yale Agreement, Yale has agreed to pay Miragen up to $1.1 million. Under the terms of the Yale Agreement, Miragen retains all rights to any and all intellectual property developed solely by Miragen in connection with the Yale Agreement. Yale has also agreed to provide Miragen with an exclusive option to negotiate in good faith for an exclusive, royalty-bearing license from Yale for any intellectual property developed by Yale or jointly by the parties under the Yale Agreement. Yale is responsible for filing, prosecuting and maintaining foreign and domestic patent applications and patents on all inventions jointly developed by the parties under the Yale Agreement.

The Yale Agreement terminates automatically on the date that Yale delivers its final research report to the NIH under the terms of the grant underlying the Yale Agreement. Either party may also terminate the Yale Agreement upon a specified number of days notice in the event that the NIH s grant funding is reduced or terminated or upon material breach by the other party.

Manufacturing

Miragen does not own or operate manufacturing facilities for the production of MRG-106, MRG-201 or other product candidates that Miragen develops, nor does it have plans to develop its own manufacturing operations in the foreseeable future. Miragen currently depends on third-party contract manufacturers for all of its required raw materials, active pharmaceutical ingredients, and finished product candidates for its clinical trials. Miragen does not have any current contractual arrangements for the manufacture of commercial supplies of MRG-106, MRG-201 or any other product candidates that Miragen develops. Miragen currently employs internal resources and third-party consultants to manage Miragen s manufacturing contractors.

Sales and Marketing

Miragen has not yet defined its sales, marketing or product distribution strategy for MRG-106, MRG-201 or any of Miragen s other product candidates because its product candidates are still in pre-clinical or early-stage clinical development. Miragen s commercial strategy may include the use of strategic partners, distributors, a contract sale force, or the establishment of its own commercial and specialty sales force. Miragen plans to further evaluate these alternatives as it approaches approval for one of its product candidates.

Intellectual Property

Miragen is actively building an intellectual property portfolio around Miragen s clinical-stage product candidates and discovery programs. A key component of this portfolio strategy is to seek patent protection in the United States and in

major market countries that Miragen considers important to the development of its business worldwide. As of November 16, 2016 Miragen had a portfolio of 190 patents and patent applications of which 96 are issued or allowed and 94 are pending applications. This portfolio includes methods of use and composition patents, and patent applications, on Miragen s two lead product candidates, MRG-106 and MRG-201. Miragen s

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success depends in part on Miragen s ability to obtain and maintain proprietary protection for Miragen s product candidates and other discoveries, inventions, trade secrets and know-how that are critical to Miragen s business operations. Miragen s success also depends in part on Miragen s ability to operate without infringing the proprietary rights of others, and in part, on Miragen s ability to prevent others from infringing Miragen s proprietary rights. A comprehensive discussion on risks relating to intellectual property is provided under Risk Factors under the subsection Risks Related to Miragen s Intellectual Property .

Miragen has filed composition of matter patent applications covering MRG-106 in June of 2016 in the United States as U.S. 15/173,368 and a PCT application as PCT/US2016/035865 to access foreign countries.

Miragen expects this U.S. patent will issue in the next two to three years with an expiration year of 2036 if Miragen continues to pay the maintenance fees and annuities when due, with the possibility of additional terms from the USPTO prosecution delays and from patent term extensions that may be granted due to administrative delays in the FDA. Miragen also has pending applications that cover various therapeutic uses of MRG-106. Collectively, these patents, if they issue, would have patent expirations from 2036 on if Miragen continues to pay the maintenance fees and annuities when due, not including any possible additional terms for patent term adjustments or patent term extensions. Miragen does not know if any patent will issue from any of these applications and, if any issue, Miragen does not know whether the issued patents will provide significant proprietary protection or commercial advantage against Miragen s competitors or generics. Even if they are issued, Miragen s patents may be circumvented, challenged, opposed and found to be invalid or unenforceable.

Miragen filed a composition of matter patent application covering MRG-201 in September 2015 in the United States as U.S. 14/848,085 and a PCT application PCT/US2015/49018 to access foreign countries. The U.S. patent application issued as U.S. 9,376,681 on June 28, 2016, which will expire in September of 2035 if Miragen continues to pay the maintenance fees and annuities when due, with the possibility of additional terms from USPTO prosecution delays and from patent term extensions that may be granted due to administrative delays in the FDA. Miragen also has issued patents and pending applications that cover various therapeutic uses and generic compositions of MRG-201. Collectively, these patents and patent applications, if they issue, would have patent expirations ranging from 2028 to 2035 if Miragen continues to pay the maintenance fees and annuities when due, not including any possible additional terms for patent term adjustments or patent term extensions. Miragen does not know if any patent will issue from any of the pending applications and, if any issue, Miragen does not know whether the issued patents will provide significant proprietary protection or commercial advantage against Miragen s competitors or generics. Even if they are issued, Miragen s patents may be circumvented, challenged, opposed and found to be invalid or unenforceable.

For Miragen s earlier stage product candidates, Miragen has filed compositions of matter and methods of use patent applications in the United States, under the Patent Co-operation Treaty, or the PCT, and in Argentina and Taiwan, which are not signatories to the PCT.

In addition to patent protection, Miragen seeks to rely on trade secret protection, trademark protection and know-how to expand its proprietary position around its chemistry, technology and other discoveries and inventions that Miragen consider important to Miragen s business. Miragen also seeks to protect Miragen s intellectual property in part by entering into confidentiality agreements with Miragen s employees, consultants, scientific advisors, clinical investigators and other contractors and also by requiring Miragen s employees, commercial contractors, and certain consultants and investigators, to enter into invention assignment agreements that grant it ownership of any discoveries or inventions made by them. Further, Miragen seeks trademark protection in the United States and internationally where available and when Miragen deems appropriate. Miragen has obtained registrations for the Miragen trademark, which Miragen uses in connection with Miragen s pharmaceutical research and development services as well as

Miragen s clinical-stage product candidates. Miragen currently has such registrations for Miragen in the United States, Canada and the European Union.

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Competition

The biotechnology and pharmaceutical industries are characterized by intense and rapidly changing competition to develop new technologies and proprietary products. Miragen s clinical and pre-clinical product candidates may address multiple markets. Ultimately, the diseases Miragen s product candidates target for which it may receive marketing authorization will determine Miragen s competition. Miragen believes that for most or all of its product development programs, there will be one or more competing programs under development by other companies. Any products that Miragen may commercialize will have to compete with existing therapies and new therapies that may become available in the future. Miragen faces potential competition from many different sources, including larger and better-funded biotechnology and pharmaceutical companies. In many cases, the companies with competing programs will have access to greater resources and expertise than Miragen does and may be more advanced in those programs.

Miragen believes that its current and future competition for resources and eventually for customers can be grouped into three broad categories:

- companies working to develop microRNA targeted products, including Regulus Therapeutics Inc., Mirna Therapeutics, Inc., Microlin Bio, Inc., and InteRNA Technologies B.V.;

- companies working to develop other types of oligonucleotide therapeutic products, including Ionis Pharmaceuticals, Inc., Alnylam Pharmaceuticals, Inc., Arrowhead Pharmaceuticals, Inc., Dicerna Pharmaceuticals, Inc., RaNa Therapeutics, Inc., RXi Pharmaceuticals Corporation, and Silence Therapeutics AG; and

- companies with marketed products and development programs for therapeutics that treat the same diseases for which Miragen may also be developing potential treatments.

The following companies have therapeutics marketed or in development for CTCL: Actelion Ltd, Bristol-Myers Squibb Company, Celgene Corporation, Merck & Co., Inc., Mylan Pharmaceuticals Inc., Novartis International AG, Spectrum Pharmaceuticals, Inc., Seattle Genetics, Inc., Takeda Pharmaceutical Company Ltd, and Valeant Pharmaceuticals International, Inc.

The following companies have marketed therapeutics for pulmonary fibrosis Miragen s competitors in this area include, Boehringer Ingelheim GmbH, F. Hoffmann-La Roche Ltd.

Miragen believes that the key competitive factors that will affect the success of any of its product candidates, if commercialized, are likely to be their efficacy, safety, convenience, price and the availability of reimbursement from government and other third-party payors relative to such competing products. Miragen s commercial opportunity could be reduced or eliminated if its competitors have products that are superior in one or more of these categories.

Government Regulation

FDA Drug Approval Process

In the United States, pharmaceutical products are subject to extensive regulation by the FDA. The Federal Food, Drug, and Cosmetic Act, and other federal and state statutes and regulations, govern, among other things, the research, development, testing, manufacture, storage, recordkeeping, approval, labeling, promotion and marketing, distribution, post-approval monitoring and reporting, sampling and import and export of pharmaceutical products. Failure to comply with applicable U.S. requirements at any time during the product development process may subject a company to a variety of administrative or judicial sanctions, such as imposition of clinical hold, FDA refusal to approve pending NDAs warning or untitled letters, withdrawal of approval, product recalls, product seizures, total or partial suspension of production or distribution, injunctions, fines, civil penalties and criminal prosecution.

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Miragen cannot market a drug product candidate in the United States until the drug has received FDA approval. The steps required before a drug may be marketed in the United States generally include the following:

- completion of extensive pre-clinical laboratory tests, animal studies, and formulation studies in accordance with the FDA s GLP regulations;
- submission to the FDA of an investigational new drug application, or IND, for human clinical testing, which must become effective before human clinical trials may begin;
- approval by an independent institutional review board, or IRB, at each clinical site before each trial may be initiated at that site;
- performance of adequate and well-controlled human clinical trials in accordance with GCP requirements to establish the safety and efficacy of the drug for each proposed indication;
- submission to the FDA of an NDA after completion of all pivotal clinical trials;
- satisfactory completion of an FDA advisory committee review, if applicable
- satisfactory completion of an FDA pre-approval inspection of the manufacturing facility or facilities at which the active pharmaceutical ingredient, or API, and finished drug product are produced and tested to assess compliance with cGMPs; and
- FDA review and approval of the NDA prior to any commercial marketing or sale of the drug in the United States.

Satisfaction of FDA pre-market approval requirements typically takes many years and the actual time required may vary substantially based upon the type, complexity and novelty of the product or disease.

Pre-clinical tests include laboratory evaluation of product chemistry, formulation and toxicity, as well as animal trials to assess the characteristics and potential safety and efficacy of the product. The conduct of the pre-clinical tests must comply with federal regulations and requirements, including GLP. An IND sponsor must submit the results of pre-clinical testing to the FDA as part of an IND along with other information, including information about product chemistry, manufacturing and controls and a proposed clinical trial protocol. Long term pre-clinical tests, such as animal tests of reproductive toxicity and carcinogenicity, may continue after the IND is submitted.

A 30-day waiting period after the submission of each IND is required prior to the commencement of clinical testing in humans. If the FDA has neither commented on nor questioned the IND within this 30-day period, the clinical trial proposed in the IND may begin if all other requirements, including IRB review and approval, have been met.. If the FDA raises concerns or questions about the conduct of the trial, such as whether human research subjects will be

exposed to an unreasonable health risk, the IND sponsor and the FDA must resolve any outstanding FDA concerns or questions before clinical trials can proceed.

Clinical trials involve the administration of the investigational new drug to healthy volunteers or patients under the supervision of a qualified investigator. Clinical trials must be conducted in compliance with federal regulations, including GCP requirements, which include the requirement that all research subjects provide their informed consent in writing for their participation in any clinical trial. Clinical trials are conducted under protocols detailing the objectives of the trial, the parameters to be used in monitoring safety and the effectiveness criteria to be evaluated. Each protocol and subsequent protocol amendments must be submitted to the FDA as part of the IND.

The FDA may order the temporary, or permanent, discontinuation of a clinical trial at any time, or impose other sanctions, if it believes that the clinical trial either is not being conducted in accordance with FDA requirements or presents an unacceptable risk to the clinical trial patients. The study protocol and informed consent information for patients in clinical trials must also be submitted to an IRB, for approval at each site at which the

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clinical trial will be conducted. An IRB may also require the clinical trial at the site to be halted, either temporarily or permanently, for failure to comply with the IRB s requirements, or may impose other conditions. Information about certain clinical trials must be submitted within specific timeframes to the National Institutes of Health, or NIH, for public dissemination on their *www.clinicaltrials.gov* website.

Clinical trials to support NDAs for marketing approval are typically conducted in three sequential phases, but the phases may overlap. In Phase 1, the initial introduction of the drug into healthy human subjects or patients, the drug is tested to assess pharmacological actions, side effects associated with increasing doses and, if possible, early evidence of effectiveness. Phase 2 usually involves trials in a limited patient population to study metabolism of the drug, pharmacokinetics, the effectiveness of the drug for a particular indication, dosage tolerance and optimum dosage, and to identify common adverse effects and safety risks. If a compound demonstrates evidence of effectiveness and an acceptable safety profile in Phase 2 evaluations, Phase 3 clinical trials, also called pivotal trials, are undertaken to obtain the additional information about clinical efficacy and safety in a larger number of patients, typically at geographically dispersed clinical trial sites, to permit the FDA to evaluate the overall benefit-risk relationship of the drug and to provide adequate information for the labeling of the drug. In most cases the FDA requires two adequate and well controlled Phase 3 clinical trials to demonstrate the efficacy of the drug. A single Phase 3 clinical trial with other confirmatory evidence may be sufficient in rare instances where the study is a large multicenter trial demonstrating internal consistency and a statistically very persuasive finding of a clinically meaningful effect on mortality, irreversible morbidity or prevention of a disease with a potentially serious outcome and confirmation of the result in a second trial would be practically or ethically impossible.

After completion of the required clinical testing, an NDA is prepared and submitted to the FDA. FDA approval of the NDA is required before marketing of the product may begin in the United States. The NDA must include the results of all pre-clinical, clinical and other testing and a compilation of data relating to the product s pharmacology, chemistry, manufacture and controls. The cost of preparing and submitting an NDA is substantial. The submission of most NDAs is additionally subject to a substantial application user fee, and the manufacturer and/or sponsor under an approved NDA are also subject to annual product and establishment user fees. These fees are typically increased annually. Under the Prescription Drug User Fee Act, or PDUFA, guidelines that are currently in effect, the FDA has a goal of ten months from the date of filing of a standard NDA for a new molecular entity to review and act on the submission. This review typically takes twelve months from the date the NDA is submitted to FDA because the FDA has approximately two months to make a filing decision.

The FDA has 60 days from its receipt of an NDA to determine whether the application will be accepted for filing based on the agency s threshold determination that it is sufficiently complete to permit substantive review. Once the submission is accepted for filing, the FDA begins an in-depth review. The FDA may request additional information rather than accept an NDA for filing. In this event, the application must be resubmitted with the additional information. The resubmitted application is also subject to review before the FDA accepts it for filing. Once the submission is accepted for filing, the FDA begins an in-depth substantive review. The FDA reviews an NDA to determine, among other things, whether the drug is safe and effective and whether the facility in which it is manufactured, processed, packaged or held meets standards designed to assure the product s continued safety, quality and purity.

The FDA may also refer applications for novel drug products, or drug products that present difficult questions of safety or efficacy, to an advisory committee typically a panel that includes clinicians and other experts for review, evaluation and a recommendation as to whether the application should be approved. The FDA is not bound by the recommendation of an advisory committee, but it generally follows such recommendations. Before approving an NDA, the FDA will typically inspect one or more clinical sites to assure compliance with GCPs. Additionally, the FDA will inspect the facility or the facilities at which the drug is manufactured. The FDA will not approve the product

unless compliance with cGMPs is satisfactory and the NDA contains data that provide substantial evidence that the drug is safe and effective in the indication studied.

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After the FDA evaluates the NDA and the manufacturing facilities, it issues either an approval letter or a complete response letter. A complete response letter generally outlines the deficiencies in the submission and may require substantial additional testing, or information, in order for the FDA to reconsider the application. If, or when, those deficiencies have been addressed to the FDA s satisfaction in a resubmission of the NDA, the FDA will issue an approval letter. The FDA has committed to reviewing such resubmissions in two or six months depending on the type of information included.

An approval letter authorizes commercial marketing of the drug with specific prescribing information for specific indications. Even if the FDA approves a product, it may limit the approved indications for use of the product, require that contraindications, warnings or precautions be included in the product labeling, require that post-approval studies, including Phase 4 clinical trials, be conducted to further assess a drug s safety after approval, require testing and surveillance programs to monitor the product after commercialization, or impose other conditions, including distribution and use restrictions or other risk management mechanisms under a Risk Evaluation and Mitigation Strategy, or REMS, to ensure that the benefits of the drug outweigh the potential risks. A REMS can include a medication guide, a communication plan for healthcare professionals and elements to assure safe use, such as special training and certification requirements for individuals who prescribe or dispense the drug, requirements that patients enroll in a registry and other measures that the FDA deems necessary to assure the safe use of the drug. The requirement for a REMS can materially affect the potential market and profitability of the drug. The FDA may prevent or limit further marketing of a product based on the results of post-marketing studies or surveillance programs. Once granted, product approvals may be withdrawn if compliance with regulatory standards is not maintained or problems are identified following initial marketing.

Changes to some of the conditions established in an approved application, including changes in indications, labeling, or manufacturing processes or facilities, require submission and FDA approval of a new NDA or NDA supplement before the change can be implemented. An NDA supplement for a new indication typically requires clinical data similar to that in the original application, and the FDA uses the same procedures and actions in reviewing NDA supplements as it does in reviewing NDAs. Such supplements are typically reviewed within 10 months of receipt.

Expedited Development and Review Programs

The FDA has a Fast Track program that is intended to expedite or facilitate the process for development and review of new drug products that meet certain criteria. Specifically, new drug products are eligible for Fast Track designation if they are intended to treat a serious or life-threatening disease or condition and demonstrate the potential to address unmet medical needs for the disease or condition. Fast Track designation applies to the combination of the product and the specific indication for which it is being studied. The sponsor of a new drug may request that the FDA designate the drug as a Fast Track product at any time during the clinical development of the product. For a Fast Track-designated product, the FDA may consider for review sections of the marketing application on a rolling basis before the complete application is submitted, if the sponsor provides a schedule for the submission of the sections of the application, the FDA agrees to accept sections of the application and determines that the schedule is acceptable, and the sponsor pays any required user fees upon submission of the first section of the application.

Any product submitted to the FDA for marketing, including under a Fast Track program, may be eligible for other types of FDA programs intended to expedite development and review, such as priority review and accelerated approval. Any product is eligible for priority review if it has the potential to provide safe and effective therapy where no satisfactory alternative therapy exists or a significant improvement in the treatment, diagnosis or prevention of a disease compared to marketed products. The FDA will attempt to direct additional resources to the evaluation of an application for a new drug product designated for priority review in an effort to facilitate the review. Additionally, a product may be eligible for accelerated approval. Drug products studied for their safety and effectiveness in treating

serious or life-threatening illnesses and that provide meaningful therapeutic benefit over existing treatments may be eligible for accelerated approval, which means that they may

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be approved on the basis of adequate and well-controlled clinical trials establishing that the product has an effect on a surrogate endpoint that is reasonably likely to predict a clinical benefit, or on the basis of an effect on a clinical endpoint other than survival or irreversible morbidity or mortality or other clinical benefit, taking into account the severity, rarity, or prevalence of the condition and the availability or lack of alternative treatments. As a condition of approval, the FDA may require that a sponsor of a drug product subject to accelerated approval perform adequate and well-controlled post-marketing clinical trials. In addition, the FDA currently requires as a condition for accelerated approval pre-approval of promotional materials, which could adversely impact the timing of the commercial launch of the product.

In addition, under the provisions of FDASIA, the FDA established the Breakthrough Therapy Designation which is intended to expedite the development and review of products that treat serious or life-threatening diseases or conditions. A breakthrough therapy is defined as a drug that is intended, alone or in combination with one or more other drugs, to treat a serious or life-threatening disease or condition, and preliminary clinical evidence indicates that the drug may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints, such as substantial treatment effects observed early in clinical development. The designation includes all of the features of Fast Track designation, as well as more intensive FDA interaction and guidance. The Breakthrough Therapy Designation is distinct from both accelerated approval and priority review, but these can also be granted to the same product candidate if the relevant criteria are met. The FDA must take certain actions, such as holding timely meetings and providing advice, intended to expedite the development and review of an application for approval of a breakthrough therapy. Requests for breakthrough therapy designation will be reviewed within 60 days of receipt, and FDA will either grant or deny the request.

Fast Track designation, priority review, accelerated approval and breakthrough therapy designation do not change the standards for approval but may expedite the development or approval process by allowing for approval based on a surrogate endpoint likely to predict clinical benefit of the underlying drug, rather than through a direct measure of clinical benefit. Even if Miragen receives one of these designations for its product candidates, the FDA may later decide that its product candidates no longer meet the conditions for qualification. In addition, these designations may not provide Miragen with a material commercial advantage.

Post-Approval Requirements

Once an NDA is approved, a product may be subject to certain post-approval requirements. For instance, the FDA closely regulates the post-approval marketing and promotion of drugs, including standards and regulations for direct-to-consumer advertising, off-label promotion, industry-sponsored scientific and educational activities and promotional activities involving the internet and social media. Drugs may be marketed only for the approved indications and in accordance with the provisions of the approved labeling.

Adverse event reporting and submission of periodic reports is required following FDA approval of an NDA. The FDA also may require post-marketing testing, known as Phase 4 testing, REMS, surveillance to monitor the effects of an approved product, or restrictions on the distribution or use of the product. In addition, quality-control, drug manufacture, packaging and labeling procedures must continue to conform to cGMPs after approval. Drug manufacturers and certain of their subcontractors are required to register their establishments with the FDA and certain state agencies. Registration with the FDA subjects entities to periodic unannounced inspections by the FDA, during which the agency inspects manufacturing facilities to assess compliance with cGMPs. Accordingly, manufacturers must continue to expend time, money and effort in the areas of production and quality-control to maintain compliance with cGMPs. Later discovery of previously unknown problems with a product, including adverse events of unanticipated severity or frequency, or failure to comply with regulatory requirements, may result in mandatory revisions to the approved labeling to add new safety information, imposition of post-market studies or

clinical trials to assess new safety risks or imposition of distribution or other restrictions under a REMS program. Other potential consequences include, among other things:

- restrictions on the marketing or manufacturing of the product, complete withdrawal of the product from the market or product recalls;

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fines, warning letters or holds on post-approval clinical trials;

refusal of the FDA to approve pending applications or supplements to approved applications, or suspension or revocation of product approvals;

product seizure or detention, or refusal to permit the import or export of products; or injunctions or the imposition of civil or criminal penalties.

The FDA strictly regulates marketing, labeling, advertising and promotion of products that are placed on the market. Drugs may be promoted only for the approved indications and in accordance with the provisions of the approved label. The FDA and other agencies actively enforce the laws and regulations prohibiting the promotion of off-label uses, and a company that is found to have improperly promoted off-label uses may be subject to significant liability.

Foreign Regulation

In order to market any product outside of the United States, Miragen would need to comply with numerous and varying regulatory requirements of other countries and jurisdictions regarding quality, safety and efficacy and governing, among other things, clinical trials, marketing authorization, commercial sales and distribution of Miragen s products. Whether or not Miragen obtains FDA approval for a product, Miragen would need to obtain the necessary approvals by the comparable foreign regulatory authorities before Miragen can commence clinical trials or marketing of the product in foreign countries and jurisdictions.

Some countries outside of the United States have a similar process that requires the submission of a clinical trial application, or CTA, much like the IND prior to the commencement of human clinical trials. In Europe, for example, a CTA must be submitted to each country s national health authority and an independent ethics committee, much like the FDA and IRB, respectively. Once the CTA is approved in accordance with a country s requirements, a clinical trial may proceed in that country. To obtain regulatory approval to commercialize a new drug under European Union regulatory systems, Miragen must submit a marketing authorization application, or MAA. The MAA is similar to the NDA, with the exception of, among other things, country-specific document requirements.

In Canada, biopharmaceutical product candidates are regulated by the Food and Drugs Act and the rules and regulations promulgated thereunder, which are enforced by the Therapeutic Products Directorate of Health Canada, or TPD. Before commencing clinical trials in Canada, an applicant must complete pre-clinical studies and file a CTA with the TPD. After filing a CTA, the applicant must receive different clearance authorizations to proceed with Phase 1 clinical trials, which can then lead to Phase 2 and Phase 3 clinical trials. To obtain regulatory approval to commercialize a new drug in Canada, a new drug submission, or NDS, must be filed with the TPD. If the NDS demonstrates that the product was developed in accordance with the regulatory authorities rules, regulations and guidelines and demonstrates favorable safety and efficacy and receives a favorable risk/benefit analysis, the TPD issues a notice of compliance which allows the applicant to market the product.

Other Healthcare Laws

Although Miragen currently does not have any products on the market, Miragen s current and future business operations may be subject to additional healthcare regulation and enforcement by the federal government and by authorities in the states and foreign jurisdictions in which Miragen conducts its business. Such laws include, without limitation, state and federal anti-kickback, fraud and abuse, false claims, privacy and security, price reporting and physician sunshine laws. Some of Miragen s pre-commercial activities are subject to some of these laws.

The federal Anti-Kickback Statute makes it illegal for any person or entity, including a prescription drug manufacturer or a party acting on its behalf to knowingly and willfully, directly or indirectly, solicit, receive,

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offer, or pay any remuneration that is intended to induce the referral of business, including the purchase, order, lease of any good, facility, item or service for which payment may be made under a federal healthcare program, such as Medicare or Medicaid. The term remuneration has been broadly interpreted to include anything of value. The Anti-Kickback Statute has been interpreted to apply to arrangements between pharmaceutical manufacturers on one hand and prescribers, purchasers, formulary managers, and beneficiaries on the other. Although there are a number of statutory exceptions and regulatory safe harbors protecting some common activities from prosecution, the exceptions and safe harbors are drawn narrowly. Practices that involve remuneration that may be alleged to be intended to induce prescribing, purchases or recommendations may be subject to scrutiny if they do not qualify for an exception or safe harbor. Failure to meet all of the requirements of a particular applicable statutory exception or regulatory safe harbor does not make the conduct per se illegal under the Anti-Kickback Statute. Instead, the legality of the arrangement will be evaluated on a case-by-case basis based on a cumulative review of all its facts and circumstances. Several courts have interpreted the statute s intent requirement to mean that if any one purpose of an arrangement involving remuneration is to induce referrals of federal healthcare covered business, the Anti-Kickback Statute has been violated. In addition, a person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation. Violations of this law are punishable by up to five years in prison, and can also result in criminal fines, civil money penalties and exclusion from participation in federal healthcare programs.

Moreover, a claim including items or services resulting from a violation of the federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the federal civil False Claims Act.

The federal civil False Claims Act prohibits, among other things, any person or entity from knowingly presenting, or causing to be presented, for payment to, or approval by, federal programs, including Medicare and Medicaid, claims for items or services, including drugs, that are false or fraudulent or not provided as claimed. Persons and entities can be held liable under these laws if they are deemed to cause the submission of false or fraudulent claims by, for example, providing inaccurate billing or coding information to customers or promoting a product off-label. In addition, Miragen s future activities relating to the reporting of wholesaler or estimated retail prices for Miragen s products, the reporting of prices used to calculate Medicaid rebate information and other information affecting federal, state and third-party reimbursement for Miragen s products, and the sale and marketing of Miragen s products, are subject to scrutiny under this law. Penalties for federal civil False Claims Act violations may include up to three times the actual damages sustained by the government, plus mandatory civil penalties of between $5,500 and $11,000 for each separate false claim, the potential for exclusion from participation in federal healthcare programs, and, although the federal False Claims Act is a civil statute, False Claims Act violations may also implicate various federal criminal statutes.

HIPAA created new federal criminal statutes that prohibit among other actions, knowingly and willfully executing, or attempting to execute, a scheme to defraud any healthcare benefit program, including private third-party payors, knowingly and willfully embezzling or stealing from a healthcare benefit program, willfully obstructing a criminal investigation of a healthcare offense, and knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false, fictitious or fraudulent statement in connection with the delivery of or payment for healthcare benefits, items or services. Like the federal Anti-Kickback Statute a person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation.

The civil monetary penalties statute imposes penalties against any person or entity that, among other things, is determined to have presented or caused to be presented a claim to a federal health program that the person knows or should know is for an item or service that was not provided as claimed or is false or fraudulent.

Also, many states have similar fraud and abuse statutes or regulations that may be broader in scope and may apply regardless of payor, in addition to items and services reimbursed under Medicaid and other state programs. Additionally, to the extent that any of Miragen s products are sold in a foreign country, Miragen may be subject to similar foreign laws.

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HIPAA, as amended by HITECH, and their implementing regulations, including the final omnibus rule published on January 25, 2013, mandates, among other things, the adoption of uniform standards for the electronic exchange of information in common healthcare transactions, as well as standards relating to the privacy and security of individually identifiable health information, which require the adoption of administrative, physical and technical safeguards to protect such information. Among other things, HITECH makes HIPAA s security standards directly applicable to business associates, defined as independent contractors or agents of covered entities that create, receive or obtain protected health information in connection with providing a service for or on behalf of a covered entity. HITECH also increased the civil and criminal penalties that may be imposed against covered entities and business associates, and gave state attorneys general new authority to file civil actions for damages or injunctions in federal courts to enforce the federal HIPAA laws and seek attorney s fees and costs associated with pursuing federal civil actions. In addition, certain state laws govern the privacy and security of health information in certain circumstances, some of which are more stringent than HIPAA and many of which differ from each other in significant ways and may not have the same effect, thus complicating compliance efforts. Failure to comply with these laws, where applicable, can result in the imposition of significant civil and/or criminal penalties.

The Affordable Care Act imposed, among other things, new annual reporting requirements for covered manufacturers for certain payments and other transfers of value provided to physicians and teaching hospitals, as well as certain ownership and investment interests held by physicians and their immediate family members. Failure to submit timely, accurately and completely the required information for all payments, transfers of value and ownership or investment interests may result in civil monetary penalties of up to an aggregate of $150,000 per year and up to an aggregate of $1 million per year for knowing failures. Certain states also mandate implementation of compliance programs, impose restrictions on drug manufacturer marketing practices and/or require the tracking and reporting of gifts, compensation and other remuneration to physicians.

Because Miragen intends to commercialize products that could be reimbursed under a federal healthcare program and other governmental healthcare programs, Miragen intends to develop a comprehensive compliance program that establishes internal control to facilitate adherence to the rules and program requirements to which Miragen will or may become subject. Although the development and implementation of compliance programs designed to establish internal control and facilitate compliance can mitigate the risk of investigation, prosecution, and penalties assessed for violations of these laws, the risks cannot be entirely eliminated.

If Miragen s operations are found to be in violation of any of such laws or any other governmental regulations that apply to Miragen, Miragen may be subject to penalties, including, without limitation, administrative, civil and criminal penalties, damages, fines, disgorgement, contractual damages, reputational harm, diminished profits and future earnings, the curtailment or restructuring of Miragen s operations, exclusion from participation in federal and state healthcare programs and individual imprisonment, any of which could adversely affect Miragen s ability to operate its business and its financial results.

Health Reform

In the United States and foreign jurisdictions, there have been a number of legislative and regulatory changes to the healthcare system that could affect Miragen s future results of operations. There have been and continue to be a number of initiatives at the U.S. federal and state levels that seek to reduce healthcare costs.

In particular, the Affordable Care Act has had, and is expected to continue to have, a significant impact on the healthcare industry. The Affordable Care Act was designed to expand coverage for the uninsured while at the same time containing overall healthcare costs. With regard to pharmaceutical products, among other things, the Affordable Care Act revised the definition of average manufacturer price for calculating and reporting Medicaid drug rebates on

outpatient prescription drug prices and imposed a significant annual fee on companies that manufacture or import certain branded prescription drug products. Substantial new provisions affecting compliance have also been enacted, which may require Miragen to modify Miragen s business practices with

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healthcare providers and entities, and a significant number of provisions are not yet, or have only recently become, effective.

Miragen continues to evaluate the effect that the Affordable Care Act will have on Miragen s business. In the coming years, additional legislative and regulatory changes could be made to governmental health programs that could significantly impact pharmaceutical companies and the success of its product candidate.

In addition, other legislative changes have been proposed and adopted since the Affordable Care Act was enacted. In August 2011, the President signed into law the Budget Control Act of 2011, which, among other things, created the Joint Select Committee on Deficit Reduction to recommend to Congress proposals in spending reductions. The Joint Select Committee did not achieve a targeted deficit reduction of at least $1.2 trillion for the years 2013 through 2021, triggering the legislation s automatic reduction to several government programs. These included reductions to Medicare payments to providers of 2% per fiscal year, which went into effect on April 1, 2013 and, due to subsequent legislative amendments to the statute, will stay in effect through 2025 unless additional Congressional action is taken. Additionally, in January 2013, the American Taxpayer Relief Act of 2012 was signed into law, which, among other things, further reduced Medicare payments to several providers and increased the statute of limitations period for the government to recover overpayments to providers from three to five years.

Moreover, the Drug Supply Chain Security Act, imposes new obligations on manufacturers of pharmaceutical products, among others, related to product tracking and tracing, which will be phased in over several years beginning in 2016. Among the requirements of this legislation, manufacturers will be required to provide certain information regarding the drug product to individuals and entities to which product ownership is transferred, label drug product with a product identifier, and keep certain records regarding the drug product. The transfer of information to subsequent product owners by manufacturers will eventually be required to be done electronically. Manufacturers will also be required to verify that purchasers of the manufacturers products are appropriately licensed. Further, under this new legislation, manufacturers will have drug product investigation, quarantine, disposition, and notification responsibilities related to counterfeit, diverted, stolen, and intentionally adulterated products, as well as products that are the subject of fraudulent transactions or which are otherwise unfit for distribution such that they would be reasonably likely to result in serious health consequences or death.

Coverage and Reimbursement

Sales of Miragen s product candidates, once approved, will depend, in part, on the extent to which the costs of Miragen s products will be covered by third-party payors, such as government health programs, private health insurers and managed care organizations. Third-party payors generally decide which drugs they will cover and establish certain reimbursement levels for such drugs. In particular, in the U.S., private health insurers and other third-party payors often provide reimbursement for products and services based on the level at which the government (through the Medicare or Medicaid programs) provides reimbursement for such treatments. Patients who are prescribed treatments for their conditions and providers performing the prescribed services generally rely on third-party payors to reimburse all or part of the associated healthcare costs. Patients are unlikely to use its products unless coverage is provided and reimbursement is adequate to cover a significant portion of the cost of its products. Sales of Miragen s product candidates, and any future product candidates, will therefore depend substantially on the extent to which the costs of Miragen s product candidates, and any future product candidates, will be paid by third-party payors. Additionally, the market for Miragen s product candidates, and any future product candidates, will depend significantly on access to third-party payors formularies without prior authorization, step therapy, or other limitations such as approved lists of treatments for which third-party payors provide coverage and reimbursement. Additionally, coverage and reimbursement for therapeutic products can differ significantly from payor to payor. One third-party payor s decision to cover a particular medical product or service does not ensure that other payors will also provide coverage for the

medical product or service, or will provide coverage at an adequate reimbursement rate. As a result, the coverage determination process will require Miragen to provide scientific and clinical support for the use of Miragen s products to each payor separately and will be a time-consuming process.

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Third-party payors are developing increasingly sophisticated methods of controlling healthcare costs and increasingly challenging the prices charged for medical products and services. Additionally, the containment of healthcare costs has become a priority of federal and state governments and the prices of drugs have been a focus in this effort. The U.S. government, state legislatures and foreign governments have shown significant interest in implementing cost-containment programs, including price controls and transparency requirements, restrictions on reimbursement and requirements for substitution of generic products. Adoption of price controls and cost-containment measures, and adoption of more restrictive policies in jurisdictions with existing controls and measures, could limit Miragen s net revenue and results. If these third-party payors do not consider Miragen s products to be cost-effective compared to other therapies, they may not cover Miragen s products once approved as a benefit under their plans or, if they do, the level of reimbursement may not be sufficient to allow Miragen to sell its products on a profitable basis. Decreases in third-party reimbursement for Miragen s products once approved or a decision by a third-party payor to not cover its products could reduce or eliminate utilization of Miragen s products and have an adverse effect on its sales, results of operations and financial condition. In addition, state and federal healthcare reform measures have been and will be adopted in the future, any of which could limit the amounts that federal and state governments will pay for healthcare products and services, which could result in reduced demand for Miragen s products once approved or additional pricing pressures.

Facilities

Miragen occupies 27,128 square feet of headquarters office and laboratory space in Boulder, Colorado under a lease that expires in August 2020. Miragen believes that its facilities are adequate for its current needs.

Employees

As of December 31, 2016, Miragen employed 43 full-time employees. Miragen has never had a work stoppage, and none of its employees is represented by a labor organization or under any collective bargaining arrangements. Miragen considers its employee relations to be good.

Legal Proceedings

From time to time, Miragen is involved in legal proceedings in the ordinary course of business. Miragen is currently not a party to any legal proceedings that Miragen believes would have a material adverse effect on its business, financial condition or results of operations.

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SIGNAL MANAGEMENT S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

The following discussion and analysis of financial condition and results of operations should be read together with the section titled Selected Historical and Unaudited Pro Forma Condensed Combined Financial Information and Data Selected Historical Financial Consolidated Data of Signal in this proxy statement/prospectus/information statement and the consolidated financial statements of Signal and accompanying notes appearing elsewhere in this proxy statement/prospectus/information statement. This discussion of Signal s financial condition and results of operations contains certain statements that are not strictly historical and are forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995 and involve a high degree of risk and uncertainty. Actual results may differ materially from those projected in the forward-looking statements due to other risks and uncertainties that exist in Signal s operations, development efforts and business environment, including those set forth in the section titled Risk Factors Risks Related to Signal in this proxy statement/prospectus/information statement, the other risks and uncertainties described in the section titled Risk Factors in this proxy statement/prospectus/information statement and the other risks and uncertainties described elsewhere in this proxy statement/prospectus/information statement. All forward-looking statements included in this proxy statement/prospectus/information statement are based on information available to Signal as of the date hereof, and Signal assumes no obligation to update any such forward-looking statement.

Overview

Signal is a commercial stage, molecular genetic diagnostic company that is currently marketing and selling its MyPRS test to physicians treating patients suffering from MM in academic institutions in all 50 states. Signal has been operating at a net loss since inception, based upon a business plan that anticipated raising additional funds through debt or equity financing to operate beyond the second quarter of 2017. Due to current market conditions, Signal s current liquidity position and its depressed stock price, Signal came to believe it would be difficult to obtain additional equity or debt financing on acceptable terms, if at all. Therefore, Signal s board of directors began discussing and evaluating its strategic opportunities to maximize stockholder value beginning near the end of 2015, including engaging in a sale of the company or a merger transaction.

Signal has incurred net losses in each year since its inception. As of September 30, 2016, Signal had an accumulated deficit of approximately $25 million. Substantially all of its net losses have resulted from costs incurred in connection with building the infrastructure to support is laboratory services business, its research and development programs and from general and administrative costs associated with its operations.

If the Merger and the sale of intellectual property assets related to Signal s MyPRS test are not completed, Signal will reconsider its strategic alternatives and would likely dissolve and liquidate its assets. Signal would be required to pay all of its debts and contractual obligations, and to set aside certain reserves for potential future claims, and there can be no assurances as to the amount or timing of available cash remaining to distribute to stockholders after paying the Signal obligations and setting aside funds for reserves.

Signal s future funding requirements, both near and long-term, will depend on many factors, including, but not limited to:

- the timing and completion of the proposed Merger with Miragen;

the timing and completion of the sale of its intellectual property assets related to its one proprietary test, MyPRS; and

the costs associated with the winding down of it laboratory services business in Little Rock, Arkansas and corporate operations in Carlsbad, California.

Signal operates in only one segment and, currently, has no operations outside of the United States.

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Sources of Revenues and Expenses

Revenues

Signal generates revenues primarily from the completion of tests processed through its CAP-accredited and CLIA certified laboratory when test results are delivered to ordering physicians. During the first nine months of 2016, Signal had three major customers, including UAMS. Revenue sourced either from or through UAMS as a percentage of net revenue during the first nine months of 2016 and 2015 were 22% and 64%, respectively. Revenue sourced either from or through the other two major customers as a percentage of net revenue during the first nine months of 2016 and 2015 were 27% and 1%, and 11% and 11%, respectively.

A significant portion of Signal s revenues consist of payments or reimbursements received from various payors, including Medicare, contracted insurance companies, directly billed customers (UAMS, pharmaceutical companies, reference laboratories and hospitals) and non-contracted insurance companies. Signal reports revenues from contracted payors and directly billed customers based on the contractual rate. Medicare reimburses MyPRS based on the local coverage determination at approximately $1,900 per test and Blue Cross Blue Shield of Arkansas reimburses MyPRS based on the contractual rate of approximately $2,000 per test. Revenues from non-contracted payors are reported based on the amount expected to be collected, which is based on the historical collection experience of each payor or payor group, as appropriate. The estimates of net revenue are subject to change based on the contractual status and payment policies of third-party payors with whom Signal deals as well as anticipated changes in the healthcare industry and related legislation. Signal regularly refines its estimates in order to make estimated revenue as accurate as possible based on its most recent collection experience with each third-party payor.

Cost of Revenue

Signal s cost of revenue consists primarily of the cost of materials and supplies, labor, and other costs associated with processing specimens including pathological review, quality control analyses, delivery charges necessary to render an individualized test result, depreciation, amortization and royalty expense. Costs associated with performing tests are recorded as the tests are processed.

Research and Development Expenses

Signal s research and development expenses primarily include personnel costs, laboratory supplies, reagents, consulting costs associated with developing and validating new testing services and sponsored research agreements with leading academic institutions for clinical trials and other studies to further validate the use of MyPRS for MM and AMG.

Selling and Marketing Expenses

Signal s selling and marketing expenses consist primarily of sales commissions and support costs, salaries and related employee benefits, travel, and marketing costs for its commercial, business development, medical affairs and managed care functions.

General and Administrative Expenses

Signal s general and administrative expenses consist primarily of personnel costs, professional service fees and other costs related to its being a publicly-traded company.

Interest Expense

Interest expense primarily reflects interest on Signal s note payable related party.

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Critical Accounting Policies and Estimates

The preparation of financial statements in conformity with U.S. GAAP requires the use of estimates and assumptions that affect the reported amounts of assets and liabilities, revenues and expenses, and related disclosures in the financial statements. Critical accounting policies are those accounting policies that may be material due to the levels of subjectivity and judgment necessary to account for highly uncertain matters or the susceptibility of such matters to change, and that have a material impact on financial condition or operating performance. While Signal bases its estimates and judgments on its experience and on various other factors that it believes to be reasonable under the circumstances, actual results may differ from these estimates under different assumptions or conditions.

Signal believes the following critical accounting policies used in the preparation of its financial statements require significant judgments and estimates:

Revenue Recognition

Accounts Receivable, Contractual Allowance and Allowance for Doubtful Accounts

Stock-Based Compensation

Accounting for Income Taxes

During the nine months ended September 30, 2016, other than as discussed below, there were no significant changes in Signal s critical accounting policies and estimates.

Revenue Recognition

Signal recognizes revenue from testing services in accordance with the Financial Accounting Standards Board Accounting Standards Codification, or FASB ASC, 605, Revenue Recognition, which requires that four basic criteria be met before revenue can be recognized: (1) persuasive evidence that an arrangement exists; (2) delivery has occurred and title and the risks and rewards of ownership have been transferred to the client or services have been rendered; (3) the price is fixed or determinable; and (4) collectability is reasonably assured.

Revenues are recorded on an accrual basis when the contractual obligations are completed as tests are processed through Signal s laboratory and test results are delivered to ordering physicians. Revenues are billed to various payors, including Medicare, contracted insurance companies, directly billed customers (UAMS, pharmaceutical companies, reference laboratories and hospitals) and non-contracted insurance companies. Revenues from Medicare, contracted insurance companies and directly billed customers are reported based on the contractual rate. The difference between the amounts billed and the contractual rates from Medicare and contracted insurance companies are recorded as contractual allowances at the same time the revenue is recognized, to arrive at reported net revenue. The contractual rate is based on established agreed upon rates between Signal and the respective payor. Directly billed customers are invoiced at the contractual rate. Revenues from non-contracted insurance companies are reported based on the amount expected to be collected, which is based on the historical collection experience of each payor or payor group, as appropriate, and anticipated effects of changes in the healthcare industry, if any. The difference between the amount billed and the amount estimated to be collected from non-contracted insurance companies is recorded as a contractual

allowance at the same time the revenue is recognized, to arrive at reported net revenue. Signal does not record revenue from individuals for billings until cash is collected; as collectability is not assured at the time services are provided, therefore there are no accounts receivable from self-payors. Gross revenues from individuals have been immaterial to date.

Signal s estimates of net revenue for non-contracted insurance companies are subject to change based on the contractual status and payment policies of the third-party payors with whom Signal deals. Signal regularly refines its estimates in order to make estimated revenue as accurate as possible based on its most recent collection experience with each third-party payor. Signal regularly reviews its historical collection experience for non-

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contracted payors and anticipated changes in the healthcare industry and adjust expected revenues for current and subsequent periods accordingly, including previously recorded revenues related to outstanding accounts receivable for such non-contracted payors.

Accounts Receivable, Contractual Allowances and Allowance for Doubtful Accounts

Signal records accounts receivable net of contractual allowances and an allowance for doubtful accounts. At September 30, 2016 and December 31, 2015, contractual allowances were $3.1 million and $2.1 million, respectively. Signal estimates an allowance for doubtful accounts based on the aging of the accounts receivable and the historical collection experience for each contracted payor. When the amounts are determined to be uncollectible, they are expensed as bad debt and subsequently charged-off against the allowance. During the third quarters of 2016 and 2015, Signal recognized $7,000 and $4,000, respectively, in bad debt expense. During first nine months of 2016 and 2015, it recognized $8,000 and $32,000, respectively, in bad debt expense. During 2015 and 2014, Signal recognized $33,000 and $177,000 in bad debt expense, respectively. At September 30, 2016 and December 31, 2015, allowances for doubtful accounts were $10,000 and $0, respectively. Uncollectability of accounts receivable for a non-contracted payor is typically a reflection of an estimate in excess of actual collections and is adjusted in the period of collection as a change in estimate resulting in an increase in contractual allowances and, therefore, a reduction in current period net revenue.

The following tables present Signal s gross accounts receivable from customers outstanding by aging category reduced by total contractual and doubtful account allowances to arrive at the net accounts receivable balances at September 30, 2016 and December 31, 2015. Other than the direct bill customers, all receivables were pending approval by third-party payors as of the date that the receivables were recorded:

	September 30, 2016				
(in thousands)	**0 - 30 Days**	**31 - 60 Days**	**61 - 90 Days**	**Over 90 Days**	**Total**
Medicare	$ 270	$ 155	$ 9	$ 31	$ 465
Contracted insurance companies	53	9	4	14	80
Direct bill	151	6		3	160
Non-contracted insurance companies	365	243	286	2,239	3,133
Accounts receivable, gross	839	413	299	2,287	3,838
Less: contractual and doubtful account allowances	(450)	(274)	(235)	(2,146)	(3,105)
Accounts receivable, net	$ 389	$ 139	$ 64	$ 141	$ 733

	December 31, 2015				
(in thousands)	**0 - 30 Days**	**31 - 60 Days**	**61 - 90 Days**	**Over 90 Days**	**Total**
Medicare	$ 116	$ 55	$ 32	$ 16	$ 219
Contracted insurance companies	13		9	16	38
Direct bill	101	12	24	14	151

Non-contracted insurance companies	336	256	215	1,244	2,051
Accounts receivable, gross	566	323	280	1,290	2,459
Less: contractual allowances	(347)	(245)	(230)	(1,243)	(2,065)
Accounts receivable, net	$ 219	$ 78	$ 50	$ 47	$ 394

The day sales outstanding, or DSO, at September 30, 2016 has increased to 78 days, compared to 53 days at December 31, 2015, attributable to the growth in net accounts receivable which was influenced by the increase in both test volume and average selling price for billings to non-contracted insurance payors. Since private non-contracted insurance payors are slower to pay, Signal expects its DSO s to increase as net revenues from these payors increase.

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Stock-Based Compensation

Signal recognizes compensation expense in an amount equal to the estimated fair value of each stock award over the estimated period of service and vesting. The estimation of the fair value of each stock-based grant or issuance involves numerous assumptions by management. The use of different values by management in connection with these assumptions could produce substantially different results.

Accounting for Income Taxes

Deferred income taxes result primarily from temporary differences between financial and tax reporting. Deferred tax assets and liabilities are determined based on the difference between the financial statement basis and tax basis of assets and liabilities using enacted tax rates. Future tax benefits are subject to a valuation allowance when management is unable to conclude that Signal s deferred tax assets will more-likely-than-not be realized from the results of operations. The estimate for the valuation allowance for deferred tax assets requires management to make significant estimates and judgments about projected future operating results. If actual results differ from these projections or if management s expectations of future results change, it may be necessary to adjust the valuation allowance.

Recently Adopted Accounting Pronouncements

In March 2016, the Financial Accounting Standards Board, or FASB, issued Accounting Standards Update, or ASU, No. 2016-09, which simplifies several aspects of the accounting for stock-based payment transactions, including the income tax consequences, classification of awards as either equity or liabilities, and classification on the statement of cash flows. The update is effective for fiscal years and the interim periods within those fiscal years beginning after December 15, 2016, with early adoption permitted. Amendments related to the timing of when excess tax benefits are recognized, minimum statutory withholding requirements and forfeitures are applied using a modified retrospective transition method by means of a cumulative-effect adjustment to equity as of the beginning of the period in which the guidance is adopted. Amendments related to the presentation of employee taxes paid on the statement of cash flows when an employer withholds shares to meet the minimum statutory withholding requirement is applied retrospectively. Amendments requiring recognition of excess tax benefits and tax deficiencies in the income statement are applied prospectively. Signal elected to early adopt this guidance effective January 1, 2016. The impact of adoption of this guidance had no effect on Signal s financial position, statements of operations or statements of cash flows.

In May 2015, the FASB issued ASU No. 2015-07 that eliminates the requirement to categorize investments within the fair value hierarchy if their fair value is measured using the net asset value per share practical expedient in the FASB s fair value measurement guidance. The amendments also limit certain disclosures to investments for which the entity has elected to measure at fair value using the net asset value per share practical expedient. The amendments were applied retrospectively by removing from the fair value hierarchy any investments for which fair value is measured using the net asset value per share practical expedient. Adoption of this guidance did not have an impact on Signal s financial position or results of operations.

Recent Accounting Pronouncements

Signal has reviewed all recently issued standards and has determined that other than as disclosed above and in Note 2 to the financial statements included herein, such standards will not have a material impact on its financial statements or do not otherwise apply to its operations.

Future Accounting Pronouncements

Section 107 of the JOBS Act provides that an emerging growth company, such as Signal, can take advantage of an extended transition period for complying with new or revised accounting standards. Thus, an emerging growth

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company can delay the adoption of certain accounting standards until those standards would otherwise apply to private companies. Although to date, Signal has not yet taken advantage of this delay, it has elected to avail itself of this extended transition period for adopting new or revised accounting standards in the future. Therefore, Signal will not be subject to the same new or revised accounting standards as other public companies that are not emerging growth companies. As a result of this election, the financial statements may not be comparable to companies that comply with public company effective dates. In the future, Signal may elect to opt out of the extended period for adopting new or revised accounting standards. If Signal does so, it will be required to disclose such decision, which will be irrevocable.

Results of Operations

Third Quarter of 2016 Compared to the Third Quarter of 2015

Net Revenue

Net revenue was $889,000 during the third quarter of 2016, an increase of $388,000, or 77%, compared to $501,000 during the third quarter of 2015. Net revenue and tests billed during the third quarters of 2016 and 2015 were as follows:

	Three Months Ended September 30,							
	Net Revenue (in 000s)				Tests Billed			
			Increase (Decrease)				Increase (Decrease)	
	2016	2015	$	%	2016	2015	#	%
Clinical patients at U.S. hospitals and direct billed customers	$ 821	$ 421	$ 400	95%	527	343	184	54%
Research testing services	52	75	(23)	(31)%	46	94	(48)	(51)%
Pharmaceutical services	16	5	11	220%	5	10	(5)	(50)%
Total	$ 889	$ 501	$ 388	77%	578	447	131	29%

The number of tests billed for clinical patients at U.S. hospitals and direct billed customers increased 54% during the third quarter of 2016 compared to the same period in 2015 due to an increase in new hospital customers and an increase in tests sourced from existing customers. Net revenue recognized for such tests billed increased 95% during the third quarter of 2016 when compared to the same period in 2015. The increase in net revenue was driven primarily by the increased test volume and an increase in test average selling price estimates used to calculate revenue for billings to non-contracted insurance payors based on positive collections experience with such payors. Additionally, net favorable changes in estimates of $6,000 were recorded in the third quarter of 2016, related to revenues recorded in prior years. Net revenue of $421,000 in the third quarter of 2015 was reduced by $64,000 of net unfavorable changes in estimates related to revenue recorded in 2014.

Both the net revenue recognized and number of tests reported and billed for research testing services, primarily UAMS, decreased 31% and 51% during the third quarter of 2016 compared to the third quarter of 2015 primarily due to the decrease in funds available at UAMS for such services.

In Signal s pharmaceutical services business, MyPRS is being run across multiple clinical trials in connection with the development of novel treatments for patients with multiple myeloma. Signal recognized net revenue of $16,000 for services rendered during the third quarter of 2016.

Cost of Revenue

Cost of revenue was $599,000, or 67% of net revenues, during the third quarter of 2016, an increase of $22,000, or 4%, compared to $577,000, or 115% of net revenues, during the third quarter of 2015. The increase in cost of

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revenue is primarily attributable to an increase in assigned laboratory personnel costs to fulfill the higher test volumes from clinical patients at U.S. hospitals for the third quarter of 2016 and an increase in the royalties due to UAMS for the higher test volume.

Research and Development Expenses

Research and development expenses were $226,000 during the third quarter of 2016, a decrease of $27,000, or 11%, when compared to $253,000 during the third quarter of 2015. The decrease is primarily attributable to a $132,000 decrease in the usage of labor, materials and supplies for internal research projects compared to the third quarter of 2015, offset by a $105,000 increase in sponsored research programs related to research to further validate the use of MyPRS in MM and AMG.

Selling and Marketing Expenses

Selling and marketing expenses were $373,000 during the third quarter of 2016, a decrease of $423,000, or 53%, when compared to $796,000 during the third quarter of 2015. The decrease is primarily attributed to $137,000 in recruiting and hiring costs incurred during the third quarter of 2015 related to establishing Signal s medical affairs function, a $209,000 decrease in marketing projects due to one-time projects incurred in the third quarter of 2015 and a $77,000 decrease in personnel costs due to a reduction in staff during 2016.

General and Administrative Expenses

General and administrative expenses were $1.5 million during the third quarter of 2016, a decrease of $496,000, or 25%, when compared to $2.0 million during the third quarter of 2015. The decrease was primarily attributable to a $720,000 decrease in stock-based compensation expense, $40,000 in decreased expenses related to facility and other administrative costs, offset by $242,000 in increased spending related to professional services, and $22,000 in increased personnel costs related to hiring of accounting, internal billing and IT staff.

First Nine Months of 2016 Compared to the First Nine Months of 2015

Net Revenue

Net revenue was $2.6 million during the first nine months of 2016, an increase of $702,000, or 37%, compared to $1.9 million during the first nine months of 2015. Net revenue and tests billed during the first nine months of 2016 and 2015 were as follows:

	Nine Months Ended September 30,							
	Net Revenue (in 000s)				Tests Billed			
			Increase (Decrease)				Increase (Decrease)	
	2016	2015	$	%	2016	2015	#	%
Clinical patients at U.S. hospitals and direct billed customers	$ 2,368	$ 974	$ 1,394	143%	1,492	878	614	70%
Research testing services	131	900	(769)	(85)%	144	1,106	(962)	(87)%
Pharmaceutical services	82	5	77	1,540%	17	10	7	70%

Total	$ 2,581	$ 1,879	$ 702	37%	1,653	1,994	(341)	(17)%

The number of tests billed for clinical patients at U.S. hospitals and direct billed customers increased 70% during the first nine months of 2016 compared to the same period in 2015 due to an increase in new hospital customers and an increase in tests sourced from existing customers. Net revenue recognized for such tests billed increased 143% during the first nine months of 2016 when compared to the same period in 2015. The increase in net

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revenue was driven primarily by the increased test volume and an increase in test average selling price estimates used to calculate revenue for billings to non-contracted insurance payors based on positive collections experience with such payors. Additionally, net favorable changes in estimates of $229,000 were recorded in the first nine months of 2016, related to revenues recorded in prior years. Net revenue of $974,000 in the first nine months of 2015 was reduced by $137,000 of net unfavorable changes in estimates related to revenue recorded in 2014.

Both the net revenue recognized and number of tests reported and billed for research testing services, primarily UAMS, decreased 85% and 87% during the first nine months of 2016 compared to the first nine months of 2015 primarily due to the decrease in funds available at UAMS for such services.

In Signal s pharmaceutical services business, MyPRS is being run across multiple clinical trials in connection with the development of novel treatments for patients with multiple myeloma. Signal recognized net revenue of $82,000 for services rendered during the first nine months of 2016.

Cost of Revenue

Cost of revenue was $1.9 million, or 72% of net revenues, during the first nine months of 2016, a decrease of $160,000, or 8%, compared to $2.0 million, or 107% of net revenues, during the first nine months of 2015. The decrease in cost of revenue is primarily attributable to a decrease of $46,000 of assigned laboratory personnel and $160,000 decrease in laboratory supply costs, a reflection of lower test volumes from UAMS, offset by a $46,000 increase in royalty expense, related to an increase in clinical patient-related revenues.

Research and Development Expenses

Research and development expenses were $867,000 during the first nine months of 2016, an increase of $321,000, or 59%, when compared to $546,000 during the first nine months of 2015. The increase is primarily attributable to $486,000 increase in sponsored research programs related to research to further validate the use of MyPRS in MM and AMG, offset by a $165,000 decrease in the usage of labor, materials and supplies for internal research projects compared to the first nine months of 2015.

Selling and Marketing Expenses

Selling and marketing expenses were $1.4 million during the first nine months of 2016, a decrease of $366,000, or 20% when compared to $1.8 million during the first nine months of 2015. The decrease is primarily attributed to $90,000 in recruiting and hiring costs incurred during the first nine months of 2015 related to establishing a medical affairs function, a $241,000 decrease in marketing projects due to one-time projects incurred in the first nine months of 2015 and a $35,000 decrease in personnel costs due to a reduction in staff during 2016.

General and Administrative Expenses

General and administrative expenses were $5.5 million during the first nine months of 2016, a decrease of $288,000, or 5%, when compared to $5.7 million during the same period in 2015. The decrease was primarily attributable to a $750,000 decrease in stock-based compensation expense and $42,000 in decreased expenses related to facility and other administrative costs, offset by $255,000 in increased personnel costs related to hiring of accounting, internal billing and IT staff, $174,000 in increased spending related to professional services, and $75,000 in increased fees and expenses for the board of directors.

Interest Expense

Interest expense was $69,000 during the first nine months of 2016, compared to $118,000 during the first nine months of 2015. The decrease was primarily due to interest expense recorded in the third quarter of 2015 related to the increase in the principal amount of an unsecured note payable due to a related party. The increase in the principal amount of the note was deferred and was amortized to interest expense over the initial term of the note to June 30, 2015.

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Year Ended December 31, 2015 Compared to the Year Ended December 31, 2014

Net Revenue

Net revenue was $2.5 million during 2015, a decrease of $1.8 million, or 41%, compared to $4.3 million during 2014. Net revenue and tests billed during 2015 and 2014 were as follows:

	Net Revenue (in 000s)				Tests Billed			
			Increase (Decrease)				Increase (Decrease)	
	2015	2014	$	%	2015	2014	#	%
UAMS-sourced:								
Research programs	$ 954	$ 3,114	$ (2,160)	(69)%	1,170	3,225	(2,055)	(64)%
Clinical patient revenue	412	504	(92)	(18)%	346	448	(102)	(23)%
Other US hospitals and direct billed customers	1,052	668	384	57%	921	511	410	80%
Pharmaceutical services	120	34	86	253%	59	12	47	392%
Total	$ 2,538	$ 4,320	(1,782)	(41)%	2,496	4,196	(1,700)	(41)%

The net revenue recognized and number of tests reported and billed under the UAMS research programs decreased 69% and 64% respectively, in 2015 compared to 2014 primarily due to the decrease in funds available at UAMS for such programs. Signal expects continued declining revenue from the UAMS research programs.

The number of tests reported and billed for UAMS-sourced clinical patients decreased 23% in 2015 when compared to 2014 due to the normal fluctuation in patient census. Net revenue recognized for such tests billed decreased 18% in 2015 when compared to 2014. The decrease in net revenue related to the decreased test volume, offset by $73,000 of net unfavorable prior year adjustments, booked in 2015, related to revenues recorded in the prior year.

The number of tests billed for other U.S. hospitals and direct billed customers increased 80% in 2015 when compared to 2014 due to an increase in new hospital customers, a direct result of the ongoing expansion of the commercial organization and the increased marketing efforts. Net revenue recognized for such tests increased 57% in 2015 when compared to 2014. The increase in net revenue was driven by the increased test volume offset by a reduction in test average selling price estimates used to calculate revenue for billings to non-contracted insurance payors. Additionally, a net unfavorable prior year adjustment of $120,000 was booked in 2015, relating to revenues recorded in the prior year. The reduction in current year pricing estimates for these non-contracted payors was in anticipation of the potential impact of the Affordable Care Act on utilization, coupled with a review of the historical collection trends, including non-contracted payors for whom Signal does not have collection experience. Signal expects the number of new payors to continue to increase, which may affect collection trends and, therefore, revenue estimates for billings to non-contracted insurance payors.

The net revenue recognized and number of tests reported and billed under service agreements with pharmaceutical customers increased 253% and 392%, respectively, in 2015 compared to 2014 due to the master laboratory service agreements executed with two pharmaceutical companies during 2015. Signal expects revenue from its pharmaceutical services business to grow as testing volume from these two agreements increase. Signal is pursuing additional agreements with other pharmaceutical companies as well as additional projects with its two current collaborators.

Cost of Revenue

Cost of revenue was $2.5 million or 97% of net revenues, during 2015, a decrease of $894,000, or 27%, compared to $3.4 million, or 78% of net revenues, during 2014. The decrease was attributable to (1) $526,000 in decreased personnel costs, primarily related to $200,000 in decreased stock-based compensation expense, $100,000 in one-time bonuses paid in 2014, $156,000 in labor costs allocated to research and development

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projects and $109,000 in reduced employee health insurance costs related to changing insurers, and (2) $424,000 in decreased material and supply costs due to a decrease in the total tests performed. These decreases were partially offset by a $56,000 increase in other laboratory related expenses, including depreciation expense.

Research and Development Expenses

Research and development expenses were $1.0 million during 2015, an increase of $655,000, or 189%, when compared to $347,000 during 2014. The increase is due to $470,000 in increased usage of labor, materials and supplies for research projects, $15,000 in increased consulting services and $170,000 in sponsored research programs related to research to further validate the use of MyPRS in MM and AMG.

Selling and Marketing Expenses

Selling and marketing expenses were $2.6 million during 2015, an increase of $1.8 million, or 257%, when compared to $717,000 during 2014. The increase was primarily attributed to a $1.4 million increase in personnel costs related to expanding the sales and marketing function and establishing managed care, commercial and business development functions, and $432,000 of expense for new marketing projects.

General and Administrative Expenses

General and administrative expenses were $7.7 million during 2015, an increase of $835,000, or 12%, when compared to $6.9 million during 2014. The increase was primarily attributable to $1.2 million in increased personnel costs related to hiring the chief financial and information officers, and accounting, internal billing, information technology and administrative staff, $275,000 in additional costs for an incentive plan, $638,000 of increased legal, accounting and insurance expenses related to Signal being a publicly-traded company for a full year during 2015, partially offset by $1.1 million in decreased stock-based compensation expense and $144,000 in decreased bad debt expense.

Gain on Legal Settlement

In August 2013, Signal settled a lawsuit in which it was the plaintiff for a tortuous interference claim regarding a potential acquisition, of which $100,000 was recognized as a gain on legal settlement during 2014.

Interest Expense

Interest expense was $141,000 during 2015, compared to $1.0 million during 2014. The decrease was primarily attributable to the Debt Conversion that occurred in June 2014.

Liquidity and Capital Resources

Signal had cash and cash equivalents of $5.4 million at September 30, 2016 compared to $10.8 million at December 31, 2015. At September 30, 2016, it had working capital of $3.7 million.

Signal s existing cash resources will not be sufficient to meet its operating plan for the full 12-month period after the date of this proxy statement/prospectus/information statement. Based on available resources, Signal believes it can maintain its operations into the second quarter of 2017. As a result, to continue to fund operations beyond the second quarter of 2017, Signal would need to (1) raise additional capital through the issuance of equity, debt or other securities, (2) convert existing debt into equity, (3) enter into strategic partnerships, alliances, collaborations or other similar transactions or (4) a combination thereof. Signal s financial statements do not include any adjustments that

might be necessary if it is unable to continue as a going concern.

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Due to current market conditions, Signal s current liquidity position and its depressed stock price, Signal came to believe it may be difficult to obtain additional equity or debt financing on terms acceptable, if at all, thus raising substantial doubt about its ability to continue as a going concern. On October 31, 2016, Signal, Merger Sub and Miragen entered into the Merger Agreement, pursuant to which, among other things, subject to the satisfaction or waiver of the conditions set forth in the Merger Agreement, Merger Sub will merge with and into Miragen, with Miragen becoming a wholly-owned subsidiary of Signal and the surviving corporation of the Merger. If the Merger is completed, the business of Signal will become the business of Miragen as described in this proxy statement/prospectus/information statement under the caption Miragen Business. Also on October 31, 2016, Signal announced that it had entered into a non-binding letter of intent with a large global diagnostic laboratory for the sale of intellectual property assets related to Signal s MyPRS test. Subsequently on November 29, 2016, Signal and Quest Diagnostics Investments LLC entered into the Intellectual Property Purchase Agreement. Pursuant to the Intellectual Property Purchase Agreement, upon closing of the sale of the MyPRS asset transaction, Signal will receive $825,000 in cash from Quest, plus an additional $100,000 if Quest exercises the option to require Signal to operate the lab after December 31, 2016 (but not later than January 14, 2017).

Signal has no material commitments for capital expenditures at this time.

Operating activities

Cash used by operations during the first nine months of 2016 was $5.4 million, compared to $5.6 million during the first nine months of 2015.

During the first nine months of 2016, the provision of cash from changes in operating assets and liabilities of $101,000 includes a decrease in inventory of $125,000 and an increase in accounts payable and accrued liabilities of $360,000, partially offset by a $339,000 increase in accounts receivable, which primarily reflects an increase in Signal s net revenue during the first nine months of 2016 when compared to the fourth quarter of 2015, and an increase in prepaid expenses and other current assets of $45,000.

During the first nine months of 2015, the provision of cash from changes in operating assets and liabilities of $244,000 includes a $541,000 decrease in accounts receivable and a $307,000 increase in accounts payable and accrued liabilities, primarily due to higher accrued compensation, partially offset by an increase in inventory of $185,000, an increase in prepaid expenses and other current assets of $171,000 and a reduction in Signal s lease termination/abandonment payable of $248,000.

Investing activities

Net cash used by investing activities during the first nine months of 2016 and 2015 of $3,000 and $72,000, respectively, were for the purchase of property and equipment.

Financing activities

Net cash used by financing activities during the first nine months of 2016 of $124,000 consisted of $61,000 used to repurchase shares from employees to satisfy tax withholding obligations for restricted stock awards and $63,000 for repayment of Signal s capital lease obligation.

Net cash provided by financing activities during the first nine months of 2015 of $12.7 million consisted primarily of the net proceeds from Signal s public offerings of common stock in February and September 2015 of $13.1 million, partially offset by $363,000 used to repurchase shares from employees to satisfy tax withholding obligations for

restricted stock awards and $56,000 for repayment of Signal s capital lease obligation.

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Related Party Transactions

During 2014, Signal s then majority member, and current Chairman of the board of directors, through various entities controlled by such member, loaned a net amount of $795,000 to Signal to support its operations. The secured note bore interest at 8% compounded quarterly, was due on demand and collateralized by substantially all of Signal s assets. Pursuant to the terms of an exchange agreement, and prior to the corporate conversion, $27.3 million of the secured note payable as of June 17, 2014 was exchanged for 2,732,629 Class C units of Signal Genetics LLC and recorded to members equity. The remaining $1.0 million as of that date, along with an additional $45,000, which was advanced to pay for certain offering expenses, was reclassified as unsecured amounts due to related party in the consolidated balance sheet. The aggregate amount was non-interest bearing and was due on demand.

On March 6, 2015, the amounts due to related party, aggregating $1,045,000, were converted into an unsecured note payable related party, bearing interest at 8% per annum and due on demand. The principal amount of the note was increased by $60,000 over the amounts due to related party to $1,105,009 to provide the equivalent of 8% per annum interest for the period of time the amounts due to related party were held as a payable in exchange for a provision that the related party would not call the note prior to June 30, 2015. The increase in the principal amount of the note was deferred and amortized to interest expense over the initial term of the note to June 30, 2015. Interest expense related to this note during the year ended December 31, 2015 was $132,000. The note balance at December 31, 2015 was $1,105,009 and accrued interest payable of $73,000 is included in accrued liabilities in the consolidated balance sheet at December 31, 2015.

On October 31, 2016, Signal entered into the Note Amendment, modifying the principal amount of the note to $1,045,000, the original amount advanced to Signal as of June 17, 2014, and the interest of the original note to a rate per annum of 11% commencing on June 17, 2014, with interest computed on the basis of the actual number of days in a 360-day year, or Outstanding Balance. The Note Amendment also allows for the conversion of the Outstanding Balance subject to an additional 11% premium on the Outstanding Balance into shares of common stock immediately prior to the effective time of the Merger with Miragen at a conversion price equal to $5.39 per share, which was the closing price of Signal s common stock on The NASDAQ Capital Market as of the effective date of the Note Amendment. This conversion provision of the Note Amendment is subject to, among other things, approval by Signal stockholders. If the conversion of the Note Amendment is not approved by the stockholders or if the Merger Agreement is terminated prior to the completion of the Merger, the Note Amendment will not be converted into Signal s common stock and will remain outstanding.

Commitments and Contingencies

At September 30, 2016 and December 31, 2015, other than Signal s office and laboratory leases, a license agreement with UAMS and a services agreement with a third party to assist with collections from customers, it had no material commitments other than the liabilities reflected in the financial statements.

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MIRAGEN MANAGEMENT S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

The following discussion and analysis of financial condition and results of operations should be read together with the section titled Selected Historical and Unaudited Pro Forma Condensed Combined Financial Information and Data Selected Historical Financial Consolidated Data of Miragen in this proxy statement/prospectus/information statement and the consolidated financial statements of Miragen and accompanying notes appearing elsewhere in this proxy statement/prospectus/information statement. This discussion of Miragen s financial condition and results of operations contains certain statements that are not strictly historical and are forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995 and involve a high degree of risk and uncertainty. Actual results may differ materially from those projected in the forward-looking statements due to other risks and uncertainties that exist in Miragen s operations, development efforts and business environment, including those set forth in the section titled Risk Factors Risks Related to Miragen in this proxy statement/prospectus/information statement, the other risks and uncertainties described in the section titled Risk Factors in this proxy statement/prospectus/information statement and the other risks and uncertainties described elsewhere in this proxy statement/prospectus/information statement. All forward-looking statements included in this proxy statement/prospectus/information statement are based on information available to Miragen as of the date hereof, and Miragen assumes no obligation to update any such forward-looking statement.

Overview

Miragen is a clinical-stage biopharmaceutical company discovering and developing proprietary RNA-targeted therapeutics with a specific focus on microRNAs and their role in diseases where there is a high unmet medical need. microRNAs are short RNA molecules, or oligonucleotides, that regulate gene expression or activity and play a vital role in influencing the pathways responsible for many disease processes. Miragen believes its experience in microRNA biology and chemistry, drug discovery, bioinformatics, and translational medicine provide it with a potential competitive advantage to identify and develop microRNA-targeted drugs designed to regulate gene pathways to result in disease modification. Miragen uses its expertise in systems biology and oligonucleotide chemistry to discover and develop a pipeline of product candidates. Miragen s two lead product candidates, MRG-106 and MRG-201, are currently in Phase 1 clinical trials. Miragen s clinical product candidate for the treatment of certain cancers, MRG-106, is an inhibitor of microRNA-155, or miR-155, which is found at abnormally high levels in several blood cancers. Miragen s clinical product candidate for the treatment of pathological fibrosis, MRG-201, is a replacement for miR-29, which is found at abnormally low levels in a number of pathological fibrotic conditions, including cardiac, renal, hepatic, and pulmonary fibrosis, as well as systemic sclerosis. In addition to Miragen s clinical programs, it is developing a pipeline of pre-clinical product candidates. The goal of Miragen s translational medicine strategy is to progress rapidly to first in human studies once it has established the pharmacokinetics (the movement of drug into, through, and out of the body), pharmacodynamics (the effect and mechanism of action of a drug) and safety of the product candidate in pre-clinical studies.

Liquidity

Miragen has no products approved for commercial sale and has not generated any revenue from product sales. From inception to September 30, 2016, Miragen has raised net cash proceeds of approximately $72 million, primarily from private placements of convertible preferred stock and bridge financings and $33.8 million in proceeds under Miragen s strategic alliance with Servier.

Miragen has never been profitable and have incurred operating losses in each year since inception. Miragen s net losses were $11.3 million for the nine months ended September 30, 2016, and $15.7 million and $5.9 million for the years ended December 31, 2015 and 2014, respectively. As of September 30, 2016, Miragen had an accumulated deficit of $61.1 million. Substantially all of Miragen s operating losses resulted from expenses

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incurred in connection with its research and development programs and from general and administrative costs associated with its operations.

Miragen expects to incur significant expenses and increasing operating losses for at least the next several years as Miragen initiates and continues the clinical development of, and seek regulatory approval for, Miragen s product candidates and add personnel necessary to operate as a public company with an advanced clinical candidate pipeline of product candidates. In addition, operating as a publicly-traded company would involve the hiring of additional financial and other personnel, upgrading financial information systems, and incurring costs associated with operating as a public company. Miragen expects that its operating losses will fluctuate significantly from quarter to quarter and year to year due to timing of clinical development programs and efforts to achieve regulatory approval.

As of September 30, 2016, Miragen had cash, cash equivalents, and short-term investments of $25.6 million. Miragen s current capital resources are sufficient to fund its planned operations for the next 12-months with or without completion of the Merger and/or the concurrent financing contemplated by the Merger Agreement. Miragen will continue to require substantial additional capital to continue its clinical development activities. Accordingly, Miragen will need to raise substantial additional capital to continue to fund its operations. The amount and timing of Miragen s future funding requirements will depend on many factors, including the pace and results of its clinical development efforts. Failure to raise capital as and when needed, on favorable terms or at all, would have a negative impact on Miragen s financial condition and its ability to develop its product candidates.

Recent Events

On October 31, 2016, Miragen entered into the Merger Agreement pursuant to which, among other things, subject to the satisfaction or waiver of the conditions set forth in the Merger Agreement, a wholly-owned subsidiary of Signal will merge with and into Miragen, with Miragen becoming a wholly-owned subsidiary of Signal and the surviving corporation of the Merger. At the closing of the Merger, each outstanding share of Miragen common stock will be converted into the right to receive approximately 0.6995 shares of common stock of Signal, without giving effect to the reverse stock split, or between 0.6995 and 0.0466 shares of common stock of Signal after giving effect to the reverse stock split, as well as the payment of cash in lieu of fractional shares. Immediately after the Merger, Miragen securityholders will own approximately 96% of the fully-diluted common stock of the combined company, with Signal securityholders owning approximately 4% of the fully-diluted common stock of the combined company, each assuming that Miragen closes its concurrent financing immediately prior to the effective time of the Merger. If the concurrent financing does not close, then Miragen s securityholders would own approximately 94% of the fully-diluted common stock of the combined company and Signal s securityholders would own approximately 6% of the fully-diluted common stock of the combined company. These estimates are based on the anticipated pre-split Exchange Ratio and post-split Exchange Ratios and are subject to adjustment.

Prior to entering into the Merger Agreement, certain third parties, including some of Miragen s existing stockholders, entered into the Subscription Agreement pursuant to which such parties have agreed, subject to the terms and conditions of such agreements, to purchase, prior to consummation of the Merger, shares of its capital stock upon the Merger for an aggregate purchase price of approximately $40.7 million. The consummation of the transactions contemplated by such agreements is conditioned upon the satisfaction or waiver of the conditions set forth in the Merger Agreement.

Revenue

Miragen s revenue primarily consists of upfront payments for licenses, and payments for other research services under the Servier Collaboration Agreement with Servier, as well as grants that Miragen has been directly and indirectly

awarded.

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In the future, Miragen may generate revenue from a combination of license fees and other upfront payments, payments for research and development services, milestone payments, product sales and royalties in connection with Miragen s current and/or future strategic alliances. Miragen expects that any revenue it generates will fluctuate from quarter-to-quarter as a result of the timing of its achievement of pre-clinical, clinical, regulatory and commercialization milestones, if at all, the timing and amount of payments relating to such milestones and the extent to which any of Miragen s products are approved and successfully commercialized by Miragen or Servier. If Servier does not elect or otherwise agree to fund its development costs pursuant to the Servier Collaboration Agreement, or Miragen or Servier fails to develop product candidates in a timely manner or obtain regulatory approval for them, Miragen s ability to generate future revenues, and its results of operations and financial position would be adversely affected.

Research and Development Expenses

Research and development expenses consist of costs associated with Miragen s research activities, including its product discovery efforts, and the development of its product candidates. Miragen s research and development expenses include:

- employee-related expenses, including salaries, benefits, and stock-based compensation;
- external research and development expenses incurred under arrangements with third parties, such as CROs, contract manufacturing organizations, consultants, and Miragen s scientific advisors;
- license fees; and
- facilities, information technology, depreciation and other allocated expenses, which include direct and allocated expenses for rent and maintenance of facilities, depreciation of leasehold improvements and equipment, and laboratory and other supplies.

Miragen expenses research and development costs as incurred. Miragen accounts for nonrefundable advance payments for goods and services that will be used in future research and development activities as expenses when the service has been performed or when the goods have been received.

At any time, Miragen is working on multiple programs, primarily within Miragen s therapeutic areas of focus. Miragen s internal resources, employees and infrastructure are not directly tied to any one research or drug discovery project and are typically deployed across multiple projects. As such, Miragen does not generate meaningful information regarding the costs incurred for these early stage research and drug discovery programs on a specific project basis. However, Miragen is currently spending the vast majority of its research and development resources on its two lead development programs.

Since Miragen s inception in July 2007, Miragen has grown to 32 research and development personnel and has spent a total of approximately $66 million in research and development expenses through September 30, 2016.

Miragen expects its research and development expenses to increase for the foreseeable future as the company continues to conduct its ongoing clinical trials, initiates new clinical trials and advances its pre-clinical research

programs toward the clinic, including registration-enabling activities. The process of conducting clinical trials and pre-clinical studies necessary to obtain regulatory approval is costly and time consuming. Miragen, or Servier, may never succeed in achieving marketing approval for any of Miragen s product candidates.

The development of each product candidate (commencing with registration enabling toxicology studies) under the Servier Collaboration Agreement is performed pursuant to a mutually agreed upon development plan to be conducted by the parties as necessary to generate data useful for both parties to obtain regulatory approval of such product candidates. Servier is responsible for a specified percentage of the cost of research and development activities through the completion of one or more Phase 2 clinical trials and will reimburse Miragen for a specified portion of such costs Miragen incurs. The costs of Phase 3 clinical trials for each product candidate will be

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allocated between the parties at a specied percentage of costs between the parties upon the occurrence of specified events under the Servier Colloboration Agreement, including if Miragen enters into a third-party agreement for the development and/or commercialization of a product in the United States at least 180 days before the initiation of the first Phase 3 clinical trial or if Miragen subsequently enters into a U.S. partner agreement or if Miragen does not enter into a U.S. partner agreement, but files for approval in the United States using data from the Phase 3 clinical trial.

Successful development of future product candidates is highly uncertain and may not result in approved products. Completion dates and completion costs can vary significantly for each future product candidate and are difficult to predict. Miragen anticipates it will make determinations as to which programs to pursue and how much funding to direct to each program on an ongoing basis in response to Miragen s ability to maintain or enter into new strategic alliances with respect to each program or potential product candidate, the scientific and clinical success of each future product candidate, and ongoing assessments as to each future product candidate s commercial potential. Miragen will need to raise additional capital and may seek additional strategic alliances in the future in order to advance its various programs.

General and Administrative Expenses

General and administrative expenses consist primarily of employee salaries and benefits, including stock-based compensation, related to Miragen s executive, finance, accounting, legal, business development, and support functions. Other general and administrative expenses include allocated facility and information technology related costs not otherwise included in research and development expenses and professional fees for auditing, tax, and legal services. Miragen expects that general and administrative expenses will increase in the future as Miragen expands its operating activities.

If Miragen completes the Merger, Miragen would become a publicly-traded company and would expect to incur significant additional costs associated with being a publicly-traded company. These increases will likely include legal fees, costs associated with Sarbanes-Oxley compliance, accounting fees, and directors and officers liability insurance premiums.

Other income (expense), net

Other income (expense) consists primarily of interest income and expense, and various income or expense items of a non-recurring nature. Miragen earns interest income from interest-bearing accounts and money market funds for cash and cash equivalents and short-term investments. Interest expense has historically been comprised of interest incurred under outstanding notes payable with Silicon Valley Bank, as well as interest and other related non-cash charges under convertible notes payable with Miragen s investors.

Critical Accounting Polices and Estimates

This management discussion and analysis of financial condition and results of operations is based on Miragen s consolidated financial statements, which have been prepared in accordance with U.S. GAAP. The preparation of these financial statements requires Miragen to make estimates and judgments that affect the reported amounts of assets, liabilities and expenses. On an ongoing basis, Miragen evaluates these estimates and judgments. Miragen bases its estimates on historical experience and on various assumptions that Miragen believes to be reasonable under the circumstances. These estimates and assumptions form the basis for making judgments about the carrying values of assets and liabilities and the recording of expenses that are not readily apparent from other sources. Actual results may differ materially from these estimates. Miragen believes that the accounting policies discussed below are critical to understanding Miragen s historical and future performance, as these policies relate to the more significant areas

involving its judgments and estimates.

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Revenue Recognition

Miragen recognizes revenue from upfront payments for licenses or options to obtain licenses in the future, milestone payments that are generated from defined research or development events, as well as amounts for other research and development services under strategic alliance and collaboration agreements. Miragen recognizes revenue when all four of the following criteria are met: (i) persuasive evidence of an arrangement exists; (ii) products have been delivered or services rendered; (iii) the selling price is fixed or determinable; and (iv) collectability is reasonably assured.

Multiple element arrangements are examined to determine whether the deliverables can be separated or must be accounted for as a single unit of accounting. Miragen s collaboration agreement with Servier, for example, includes a combination of upfront license fees, payments for research and development activities, and milestone payments that are evaluated to determine whether each deliverable under the agreement has value to the customer on a stand-alone basis and whether reliable evidence of fair value for the deliverable exists. Deliverables in an arrangement that do not meet these separation criteria are treated as a single unit of accounting, generally applying applicable revenue recognition guidance for the final deliverable to the combined unit of accounting.

Miragen recognizes revenue from nonrefundable upfront license fees over the term of performance under the collaboration agreement. When the performance period is not specified, Miragen estimates the performance period based upon provisions contained within the agreement, such as the duration of the research or development term, the existence, or likelihood of achievement of development commitments and any other significant commitments. These advance payments are deferred and recorded as deferred revenue upon receipt, pending recognition, and are classified as a short-term or long-term liability in the accompanying consolidated balance sheets. Expected performance periods are reviewed periodically and, if applicable, the amortization period is adjusted which, Miragen may accelerate or decelerate revenue recognition. The timing of revenue recognition, specifically as it relates to the amortization of upfront license fees, is significantly influenced by Miragen s estimates.

Stock-Based Compensation

Miragen accounts for stock-based compensation expense related to stock options granted to employees and members of Miragen s board of directors under the Miragen 2008 Plan by estimating the fair value of each stock option or award on the date of grant using the Black-Scholes model. Miragen recognizes stock-based compensation expense on a straight-line basis over the vesting term.

Miragen accounts for stock options issued to non-employees by valuing the award using an option pricing model and remeasuring such awards to the current fair value until the awards are vested or a performance commitment has otherwise been reached.

Research and Development

Research and development costs are expensed as incurred and include compensation and related benefits, stock-based compensation, license fees, laboratory supplies, facilities, and overhead costs. Miragen often makes nonrefundable advance payments for goods and services that will be used in future research and development activities. These payments are capitalized and recorded as expense in the period that Miragen receives the goods or when the services are performed.

Miragen records upfront and milestone payments to acquire contractual rights to licensed technology as research and development expenses when incurred if there is uncertainty in Miragen receiving future economic benefit from the

acquired contractual rights. Miragen considers future economic benefits from acquired contractual rights to licensed technology to be uncertain until such a drug candidate is approved by the FDA or when other significant risk factors are abated.

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Clinical Trial and Pre-Clinical Study Accruals

Miragen makes estimates of its accrued expenses as of each balance sheet date in Miragen s consolidated financial statements based on certain facts and circumstances at that time. Miragen s accrued expenses for pre-clinical studies and clinical trials are based on estimates of costs incurred for services provided by CROs, manufacturing organizations, and for other trial related activities. Payments under Miragen s agreements with external service providers depend on a number of factors such as site initiation, patient screening, enrollment, delivery of reports, and other events. In accruing for these activities, Miragen obtains information from various sources and estimates level of effort or expense allocated to each period. Adjustments to Miragen s research and development expenses may be necessary in future periods as its estimates change. As these activities are generally material to Miragen s overall financial statements, subsequent changes in estimates may result in a material change in its accruals.

Results of Operations

Comparison of the nine months ended September 30, 2016 and 2015

The following table summarizes Miragen s results of operations for the nine months ended September 30, 2016 and 2015 (in thousands):

	Nine Months Ended September 30,	
	2016	**2015**
Revenue	$ 2,969	$ 4,016
Research and development expenses	9,786	9,918
General and administrative expenses	4,255	2,902
Other income (expense), net	(229)	(1,599)
Net loss	11,301	10,403

Revenue

Revenue was $3.0 million for the nine months ended September 30, 2016 compared to $4.0 million for the nine months ended September 30, 2015, which was derived primarily from the Servier Collaboration Agreement. Revenue recognized under the Servier Collaboration Agreement during the nine months ended September 30, 2016 decreased by $1.5 million as compared to the same period in 2015. This decrease is primarily the result of a decrease in funded research and development expenses of $0.9 million and a decrease in revenue recognized from prior upfront license payments Miragen received from Servier of $0.6 million. These changes were driven by planned variability in the timing and extent of research and development activities under Miragen s collaboration. In addition, Miragen recognized $0.5 million in grant revenue, which related to other research and development activities.

As of September 30, 2016, Miragen had $0.1 million of deferred revenue, which consisted of payments received from Servier under the Servier Collaboration Agreement that had not yet been recognized in accordance with Miragen s revenue recognition policies. This deferred revenue is expected to be recognized through October 2017.

Research and Development Expenses

Research and development expenses were $9.8 million during the first nine months of 2016, as compared to $9.9 million during the nine months ended September 30, 2015. This decrease of $0.1 million was driven by a $1.9 million

decrease in outsourced pre-clinical studies and manufacturing costs as Miragen completed the toxicology and manufacturing studies required to support filing two INDs in the second half of 2015. This decrease was partially offset by an increase of $0.9 million in expenses incurred during the first half of 2016 related a Phase 1 clinical trial under Miragen s MRG-201 program that began to enroll subjects during the fourth quarter for 2015

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and a Phase 1 clinical trial under Miragen s MRG-106 program that began to enroll patients in the first quarter for 2016. Miragen also incurred $0.7 million of additional wages, benefits, consulting and support expenses during the first nine months of 2016 as compared to the same period in 2015 as Miragen built out its research and development organization.

General and Administrative Expenses

General and administrative expenses were $4.3 million for the nine months ended September 30, 2016 as compared to $2.9 million for the nine months ended September 30, 2015. This increase of $1.4 million was driven in part by increased corporate legal expenses of $0.7 million that were primarily related to the Merger Agreement. Miragen s personnel costs also increased by $0.5 million in 2016 due to new employee hires and increases in compensation as compared to the prior year.

Other income (expense), net

Miragen incurred $0.2 million net other non-operating expenses during the nine months ended September 30, 2016 as compared to $1.6 million during the nine months ended September 30, 2015. This decrease was primarily related to interest expense and related charges incurred in 2015 on the $8.5 million in convertible notes payable issued to Miragen s investors in the first half of 2015, which converted into preferred stock during the fourth quarter of 2015.

Comparison of the years December 31, 2015 and 2014

The following table summarizes Miragen s results of operations for the years ended December 31, 2015 and 2014 (in thousands):

	Years Ended December 31,	
	2015	**2014**
Revenue	$ 5,004	7,641
Research and development expenses	13,312	9,488
General and administrative expenses	3,850	4,068
Other income (expense), net	(3,528)	9
Net loss	15,686	5,906

Revenue

Revenue was $5.0 million for the year ended December 31, 2015 compared to $7.6 million for the year ended December 31, 2014, which was derived solely from the Servier Collaboration Agreement for both periods. Revenue during the year ended December 31, 2015 decreased by $2.6 million as compared to prior year. This decrease is primarily the result of a decrease in revenue recognized from prior upfront license payments Miragen received from Servier as a result of a change in the amortization period due to the extension of the Servier Collaboration Agreement that occurred in May 2014. As of December 31, 2015, Miragen had $0.5 million of deferred revenue, which consisted of payments received from Servier under the Servier Collaboration Agreement that have not yet been recognized in accordance with Miragen s revenue recognition policies.

Research and Development Expenses

Research and development expenses were $13.3 million for the year ended December 31, 2015 compared to $9.5 for the year ended December 31, 2014. The change was primarily driven by an increase in Miragen s outsourced pre-clinical studies and clinical trial costs of $1.7 million for the year ended December 31, 2015, compared to the year ended December 31, 2014. This increase was due to costs incurred to complete IND enabling toxicology

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studies and for clinical trial startup activities related to the initiation of two Phase 1 clinical trials. Additionally, outsourced product manufacturing costs increased by $2.0 million for the year ended December 31, 2015, compared to the year ended December 31, 2014. This increase was due to costs incurred associated with product manufacturing for IND enabling toxicology studies and to support the initiation of two Phase 1 clinical trials.

Miragen expects its research and development expenses to increase for the foreseeable future as Miragen initiates its clinical trials in the fourth quarter, and continues to advance Miragen s pre-clinical research programs toward the clinic, including other IND enabling activities.

General and Administrative Expenses

General and administrative expenses were $3.9 million for the year ended December 31, 2015 compared to $4.1 for the year ended December 31, 2014. For the year ended December 31, 2015, personnel costs, including non-cash stock based compensation increased by $0.1 million as compared to the year ended December 31, 2014. This increase was offset by a decrease in legal expenses of $0.3 million for the year ended December 31, 2015 as compared to the year ended December 31, 2014.

Other income (expense), net

Miragen incurred $3.5 million net other non-operating expenses for the year ended December 31, 2015 compared to $9 thousand in net other non-operating income for the year ended December 31, 2014. During the year ended December 31, 2015, Miragen issued $8.5 million in convertible debt to certain investors and $5.0 million notes payable to Silicon Valley Bank. Miragen incurred interest expense of $1.6 million under its convertible notes payable, including a non-cash charge of $1.3 million for the amortization of debt discount, and $0.2 million under Miragen s notes payable. During the fourth quarter of 2015, Miragen also incurred non-cash charges of $1.7 million related to changes in the fair value of the put option and loss on extinguishment of debt when the convertible notes payable converted into preferred stock.

Under the terms of these convertible promissory notes, the notes together with accrued interest were to convert at a conversion rate equal to 75% of the per share price pad for shares of Miragen Series C convertible preferred stock. However, this provision was waived by the note holders, and in October 2015, the convertible notes and accrued interest thereon totaling $8.9 million converted into 2,003,884 shares of Miragen Series C convertible preferred stock at a conversion rate of $4.43 per share, the per share cash price paid by investors to purchase each share of Series C convertible preferred stock.

Miragen concluded that the right to receive a 25% discount on the conversion to a class of equity securities in a qualified financing was a put option that needed to be valued separately. As such, Miragen recorded proceeds from these convertible promissory notes based on the estimated fair value of the embedded put option ($2.7 million) and the convertible promissory notes, which resulted in a debt discount of $2.7 million related to the value of this put option. This debt discount was being amortized over the term of the convertible promissory notes. Upon conversion of the convertible promissory notes in October 2015, Miragen recorded a loss extinguishment of the convertible promissory notes of $1.4 million, which reflects the difference between the fair value of the shares of Series C convertible preferred stock issued upon conversion of and the value of the convertible promissory notes.

Liquidity and Capital Resources

Since Miragen s inception and through September 30, 2016, Miragen has received $72 million from the sale of its equity and convertible debt securities, $33.8 million from, primarily, upfront payments and research funding under the

Servier Collaboration Agreement and $5.0 million from outstanding notes payable to Silicon Valley Bank. As of September 30, 2016, Miragen had $5.0 million available under Miragen s loan agreement with Silicon Valley Bank. This amount is available to Miragen through July 31, 2017.

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As of September 30, 2016, Miragen had $24.6 million in cash and cash equivalents. The following table shows a summary of Miragen s cash flows for the years ended December 31, 2015 and 2014 and for the nine months ended September 30, 2016 and 2015 (in thousands):

	Year Ended December 31,		Nine Months Ended September 30,	
	2015	2014	2016	2015
Net cash (used in) provided by:				
Operating activities	$ (12,950)	$ (7,704)	$ (11,469)	$ (10,112)
Investing activities	(312)	1,901	(1,249)	(52)
Financing activities	29,383	6,995	16,081	13,419
Net increase in cash and cash equivalents	$ 16,121	$ 1,192	$ 3,363	$ 3,255

Operating Activities

Cash used in operating activities was $11.5 million for the nine months ended September 30, 2016 as compared to $10.1 million for the nine months ended September 30, 2015. The increase of $1.4 million was the result of a $0.9 million increase in net loss and $1.2 million non-cash interest expense and other charges incurred during the nine months ended 2015 related to Miragen s convertible notes. These changes were partially offset by $0.6 million changes in working capital.

Cash used in operating activities was $13.0 million for the year ended December 31, 2015 as compared to $7.7 million for the year ended December 31, 2014. The increase of $5.3 million was the result of a $9.8 million increase in net loss for the year ended December 31, 2015, offset by changes in Miragen s operating assets and liabilities and $3.4 million in non-cash interest expense and charges incurred under to its convertible notes and notes payable incurred in 2015.

Investing Activities

Net cash used in investing activities was $1.2 million during the nine months ended September 30, 2016 as compared to $52 thousand during the nine months ended September 30, 2015. This increase was primarily the result of $1.0 million in purchases of marketable securities in 2016. Miragen did not have any marketable securities during the first nine months of 2015.

Net cash used in investing activities was $0.3 million during the year ended December 31 2015 as compared to net cash provided by investing activities of $1.9 million during the year ended December 31, 2014. This change primarily was the result of $2.0 million in sales and maturities of marketable securities net of purchases in 2014. Miragen did not have any marketable securities during 2015.

Financing Activities

Net cash provided by financing activities was $16.1 million for the nine months ended September 30, 2016 as compared to $13.4 million for the nine months ended September 30, 2015. During the nine months ended September 30, 2016, Miragen received $16.1 million from the issuance of preferred stock. During the nine months ended September 30, 2015, Miragen received $8.5 million from the issuance of convertible notes to Miragen s existing

investors and $5.0 million under a loan agreement with Silicon Valley Bank.

Net cash provided by financing activities was $29.4 million for the year ended December 31, 2015 as compared to $7.0 million during the year ended December 31, 2014. During 2015, Miragen received $16.1 million from the issuance of Series C convertible preferred stock, $8.5 million from the issuance of convertible notes to Miragen s existing investors, and $5.0 million under a loan agreement with Silicon Valley Bank. During 2014, Miragen received $7.0 million from the issuance of Series B convertible preferred stock.

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Future Capital Requirements

Miragen has not generated any revenue from product sales. Miragen does not know when, or if, it will generate any revenue from product sales. Miragen does not expect to generate any revenue from product sales unless and until Miragen obtains regulatory approval for and commercializes any of Miragen s product candidates. At the same time, Miragen expects its expenses to increase in connection with its ongoing development and manufacturing activities, particularly as Miragen continues the research, development, manufacture and clinical trials of, and seeks regulatory approval for, Miragen s product candidates. Immediately prior to the closing of the Merger, Miragen expects to receive proceeds of $40.7 million from the financing contemplated to close contemporaneously with the Merger Agreement. Upon the closing of the Merger, Miragen expects to incur additional costs associated with operating as a public company. In addition, subject to obtaining regulatory approval of any of its product candidates, Miragen anticipates that Miragen will need substantial additional funding in connection with its continuing operations.

As of September 30, 2016, Miragen had approximately $25.6 million in cash, cash equivalents, and short-term investments. Miragen expects its research and development expenses to substantially increase in connection with Miragen s ongoing activities, particularly as Miragen advances its product candidates in or towards clinical development.

Miragen s future capital requirements are difficult to forecast and will depend on many factors, including but not limited to:

- the achievement of milestones under the Servier Collaboration Agreement with Servier;
- the terms and timing of any other strategic alliance, licensing and other arrangements that Miragen may establish;
- the initiation and progress of Miragen s ongoing pre-clinical studies and clinical trials for its product candidates:
- the number of programs Miragen pursues;
- the outcome, timing and cost of regulatory approvals;
- the cost and timing of hiring new employees to support Miragen s continued growth;
- the costs involved in patent filing, prosecution, and enforcement; and
- the costs and timing of having clinical supplies of Miragen s product candidates manufactured.

Miragen believes that Miragen s cash, cash equivalents, and short-term investments are sufficient to fund its anticipated operating and capital requirements through, at a minimum, through at least September 30, 2017.

Until Miragen can generate a sufficient amount of product revenue to finance its cash requirements, Miragen expects to finance its future cash needs primarily through the issuance of additional equity, including in connection with the contemplated Merger, and potentially through borrowing and strategic alliances with partner companies. To the extent that Miragen raises additional capital through the issuance of additional equity or convertible debt securities, the ownership interest of Miragen s stockholders will be diluted, and the terms of these securities may include liquidation or other preferences that adversely affect the rights of existing stockholders. Debt financing, if available, may involve agreements that include covenants limiting or restricting Miragen s ability to take specific actions, such as incurring additional debt, making capital expenditures or declaring dividends. For instance, pursuant to the terms of Miragen s credit facility with Silicon Valley Bank, Miragen cannot, without the prior written consent of Silicon Valley Bank, dispose of its assets outside the ordinary course of business, pay any dividend or make any distribution to its stockholders, incur additional specified indebtedness, engage in a change in control of Miragen or make any material change to Miragen s business. If Miragen raises additional funds through marketing and distribution arrangements or other

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collaborations, strategic alliances or licensing arrangements with third parties, Miragen may have to relinquish valuable rights to Miragen s technologies, future revenue streams, research programs or product candidates or grant licenses on terms that may not be favorable to Miragen. If Miragen is unable to raise additional funds through equity or debt financings when needed, Miragen may be required to delay, limit, reduce or terminate its product development or commercialization efforts or grant rights to develop and market product candidates to third parties that Miragen would otherwise prefer to develop and market itself.

Notes Payable

In April 2015, Miragen entered into a loan and security agreement with Silicon Valley Bank to borrow up to $10 million in two separate tranches. The first tranche of $5.0 million was funded in May 2015 and is scheduled to be repaid over a 48-month period with interest only payments during the first 18 months. The second tranche of $5.0 million is available at any time during the draw period once Miragen provides Silicon Valley Bank with evidence of Miragen s achievement of specified events, including, that Miragen has achieved mechanistic proof-of-concept for Miragen s Phase 1 clinical trial of MRG-106. Accelerated payments are due under specified circumstances. Amounts outstanding bear interest at the prime rate minus 0.25% (which was 3.25% at December 31, 2015) with a final payment fee equal to 5.50% of amounts borrowed. Borrowings are secured by a priority security interest, right, and title in all business assets, excluding Miragen s intellectual property, which is subject to a negative pledge. In December 2016, this agreement was amended to, among other items, extend the draw period from December 31, 2016 to July 31, 2017.

Leases

In December 2010, Miragen entered into a lease agreement for office and lab space, or the Crestview Lease, and in 2015, Miragen amended this lease agreement to extend its term through August 2020.

In April 2013, Miragen entered into separate lease agreement for additional office space, or the Westview Lease, and in 2015, Miragen amended this lease agreement to extend its term by four months through October 2015. This lease expired in 2015 and was not renewed.

Miragen s Crestview Lease is noncancelable. Minimum base lease payments, including the impact of tenant improvement allowances, under the operating lease are recognized on a straight line basis over the full term of

the lease. Rent expense for the Crestview and Westview Leases during the nine months ended September 30, 2016 and 2015 was $0.3 million and $0.2 million, respectively. Miragen is also required to pay for a portion of the operating expenses for each facility and during the nine months ended September 30, 2016 and 2015 Miragen expensed $0.3 million and $0.2 million, respectively, related to this additional rent expense.

Collaboration and License Agreements

Strategic Alliance and Collaboration with Servier

In October 2011, Miragen entered into the Servier Collaboration Agreement with Servier for the research, development, and commercialization of RNA-targeting therapeutics in cardiovascular disease, which was subsequently amended in May 2013, May 2014, May 2015, and September 2016. Under the Servier Collaboration Agreement, Miragen granted Servier an exclusive license to research, develop, and commercialize RNA-targeting therapeutics for three targets in the cardiovascular field. As of December 31, 2016, three named targets exist under the Servier Collaboration Agreement, two of which are replaceable by Servier.

Servier s rights to each of the targets are limited to therapeutics in the cardiovascular field in their territory, which is worldwide except for the United States and Japan. Miragen retains all rights for each named target in the United States and Japan and for any products or product candidates outside of the cardiovascular field.

In connection with entering into the strategic alliance with Servier, Miragen received a nonrefundable upfront payment of $8.4 million (6.0 million) in 2011 and an additional $4.0 million (3.0 million) in 2013 when

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Servier exercised their right to name a third target under the agreement. Miragen is also eligible to receive development milestone payments of 5.8 million to 13.8 million ($6.5 million to $15.5 million as of September 30, 2016) and regulatory milestone payments of 10.0 million to 40.0 million ($11.2 million to $44.8 million as of September 30, 2016) for each target. Additionally, Miragen may receive up to 175 million ($196 million as of September 30, 2016) in commercialization milestones as well as quarterly royalty payments between the low-double digits to the mid-teens (subject to reductions for patent expiration, generic competition, third-party royalty and costs of goods) on the net sales of any licensed product commercialized by Servier. Additionally, if Miragen undergoes a change of control in specified circumstances, Servier has agreed to increase this royalty by an additional percentage in the low-single digits if it seeks to use any of the acquiror s intellectual property in the development of product candidates under the Servier Collaboration Agreement. Servier is obligated to make any such royalty payment for a specified period under the Servier Collaboration Agreement.

As part of the Servier Collaboration Agreement, Miragen established a multiple-year research collaboration, under which Miragen jointly performs agreed upon research activities directed to the identification and characterization of named targets and oligonucleotides in the cardiovascular field, which Miragen refers to as the Research Collaboration. The initial three-year term of the Research Collaboration was extended by two additional years in May 2014 and again by one additional year in September 2016 through October 2017. Servier is responsible for funding all of the costs of the Research Collaboration, as defined under the Servier Collaboration Agreement.

The development of each product candidate (commencing with registration enabling toxicology studies) under the Servier Collaboration Agreement is performed pursuant to a mutually agreed upon development plan to be conducted by the parties as necessary to generate data useful for both parties to obtain regulatory approval of such product candidates. Servier is responsible for a specified percentage of the cost of research and development activities through the completion of one or more Phase 2 clinical trials and will reimburse Miragen for a specified portion of such costs Miragen incurs. The costs of Phase 3 clinical trials for each product candidate will be allocated between the parties at a specied percentage of costs between the parties upon the occurrence of specified events under the Servier Colloboration Agreement, including if Miragen enters into a third-party agreement for the development and/or commercialization of a product in the United States at least 180 days before the initiation of the first Phase 3 clinical trial or if Miragen subsequently enters into a U.S. partner agreement or if Miragen does not enter into a U.S. partner agreement, but files for approval in the United States using data from the Phase 3 clinical trial. Miragen is responsible, by itself or through a third-party manufacturer, for the manufacture and supply of all licensed oligonucleotides during the pre-clinical phase of development under the Sevier Collaboration Agreement while Servier is primarily responsible for manufacture and supply of all licensed oligonucleotides and product during the clinical phase of development under the Servier Collaboration Agreement. The parties are each responsible for the commercial supply of any licensed product to be sold in each s respective territory under the Servier Collaboration Agreement.

Under the Servier Collaboration Agreement, Miragen also granted Servier a royalty-free, non-exclusive license to develop a companion diagnostic for any therapeutic product which may be developed by Servier under the Servier Collaboration Agreement. Miragen also granted Servier an exclusive, royalty free license to commercialize such a companion diagnostic for use in connection with such therapeutic product in its territory.

The Servier Collaboration Agreement will expire as to each underlying product candidate when Servier s royalty obligations as to such product candidate have expired. Servier may also terminate the Servier Collaboration Agreement for (i) convenience upon a specified number of days prior notice to Miragen or (ii) upon determination of a safety issue relating to development under the agreement upon a specified number of days prior notice to Miragen. Either party may terminate the Servier Collaboration Agreement upon a material breach by the other party which is not cured within a specified number of days. Miragen may also terminate the agreement if Servier challenges any of the patents licensed by Miragen to Servier.

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License Agreements with the University of Texas

As of September 30, 2016, Miragen had five UT License Agreements with the University of Texas. Under each of the UT License Agreements, the University of Texas granted Miragen exclusive and nonexclusive licenses to certain patent and technology rights. The University of Texas is a minority stockholder of Miragen.

In consideration of rights granted by the University of Texas, Miragen agreed to (i) pay a nonrefundable upfront license documentation fee in the amount of $10 thousand per license, (ii) pay an annual license maintenance fee in the amount of $10 thousand per license starting one year from the date of each agreement, (iii) reimburse the University of Texas for actual costs incurred in conjunction with the filing, prosecution, enforcement, and maintenance of patent rights prior to the effective date, and (iv) bear all future costs of and manage the filing, prosecution, enforcement, and maintenance of patent rights. In 2015 and 2014, Miragen incurred upfront and maintenance fees under the UT License Agreements totaling $0.1 million, and recorded the amounts as research and development expense. All costs related to the filing, prosecution, enforcement, and maintenance of patent and technology rights are recorded as general and administrative expense when incurred.

Under the terms of the UT License Agreements, Miragen may be obligated to make the following future milestone payments for each licensed product candidate: (i) up to $0.6 million upon the initiation of defined clinical trials, (ii) $2.0 million upon regulatory approval in the United States, and (iii) $0.5 million per region upon regulatory approval in other specified regions. Additionally, if Miragen successfully commercializes any product candidate subject to the UT License Agreements, Miragen is responsible for royalty payments in the low-single digits and payments up to a percentage in the mid-teens of any sublicense income, subject to specified exceptions, based upon net sales of such licensed products. UT s right to these royalty payments will expire as to each license agreement upon the expiration of the last patent claim subject to the applicable UT License Agreement.

The license term extends on a country by country basis until the expiration of the last to expire of the licensed patents that covers such product in such country. Upon expiration of the royalty payment obligation, Miragen will have a fully paid license in such country. Miragen may also terminate each UT License Agreement for convenience upon a specified number of days prior notice to the University of Texas. The University of Texas also has the right to earlier terminate the UT License Agreements after a defined date under specified circumstances where Miragen has effectively abandoned its research and development efforts or has no sales. The UT License Agreements will terminate under customary termination provisions including Miragen s bankruptcy or insolvency, material breach, and upon mutual written consent. Miragen has expensed all charges incurred under the UT License Agreements to date, due to the uncertainty as to future economic benefit from the acquired rights.

License Agreement with Roche Innovation Center Copenhagen A/S (formerly Santaris Pharma A/S)

In June 2010, Miragen entered into the RICC License Agreement with RICC, which was subsequently amended in October 2011 and amended and restated in December 2012. In 2014, RICC was acquired by F. Hoffmann-La Roche Ltd, or Roche, and has become a wholly owned subsidiary of Roche.

Under the RICC License Agreement, Miragen received exclusive and nonexclusive licenses from RICC to use the RICC Technology for specified uses including research, development, and commercialization of pharmaceutical products using this technology worldwide. Under the RICC License Agreement, Miragen has the right to develop and commercialize the RICC Technology directed to four specified targets and the option to obtain exclusive product licenses for up to six additional targets. The acquisition of Santaris Pharma A/S by Roche was considered a change-of-control under the RICC License Agreement, and as such, certain terms and conditions of the RICC License Agreement changed, as contemplated and in accordance with the RICC License Agreement. These changes primarily

relate to milestone payments reflected in the disclosures below. As consideration for the grant of the license and option, Miragen previously paid RICC $2.3 million and issued

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RICC 856,806 shares of Miragen s Series A convertible preferred stock, which are now owned by Roche Finance Ltd, an affiliate of Roche. If Miragen exercises its option to obtain additional product licenses or to replace the target families, Miragen will be required to make additional payments to RICC.

Under the terms of the RICC License Agreement, milestone payments were previously decreased by a specified percentage as a result of the change of control by RICC referenced above. Miragen is obligated to make future milestone payments for each licensed product for up to $5.2 million. Certain of these milestones will be increased by a specified percentage if Miragen undergoes a change in control during the term of the RICC License Agreement. If Miragen grants a third party a sublicense to the RICC Technology, in lieu of the fixed milestone payments noted above, Miragen is required to remit to Roche up to a specified percentage of the upfront and milestone payments Miragen receives under its sublicense.

If Miragen successfully commercializes any product candidate subject to the RICC License Agreements, then RICC is entitled to royalty payments in the mid-single digits on the net sales of such product, provided that if such net sales are made by a sublicensee under the RICC License Agreement, RICC is entitled to royalty payments equal to the lesser of a percentage in the mid-single digits on the net sales of such product or a specified percentage of the royalties paid to Miragen by such sublicensee, subject to specified restrictions. Miragen is obligated to make any such royalty payments until the later of (i) a specified anniversary of the first commercial sale of the applicable product or (ii) the expiration of the last valid patent claim licensed by RICC under the RICC License Agreement underlying such product. Upon the occurrence of specified events, the royalty owed to RICC will be decreased by a specified percentage.

The RICC License Agreement will terminate upon the latest of the expiration of all of RICC s royalty rights, the termination of the last Miragen target or the expiration of its right to obtain a product license for a new target under the RICC License Agreement. Miragen may also terminate the RICC License Agreement for convenience upon a specified number of days prior notice to RICC, subject to specified terms and conditions. Either party may terminate the RICC License Agreement upon an uncured material breach by the other party and RICC may terminate the RICC License Agreement upon the occurrence of other specified events that are not cured within a specified number of days.

Miragen has expensed all charges incurred under the RICC License Agreement to date, due to the uncertainty as to future economic benefit from the acquired rights.

License Agreements with the t2cure GmbH

In October 2010, Miragen entered the t2cure Agreement, with t2cure, which was subsequently amended in July 2014. Under the t2cure Agreement, Miragen received a worldwide, royalty bearing, and exclusive license to specified patent and technology rights to develop and commercialize product candidates targeted at miR-92.

In consideration of rights granted by t2cure, Miragen paid a onetime upfront fee of $46 thousand and agreed to: (i) pay an annual license maintenance fee in the amount of 3 thousand ($3 thousand at September 30, 2016), and (ii) reimburse t2cure for 100% of actual costs incurred in conjunction with the filing, prosecution, enforcement, and maintenance of patent rights prior to the effective date. All costs related to the filing, prosecution, enforcement, and maintenance of patent and technology rights are recorded as general and administrative expense when incurred.

Under the terms of the t2cure Agreement, Miragen is obligated to make the following future milestone payments for each licensed product: (i) up to $0.7 million upon the initiation of certain defined clinical trials, (ii) $2.5 million upon regulatory approval in the United States and (iii) up to $1.5 million per region upon regulatory approval in the European Union or Japan. Additionally, if Miragen successfully commercializes any product candidate subject to the

t2cure Agreement, Miragen is responsible for royalty payments in the low-single digits upon net sales of licensed products and sublicense fees equal to a percentage in the low-twenties of sublicensed

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income to Miragen. Miragen is obligated to make any such royalty payment until the later of (i) the tenth anniversary of the first commercial sale of the applicable product or (ii) the expiration of the last valid claim to a patent licensed by t2cure under the t2cure Agreement covering such product. If such patent claims expire prior to the end of the ten-year term, then the royalty owed to t2cure will be decreased by a specified percentage.

The license term extends on a country by country basis until the later of: (i) the tenth anniversary of the first commercial sale of a licensed product in a country, and (ii) the expiration of the last to expire valid claim that claims such licensed product in such country. Upon expiration of the royalty payment obligation, Miragen will have a fully paid license in such country. Miragen has the right to terminate the t2cure Agreement at will, on a country-by-country basis, after 60 days written notice. Miragen has expensed all charges incurred under the t2cure Agreement to date, due to the uncertainty as to future economic benefit from the acquired rights.

License Agreement with The Brigham and Women s Hospital

In May 2016, Miragen entered into the BWH License Agreement with BWH.

Under the BWH License Agreement, BWH granted Miragen an exclusive, worldwide license, including a right to sublicense, to specified technology and patent rights of BWH. As consideration for this exclusive license, Miragen paid BWH a specified issue fee and is obligated to pay a specified annual license fee. BWH is also entitled to milestone payments of up to $2.6 million for any of Miragen s product candidates developed based on the patent rights subject to the BWH License Agreement plus a one-time sales milestone payment of $0.25 million for all product candidates developed based on the patent rights subject to the BWH License Agreement. If Miragen were to successfully commercialize any product candidate subject to the BWH License Agreement, then BWH is entitled to royalty payments in the low-single digits on the net sales of such product. BWH s right to these royalty payments will expire upon the expiration of the last patent claim subject to BWH License Agreement. BWH is also entitled to a percentage in the low-double digits of any sublicense income from such product, subject to specified exceptions. Miragen is also responsible for all costs associated with the preparation, filing, prosecution and maintenance of the patent rights subject to the BWH License Agreement.

Additionally, Miragen is obligated to use commercially reasonable efforts to develop a product under the BWH License Agreement and to meet specified diligence milestones thereunder.

The BWH License Agreement will terminate upon the expiration of all issued patents and patent applications subject to the patent rights under the agreement. Miragen may also terminate the BWH License Agreement for convenience upon a specified number of days prior notice to BWH. BWH may terminate the BWH License Agreement upon a material breach by Miragen of its payment obligations and upon the occurrence of other specified events that are not cured within a specified number of days.

Subcontract Agreement with Yale University

In October 2014, Miragen entered into the Yale Agreement with Yale which was subsequently amended in February 2016 and November 2016. Under the Yale Agreement, Miragen agreed to provide specified services regarding the development of a proprietary compound that targets microRNA-29 in the indication of idiopathic pulmonary fibrosis. Yale entered into the Yale Agreement in connection with a grant that Yale received from the National Institutes of Health, or NIH, for the development a microRNA-29 mimicry as a potential therapy for pulmonary fibrosis.

In consideration of Miragen s services under the Yale Agreement, Yale has agreed to pay Miragen up to $1.1 million. Under the terms of the Yale Agreement, Miragen retains all rights to any and all intellectual property developed solely

by Miragen in connection with the Yale Agreement. Yale has also agreed to provide Miragen with an exclusive option to negotiate in good faith for an exclusive, royalty-bearing license from Yale for any intellectual property developed by Yale or jointly by the parties under the Yale Agreement. Yale is responsible for filing, prosecuting and maintaining foreign and domestic patent applications and patents on all inventions jointly developed by the parties under the Yale Agreement.

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The Yale Agreement terminates automatically on the date that Yale delivers its final research report to the NIH under the terms of the grant underlying the Yale Agreement. Either party may also terminate the Yale Agreement upon a specified number of days notice in the event that the NIH s grant funding is reduced or terminated or upon material breach by the other party.

Off-Balance Sheet Arrangements

Miragen has not entered into any off-balance sheet arrangements and does not have any holdings in variable interest entities.

Recent Accounting Pronouncements

In May 2014, the FASB issued ASU No. 2014-09, *Revenue from Contracts with Customers*, an updated standard on revenue recognition. ASU No. 2014-09 provides enhancements to the quality and consistency of how revenue is reported by companies while also improving comparability in the financial statements of companies reporting using International Financial Reporting Standards or U.S. GAAP. The main purpose of the new standard is for companies to recognize revenue to depict the transfer of goods or services to customers in amounts that reflect the consideration to which a company expects to be entitled in exchange for those goods or services. The new standard also will result in enhanced disclosures about revenue, provide guidance for transactions that were not previously addressed comprehensively and improve guidance for multiple-element arrangements. In July 2015, the FASB voted to approve a one-year deferral of the effective date of ASU No. 2014-09, which will be effective for Miragen in the first quarter of fiscal year 2018 and may be applied on a full retrospective or modified retrospective approach. Miragen is currently evaluating the impact of implementation and transition approach of ASU 2014 on its financial statements and related disclosures.

In March 2016, the FASB issued ASU No. 2016-08, *Revenue from Contracts with Customers (Topic 606): Principal versus Agent Considerations*. The purpose of ASU No. 2016-08 is to clarify the implementation of guidance on principal versus agent considerations. For public entities, the amendments in ASU No. 2016-08 are effective for interim and annual reporting periods beginning after December 15, 2017. Miragen is currently evaluating the impact of ASU No. 2016-08 on its financial statements and related disclosures.

In August 2014, the FASB issued ASU No. 2014-15, *Presentation of Financial Statements-Going Concern*, which defines management s responsibility to assess an entity s ability to continue as a going concern, and requires related footnote disclosures if there is substantial doubt about its ability to continue as a going concern. ASU No. 2014-15 is effective for Miragen for the fiscal year ending December 31, 2016, with early adoption permitted. Miragen is currently evaluating the impact of ASU No. 2014-15 on its financial statements and related disclosures.

In November 2015, the FASB issued ASU No. 2015-17, *Balance Sheet Classification of Deferred Taxes*. ASU No. 2015-17 requires that deferred tax liabilities and assets be classified as noncurrent in a classified statement of financial position. ASU No. 2015-17 is effective for financial statements issued for fiscal years beginning after December 15, 2016, and interim periods within those fiscal years. Miragen currently does not believe the impact of adopting ASU No. 2014-15 will have a material impact on its financial statements and related disclosures.

In January 2016, the FASB issued ASU No. 2016-01, *Recognition and Measurement of Financial Assets and Financial Liabilities*. ASU No. 2016-01 requires equity investments to be measured at fair value with changes in fair value recognized in net income; simplifies the impairment assessment of equity investments without readily determinable fair values by requiring a qualitative assessment to identify impairment; eliminates the requirement for public business entities to disclose the method(s) and significant assumptions used to estimate the fair value that is

required to be disclosed for financial instruments measured at amortized cost on the balance sheet; requires public business entities to use the exit price notion when measuring the fair value of financial instruments for disclosure purposes; requires an entity to present separately in other comprehensive income the

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portion of the total change in the fair value of a liability resulting from a change in the instrument-specific credit risk when the entity has elected to measure the liability at fair value in accordance with the fair value option for financial instruments; requires separate presentation of financial assets and financial liabilities by measurement category and form of financial assets on the balance sheet or the accompanying notes to the financial statements and clarifies that an entity should evaluate the need for a valuation allowance on a deferred tax asset related to available-for-sale securities in combination with the entity s other deferred tax assets. ASU No. 2016-01 is effective for financial statements issued for fiscal years beginning after December 15, 2017, and interim periods within those fiscal years. Miragen is currently evaluating the impact of ASU No. 2016-01 on its financial statements and related disclosures.

In February 2016, the FASB issued ASU No. 2016-02, *Leases (Topic 842)*, which supersedes FASB ASC Topic 840, Leases (Topic 840) and provides principles for the recognition, measurement, presentation and disclosure of leases for both lessees and lessors. The new standard requires lessees to apply a dual approach, classifying leases as either finance or operating leases based on the principle of whether or not the lease is effectively a financed purchase by the lessee. This classification will determine whether lease expense is recognized based on an effective interest method or on a straight-line basis over the term of the lease, respectively. A lessee is also required to record a right-of-use asset and a lease liability for all leases with a term of greater than twelve months regardless of classification. Leases with a term of twelve months or less will be accounted for similar to existing guidance for operating leases. The standard is effective for annual and interim periods beginning after December 15, 2018, with early adoption permitted upon issuance. Miragen is currently evaluating the impact of ASU 2016-02 on its financial statements and related disclosures.

In March 2016, the FASB issued ASU No. 2016-09, *Compensation Stock Compensation (Topic 718): Improvements to Employee Share-Based Payment Accounting*. The amendment is to simplify several aspects of the accounting for stock-based payment transactions including the income tax consequences, classification of awards as either equity or liabilities, and classification on the statement of cash flows. The amendments in ASU No. 2016-09 are effective for interim and annual reporting periods beginning after December 15, 2016. Miragen is currently assessing the impact of ASU No. 2016-09 on its financial statements and related disclosures.

In April 2016, the FASB issued ASU No. 2016-10, *Revenue from Contracts with Customer*. The new guidance is an update to ASC 606 and provides clarity on: identifying performance obligations and licensing implementation. For public companies, ASU No. 2016-10 is effective for annual periods, including interim periods within those annual periods, beginning after December 15, 2016. Miragen is currently evaluating the impact of ASU No. 2016-10 on its financial statements and related disclosures.

In June 2016, the FASB issued ASU No. 2016-13, *Financial Instruments Credit Losses: Measurement of Credit Losses on Financial Instruments*. ASU 2016-13 requires that expected credit losses relating to financial assets measured on an amortized cost basis and available-for-sale debt securities be recorded through an allowance for credit losses. ASU 2016-13 limits the amount of credit losses to be recognized for available-for-sale debt securities to the amount by which carrying value exceeds fair value and also requires the reversal of previously recognized credit losses if fair value increases. The new standard will be effective for Miragen on January 1, 2020. Early adoption will be available on January 1, 2019. Miragen is currently evaluating the impact of ASU 2016-13 on its financial statements and related disclosures.

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MANAGEMENT FOLLOWING THE MERGER

Executive Officers and Directors

Termination of Current Executive Officers of Signal

The employment of the current executive officers of Signal is expected to be terminated immediately prior to the completion of the Merger.

Executive Officers and Directors of the Combined Company Following the Merger

Following the Merger, the combined company s directors will consist of William S. Marshall, Ph.D., Bruce L. Booth, Ph.D., John W. Creecy, Thomas E. Hughes, Ph.D., Kevin Koch, Ph.D., Kyle A. Lefkoff and Joseph Turner.

The following table lists the names and ages as of December 31, 2016 and positions of the individuals who are expected to serve as executive officers and directors of the combined company upon completion of the Merger:

Name	Age	Position(s)
Executive Officers		
William S. Marshall, Ph.D.	53	President, Chief Executive Officer and Director
Jason A. Leverone	43	Chief Financial Officer, Secretary and Treasurer
Adam S. Levy	38	Chief Business Officer
Paul D. Rubin, M.D.	63	Executive Vice President, Research and Development
Non-Employee Directors		
Bruce L. Booth, Ph.D.	42	Director
John W. Creecy	62	Director
Thomas E. Hughes, Ph.D.	57	Director
Kevin Koch, Ph.D.	56	Director
Kyle A. Lefkoff	57	Director
Joseph L. Turner	65	Director

Executive Officers

William S. Marshall, Ph.D. Dr. Marshall has served as Miragen s president and chief executive officer and as director since the company was founded in September 2007. Prior to founding Miragen, Dr. Marshall was vice president of technology and business development for bioscience at Thermo Fisher Scientific Inc., a serving science company, from April 2005 to July 2007. Dr. Marshall was one of the scientific founders of Dharmacon, Inc., a biotechnology company, which was acquired by Fisher Scientific International Inc. in April 2004, and he served as the executive vice president for research and operations and general manager of Dharmacon from August 2002 to April 2005. Prior to joining Dharmacon, Dr. Marshall served in multiple positions at Amgen, Inc., a biotechnology company, most recently as associate director of research, site head for research and head of the nucleic acid and peptide technology department. Dr. Marshall earned a B.S. in Biochemistry from the University of Wisconsin-Madison and his Ph.D. in Chemistry at the University of Colorado at Boulder.

Miragen believes that Dr. Marshall s role as Miragen s chief executive, prior board service, and extensive experience and innovations in the field of biotechnology enable him to bring a unique perspective to the board of directors. In

addition, Dr. Marshall s academic expertise and accomplishments provide the board of directors with in-depth product and field knowledge.

Jason A. Leverone. Mr. Leverone joined Miragen in November 2008 as its senior director of finance and operations and was appointed vice president, finance in March 2010. Mr. Leverone was appointed as Miragen s

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chief financial officer in February 2012. Prior to joining Miragen, Mr. Leverone was senior director of finance and controller for Replidyne, Inc., a publicly-traded biotechnology company, from November 2005 to November 2008. Prior to joining Replidyne, Mr. Leverone was the corporate controller for CreekPath System, Inc., an international software development company, from September 2002 to October 2005. He commenced his professional career with the accounting firm of Ernst and Young LLP, where he last served a senior accountant, and then Arthur Andersen LLP, where he last served as an audit manager. Mr. Leverone is a Certified Public Accountant and earned a B.S. in Business Administration from Bryant University.

Adam S. Levy. Mr. Levy has served as Miragen s chief business officer since May 2016. Prior to joining Miragen, Mr. Levy served as a senior vice president of healthcare investment banking at Wedbush Securities Inc. from September 2013 to May 2016. From May 2011 to August 2012, Mr. Levy was employed by Merrill Lynch, Pierce, Fenner & Smith, Incorporated as vice president of healthcare investment banking. Prior to joining Merrill Lynch, Mr. Levy served as vice president of healthcare investment banking at Wedbush from October 2009 through April 2011. Mr. Levy earned a B.S. in Applied Economics from Cornell University.

Paul D. Rubin, M.D. Dr. Rubin has served as Miragen s executive vice president, research and development since November 2016. Prior to joining Miragen, Dr. Rubin served as senior vice president, research and development and chief medical officer of Xoma Corporation, a publicly-traded biotechnology company, from November 2011 to November 2016, having joined Xoma in June 2011 as its vice president, clinical development and chief medical officer. Prior to joining XOMA, Dr. Rubin was the chief medical officer at Funxional Therapeutics Ltd., a pharmaceutical company from February 2011 to June 2011. He served as chief executive officer of Resolvyx Pharmaceuticals, Inc. from 2007 to 2009 and president and chief executive officer of Critical Therapeutics, Inc. from 2002 to 2007. From 1996 to 2002, Dr. Rubin served as senior vice president, development, and later as executive vice president, research and development at Sepracor Inc. From 1993 to 1996, Dr. Rubin held senior level positions at Glaxo-Wellcome Pharmaceuticals, most recently as vice president of worldwide clinical pharmacology and early clinical development. During his tenure with Abbott Laboratories from 1987 to 1993, Dr. Rubin served as vice president, immunology and endocrinology. Dr. Rubin received a B.A. from Occidental College and his M.D. from Rush Medical College. He completed his training in internal medicine at the University of Wisconsin.

Non-Employee Directors

Bruce L. Booth, Ph.D. Dr. Booth has served as a member of Miragen s board of directors since September 2007. Dr. Booth joined Atlas Venture Associates in 2005, and currently serves as partner in its life sciences group. Prior to joining Atlas Venture, from 2004 to 2005, Dr. Booth was a principal at Caxton Health Holdings L.L.C., a healthcare-focused investment firm. Prior to joining Caxton, from 1999 to 2004, Dr. Booth was an associate principal at McKinsey & Company, a global strategic management consulting firm. Dr. Booth serves on the board of Zafgen, Inc., a publicly-traded biopharmaceutical company, and several privately-held companies. Dr. Booth earned a Ph.D. in molecular immunology from Oxford University s Nuffield Department of Medicine and a B.S. in biochemistry from Pennsylvania State University.

Miragen believes Dr. Booth is qualified to serve on its board of directors due to his years of investment in the healthcare industry and his continued service leading the boards of directors of both private and public companies, which will enable him to contribute important strategic insight to the combined company s board of directors.

John W. Creecy. Mr. Creecy has served as a member of Miragen s board of directors since April 2012. Mr. Creecy has served as the chief executive officer and a director of Remeditex Ventures, LLC, a biomedical investment company, since June 2011. Prior to joining Remeditex, Mr. Creecy served as president and chief executive officer of Hunt Petroleum Corporation from February 2001 to September 2008. Prior to Hunt, Mr. Creecy served as the chief

operating officer of the Hodges Companies, Inc. from 1988 to 2000. In addition to Miragen, Mr. Creecy sits on the boards of a number of private companies. Mr. Creecy earned a B.S. in Accounting from Texas Tech University and an M.S. in Accounting from the University of North Texas.

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Miragen believes Mr. Creecy is qualified to serve on its board of directors due to his years of investment in the biomedical industry and his experience as an executive officer, which will enable him to contribute important strategic insight to the combined company s board of directors.

Thomas E. Hughes, Ph.D. Dr. Hughes has served as a member of Miragen s board of directors since September 2009. Dr. Hughes joined Zafgen, Inc., a publicly-traded biopharmaceutical company, as the chief executive officer and as a director in October 2008 and also served as its president from October 2008 until June 2014. From 1987 to 2008, Dr. Hughes held several positions at Novartis AG (formerly Sandoz Pharmaceuticals), including vice president and global head of the cardiovascular and metabolic diseases therapeutic area at the Novartis Institutes for BioMedical Research in Cambridge, MA. Dr. Hughes also serves as a member of the scientific advisory board for Navitor Therapeutics, a discovery-stage biopharmaceutical company, and as a member of the strategic advisory board for Broadview Ventures, an early-stage investment company. Dr. Hughes earned a Ph.D. in nutritional biochemistry from Tufts University, an M.S. in Zoology from Virginia Polytechnic Institute & State University and a B.A. in biology from Franklin and Marshall College.

Miragen believes Dr. Hughes is qualified to serve on its board of directors due to his years of experience in the biotechnology industry and service on both public and private boards of directors of biopharmaceutical companies, which will enable him to contribute important strategic insight to the combined company s board of directors.

Kevin Koch, Ph.D. Dr. Koch has served as a member of Miragen s board of directors since July 2016. Dr. Koch has served as a venture partner at OrbiMed Advisors, LLC since May 2016. Prior to joining OrbiMed, Dr. Koch acted as a consultant in the biotech industry from September 2015 to May 2016. Prior to acting as a consultant, Dr. Koch served as the senior vice president, drug discovery, chemical and molecular therapeutics, at Biogen, Inc. from December 2013 to September 2015. Prior to joining Dr. Koch, founded Array BioPharma Inc., a publicly-traded biopharmaceutical company, and served as its president, chief scientific officer and a member of its board of directors from May 1998 to November 2013. Prior to forming Array, Dr. Koch was an associate director of medicinal chemistry and project leader for the protease inhibitor and new technologies group for Amgen Inc. from 1995 to 1998. From 1988 until 1995, Dr. Koch held various research positions within the Central Research Division of Pfizer, Inc., including senior research investigator and senior research scientist. Dr. Koch earned a B.S. in chemistry and in biochemistry from the State University of New York at Stony Brook and a Ph.D. in synthetic organic chemistry from the University of Rochester.

Miragen believes Dr. Koch is qualified to serve on its board of directors due to his years of experience in the biotechnology industry and service on both public and private boards of biopharmaceutical companies, which will enable him to contribute important strategic insight to the combined company s board of directors.

Kyle A. Lefkoff. Mr. Lefkoff has served as a member of Miragen s board of directors since September 2007. Mr. Lefkoff has served as a general partner of Boulder Ventures, Ltd, a venture capital firm, since its founding in 1995. From 1986 until 1995, Mr. Lefkoff was employed by Colorado Venture Management, a venture capital firm, as a general partner. Mr. Lefkoff serves as chairman of the board of directors of Array BioPharma Inc., a publicly-traded biopharmaceutical company, and is a director of number of private companies. Mr. Lefkoff earned a B.A. in Economics from Vassar College, completed a fellowship in Economic History at the London School of Economics and has an M.B.A. in Finance at the University of Chicago.

Miragen believes Mr. Lefkoff is qualified to serve on its board of directors due to his years of venture capital experience and his continued service leading the boards of directors of both private and public biopharmaceutical companies, which will enable him to contribute important strategic insight to the combined company s board of directors.

Joseph L. Turner. Mr. Turner will be appointed as a member of Miragen s board of directors effective as the closing of the Merger. Mr. Turner served on the boards of directors and is the chair of the audit committees of

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Corcept Therapeutics, Inc., a publicly-traded pharmaceutical company, from 2012 to May 2016, Kythera Biopharmaceuticals, Inc., a publicly-traded pharmaceutical company, from 2008 until Kythera s acquisition by Allergan Inc. October 2015, and Sophiris Bio, a publicly-traded pharmaceutical company from 2013 to May 2016. From July 2010 until its acquisition by Grupo Ferrer Internacional, S.A. in June 2016, Mr. Turner served on the board of directors and as a chair of the audit committee of Alexza Pharmaceuticals, Inc., a publicly-traded pharmaceutical company. In 2012, Mr. Turner served on the board of directors and as chair of the audit committee of Allos Therapeutics, Inc., a publicly-traded pharmaceutical company, until its acquisition by Spectrum Pharmaceuticals Inc. in September 2012. From 2010 through 2012, he served on the board of directors and as a member of the audit committee of QLT Inc., a publicly-traded biotechnology company. In 2008, Mr. Turner served as a director and member of the audit committee of SGX Pharmaceuticals Inc., a publicly-traded pharmaceutical company. Mr. Turner served as Chief Financial Officer at Myogen, Inc., a publicly-traded biopharmaceutical company, from 1999 until it was acquired by Gilead Sciences in 2006. Previously, Mr. Turner was the chief financial officer at Centaur Pharmaceuticals, Inc. and served as Chief Financial Officer and Vice President, Finance and Administration at Cortech, Inc. Since 2009, Mr. Turner has also served on the board of managers of Swarthmore College where at various times he has served on its executive committee, finance committee, audit committee, academic affairs committee (which he currently chairs) and student affairs committee and property committee. In 2013 until 2015, Mr. Turner served on the board of directors of the Linda Crnic Institute for Down Syndrome at the University of Colorado Medical School. Mr. Turner has an M.B.A. from the University of North Carolina at Chapel Hill, an M.A. in molecular biology from the University of Colorado and a B.A. in chemistry from Swarthmore College.

Miragen believes Mr. Turner is qualified to serve on its board of directors due to his years of service on both public and private boards of directors of pharmaceutical companies, including service on audit committees and extensive finance experience, which will enable him to contribute important strategic insight to the combined company s board of directors.

Board of Directors of the Combined Company Following the Merger

Signal s board of directors currently consists of five directors consisting of Bennett S. LeBow, Samuel D. Riccitelli, David A. Gonyer, Douglas A. Schuling and Robin L. Smith, M.D. Following the Merger, none of the current Signal directors will serve as directors of the combined company and the combined company s directors will consist of seven members of Miragen s board of directors, namely William S. Marshall, Ph.D., Bruce L. Booth, Ph.D., John W. Creecy, Thomas E. Hughes, Ph.D., Kevin Koch, Ph.D., Kyle A. Lefkoff and Joseph L. Turner.

There are no family relationships among any of the current Signal directors and executive officers, and there are no family relationships among any of the proposed combined company directors and officers.

Director Independence

NASDAQ s listing standards require that Signal s board of directors consist of a majority of independent directors, as determined under the applicable rules and regulations of The NASDAQ Stock Market LLC. The board of directors has determined that each of Messrs. Gonyer and Schuling and Dr. Smith qualify as an independent director and that neither Messrs. LeBow nor Riccitelli qualify as an independent director.

Based upon information requested from and provided by each proposed director concerning his or her background, employment and affiliations, including family relationships, other than Dr. Marshall by virtue of his position as chief executive officer of Miragen, Miragen s board of directors believes that each of Drs. Booth, Hughes and Koch and Messrs. Creecy, Lefkoff and Turner will qualify as an independent director following the completion of the Merger.

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Committees of the Board of Directors

Signal s board of directors currently has, and following the completion of the Merger will continue to have, the following committees: audit committee, a compensation committee and a nominating and corporate governance committee.

Audit Committee

The responsibilities of Signal s audit committee include the following:

- appointing, approving the compensation of, and assessing the independence of Signal s registered public accounting firm;
- overseeing the work of Signal s independent registered public accounting firm, including through the receipt and consideration of reports from that firm;
- reviewing and discussing with management and Signal s independent registered public accounting firm its annual and quarterly financial statements and related disclosures;
- monitoring Signal s internal control over financial reporting, disclosure controls and procedures;
- overseeing Signal s internal audit function; and
- discussing Signal s risk management policies.

The audit committee currently consists of Mr. Gonyer, Mr. Schuling and Dr. Smith. Signal s board of directors has determined that Mr. Schuling is an audit committee financial expert as defined in Item 407(d)(5) of Regulation S-K. Mr. Schuling also serves as the chairman of Signal s audit committee

The audit committee of the combined company is expected to retain these duties and responsibilities following completion of the Merger.

Following the closing of the Merger, the members of the audit committee are expected to be Mr. Turner, who is expected to serve as chairman and as an audit committee financial expert as defined in Item 407(d)(5) of Regulation S-K, Messrs. Lefkoff and Creecy. To qualify as independent to serve on Signal s audit committee, listing standards of The NASDAQ Capital Market and the applicable rules of the SEC require that a director not accept any consulting, advisory, or other compensatory fee from Signal, other than for service as a director, or be an affiliated person of Signal. Signal s board of directors has concluded that the current composition of the audit committee meets the requirements for independence under the rules and regulations of The NASDAQ Stock Market LLC and of the SEC. Miragen believes that, following completion of the Merger, the composition of the audit committee will comply with the applicable requirements of the rules and regulations of The NASDAQ Stock Market LLC and of the SEC.

Compensation Committee

The responsibilities of Signal s compensation committee include the following:

- reviewing and approving annually the corporate goals and objectives applicable to the compensation of Signal s chief executive officer, evaluating at least annually the chief executive officer s performance in light of those goals and objectives, and determining and approving the chief executive officer s compensation level based on this evaluation

- reviewing and approving the compensation of Signal s directors and all other executive officers;

- reviewing and approving and, when appropriate, recommending to Signal s board of directors for approval, incentive compensation plans and equity-based plans, and where appropriate or required, recommending for approval by Signal stockholders, the adoption, amendment or termination of such plans; and administering such plans;

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reviewing and approving the executive compensation information included in Signal s annual report on Form 10-K and proxy statement

reviewing and approving or providing recommendations with respect to any employment agreements or severance arrangements or plans; and

reviewing director compensation and recommending any changes to the board of directors.

The current members of Signal s compensation committee are Mr. Gonyer, Mr. Schuling and Dr. Smith. Dr. Smith is the chair of Signal s compensation committee.

The compensation committee of the combined company is expected to retain these duties and responsibilities following completion of the Merger.

Following the closing of the Merger, the members of the compensation committee are expected to be Dr. Hughes, who is expected to serve as chairman, and Dr. Booth. To qualify as independent to serve on Signal s compensation committee, the listing standards of The NASDAQ Capital Market require a director not to accept any consulting, advisory, or other compensatory fee from Signal, other than for service on Signal s board of directors, and that Signal s board of directors consider whether a director is affiliated with Signal and, if so, whether such affiliation would impair the director s judgment as a member of Signal s compensation committee. Signal s board of directors has concluded that the composition of the compensation committee meets the requirements for independence under the rules and regulations of the NASDAQ Stock Market LLC and of the SEC. Miragen believes that, after the completion of the Merger, the composition of the compensation committee will meet the requirements for independence under, and the functioning of such compensation committee will comply with any applicable requirements of the rules and regulations of The NASDAQ Stock Market LLC and of the SEC.

Nominating and Corporate Governance Committee

The responsibilities of Signal s Nominating and Corporate Governance Committee include the following:

identifying and recommending candidates to fill vacancies on the board of directors and for election by the stockholders;

recommending committee and chairperson assignments for directors to the board of directors;

developing, subject to the board of directors approval, a process for an annual evaluation of the board of directors and its committees and to oversee the conduct of this annual evaluation;

overseeing Signal s corporate governance practices, including reviewing and recommending to the board of directors for approval any changes to the documents and policies in Signal s corporate governance framework, including its certificate of incorporation and bylaws; and

monitoring compliance with Signal s Code of Business Conduct and Ethics, investigating alleged breaches or violations thereof and enforcing its provisions.

Board candidates are considered by Signal s nominating and corporate governance committee on a case-by-case basis. A candidate for election to Signal s board of directors must possess the ability to apply good business judgment and must be in a position to properly exercise his or her duties of loyalty and care in his or her representation of the interests of stockholders. Candidates should also exhibit proven leadership capabilities, high integrity and experience with a high level of responsibilities within their chosen fields, and have the ability to quickly grasp complex principles of business, finance, and transactions regarding Signal s industry. In general, preferred candidates will currently hold, or have recently held, an established executive level position and have extensive experience in business, finance, law, science, research, or government. Signal s nominating and corporate governance committee will consider these criteria for nominees identified by the committee, by stockholders, or through other sources. When current members of Signal s

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board of directors are considered for nomination for reelection, Signals nominating and corporate governance committee takes into consideration their prior contributions to Signal s board of directors and performance as well as the composition of Signal s board of directors as a whole, including whether Signal s board of directors reflects the appropriate balance of independence, sound judgment, business specialization, technical skills, diversity, and other desired qualities. Signal s nominating and corporate governance committee makes a preliminary assessment of each proposed nominee based upon the résumé and biographical information, an indication of the individual s willingness to serve, and other relevant information. This information will be evaluated against the criteria set forth above and Signal s specific needs at that time. Based upon a preliminary assessment of the candidate(s), those who appear best suited to meet Signal s needs may be invited to participate in a series of interviews, which are used as a further means of evaluating potential candidates. On the basis of information learned during this process, Signal s nominating and corporate governance committee will determine which nominee(s) to submit for election. Signal s nominating and corporate governance committee uses the same process for evaluating all nominees, regardless of the original source of the nomination.

Signal s nominating and corporate governance committee and its board of directors believe that diversity along multiple dimensions, including opinions, skills, perspectives, personal and professional experiences and other differentiating characteristics, is an important element of its nomination recommendations. Signal s board of directors considers each nominee in the context of the board as a whole, with the objective of assembling a board of directors that can best maintain the success of Signal s business. Although Signal s board of directors and nominating and corporate governance committee does not have a formal diversity policy, Signal s nominating and corporate governance committee and board of directors periodically review the membership of the board of directors in light of Signal s business and strategic objectives, consider whether the directors possess the requisite skills, experience and perspectives to oversee Signal in achieving those goals, and may seek additional directors from time to time as a result of its considerations.

The current members of Signal s nominating and corporate governance committee are Mr. Gonyer, Mr. Schuling and Dr. Smith, each of whom has been determined by Signal s board of directors to be independent under the rules and regulations of The NASDAQ Stock Market LLC. Mr. Gonyer is the chair of the nominating and corporate governance committee.

Signal s nominating and corporate governance committee of the combined company is expected to retain these duties and responsibilities following completion of the Merger.

Following the closing of the Merger, the members of Signal s nominating and corporate governance committee are expected to be Dr. Koch, who is expected to serve as chairman, and Dr. Hughes.

Director Compensation

Miragen does not currently have a director compensation policy, and, except for the compensation for Drs. Hughes and Koch discussed below, none of Miragen s non-employee directors received cash compensation for service during 2016. However, Miragen does provide reimbursement for reasonable out-of-pocket expenses incurred for attending meetings of Miragen s board of directors or any committees thereof.

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The following table sets forth compensation earned and paid to each Miragen non-employee director for service as a director during 2016:

Director Compensation(1)

Name	Fees Paid in Cash	Option Awards(2)	Stock Awards	Total
Bruce L. Booth, Ph.D.	$	$	$	$
John W. Creecy				
Marvin H. Caruthers, Ph.D.(3)				
Thomas E. Hughes, Ph.D.(4)	27,000	25,736		52,736
Kyle A. Lefkoff				
Kevin Koch, Ph.D.(4)	25,000	20,397		45,397
Reza Halse, Ph.D.				

(1) The table does not include Mr. Turner, because he was not a member of Miragen s board of directors in the year ended December 31, 2016. Dr. Marshall, Miragen s president and chief executive officer, is also a director but does not receive any additional compensation for his service as a director. Dr. Marshall s compensation as an executive officer is set forth below under *Management Following the Merger Executive Compensation Summary Compensation Table*.

(2) The amounts reflect the full grant date fair value for awards granted during the year ended December 31, 2016. The grant date fair value was computed in accordance with ASC Topic 718, Compensation *Stock Compensation*.

(3) Dr. Caruthers resigned from Miragen s board of directors in July 2016.

(4) Miragen provides Drs. Hughes and Koch compensation of $25,000 on an annual basis for serving as a member of Miragen s board of directors. Additionally, Miragen pays Dr. Hughes a fee of $2,000 for each meeting of the scientific advisory board he attends as an advisor.

Each of Drs. Hughes and Koch have also been previously awarded options to purchase shares of Miragen s common stock, at an exercise price equal to the fair market value of Miragen s common stock at the time of grant. Dr. Hughes stock option awards include (i) an option to purchase 20,000 shares granted in September 2009 with an exercise price of $0.40 per share that was exercised in full in October 2016, (ii) an option to purchase 16,000 shares granted in June 2012 with an exercise price of $0.86 per share that is vested in full and (iii) an option to purchase 19,500 shares granted in February 2016 with an exercise price of $0.74 per share that vests in twelve equal installments on a quarterly basis beginning in the second quarter of 2016. Dr. Koch s stock option award includes an option to purchase 41,600 shares granted in August 2016 with an exercise price of $0.74 per share, that vests in twelve equal installments on a quarterly basis beginning in the fourth quarter of 2016.

While Miragen does not currently have a director compensation policy, in November 2016, Miragen s board of directors adopted a non-employee director cash and equity compensation policy to be effective upon the closing of the Merger. Under this policy the combined company will pay each of its non-employee directors a cash stipend for service on its board of directors and, if applicable, on the audit committee, compensation committee and nominating and corporate governance committee. Each of the combined company s non-employee directors will receive an additional stipend if they serve as the chairperson of the compensation committee, nominating and corporate governance committee or audit committee or serve as the non-executive chairperson. The stipends payable to each non-employee directors for service on the combined company s board of directors are as follows:

	Member Annual Service Stipend(1)	Chairperson Annual Service Stipend(1)(2)
Board of directors	$ 35,000	$
Audit committee	7,500	15,000
Compensation committee	5,000	10,000
Nominating and corporate governance committee	3,750	7,500
Non-Executive Chairperson	30,000	N/A

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(1) Each non-employee director has the right to elect to receive all or a portion of his or her annual cash compensation under the policy in the form of either cash, quarterly restricted common stock based on the closing price of the combined company s common stock on The NASDAQ Capital Market on the date of grant, or quarterly stock options to purchase common stock based on the Black-Scholes option-pricing model as of the date of grant. Any such election will be made before the start of the fiscal year and with any such stock options or restricted common stock elected by the directors to be vested upon grant, with stock options to expire ten years from the date of grant;
(2) Chairpersons will not receive a stipend for being a member of the applicable committee.

In addition, the cash compensation described above each member of the combined company s board of directors will receive an automatic option grant to purchase 12,000 shares (subject to adjustment for stock splits and similar matters) of the combined company s common stock at each annual meeting when such director is re-elected with an exercise price equal to the fair market value of a share of the combined company s common stock on such date. Each option grant will vest in full on the earlier of the one year anniversary of the date of grant or the combined company s next annual meeting.

Each new director elected or appointed to the combined company s board of directors will receive an initial option grant to purchase 24,000 shares (subject to adjustment for stock splits and similar matters) of the combined company s common stock upon such director s appointment or election with an exercise price equal to the fair market value of a share of the combined company s common stock on such date. Each option grant will vest in 36 equal monthly installments.

Compensation Committee Interlocks and Insider Participation

Following the completion of the Merger, the members of Signal s compensation committee are expected to be Thomas E. Hughes, Ph.D., who is expected to serve as chairman, and Bruce L. Booth, Ph.D. Each member of the Compensation Committee is expected to be an outside director as that term is defined in Section 162(m) of the Code, a non-employee director within the meaning of Rule 16b-3 of the rules promulgated under the Exchange Act and independent within the meaning of the independent director guidelines of The NASDAQ Stock Market LLC. None of the proposed combined company s executive officers serves as a member of the board of directors or compensation committee of any entity that has one or more executive officers who is proposed to serve on the combined company s board of directors or compensation committee following the completion of the Merger.

Executive Compensation

Miragen s executive officers for the year ended December 31, 2016 and who will serve as executive officers of the combined company following the Merger are referred to herein as the named executive officers. The named executive officers and their current positions are as follows:

William S. Marshall, Ph.D., President and Chief Executive Officer;

Adam S. Levy, Chief Business Officer; and

Paul D. Rubin, M.D., Executive Vice President, Research and Development.

Jason A. Leverone, Miragen s chief financial officer, will also serve as an executive officer of the combined company following the Merger.

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Summary Compensation Table

The following table provides information regarding the named executive officers of Miragen during the fiscal year ended December 31, 2016 who will serve as executive officers of the combined company. For the management of the combined company after the closing of the Merger, see *Management Following the Merger Executive Officers and Directors Executive Officers and Directors of the Combined Company Following the Merger* beginning on page 247.

Name and Principal Position	Fiscal Year	Salary	Option Awards(1)	Non-Equity Incentive Plan Compensation	All Other Compensation	Total
William S. Marshall, Ph.D.	2016	$ 340,000	$ 109,425	$ 200,056	$ 7,085(2)	$ 656,566
President and Chief Executive Officer	2015	$ 340,000	$	$ 113,101	$ 5,000(3)	$ 458,101
Adam S. Levy	2016	$ 207,885	$ 112,812	$ 150,000	$ 20,385(4)	$ 491,082
Chief Business Officer						
Paul D. Rubin, M.D.	2016	$ 124,375	$ 807,919	$ 108,575	$	$ 1,040,869
Executive Vice President, Research and Development						

(1) The amounts reflect the full grant date fair value for awards granted during 2016. The grant date fair value was computed in accordance with ASC Topic 718, Compensation *Stock Compensation*.
(2) Includes payment of disability insurance premiums for Dr. Marshall s benefit.
(3) Includes payment of life insurance premiums for Dr. Marshall s benefit.
(4) Includes payment of relocation reimbursements to Mr. Levy.

Narrative Disclosure to Summary Compensation Table

Base Salary

In 2015, Miragen s compensation committee and board of directors approved base salaries for Miragen s management team, resulting in an annual base salary of $340,000 for Dr. Marshall.

In 2016, Miragen s compensation committee and board of directors approved base salaries for Miragen s management team, resulting in an annual base salary of $340,000 for Dr. Marshall. In April 2016 and October 2016, Miragen entered into offers letter with Mr. Levy and Dr. Rubin, respectively, pursuant to which Miragen agreed to pay Mr. Levy an annual salary of $300,000 and Dr. Rubin an annual salary of $395,000.

Annual Bonuses

Miragen s board of directors and compensation committee may make special cash bonus awards in their discretion. In February 2016, Miragen s compensation committee recommended and Miragen s board of directors approved, a discretionary cash bonus to Dr. Marshall of $113,101 in recognition of his services in the year ended December 31, 2015 and in accordance with the terms of Dr. Marshall s employment agreement with the company. In January 2017,

Miragen s compensation committee awarded Mr. Levy and Dr. Rubin discretionary cash bonuses of $150,000 and $33,575, respectively, in recognition of their services provided in the year ended December 31, 2016 and in accordance with the terms of each s offer letter. The compensation committee also awarded Dr. Rubin a retention bonus of $75,000 in accordance with the terms of Dr. Rubin s offer letter. In January 2017, Miragen s compensation committee recommended and Miragen s board of directors approved, a discretionary cash bonus to Dr. Marshall of $200,056 in recognition of his services in the year ended December 31, 2016 and in accordance with the terms of Dr. Marshall s employment agreement with the company. These bonus amounts, to the extent they were in recognition for Dr. Marshall s, Mr. Levy s and Dr. Rubin s performance during the indicated year, are reflected in the Non-Equity Incentive Plan Compensation column of the Summary Compensation Table above for the indicated year.

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Stock Options

Miragen s compensation committee and the board of directors elected not to grant stock option awards to any of Miragen s named executive officers in 2015.

In February 2016, Miragen s compensation committee awarded to Dr. Marshall an option to purchase 223,000 shares of its common stock. This option has an exercise price of $0.74 per share and vests monthly over a period of four years.

In June 2016, in connection with the commencement of Mr. Levy s employment with Miragen, Miragen s board of directors approved the grant of an option to Mr. Levy to purchase 230,883 shares of its common stock. This option has an exercise price of $0.74 per share and vests as to 25% of the shares subject to the option in May 2017 with the remainder vesting monthly over a period of three years thereafter.

In November 2016, in connection with the commencement of Dr. Rubin s employment with Miragen, Miragen s board of directors approved the grant of an option to Dr. Rubin to purchase 288,604 shares of its common stock. This option has an exercise price of $4.00 per share and vests as to 25% of the shares subject to the option in November 2017 with the remainder vesting monthly over a period of three years thereafter.

Outstanding Equity Awards at Fiscal Year-End

The following table presents the outstanding equity awards held by each of Miragen s named executive officers as of December 31, 2016. Neither of the named executive officers of Miragen exercised options to purchase Miragen common stock in 2016.

Name	Number of securities underlying unexercised options exercisable	Number of securities underlying unexercised options unexercisable	Option Exercise price ($)	Option Grant Date	Option Expiration date
William S. Marshall, Ph.D.	164,726		0.40	7/31/2008	7/30/2018
	328,500		0.86	6/15/2012	6/14/2022
	46,458	176,542(1)(2)	0.74	2/22/2016	2/21/2026
Adam S. Levy		230,883(3)(4)	0.74	6/15/2016	6/14/2026
Paul D. Rubin, M.D.		288,604(3)(5)	4.00	11/30/2016	11/29/2026

(1) The remaining portion of these options to purchase common stock vest at the rate of 1/48th of the number of total shares subject to the option on a monthly basis as measured from the date of grant.

(2) If Miragen terminates Dr. Marshall s employment without cause or Dr. Marshall resigns for good reason, then this option will immediately vest the equivalent of twelve months vesting; provided, if such termination or resignation occurs within one month prior to or thirteen months following a change of control, then this option shall vest in full.

(3) If Miragen terminates Mr. Levy s or Dr. Rubin s, as applicable, employment without cause or Mr. Levy or Dr. Rubin, as applicable, resigns for good reason, then this option will immediately vest the equivalent of 12 months vesting.
(4) 25% of the shares subject to this option vest on May 16, 2017 with the remainder vesting monthly over a period of three years thereafter.
(5) 25% of the shares subject to this option vest on November 16, 2017 with the remainder vesting monthly over a period of three years thereafter.

Upon completion of the Merger, each of the above options will convert into an option to purchase common stock of Signal, with the number of shares and exercise price being appropriately adjusted to reflect the Exchange Ratio in the Merger. See *The Merger Stock Options and Warrants* beginning on page 114.

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Employment Agreements and Potential Payments Upon Termination of Employment or Change in Control

Miragen has entered into employment agreements with each of its named executive officers described below, and standard confidential information and/or inventions assignment agreements, under which each of its named executive officers has agreed not to disclose Miragen s confidential information.

William S. Marshall, Ph.D.

2008 Employment Agreement. In May 2008, Miragen entered into an employment agreement with Dr. Marshall, its president and chief executive officer. Under this employment agreement, Dr. Marshall is entitled to an annual base salary of $250,000 (subject to review and adjustment in the discretion of the board of directors or the compensation committee) and a discretionary annual cash bonus between 20% and 60% of, with a target amount equal to 40%, of Dr. Marshall s then effective base salary (subject to review and adjustment in the sole discretion of the board of directors). Dr. Marshall is also eligible to participate in, subject to applicable eligibility requirements, all of Miragen s benefits plans and fringe benefits and programs that may be provided to senior executives of Miragen from time to time. In connection with Dr. Marshall entering into his 2008 employment agreement, and pursuant to the terms thereof, Miragen issued to Dr. Marshall a stock option exercisable for 164,726 shares of Miragen s common stock on July 31, 2008 with an exercise price of $0.40 per share.

Dr. Marshall s 2008 employment agreement provides that either party may terminate the agreement at-will. In addition, the agreement provides that if Miragen terminates Dr. Marshall s employment without cause or Dr. Marshall resigns for good reason, Dr. Marshall will be eligible to receive the following severance benefits: (i) an amount equal to 12 months of his annual base salary, less applicable deductions, payable in accordance with Miragen s normal payroll schedule; (ii) the vesting of the equivalent of 12 months on all of Dr. Marshall s then outstanding stock options or other equity awards; and (iii) 12 months of continued health coverage. Although, if such termination or resignation occurs within one month prior to or thirteen months following a change of control, Dr. Marshall will be eligible to receive the following severance benefits: (i) an amount equal to 24 months of his annual base salary, less applicable deductions, payable in accordance with Miragen s normal payroll schedule; (ii) the vesting in full of all of his then outstanding stock options or other equity awards then outstanding and subject to time-based vesting; and (iii) 24 months of continued health coverage.

The following definitions have been adopted in Dr. Marshall s 2008 employment agreement:

> cause means (i) Dr. Marshall s commission of any felony or any crime involving fraud, dishonesty or moral turpitude under the laws of the United States or any state thereof; (ii) Dr. Marshall s attempted commission of, or participation in, a fraud or act of dishonesty against Miragen; (iii) Dr. Marshall s intentional, material violation of any contract or agreement between Dr. Marshall and Miragen or any statutory duty Dr. Marshall owes to Miragen, in each case, which remains uncured for 30 days after Miragen provides Dr. Marshall with written notice of his intentional action or conduct; (iv) Dr. Marshall s unauthorized use or disclosure of Miragen s confidential information or trade secrets, which remains uncured for 30 days after Miragen provides Dr. Marshall with written notice of his unauthorized action or conduct; or (v) Dr. Marshall s gross misconduct.

> good reason means the occurrence, without Dr. Marshall s consent, of any one or more of the following: (i) an assignment to Dr. Marshall of any duties or responsibilities that results in a material diminution in Dr.

Marshall s function; (ii) a material reduction in his base salary, subject to specified exception; (iii) the material failure by Miragen to continue Dr. Marshall s participations in any benefit plan or program in which Dr. Marshall was participating; (iv) a relocation of Dr. Marshall s business office to a location that increases Dr. Marshall s one-way commute by more than twenty-five miles; or (v) a material breach by Miragen of any material agreement with Dr. Marshall concerning the terms and conditions of his employment. In order to constitute good reason, however, Dr. Marshall must provide notice to Miragen within 90 days of the existence of the condition or event constituting good reason, after which Miragen has 30 days to cure the condition or event constituting good reason. If

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Miragen fails to cure, Dr. Marshall s separation from service must take place within two years following the initial existence of the good reason condition.

2016 Employment Agreement. In December 2016, Miragen entered into an employment agreement with Dr. Marshall to be effective upon the closing of the Merger, which will supersede his 2008 employment agreement. Under this employment agreement, Dr. Marshall is entitled to an annual base salary (subject to periodic review and adjustment by the board of directors or compensation committee of the board of directors) of $400,000 and a discretionary annual cash bonus equal to 50% of Dr. Marshall s then effective base salary (subject to review and adjustment in the sole discretion of the board of directors or the compensation committee of the board of directors). Dr. Marshall is also eligible to participate in, subject to applicable eligibility requirements, all of Miragen s benefits plans and fringe benefits and programs that may be provided to senior executives of Miragen from time to time.

The 2016 employment agreement provides that either party may terminate the agreement at-will. In addition, the agreement provides that if Miragen terminates Dr. Marshall s employment without cause or Dr. Marshall resigns for good reason, Dr. Marshall will be eligible to receive the following severance benefits: (i) an amount equal to 12 months of his annual base salary, less applicable deductions, payable in accordance with Miragen s normal payroll schedule; (ii) the vesting of the equivalent of 12 months on all of Dr. Marshall s stock options or other equity awards that were outstanding as of the effective date of Dr. Marshall s 2016 employment agreement; and (iii) 12 months of continued health coverage. Although, if such termination or resignation occurs within one month prior to or 12 months following a change of control, Dr. Marshall will be eligible to receive the following severance benefits: (i) an amount equal to 24 months of his annual base salary, less applicable deductions, payable in accordance with Miragen s normal payroll schedule; (ii) the vesting in full of all of his then outstanding stock options or other equity awards then outstanding and subject to time-based vesting; and (iii) 12 months of continued health coverage.

The following definitions have been adopted in each of Dr. Marshall s 2016 employment agreements:

cause means (i) Dr. Marshall s commission of any felony or any crime involving fraud, dishonesty or moral turpitude under the laws of the United States or any state thereof; (ii) Dr. Marshall s attempted commission of, or participation in, a fraud or act of dishonesty against Miragen; (iii) Dr. Marshall s intentional, material violation of any contract or agreement between Dr. Marshall and Miragen or any statutory duty Dr. Marshall owes to Miragen, in each case, which remains uncured for 30 days after Miragen provides written notice of such action or conduct to Dr. Marshall; (iv) Dr. Marshall s unauthorized use or disclosure of Miragen s confidential information or trade secrets; or (v) Dr. Marshall s gross misconduct which remains uncured for 30 days after Miragen provides written notice of such action or conduct to Dr. Marshall.

good reason means the occurrence, without Dr. Marshall s consent, of any one or more of the following: (i) a material reduction in his base salary of ten percent or more (unless such reduction is pursuant to a salary reduction program applicable generally to Miragen s similarly situated executives); (ii) a material reduction in Dr. Marshall s authority, duties or responsibilities; (iii) a relocation of Dr. Marshall s principal place of employment to a place that increases Dr. Marshall s one-way commute by more than 25 miles; or (iv) material breach by Miragen of any material provision of Dr. Marshall s employment agreement.

All severance benefits payable to Dr. Marshall under either his 2008 employment agreement or 2016 employment agreement are subject to him signing, not revoking and complying with a release of claims.

Adam S. Levy

Offer Letter. In April 2016, Miragen entered into an offer letter with Mr. Levy, its chief business officer. The offer letter provides that if Miragen terminates Mr. Levy s employment without cause or Mr. Levy resigns for

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good reason, Mr. Levy will be eligible to receive the following severance benefits: (i) an amount equal to 12 months of his annual base salary, less applicable deductions, payable in accordance with Miragen s normal payroll schedule; (ii) the vesting of the equivalent of 12 months on all of Mr. Levy s then outstanding stock options or other equity awards; and (iii) 12 months of continued health coverage.

The following definitions have been adopted in Mr. Levy s offer letter:

cause means the occurrence of any one or more of the following: (i) Mr. Levy s commission of any felony or any crime involving fraud, dishonesty or moral turpitude under the laws of the United States or any state thereof; (ii) Mr. Levy s attempted commission of, or participation in, a fraud or act of dishonesty against Miragen; (iii) Mr. Levy s material violation of any contract or agreement between Mr. Levy and Miragen or any statutory duty Mr. Levy owes to Miragen, in each case, which remains uncured for 30 days after Miragen provides Mr. Levy notice of such action or conduct; (iv) Mr. Levy s unauthorized use or disclosure of Miragen s confidential information or trade secrets, which remains uncured for 30 days after Miragen provides Mr. Levy notice of such action or conduct; or (v) Mr. Levy s gross misconduct.

good reason means the occurrence, without Mr. Levy s express written consent, of any one or more of the following: (i) the assignment to Mr. Levy of any duties or responsibilities that results in a material diminution in his function; (ii) a material reduction in his base salary, subject to a specified exception; (iii) the material failure by Miragen to continue Mr. Levy s participations in any benefit plan or program in which Mr. Levy was participating, or the taking of any action by Miragen that would materially diminish either Mr. Levy s participation in or benefits received under any existing benefit plan or program; (iv) a relocation of Mr. Levy s business office of employment to a location that increases Mr. Levy s one-way commute by more than twenty-five miles; or (v) material breach by Miragen of any material agreement with Mr. Levy s concerning the terms and conditions of his employment.

2016 Employment Agreement. In December 2016, Miragen entered into an employment agreement with Mr. Levy to be effective upon the closing of the Merger, which will supersede his offer letter. Under this employment agreement, Mr. Levy is entitled to an annual base salary (subject to periodic review and adjustment by the board of directors or compensation committee of the board of directors) of $300,000 and a discretionary annual cash bonus equal to 40% of Mr. Levy s then effective base salary (subject to review and adjustment in the sole discretion of the board of directors or the compensation committee of the board of directors). Mr. Levy is also eligible to participate in, subject to applicable eligibility requirements, all of Miragen s benefits plans and fringe benefits and programs that may be provided to senior executives of Miragen from time to time.

The employment agreement provides that either party may terminate the agreement at-will. In addition, the agreement provides that if Miragen terminates Mr. Levy s employment without cause or Mr. Levy resigns for good reason, Mr. Levy will be eligible to receive the following severance benefits: (i) an amount equal to 12 months of his annual base salary, less applicable deductions, payable in accordance with Miragen s normal payroll schedule; (ii) the vesting of the equivalent of 12 months on all of Mr. Levy s stock options or other equity awards that were outstanding as of the effective date of Mr. Levy s employment agreement; and (iii) 12 months of continued health coverage. Although, if such termination or resignation occurs within one month prior to or 12 months following a change of control, Mr. Levy will be eligible to receive the following severance benefits: (i) an amount equal to 12 months of his annual base salary, less applicable deductions, payable in accordance with Miragen s normal payroll schedule; (ii) the vesting in full of all of Mr. Levy s then outstanding stock options or other equity awards subject to time-based vesting; and (iii) twelve months of continued health coverage.

The following definitions have been adopted in each of Mr. Levy s 2016 employment agreements:

cause means (i) Mr. Levy s commission of any felony or any crime involving fraud, dishonesty or moral turpitude under the laws of the United States or any state thereof; (ii) Mr. Levy s attempted

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commission of, or participation in, a fraud or act of dishonesty against Miragen; (iii) Mr. Levy s intentional, material violation of any contract or agreement between Mr. Levy and Miragen or any statutory duty Mr. Levy owes to Miragen, in each case, which remains uncured for 30 days after Miragen provides written notice of such action or conduct to Mr. Levy; (iv) Mr. Levy s unauthorized use or disclosure of Miragen s confidential information or trade secrets; or (v) Mr. Levy s gross misconduct which remains uncured for 30 days after Miragen provides written notice of such action or conduct to Mr. Levy.

good reason means the occurrence, without Mr. Levy s consent, of any one or more of the following: (i) a material reduction in his base salary of ten percent or more (unless such reduction is pursuant to a salary reduction program applicable generally to Miragen s similarly situated executives); (ii) a material reduction in Mr. Levy s authority, duties or responsibilities; (iii) a relocation of Mr. Levy s principal place of employment to a place that increases Mr. Levy s one-way commute by more than 25 miles; or (iv) material breach by Miragen of any material provision of Mr. Levy s employment agreement.

All severance benefits payable to Mr. Levy under either his offer letter or employment agreement are subject to him signing, not revoking and complying with a release of claims.

Paul D. Rubin, M.D.

Offer Letter. In October 2016, Miragen entered into a severance agreement with Dr. Rubin, its executive vice president, research and development. The offer letter provides that if Miragen terminates Dr. Rubin s employment without cause or Dr. Rubin resigns for good reason, Dr. Rubin will be eligible to receive the following severance benefits: (i) an amount equal to 12 months of his annual base salary, less applicable deductions, payable in accordance with Miragen s normal payroll schedule; (ii) the vesting of the equivalent of 12 months on all of Dr. Rubin s then outstanding stock options or other equity awards; and (iii) 12 months of continued health coverage.

The following definitions have been adopted in Dr. Rubin s offer letter:

cause means the occurrence of any one or more of the following: (i) Dr. Rubin s commission of any felony or any crime involving fraud, dishonesty or moral turpitude under the laws of the United States or any state thereof; (ii) Dr. Rubin s attempted commission of, or participation in, a fraud or act of dishonesty against Miragen; (iii) Dr. Rubin s material violation of any contract or agreement between Dr. Rubin and Miragen or any statutory duty Dr. Rubin owes to Miragen, in each case, which remains uncured for 30 days after Miragen provides Dr. Rubin notice of such action or conduct; (iv) Dr. Rubin s unauthorized use or disclosure of Miragen s confidential information or trade secrets, which remains uncured for 30 days after Miragen provides Dr. Rubin notice of such action or conduct; or (v) Dr. Rubin s gross misconduct.

good reason means the occurrence, without Dr. Rubin s express written consent, of any one or more of the following: (i) the assignment to Dr. Rubin of any duties or responsibilities that results in a material diminution in his function; (ii) a material reduction in his base salary, subject to a specified exception; (iii) the material failure by Miragen to continue Dr. Rubin s participations in any benefit plan or program in which Dr. Rubin was participating, or the taking of any action by Miragen that would materially diminish either Dr. Rubin s participation in or benefits received under any existing benefit plan or program; (iv) a relocation of Dr. Rubin s business office of employment to a location that increases Dr. Rubin s one-way commute by more than twenty-five miles; or (v) material breach by Miragen of any material agreement with

Dr. Rubin s concerning the terms and conditions of his employment.

2016 Employment Agreement. In December 2016, Miragen entered into an employment agreement with Dr. Rubin to be effective upon the closing of the Merger, which will supersede his offer letter. Under this

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employment agreement, Dr. Rubin is entitled to an annual base salary (subject to periodic review and adjustment by the board of directors or compensation committee of the board of directors) of $395,000 and a discretionary annual cash bonus equal to 40% of Dr. Rubin s then effective base salary (subject to review and adjustment in the sole discretion of the board of directors or the compensation committee of the board of directors). Dr. Rubin is also eligible to participate in, subject to applicable eligibility requirements, all of Miragen s benefits plans and fringe benefits and programs that may be provided to senior executives of Miragen from time to time.

The employment agreement provides that either party may terminate the agreement at-will. In addition, the agreement provides that if Miragen terminates Dr. Rubin s employment without cause or Dr. Rubin resigns for good reason, Dr. Rubin will be eligible to receive the following severance benefits: (i) an amount equal to 12 months of his annual base salary, less applicable deductions, payable in accordance with Miragen s normal payroll schedule; (ii) the vesting of the equivalent of 12 months on all of Dr. Rubin s stock options or other equity awards that were outstanding as of the effective date of Dr. Rubin s employment agreement; and (iii) 12 months of continued health coverage. Although, if such termination or resignation occurs within one month prior to or 12 months following a change of control, Dr. Rubin will be eligible to receive the following severance benefits: (i) an amount equal to 12 months of his annual base salary, less applicable deductions, payable in accordance with Miragen s normal payroll schedule; (ii) the vesting in full of all of Dr. Rubin s then outstanding stock options or other equity awards subject to time-based vesting; and (iii) twelve months of continued health coverage.

The following definitions have been adopted in each of Dr. Rubin s 2016 employment agreements:

> cause means (i) Dr. Rubin s commission of any felony or any crime involving fraud, dishonesty or moral turpitude under the laws of the United States or any state thereof; (ii) Dr. Rubin s attempted commission of, or participation in, a fraud or act of dishonesty against Miragen; (iii) Dr. Rubin s intentional, material violation of any contract or agreement between Dr. Rubin and Miragen or any statutory duty Dr. Rubin owes to Miragen, in each case, which remains uncured for 30 days after Miragen provides written notice of such action or conduct to Dr. Rubin; (iv) Dr. Rubin s unauthorized use or disclosure of Miragen s confidential information or trade secrets; or (v) Dr. Rubin s gross misconduct which remains uncured for 30 days after Miragen provides written notice of such action or conduct to Dr. Rubin.

> good reason means the occurrence, without Dr. Rubin s consent, of any one or more of the following: (i) a material reduction in his base salary of ten percent or more (unless such reduction is pursuant to a salary reduction program applicable generally to Miragen s similarly situated executives); (ii) a material reduction in Dr. Rubin s authority, duties or responsibilities; (iii) a relocation of Dr. Rubin s principal place of employment to a place that increases Dr. Rubin s one-way commute by more than 25 miles; or (iv) material breach by Miragen of any material provision of Dr. Rubin s employment agreement.

All severance benefits payable to Dr. Rubin under either his offer letter or employment agreement are subject to him signing, not revoking and complying with a release of claims.

In December 2016, Miragen entered into an employment agreement with Mr. Leverone with substantially the same severance benefits as those provided in Mr. Levy s and Dr. Rubin s employment agreements.

Compensation Risk Management

Miragen has considered the risk associated with its compensation policies and practices for all employees and believes it has designed its compensation policies and practices in a manner that does not create incentives that could lead to excessive risk taking that would have a material adverse effect on Miragen.

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Employment Benefits Plan

2016 Plan

The following description of the 2016 Plan is a summary only and is qualified in its entirety by reference to the complete text of the 2016 Plan. Stockholders are urged to read the actual text of the 2016 Plan in its entirety.

Purpose

The 2016 Plan is designed to secure and retain the services of the combined company s employees, directors and consultants, provide incentives for such, directors and consultants to exert maximum efforts for the success of the combined company and its affiliates, and provide a means by which the combined company s employees, directors and consultants may be given an opportunity to benefit from increases in the value of its common stock. If the 2016 Plan is approved by Signal stockholders, no additional awards will be granted under the 2014 Plan or the Miragen 2008 Plan following the effective date of the 2016 Plan.

Types of Awards

The terms of the 2016 Plan provide for the grant of incentive stock options, nonstatutory stock options, stock appreciation rights, restricted stock awards, restricted stock unit awards, other stock awards, and performance awards that may be settled in cash, stock, or other property.

Shares Available for Awards

Subject to adjustment for specified changes in the combined company s capitalization and the reverse stock split, the Share Reserve will not exceed 4,182,404 shares, which number is the sum of (i) 1,681,294 shares, plus (ii) the number of shares subject to outstanding stock awards that were granted under the Miragen 2008 Plan that, from and after the closing date of the Merger, expire or terminate for any reason prior to exercise or settlement, are forfeited because of the failure to meet a contingency or condition required to vest such shares, or are reacquired, withheld or not issued to satisfy a tax withholding obligation in connection with an award or to satisfy the purchase price or exercise price of a stock award, if any, as such shares become available from time to time. In addition, the share reserve will automatically increase on January 1st of each year, for a period of not more than ten years, commencing on January 1st of the year following the year in which the effective date of the 2016 Plan occurs, and ending on (and including) January 1, 2026, in an amount equal to 4% of the shares of common stock outstanding on December 31st of the preceding calendar year; however the board of directors or compensation committee may act prior to January 1st of a given year to provide that there will be no January 1st increase in the share reserve for such year or that the increase in the share reserve for such year will be a lesser number of shares of common stock than would otherwise occur pursuant to the automatic increase.

The following shares of common stock will become available again for issuance under the 2016 Plan: (i) any shares subject to a stock award that are not issued because such stock award expires or otherwise terminates without all of the shares covered by such stock award having been issued; (ii) any shares subject to a stock award that are not issued because such stock award is settled in cash; (iii) any shares issued pursuant to a stock award that are forfeited back to or repurchased by Signal because of the failure to meet a contingency or condition required for the vesting of such shares; and (iv) any shares reacquired by the combined company in satisfaction of tax withholding obligations on a stock award or as consideration for the exercise or purchase price of a stock award.

Eligibility

All of the combined company s (including its affiliates) approximately 45 employees and six non-employee directors as of December 31, 2016 will be eligible to participate in the 2016 Plan following the closing of the Merger and may receive all types of awards other than incentive stock options. Incentive stock options may be granted under the 2016 Plan only to the combined company s employees (including officers) and employees of its affiliates.

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Section 162(m) Limits

Under the 2016 Plan, subject to adjustment for specified changes in the combined company s capitalization and the reverse stock split, no participant will be eligible to be granted performance-based compensation during any calendar year more than: (i) a maximum of 1,500,000 shares of common stock subject to stock options and stock appreciation rights whose value is determined by reference to an increase over an exercise or strike price of at least 100% of the fair market value of a share of common stock on the date of grant; (ii) a maximum of 1,500,000 shares of common stock subject to performance stock awards; and (iii) a maximum of $3,000,000 subject to performance cash awards. These limits are designed to allow the combined company to grant awards that are intended to be exempt from the $1 million limitation on the income tax deductibility of compensation paid per covered employee imposed by Section 162(m) of the Code, and will not apply to awards that the combined company s board of directors determines will not be treated as performance-based compensation.

Non-Employee Director Compensation Limit

Under the 2016 Plan, the maximum number of shares of Signal common stock subject to stock awards granted under the 2016 Plan or otherwise during any one calendar year to any non-employee director, taken together with any cash fees paid by the combined company to such non-employee director during such calendar year for services on its board of directors, will not exceed $500,000 in total value (calculating the value of any such stock awards based on the grant date fair value of such stock awards for financial reporting purposes), or, with respect to the calendar year in which a non-employee director is first appointed or elected to the combined company s board of directors, $1,000,000.

Administration

The 2016 Plan will be administered by the combined company s board of directors, which may in turn delegate authority to administer the 2016 Plan to a committee. The combined company s board of directors will delegate concurrent authority to administer the 2016 Plan to its compensation committee, but may, at any time, revest in itself some or all of the power delegated to its compensation committee. The combined company s board of directors and its compensation committee are each considered to be a Plan Administrator for purposes of this Signal Proposal No. 4. Subject to the terms of the 2016 Plan, the Plan Administrator may determine the recipients, the types of awards to be granted, the number of shares of common stock subject to or the cash value of awards, and the terms and conditions of awards granted under the 2016 Plan, including the period of their exercisability and vesting. The Plan Administrator also has the authority to provide for accelerated exercisability and vesting of awards. Subject to the limitations set forth below, the Plan Administrator also determines the fair market value applicable to a stock award and the exercise or strike price of stock options and stock appreciation rights granted under the 2016 Plan.

The Plan Administrator may also delegate to one or more officers the authority to designate employees who are not officers to be recipients of certain stock awards and the number of shares of common stock subject to such stock awards. Under any such delegation, the Plan Administrator will specify the total number of shares of common stock that may be subject to the stock awards granted by such officer. The officer may not grant a stock award to himself or herself.

Repricing; Cancellation and Re-Grant of Stock Awards

Under the 2016 Plan, the Plan Administrator does not have the authority to reprice any outstanding stock option or stock appreciation right by reducing the exercise or strike price of the stock option or stock appreciation right or to cancel any outstanding stock option or stock appreciation right that has an exercise or strike price greater than the then-current fair market value of a share of common stock in exchange for cash or other stock awards without

obtaining the approval of the combined company s stockholders. Such approval must be obtained within 12 months prior to such an event.

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Stock Options

Stock options may be granted under the 2016 Plan pursuant to stock option agreements. The 2016 Plan permits the grant of stock options that are intended to qualify as ISOs and NSOs.

The exercise price of a stock option granted under the 2016 Plan may not be less than 100% of the fair market value of the common stock subject to the stock option on the date of grant and, in some cases (see *Limitations on Incentive Stock Options* below), may not be less than 110% of such fair market value.

The term of stock options granted under the 2016 Plan may not exceed ten years and, in some cases (see *Limitations on Incentive Stock Options* below), may not exceed five years. Except as otherwise provided in a participant s stock option agreement or other written agreement with the combined company or one of its affiliates, if a participant s service relationship with combined company or any of its affiliates, referred to in this Signal Proposal No. 4 as continuous service, terminates (other than for cause and other than upon the participant s death or disability), the participant may exercise any vested stock options for up to three months following the participant s termination of continuous service. Except as otherwise provided in a participant s stock option agreement or other written agreement with the combined company or one of its affiliates, if a participant s continuous service terminates due to the participant s disability or death (or the participant dies within a specified period, if any, following termination of continuous service), the participant, or his or her beneficiary, as applicable, may exercise any vested stock options for up to 12 months following the participant s termination due to the participant s disability or for up to 18 months following the participant s death. Except as explicitly provided otherwise in a participant s stock option agreement or other written agreement with the combined company or one of its affiliates, if a participant s continuous service is terminated for cause (as defined in the 2016 Plan), all stock options held by the participant will terminate upon the participant s termination of continuous service and the participant will be prohibited from exercising any stock option from and after such termination date. Except as otherwise provided in a participant s stock option agreement or other written agreement with the combined company or one of its affiliates, the term of a stock option may be extended if the exercise of the stock option following the participant s termination of continuous service (other than for cause and other than upon the participant s death or disability) would be prohibited by applicable securities laws or if the sale of any common stock received upon exercise of the stock option following the participant s termination of continuous service (other than for cause) would violate Signal s insider trading policy. In no event, however, may a stock option be exercised after its original expiration date.

Acceptable forms of consideration for the purchase of common stock pursuant to the exercise of a stock option under the 2016 Plan will be determined by the Plan Administrator and may include payment: (i) by cash, check, bank draft or money order payable to the combined company; (ii) pursuant to a program developed under Regulation T as promulgated by the Federal Reserve Board; (iii) by delivery to the combined company of shares of common stock (either by actual delivery or attestation); (iv) by a net exercise arrangement (for NSOs only); or (v) in other legal consideration approved by the Plan Administrator.

Stock options granted under the 2016 Plan may vest as determined by the Plan Administrator at the rate specified in the stock option agreement. Shares covered by different stock options granted under the 2016 Plan may be subject to different vesting schedules as the Plan Administrator may determine.

The Plan Administrator may impose limitations on the transferability of stock options granted under the 2016 Plan in its discretion. Generally, a participant may not transfer a stock option granted under the 2016 Plan other than by will or the laws of descent and distribution or, subject to approval by the Plan Administrator, pursuant to a domestic relations order or an official marital settlement agreement. However, the Plan Administrator may permit transfer of a stock option in a manner that is not prohibited by applicable tax and securities laws. In addition, subject to approval

by the Plan Administrator, a participant may designate a beneficiary who may exercise the stock option following the participant s death.

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Limitations on Incentive Stock Options

The aggregate fair market value, determined at the time of grant, of shares of common stock with respect to ISOs that are exercisable for the first time by a participant during any calendar year under all of the combined company s stock plans may not exceed $100,000. The stock options or portions of stock options that exceed this limit or otherwise fail to qualify as ISOs are treated as NSOs. No ISO may be granted to any person who, at the time of grant, owns or is deemed to own stock possessing more than 10% of Signal s total combined voting power or that of any affiliate unless the following conditions are satisfied:

- the exercise price of the ISO must be at least 110% of the fair market value of the common stock subject to the ISO on the date of grant; and
- the term of the ISO must not exceed five years from the date of grant.

Subject to adjustment for specified changes in capitalization and the reverse stock split, the aggregate maximum number of shares of common stock that may be issued pursuant to the exercise of ISOs under the 2016 Plan is 20,912,020 shares.

Stock Appreciation Rights

Stock appreciation rights may be granted under the 2016 Plan pursuant to stock appreciation right agreements. Each stock appreciation right is denominated in common stock share equivalents. The strike price of each stock appreciation right will be determined by the Plan Administrator, but will in no event be less than 100% of the fair market value of the common stock subject to the stock appreciation right on the date of grant. The Plan Administrator may also impose restrictions or conditions upon the vesting of stock appreciation rights that it deems appropriate. The appreciation distribution payable upon exercise of a stock appreciation right may be paid in shares of Signal common stock, in cash, in a combination of cash and stock, or in any other form of consideration determined by the Plan Administrator and set forth in the stock appreciation right agreement. Stock appreciation rights will be subject to the same conditions upon termination of continuous service and restrictions on transfer as stock options under the 2016 Plan.

Restricted Stock Awards

Restricted stock awards may be granted under the 2016 Plan pursuant to restricted stock award agreements. A restricted stock award may be granted in consideration for cash, check, bank draft or money order payable to the combined company, the participant s services performed for the combined company or any of its affiliates, or any other form of legal consideration acceptable to the Plan Administrator. Shares of common stock acquired under a restricted stock award may be subject to forfeiture to or repurchase by the combined company in accordance with a vesting schedule to be determined by the Plan Administrator. Rights to acquire shares of common stock under a restricted stock award may be transferred only upon such terms and conditions as are set forth in the restricted stock award agreement. A restricted stock award agreement may provide that any dividends paid on restricted stock will be subject to the same vesting conditions as apply to the shares subject to the restricted stock award. Upon a participant s termination of continuous service for any reason, any shares subject to restricted stock awards held by the participant that have not vested as of such termination date may be forfeited to or repurchased by the combined company.

Restricted Stock Unit Awards

Restricted stock unit awards may be granted under the 2016 Plan pursuant to restricted stock unit award agreements. Payment of any purchase price may be made in any form of legal consideration acceptable to the Plan Administrator. A restricted stock unit award may be settled by the delivery of shares of Signal common stock, in cash, in a combination of cash and stock, or in any other form of consideration determined by the Plan Administrator and set forth in the restricted stock unit award agreement. Restricted stock unit awards may be

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subject to vesting in accordance with a vesting schedule to be determined by the Plan Administrator. Dividend equivalents may be credited in respect of shares of common stock covered by a restricted stock unit award, provided that any additional shares credited by reason of such dividend equivalents will be subject to all of the same terms and conditions of the underlying restricted stock unit award. Except as otherwise provided in a participant s restricted stock unit award agreement or other written agreement with the combined company or one of its affiliates, restricted stock units that have not vested will be forfeited upon the participant s termination of continuous service for any reason.

Performance Awards

The 2016 Plan allows the combined company to grant performance stock and cash awards, including such awards that may qualify as performance-based compensation that is not subject to the $1 million limitation on the income tax deductibility of compensation paid per covered employee imposed by Section 162(m) of the Code.

A performance stock award is a stock award that is payable (including that may be granted, may vest, or may be exercised) contingent upon the attainment of pre-determined performance goals during a performance period. A performance stock award may require the completion of a specified period of continuous service. The length of any performance period, the performance goals to be achieved during the performance period, and the measure of whether and to what degree such performance goals have been attained will be determined by the compensation committee of the combined company s board of directors, except that the Plan Administrator also may make any such determinations to the extent that the award is not intended to qualify as performance-based compensation under Section 162(m) of the Code. In addition, to the extent permitted by applicable law and the performance stock award agreement, the Plan Administrator may determine that cash may be used in payment of performance stock awards.

A performance cash award is a cash award that is payable contingent upon the attainment of pre-determined performance goals during a performance period. A performance cash award may require the completion of a specified period of continuous service. The length of any performance period, the performance goals to be achieved during the performance period, and the measure of whether and to what degree such performance goals have been attained will be determined by the compensation committee of the combined company s board of directors, except that the Plan Administrator also may make any such determinations to the extent that the award is not intended to qualify as performance-based compensation under Section 162(m) of the Code. The Plan Administrator may specify the form of payment of performance cash awards, which may be cash or other property, or may provide for a participant to have the option for his or her performance cash award to be paid in cash or other property.

In granting a performance stock or cash award intended to qualify as performance-based compensation under Section 162(m) of the Code, the compensation committee of the combined company s board of directors will set a period of time, or a performance period, over which the attainment of one or more goals, or performance goals, will be measured. Within the time period prescribed by Section 162(m) of the Code (no later than the earlier of the 90th day of a performance period and the date on which 25% of the performance period has elapsed, and in any event at a time when the achievement of the performance goals remains substantially uncertain), the compensation committee of the combined company s board of directors will establish the performance goals, based upon one or more criteria, or performance criteria, enumerated in the 2016 Plan and described below. As soon as administratively practicable following the end of the performance period, the compensation committee of the combined company s board of directors will certify in writing whether the performance goals have been satisfied.

Performance goals under the 2016 Plan will be based on any one or more of the following performance criteria: (i) earnings (including earnings per share and net earnings); (ii) earnings before interest, taxes and depreciation; (iii) earnings before interest, taxes, depreciation and amortization; (iv) earnings before interest, taxes, depreciation, amortization and legal settlements; (v) earnings before interest, taxes, depreciation,

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amortization, legal settlements and other income (expense); (vi) earnings before interest, taxes, depreciation, amortization, legal settlements, other income (expense) and stock-based compensation; (vii) earnings before interest, taxes, depreciation, amortization, legal settlements, other income (expense), stock-based compensation and changes in deferred revenue; (viii) earnings before interest, taxes, depreciation, amortization, legal settlements, other income (expense), stock-based compensation, other non-cash expenses and changes in deferred revenue; (ix) total stockholder return; (x) return on equity or average stockholder s equity; (xi) return on assets, investment, or capital employed; (xii) stock price; (xiii) margin (including gross margin); (xiv) income (before or after taxes); (xv) operating income; (xvi) operating income after taxes; (xvii) pre-tax profit; (xviii) operating cash flow; (xix) sales or revenue targets; (xx) increases in revenue or product revenue; (xxi) expenses and cost reduction goals; (xxii) improvement in or attainment of working capital levels; (xxiii) economic value added (or an equivalent metric); (xxiv) market share; (xxv) cash flow; (xxvi) cash flow per share; (xxvii) cash balance; (xxviii) cash burn; (xxix) cash collections; (xxx) share price performance; (xxxi) debt reduction; (xxxii) implementation or completion of projects or processes (including, without limitation, clinical trial initiation, clinical trial enrollment and dates, clinical trial results, regulatory filing submissions, regulatory filing acceptances, regulatory or advisory committee interactions, regulatory approvals, new and supplemental indications for existing products, and product supply); (xxxiii) stockholders equity; (xxxiv) capital expenditures; (xxxv) debt levels; (xxxvi) operating profit or net operating profit; (xxxvii) workforce diversity; (xxxviii) growth of net income or operating income; (xxxix) billings; (xl) bookings; (xli) employee retention; (xlii) initiation of phases of clinical trials and/or studies by specific dates; (xliii) acquisition of new customers, including institutional accounts; (xliv) customer retention and/or repeat order rate; (xlv) number of institutional customer accounts (xlvi) budget management; (xlvii) improvements in sample and test processing times; (xlviii) regulatory milestones; (xlix) progress of internal research or clinical programs; (l) progress of partnered programs; (li) partner satisfaction; (lii) milestones related to samples received and/or tests run; (liii) expansion of sales in additional geographies or markets; (liv) research progress, including the development of programs; (lv) submission to, or approval by, a regulatory body (including, but not limited to the U.S. Food and Drug Administration) of an applicable filing or a product; (lvi) timely completion of clinical trials; (lvii) milestones related to samples received and/or tests or panels run; (lviii) expansion of sales in additional geographies or markets; (lix) research progress, including the development of programs; (lx) patient samples processed and billed; (lxi) sample processing operating metrics (including, without limitation, failure rate maximums and reduction of repeat rates); (lxii) strategic partnerships or transactions (including in-licensing and out-licensing of intellectual property); (lxiii) pre-clinical development related to compound goals; (lxiv) customer satisfaction; and (lxv) and to the extent that an award is not intended to comply with Section 162(m) of the Code, other measures of performance selected by the board of directors of the combined company.

Performance goals may be based on a company-wide basis, with respect to one or more business units, divisions, affiliates or business segments, and in either absolute terms or relative to the performance of one or more comparable companies or the performance of one or more relevant indices. The compensation committee of the combined company s board of directors (or, to the extent that an award is not intended to qualify as performance-based compensation under Section 162(m) of the Code, the Plan Administrator) is authorized to make appropriate adjustments in the method of calculating the attainment of performance goals for a performance period as follows; *provided, however*, that to the extent that an award is intended to qualify as performance-based compensation under Section 162(m) of the Code, any such adjustment may be made only if such adjustment is objectively determinable and specified in the award agreement at the time the award is granted or in such other document setting forth the performance goals for the award at the time the performance goals are established: (i) to exclude restructuring and/or other nonrecurring charges; (ii) to exclude exchange rate effects; (iii) to exclude the effects of changes to U.S. GAAP; (iv) to exclude the effects of any statutory adjustments to corporate tax rates; (v) to exclude the effects of items that are unusual in nature or occur infrequently as determined under U.S. GAAP; (vi) to exclude the dilutive effects of acquisitions or joint ventures; (vii) to assume that any business divested by the combined company achieved performance objectives at targeted levels during the balance of a performance period following such divestiture; (viii)

to exclude the effect of any change in the outstanding shares of common stock of the combined company by reason of any stock dividend or split, stock repurchase, reorganization, recapitalization, merger, consolidation, spin-off, combination or exchange

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of shares or other similar corporate change, or any distributions to common stockholders other than regular cash dividends; (ix) to exclude the effects of stock based compensation and the award of bonuses under the combined company s bonus plans; (x) to exclude costs incurred in connection with potential acquisitions or divestitures that are required to be expensed under U.S. GAAP; and (xi) to exclude the goodwill and intangible asset impairment charges that are required to be recorded under U.S. GAAP.

In addition, the compensation committee of the combined company s board of directors (or, to the extent that an award is not intended to qualify as performance-based compensation under Section 162(m) of the Code, the Plan Administrator) retains the discretion to reduce or eliminate the compensation or economic benefit due upon the attainment of any performance goals and to define the manner of calculating the performance criteria it selects to use for a performance period.

Other Stock Awards

Other forms of stock awards valued in whole or in part by reference to, or otherwise based on, common stock may be granted either alone or in addition to other stock awards under the 2016 Plan. The Plan Administrator will have sole and complete authority to determine the persons to whom and the time or times at which such other stock awards will be granted, the number of shares of common stock to be granted and all other terms and conditions of such other stock awards.

Clawback Policy

Awards granted under the 2016 Plan will be subject to recoupment in accordance with any clawback policy that the combined company is required to adopt pursuant to the listing standards of any national securities exchange or association on which Signal s securities are listed or as is otherwise required by the Dodd-Frank Wall Street Reform and Consumer Protection Act or other applicable law. In addition, the Plan Administrator may impose other clawback, recovery or recoupment provisions in an award agreement as the Plan Administrator determines necessary or appropriate, including a reacquisition right in respect of previously acquired shares of common stock or other cash or property upon the occurrence of cause.

Changes to Capital Structure

In the event of certain capitalization adjustments, the Plan Administrator will appropriately adjust: (i) the class(es) and maximum number of securities subject to the 2016 Plan and by which the share reserve may increase automatically each year; (ii) the class(es) and maximum number of securities that may be issued pursuant to the exercise of ISOs; (iii) the class(es) and maximum number of securities that may be awarded to any participant pursuant to Section 162(m) limits; (iv) the class and maximum number of shares that may be awarded to any non-employee director; and (v) the class(es) and number of securities and price per share of stock subject to outstanding stock awards.

Corporate Transaction

In the event of a corporate transaction (as defined in the 2016 Plan and described below), the Plan Administrator may take one or more of the following actions with respect to stock awards, contingent upon the closing or consummation of the corporate transaction, unless otherwise provided in the instrument evidencing the stock award, in any other written agreement between the combined company or one of its affiliates and the participant or in Signal s director compensation policy, or unless otherwise provided by the Plan Administrator at the time of grant of the stock award:

arrange for the surviving or acquiring corporation (or its parent company) to assume or continue the stock award or to substitute a similar stock award for the stock award (including an award to acquire the same consideration paid to the combined company s stockholders pursuant to the corporate transaction);

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arrange for the assignment of any reacquisition or repurchase rights held by the combined company in respect of common stock issued pursuant to the stock award to the surviving or acquiring corporation (or its parent company);

accelerate the vesting (and, if applicable, the exercisability) of the stock award to a date prior to the effective time of the corporate transaction as determined by the Plan Administrator (or, if the Plan Administrator does not determine such a date, to the date that is five days prior to the effective date of the corporate transaction), with the stock award terminating if not exercised (if applicable) at or prior to the effective time of the corporate transaction; *provided, however*, that the Plan Administrator may require participants to complete and deliver to Signal a notice of exercise before the effective date of a corporate transaction, which is contingent upon the effectiveness of the corporate transaction;

arrange for the lapse of any reacquisition or repurchase rights held by the combined company with respect to the stock award;

cancel or arrange for the cancellation of the stock award, to the extent not vested or not exercised prior to the effective time of the corporate transaction, and pay such cash consideration (including no consideration) as the Plan Administrator may consider appropriate; and

cancel or arrange for the cancellation of the stock award, to the extent not vested or not exercised prior to the effective time of the corporate transaction, in exchange for a payment, in such form as may be determined by the combined company s board of directors equal to the excess, if any, of (i) the per share amount payable to holders of common stock in connection with the corporate transaction, over (ii) the per share exercise price under the applicable award. For clarity, this payment may be zero if the value of the property is equal to or less than the exercise price. In addition, any escrow, holdback, earnout or similar provisions in the definitive agreement for the corporate transaction may apply to such payment to the same extent and in the same manner as such provisions apply to the holders of common stock.

The Plan Administrator is not required to take the same action with respect to all stock awards or portions of stock awards or with respect to all participants. The Plan Administrator may take different actions with respect to the vested and unvested portions of a stock award.

In the event of a corporate transaction, unless otherwise provided in the instrument evidencing a performance cash award or any other written agreement between the combined company or one of its affiliates and the participant, or unless otherwise provided by the Plan Administrator, all performance cash awards will terminate prior to the effective time of the corporate transaction.

For purposes of the 2016 Plan, a corporate transaction generally will be deemed to occur in the event of the consummation of: (i) a sale or other disposition of all or substantially all of the combined company s consolidated assets; (ii) a sale or other disposition of more than 50% of Signal s outstanding securities; (iii) a merger, consolidation or similar transaction following which the combined company is not the surviving corporation; or (iv) a merger, consolidation or similar transaction following which the combined company is the surviving corporation but the shares of common stock outstanding immediately prior to the transaction are converted or exchanged into other property by virtue of the transaction.

Change in Control

Under the 2016 Plan, a stock award may be subject to additional acceleration of vesting and exercisability upon or after a change in control (as defined in the 2016 Plan and described below) as may be provided in the participant s stock award agreement, in any other written agreement with the combined company or one of its affiliates or in any director compensation policy, but in the absence of such provision, no such acceleration will occur.

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For purposes of the 2016 Plan, a change in control generally will be deemed to occur in the event: (i) a person, entity or group acquires, directly or indirectly, Signal s securities representing more than 50% of the combined voting power of the combined company s then outstanding securities, other than by virtue of a merger, consolidation, or similar transaction; (ii) there is consummated a merger, consolidation, or similar transaction and, immediately after the consummation of such transaction, the combined company s stockholders immediately prior thereto do not own, directly or indirectly, more than 50% of the combined outstanding voting power of the surviving entity or the parent of the surviving entity in substantially the same proportions as their ownership of the combined company s outstanding voting securities immediately prior to such transaction; (iii) there is consummated a sale or other disposition of all or substantially all of the combined company s consolidated assets, other than a sale or other disposition to an entity in which more than 50% of the entity s combined voting power is owned by the combined company s stockholders in substantially the same proportions as their ownership of the combined company s outstanding voting securities immediately prior to such sale or other disposition; or (iv) a majority of the combined company s board of directors becomes comprised of individuals whose nomination, appointment, or election was not approved by a majority of the board members or their approved successors.

Plan Amendments and Termination

The Plan Administrator will have the authority to amend or terminate the 2016 Plan at any time. However, except as otherwise provided in the 2016 Plan or an award agreement, no amendment or termination of the 2016 Plan may materially impair a participant s rights under his or her outstanding awards without the participant s consent.

The combined company will obtain stockholder approval of any amendment to the 2016 Plan as required by applicable law and listing requirements. No incentive stock options may be granted under the 2016 Plan after the tenth anniversary of the date the 2016 Plan was adopted by Signal s board of directors.

New Plan Benefits

Awards granted under the 2016 Plan to Signal s executive officers and other employees are discretionary and are not subject to set benefits or amounts under the terms of the 2016 Plan. The 2016 Plan will not become effective until the closing of the Merger and neither Signal s board of directors nor Signal s compensation committee has granted any awards under the 2016 Plan subject to stockholder approval of Signal Proposal No. 4. Accordingly, the benefits or amounts that will be received by or allocated to Signal s (or the combined company s) executive officers and other employees under the 2016 Plan, as well as the benefits or amounts which would have been received by or allocated to Signal s (or the combined company s) executive officers and other employees for fiscal year ended December 31, 2015 if the 2016 Plan had been in effect, are not determinable.

The ESPP

The material features of the ESPP are described below. The following description of the ESPP is a summary only and is qualified in its entirety by reference to the text of the ESPP.

Purpose

The purpose of the ESPP is to provide a means by which the combined company s employees may be given an opportunity to purchase shares of common stock following the closing of the Merger, to assist the combined company in retaining the services of its employees, to secure and retain the services of new employees and to provide incentives for such persons to exert maximum efforts for Signal s success. The rights to purchase common stock granted under the ESPP are intended to qualify as options issued under an employee stock purchase plan as that term is defined in

Section 423(b) of the Code.

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Administration

The combined company s board of directors will have the power to administer the ESPP and may also delegate administration of the ESPP to a committee comprised of one or more members of its board of directors. The combined company s board of directors will delegate concurrent authority to administer the 2016 Plan to its compensation committee, but may, at any time, revest in itself some or all of the power delegated to its compensation committee. The combined company s board of directors and its compensation committee will each be considered to be a Plan Administrator for purposes of this proposal. The Plan Administrator has the final power to construe and interpret both the ESPP and the rights granted under it. The Plan Administrator has the power, subject to the provisions of the ESPP, to determine when and how rights to purchase common stock will be granted, the provisions of each offering of such rights (which need not be identical), and whether employees of any parent or subsidiary companies will be eligible to participate in the ESPP.

Stock Subject to ESPP

Subject to adjustment for specified changes in Signal s capitalization and for the reverse stock split, the maximum number of shares of common stock that may be issued under the ESPP is 210,162 shares, plus the number of shares of common stock that are automatically added on January 1st of each year for a period of up to ten years, commencing on January 1 following the effective date of the ESPP and ending on (and including) January 1, 2026, in an amount equal to the lesser of (i) 1% of the total number of shares of Signal s common stock outstanding on December 31st of the preceding calendar year, and (ii) 367,784 shares of common stock; provided, that prior to the date of any annual increase, the board of directors of the combined company may determine that such increase will be less than the amount set forth in clauses (i) or (ii). If any rights granted under the ESPP terminate without being exercised in full, the shares of common stock not purchased under such rights again become available for issuance under the ESPP. The shares of common stock issuable under the ESPP will be shares of authorized but unissued or reacquired common stock, including shares repurchased by Signal on the open market.

Offerings

The ESPP will be implemented by offerings of rights to purchase common stock to all eligible employees. The Plan Administrator will determine the duration of each offering period, provided that in no event may an offering period exceed 27 months. The Plan Administrator may establish separate offerings which vary in terms (although not inconsistent with the provisions of the ESPP or the requirements of applicable laws). Each offering period will have one or more purchase dates, as determined by the Plan Administrator prior to the commencement of the offering period. The Plan Administrator has the authority to alter the terms of an offering prior to the commencement of the offering period, including the duration of subsequent offering periods. When an eligible employee elects to join an offering period, he or she is granted a right to purchase shares of common stock on each purchase date within the offering period. On the purchase date, all contributions collected from the participant are automatically applied to the purchase of Signal s common stock, subject to certain limitations (which are described further below under *Eligibility*).

The Plan Administrator has the discretion to structure an offering so that if the fair market value of a share of common stock on any purchase date during the offering period is less than or equal to the fair market value of a share of common stock on the first day of the offering period, then that offering will terminate immediately following the purchase of shares of common stock on such purchase date, and the participants in such terminated offering will be automatically enrolled in a new offering that begins immediately after such purchase date.

Eligibility

Any individual who is employed by the combined company (or by any of its parent or subsidiary companies if such company is designated by the Plan Administrator as eligible to participate in the ESPP) may participate in

offerings under the ESPP, provided such individual has been employed by the combined company (or its parent or subsidiary, if applicable) for such continuous period preceding the first day of the offering period as the Plan Administrator may require, but in no event may the required period of continuous employment be equal to or greater than two years. In addition, the Plan Administrator may provide that an employee will not be eligible to be granted purchase rights under the ESPP unless such employee is customarily employed for more than 20 hours per week and five months per calendar year. The Plan Administrator may also provide in any offering that certain of the combined company s employees who are highly compensated as defined in the Code are not eligible to participate in the ESPP.

No employee will be eligible to participate in the ESPP if, immediately after the grant of purchase rights, the employee would own, directly or indirectly, stock possessing 5% or more of the total combined voting power or value of all classes of Signal s stock or of any of Signal s parent or subsidiary companies, including any stock which such employee may purchase under all outstanding purchase rights and options. In addition, no employee may purchase more than $25,000 worth of Signal s common stock (determined based on the fair market value of the shares at the time such rights are granted) under all Signal s employee stock purchase plans and any employee stock purchase plans of the combined company s parent or subsidiary companies for each calendar year during which such rights are outstanding.

Participation in the ESPP

An eligible employee may enroll in the ESPP by delivering, prior to the date selected by the Plan Administrator as the beginning of an offering period, an agreement authorizing contributions which may not exceed the maximum amount specified by the Plan Administrator, but in any case which may not exceed 15% of such employee s earnings during the offering period. Each participant will be granted a separate purchase right for each offering in which he or she participates. Unless an employee s participation is discontinued, his or her purchase right will be exercised automatically at the end of each purchase period at the applicable purchase price.

Purchase Price

The purchase price per share at which shares of common stock are sold on each purchase date during an offering period will not be less than the lower of (i) 85% of the fair market value of a share of common stock on the first day of the offering period or (ii) 85% of the fair market value of a share of common stock on the purchase date. As of January 5, 2017, the closing price of Signal s common stock as reported on The NASDAQ Capital Market was $5.33 per share.

Payment of Purchase Price; Payroll Deductions

The purchase of shares during an offering period generally will be funded by a participant s payroll deductions accumulated during the offering period. A participant may change his or her rate of contributions, as determined by the Plan Administrator in the offering. All contributions made for a participant are credited to his or her account under the ESPP and deposited with the combined company s general funds.

Purchase Limits

In connection with each offering made under the ESPP, the Plan Administrator may specify (i) a maximum number of shares of common stock that may be purchased by any participant pursuant to such offering, (ii) a maximum number of shares of common stock that may be purchased by any participant on any purchase date pursuant to such offering, (iii) a maximum aggregate number of shares of common stock that may be purchased by all participants pursuant to such offering, and/or (iv) a maximum aggregate number of shares of common stock that may be purchased by all

participants on any purchase date pursuant to such offering. If the aggregate purchase of shares of common stock issuable upon exercise of purchase rights granted under such offering would exceed any such maximum aggregate number, then the Plan Administrator will make a pro rata allocation of available shares in a uniform and equitable manner.

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Withdrawal

Participants may withdraw from an offering by delivering a withdrawal form to the combined company and terminating their contributions. Such withdrawal may be elected at any time prior to the end of an offering, except as otherwise provided by the Plan Administrator. Upon such withdrawal, the combined company will distribute to the employee his or her accumulated but unused contributions without interest, and such employee s right to participate in that offering will terminate. However, an employee s withdrawal from an offering does not affect such employee s eligibility to participate in any other offerings under the ESPP.

Termination of Employment

A participant s rights under any offering under the ESPP will terminate immediately if the participant either (i) is no longer employed by the combined company or any of its parent or subsidiary companies (subject to any post-employment participation period required by law) or (ii) is otherwise no longer eligible to participate. In such event, the combined company will distribute to the participant his or her accumulated but unused contributions without interest.

Restrictions on Transfer

Rights granted under the ESPP are not transferable except by will, by the laws of descent and distribution, or if permitted by the combined company, by a beneficiary designation. During a participant s lifetime, such rights may only be exercised by the participant.

Changes in Capitalization

In the event of certain changes in the combined company s capitalization, the Plan Administrator will appropriately adjust: (i) the class(es) and maximum number of securities subject to the ESPP; (ii) the class(es) and maximum number of securities by which the share reserve it to increase automatically each year; (iii) the class(es) and number of securities subject to, and the purchase price applicable to, outstanding offerings and purchase rights; and (iv) the class(es) and number of securities that are the subject of any purchase limits under each ongoing offering.

Effect of Certain Corporate Transactions

In the event of a corporate transaction (as defined in the ESPP and described below), (i) any surviving or acquiring corporation (or its parent company) may assume or continue outstanding purchase rights granted under the ESPP or may substitute similar rights (including a right to acquire the same consideration paid to the stockholders in the corporate transaction) for such outstanding purchase rights, or (ii) if any surviving or acquiring corporation (or its parent company) does not assume or continue such outstanding purchase rights or does not substitute similar rights for such outstanding purchase rights, then the participants accumulated contributions will be used to purchase shares of common stock within ten business days prior to the corporate transaction under such purchase rights, and such purchase rights will terminate immediately after such purchase.

For purposes of the ESPP, a corporate transaction generally will be deemed to occur in the event of the consummation of: (i) a sale or other disposition of all or substantially all of the combined company s consolidated assets; (ii) a sale or other disposition of at least 50% of the combined company s outstanding securities; (iii) a merger, consolidation or similar transaction following which the combined company is not the surviving corporation; or (iv) a merger, consolidation or similar transaction following which the combined company is the surviving corporation but the shares of its common stock outstanding immediately prior to such transaction are converted or exchanged into other

property by virtue of such transaction.

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Duration, Amendment and Termination

The Plan Administrator may amend or terminate the ESPP at any time. However, except in regard to certain capitalization adjustments, any such amendment must be approved by the combined company s stockholders if such approval is required by applicable law or listing requirements.

Any outstanding purchase rights granted before an amendment or termination of the ESPP will not be materially impaired by any such amendment or termination, except (i) with the consent of the employee to whom such purchase rights were granted, (ii) as necessary to comply with applicable laws, listing requirements or governmental regulations (including Section 423 of the Code), or (iii) as necessary to obtain or maintain favorable tax, listing or regulatory treatment.

Notwithstanding anything in the ESPP or any offering to the contrary, the Plan Administrator will be entitled to: (i) establish the Exchange Ratio applicable to amounts withheld in a currency other than U.S. dollars; (ii) permit contributions in excess of the amount designated by a participant in order to adjust for mistakes in the processing of properly completed contribution elections; (iii) establish reasonable waiting and adjustment periods and/or accounting and crediting procedures to ensure that amounts applied toward the purchase of common stock for each participant properly correspond with amounts withheld from the participant s contributions; (iv) amend any outstanding purchase rights or clarify any ambiguities regarding the terms of any offering to enable such purchase rights to qualify under and/or comply with Section 423 of the Code; and (v) establish other limitations or procedures as the Plan Administrator determines in its sole discretion advisable that are consistent with the ESPP. Any such actions by the Plan Administrator will not be considered to alter or impair any purchase rights granted under an offering as they are part of the initial terms of each offering and the purchase rights granted under each offering.

New Plan Benefits

Participation in the ESPP is voluntary and each eligible employee will make his or her own decision regarding whether and to what extent to participate in the ESPP. In addition, Signal s board of directors and Signal s compensation committee have not granted any purchase rights under the ESPP that are subject to stockholder approval of this proposal. The ESPP will not become effective until the date of the closing of the Merger. Accordingly, the benefits or amounts that will be received by or allocated to Signal s (or the combined company s) executive officers and other employees under the ESPP, as well as the benefits or amounts which would have been received by or allocated to Signal s (or the combined company s) executive officers and other employees for the fiscal year ended December 31, 2015 if the ESPP had been in effect, are not determinable. No non-employee directors will be eligible to participate in the ESPP.

Miragen s 2008 Equity Incentive Plan

The Miragen 2008 Equity Incentive Plan, or the Miragen 2008 Plan, was adopted by its board of directors and approved by its stockholders in May 2008, and was subsequently amended by its board of directors and stockholders, most recently in October 2015.

As of December 31, 2016, there were 41,471 shares remaining available for the grant of stock awards under the Miragen 2008 Plan and there were outstanding stock options to purchase 3,300,232 shares of Miragen common stock.

Pursuant to the Merger Agreement, Signal will assume all outstanding and unexercised options to purchase shares of Miragen common stock, and such options will be converted into options to purchase Signal common stock, with the number of shares and exercise price being appropriately adjusted pursuant to this provision to reflect the Exchange

Ratio in the Merger. For additional information regarding the treatment of Miragen stock options in the Merger, please see the section entitled *The Merger Agreement Miragen Stock Options and Miragen Warrants* beginning on page 135.

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If the 2016 Plan is approved by the Signal stockholders, on and after the effective date of the Merger, no additional awards will be granted under the Miragen 2008 Plan, and all awards granted under the Miragen 2008 Plan that, from and after the effective date of the Merger, expire or terminate for any reason prior to exercise or settlement, are forfeited because of the failure to meet a contingency or condition required to vest, or are reacquired, withheld or not issued to satisfy a tax withholding obligation in connection with an award or to satisfy the exercise price of a stock award, will become available for grant under the 2016 Plan in accordance with its terms.

Stock Awards

The Miragen 2008 Plan provides for the grant of ISO, NSOs, stock appreciation rights, restricted stock awards and restricted stock unit awards (collectively, stock awards), all of which may be granted to employees, including officers, non-employee directors and consultants of Miragen. ISOs may be granted only to employees. All other awards may be granted to employees, including officers, and to non-employee directors and consultants. Miragen has only granted stock options under the Miragen 2008 Plan.

Share Reserve

The aggregate number of shares of Miragen common stock reserved for issuance pursuant to stock awards under the Miragen 2008 Plan is 3,672,515. The maximum number of shares that may be issued upon the exercise of ISOs under the Miragen 2008 Plan is 3,672,515 shares. If a stock award granted under the Miragen 2008 Plan is forfeited back because of the failure to meet a contingency or condition required to vest, such shares will become available for subsequent issuance under the Miragen 2008 Plan. In addition, shares withheld to satisfy income or employment withholding taxes and shares used to pay the exercise price of a stock option will become available for the grant of new stock awards under the Miragen 2008 Plan. Shares issued under the Miragen 2008 Plan may be authorized but unissued or reacquired common stock, including shares repurchased by Miragen on the open market. If the 2016 Plan is approved by the Signal stockholders, as of the effective date of the Merger, no additional shares will be issued pursuant to awards under the Miragen 2008 Plan.

Administration

Miragen s board of directors or the compensation committee of its board of directors may act as the administrator of the Miragen 2008 Plan. The administrator has the complete discretion to make all decisions relating to the plan and outstanding awards. The administrator has the authority to modify outstanding awards under the Miragen 2008 Plan. Subject to the terms of the Miragen 2008 Plan, the administrator has the authority to reduce the exercise or strike price of any outstanding stock award, cancel any outstanding stock award in exchange for new stock awards, cash or other consideration, or take any other action that is treated as a repricing under U.S. GAAP, with the consent of any adversely affected participant.

Terms of Awards

Subject to the terms of the Miragen 2008 Plan, the administrator determines the terms of all awards. The exercise price for stock options granted under the Miragen 2008 Plan may not be less than 100% of the fair market value of Miragen common stock on the grant date; however, the exercise price for an incentive stock option granted to a holder of more than 10% of Miragen s stock may not be less than 110% of such fair market value on the grant date. Options are generally transferable only by will or the laws of descent and distribution, and may be exercised during the holder s lifetime only by the holder.

The term of options granted under the Miragen 2008 Plan may not exceed ten years and will generally expire sooner if the optionee s service terminates. Options vest at the times determined by the administrator. Shares may be awarded under the terms of the Miragen 2008 Plan in consideration for services rendered to Miragen, or sold under the terms of the Miragen 2008 Plan. Shares awarded or sold under the Miragen 2008 Plan may be fully vested at grant or subject to special forfeiture conditions or rights of repurchase as determined by the administrator.

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Changes in Capitalization

If any change is made in the shares of common stock by reason of any merger, consolidation, reorganization, recapitalization, stock dividend, split up, combination of shares, exchange of shares, change in corporate structure, or otherwise, appropriate adjustments will be made by the administrator to the class and maximum number of shares reserved for issuance under the Miragen 2008 Plan, the class and maximum number of shares that may be issued upon the exercise of ISOs and the class and number of shares and price per share of stock subject to each outstanding award under the Miragen 2008 Plan. Any increase in the shares, or the right to acquire shares, as the result of such an adjustment will be subject to the same terms and conditions that apply to the award for which such increase was received.

Corporate Transaction

In the event of certain specified significant corporate transactions, outstanding stock awards shall be assumed, continued or substituted for similar stock awards by the surviving or acquiring corporation. If any surviving or acquiring corporation fails to assume, continue or substitute such stock awards, stock awards held by participants whose continuous service has not terminated will accelerate vesting in full prior to the corporate transaction, and all stock awards will terminate at or prior to the corporate transaction. In addition, in the event a stock award will terminate if not exercised before a corporate transaction, Miragen s board of directors may, in its sole discretion, provide that the holder of the stock award may not exercise the stock award but will receive a payment equal to the excess, if any, of (i) the value of Miragen common stock the holder would have received upon exercise of the stock awards, over (ii) any exercise price payable by the holder in connection with the exercise.

Under the Miragen 2008 Plan, a corporate transaction is generally the consummation of (i) a sale or other disposition of all or substantially all of Miragen s consolidated assets, (ii) a sale or other disposition of at least 90% of Miragen s outstanding securities, (iii) a merger, consolidation or similar transaction following which Miragen is not the surviving corporation, or (iv) a merger, consolidation or similar transaction following which Miragen is the surviving corporation but the shares of its common stock outstanding immediately prior to such transaction are converted or exchanged into other property by virtue of the transaction.

Change in Control

The Miragen 2008 Plan provides that if a change in control of Miragen occurs and as of, or within thirteen (13) months after, the effective time of such change in control, the service of an award holder is terminated due to an involuntary termination without cause (not including death or disability), or due to a voluntary termination with good reason, then the vesting and exercisability of the holder s awards will be accelerated in full. In addition, the administrator may provide, in an individual award agreement or in any other written agreement between a participant and Miragen, that the stock award will be subject to additional acceleration of vesting and exercisability in the event of a change in control.

Under the Miragen 2008 Plan, a change of control is generally (i) the acquisition by a person or entity of more than 50% of Miragen s combined voting power other than by merger, consolidation or similar transaction; (ii) a consummated merger, consolidation or similar transaction involving Miragen immediately after which Miragen s stockholders cease to own more than 50% of the combined voting power of the surviving entity or of its parent entity; (iii) a consummated sale, lease or exclusive license or other disposition of all or substantially of Miragen s consolidated assets; or (v) when a majority of Miragen s board of directors becomes comprised of individuals who were not serving on the board on the date of adoption of the Miragen 2008 Plan, or whose nomination, appointment, or election was not approved by a majority of the incumbent board then still in office. The Merger will not constitute a

change in control for purposes of the Miragen 2008 Plan, but the change in control provisions could be triggered by a subsequent transaction

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Amendment and Termination

Miragen s board of directors may at any time amend the Miragen 2008 Plan. However, Miragen s board of directors must obtain approval of Miragen s stockholders or any amendment requiring such approval under federal tax or federal securities laws. In addition, Miragen s board of directors may not alter or impair any award previously granted under the Miragen 2008 Plan without the consent of the holder of such award. The Miragen 2008 Plan will terminate on the earliest of ten years after the date the Miragen 2008 Plan was adopted by Miragen s board of directors, ten years after the date Miragen s stockholder approved the Miragen 2008 Plan or a date determined by Miragen s board of directors.

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CERTAIN RELATIONSHIPS AND RELATED PARTY TRANSACTIONS

Described below are the transactions and series of similar transactions since January 1, 2014 in which:

- the amounts involved exceeded or will exceed $120,000; and
- any of the directors, executive officers, holders of more than 5% of capital stock (sometimes refer to as 5% stockholders below) of the combined company or any member of their immediate family had or will have a direct or indirect material interest.

Miragen Transactions

Affiliations with 5% Stockholders

Dr. Booth is a member of Miragen s board of directors and a director of Atlas Venture Associates VII, Inc. and Atlas Venture Associates X, Inc., which are, respectively, affiliated with Atlas Venture VII, L.P. and Atlas Venture Fund X, L.P., or, together, the Atlas Venture Funds, which together hold more than 5% of Miragen s outstanding capital stock.

Mr. Creecy is a member of Miragen s board of directors and the chief executive officer of Remeditex Ventures LLC, which holds more than 5% of Miragen s outstanding capital stock.

Mr. Lefkoff is a member of Miragen s board of directors and a managing member of BV Partners V, L.L.C. and BV Partners VI, L.L.C., which are, respectively, affiliated with Boulder Ventures V, L.P. and Boulder Ventures VI, L.P., or together, Boulder Ventures. Boulder Ventures holds more than 5% of Miragen s outstanding capital stock.

Dr. Halse is a member of Miragen s board of directors and a partner of MRL Ventures Fund, LLC, which holds more than 5% of Miragen s outstanding capital stock. Dr. Halse has informed Miragen that he will resign as a member of Miragen s board of directors immediately prior to the effectiveness of the Merger.

Private Placement of Common Stock

On October 31 2016, Miragen entered into the Subscription Agreement with certain current stockholders of Miragen and certain new investors pursuant to which the purchasers agreed to purchase an aggregate of 9,045,126 shares of Miragen s common stock at a price per share of $4.50 for an aggregate consideration of approximately $40.7 million immediately prior to the consummation of the Merger, subject to specified conditions in the Subscription Agreement. The table below sets forth the number of shares of Miragen s common stock agreed to be purchased and the purchase price for the shares of common stock for each purchaser that is a director, executive officer or 5% stockholder of Miragen, and their affiliates.

Name of Purchaser	Shares of Common Stock (#)	Purchase Price ($)
Fidelity Select Portfolios: Biotechnology Portfolio(1)	3,507,819	$ 15,785,186
	936,625	$ 4,214,813

Fidelity Advisor Series VII: Fidelity Advisor Biotechnology Fund(1)		
Atlas Venture Fund X, L.P.(2)	1,145,835	$ 5,156,258
Boulder Ventures VI, L.P.(3)	147,419	$ 663,386
MRL Ventures Fund, LLC(4)	412,774	$ 1,857,483
JAFCO SV4 Investment Limited Partnership(5)	353,806	$ 1,592,127
Remeditex Ventures LLC(6)	797,308	$ 3,587,886
BraMira LLC(7)	1,111,111	$ 5,000,000

(1) Miragen anticipates that as a result of this transaction, Fidelity Select Portfolios: Biotechnology Portfolio and Fidelity Advisor Series VII: Fidelity Advisor Biotechnology Fund will, together, hold more than 5% of Miragen s outstanding capital stock.

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(2) The Atlas Venture Funds, together, hold more than 5% of Miragen s outstanding capital stock. Dr. Booth is a member of Miragen s board of directors and a director of Atlas Venture Associates VII, Inc. and Atlas Venture Associates X, Inc., which are affiliated with the Atlas Venture Funds.
(3) Boulder Ventures holds more than 5% of Miragen s outstanding capital stock. Mr. Lefkoff is a member of Miragen s board of directors and a managing member of BV Partners V, L.L.C. and BV Partners VI, L.L.C., which are each affiliated with Boulder Ventures.
(4) MRL Ventures Fund, LLC holds more than 5% of Miragen s outstanding capital stock. Dr. Halse is a member of Miragen s board of directors and a partner of MRL Ventures Fund, LLC. Dr. Halse has informed Miragen that he will resign as a member of Miragen s board of directors immediately prior to the effectiveness of the Merger.
(5) JAFCO SV4 Investment Limited Partnership, or JAFCO, hold more than 5% of Miragen s outstanding capital stock.
(6) Remeditex Ventures LLC holds more than 5% of Miragen s outstanding capital stock. Mr. Creecy is a member of Miragen s board of directors and the chief executive officer of Remeditex Ventures LLC.
(7) BraMira LLC holds more than 5% of Miragen s outstanding capital stock.

Issuance of Series C Convertible Preferred Stock

In October 2015 and September 2016, Miragen issued and sold in two closings an aggregate of 9,268,563 shares of Miragen s Series C convertible preferred stock at a price per share of $4.43 for an aggregate consideration of approximately $41.1 million, inclusive of the conversion, at a price per share equal to $4.43, of approximately $8.9 million of principal and accrued interest on then outstanding convertible promissory notes previously issued by Miragen. The table below sets forth the number of shares of Series C convertible preferred stock purchased and the purchase price for the shares of Series C convertible preferred stock for each purchaser that is a director, executive officer or 5% stockholder of Miragen, and their affiliates. It is a condition to the completion of the Merger that each outstanding share of Miragen s Series C convertible preferred stock will convert into one share of Miragen common stock.

Name of Purchaser	Shares of Series C Convertible Preferred Stock (#)	Purchase Price ($)
Atlas Venture Fund VII, L.P.(1)	1,245,502	$ 5,517,574
Boulder Ventures V, L.P.(2)	233,089	$ 1,032,584
Boulder Ventures VI, L.P.(2)	564,334	$ 2,500,000
MRL Ventures Fund, LLC(3)	1,580,135	$ 6,999,998
JAFCO SV4 Investment Limited Partnership(4)	1,354,402	$ 6,000,001
Remeditex Ventures LLC(5)	1,968,830	$ 8,721,917
BraMira LLC(6)	1,128,668	$ 4,999,999
William S. Marshall, Ph.D.(7)	17,263	$ 76,475

(1) Atlas Venture Fund VII, L.P. holds more than 5% of Miragen s outstanding capital stock. Dr. Booth is a member of Miragen s board of directors and a director of Atlas Venture Associates VII, Inc., which is affiliated with the Atlas Venture Fund VII, L.P.
(2) Boulder Ventures holds more than 5% of Miragen s outstanding capital stock. Mr. Lefkoff is a member of Miragen s board of directors and a managing member of BV Partners V, L.L.C. and BV Partners VI, L.L.C.,

which are each affiliated with Boulder Ventures.

(3) MRL Ventures Fund, LLC holds more than 5% of Miragen s outstanding capital stock. Dr. Halse is a member of Miragen s board of directors and a partner of MRL Ventures Fund, LLC. Dr. Halse has informed Miragen that he will resign as a member of Miragen s board of directors immediately prior to the effectiveness of the Merger.

(4) JAFCO holds more than 5% of Miragen s outstanding capital stock.

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(5) Remeditex Ventures LLC holds more than 5% of Miragen s outstanding capital stock. Mr. Creecy is a member of Miragen s board of directors and the chief executive officer of Remeditex Ventures LLC.
(6) BraMira LLC holds more than 5% of Miragen s outstanding capital stock.
(7) Dr. Marshall is a member of Miragen s board of directors and serves as its president and chief executive officer.

Convertible Promissory Notes

In February 2015, Miragen issued and sold convertible promissory notes in the aggregate principal amount of $8.5 million. The convertible promissory notes accrued interest at a rate of 6% per annum and were scheduled to mature 18 months from the date of issuance. Each outstanding convertible promissory note was converted into shares of Miragen s Series C convertible preferred stock in October 2015 a conversion price equal to $4.43 per share.

The table below sets forth, for each purchaser that is a director, executive officer or 5% stockholders of Miragen, and their affiliates, the principal amounts for the convertible promissory notes issued to such investors.

Name of Purchaser	Principal Amount ($)
Atlas Venture Fund VII, L.P.(1)	$ 1,548,834
Boulder Ventures V, L.P.(2)	$ 988,704
Remeditex Ventures LLC(3)	$ 5,000,000
William S. Marshall, Ph.D.(4)	$ 20,904

(1) Atlas Venture Fund VII, L.P. holds more than 5% of Miragen s outstanding capital stock. Dr. Booth is a member of Miragen s board of directors and a director of Atlas Venture Associates VII, Inc., which is affiliated with the Atlas Venture Fund VII, L.P.
(2) Boulder Ventures holds more than 5% of Miragen s outstanding capital stock. Mr. Lefkoff is a member of Miragen s board of directors and a managing member of BV Partners V, L.L.C. and BV Partners VI, L.L.C., which are each affiliated with Boulder Ventures.
(3) Remeditex Ventures LLC holds more than 5% of Miragen s outstanding capital stock. Mr. Creecy is a member of Miragen s board of directors and the chief executive officer of Remeditex Ventures LLC.
(4) Dr. Marshall is a member of Miragen s board of directors and serves as its chief executive officer.

Voting Agreements

In connection with the issuance of Miragen s Series C convertible preferred stock in October 2015, Miragen entered into an amended and restated voting agreement, with certain directors, executive officers and 5% stockholders, and their affiliates, or the Voting Agreement.

Miragen has also entered into support agreements in connection with the Merger with certain directors, executive officers and 5% stockholders, and their affiliates. For a description of these support agreements, see the section titled *Agreements Related to the Merger Support Agreements* beginning on page 143.

The Voting Agreement will terminate upon the completion of the Merger.

Investors Rights Agreement

In connection with the issuance of Miragen s Series C convertible preferred stock in October 2015, Miragen entered into an amended and restated investors rights agreement, including with certain directors, executive officers and 5% stockholders, and their affiliates, which provides specified holders of common stock (including those issuable upon conversion of Miragen s preferred stock and capital stock underlying warrants) specified rights relating to the registration of shares of such common stock.

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In addition to such registration rights, the amended and restated investors rights agreement provides for specified information rights and preemptive rights. The amended and restated investors rights agreement will terminate upon the completion of the Merger.

Right of First Refusal and Co-Sale Agreement

In connection with the issuance of Miragen s Series C convertible preferred stock in October 2015, Miragen entered into an amended and restated right of first refusal and co-sale agreement, including with certain directors, executive officers and 5% stockholders, and their affiliates, which will terminate upon completion of the Merger.

Director and Executive Officer Compensation

For information regarding the compensation of Miragen s executive officers and directors, please see the section titled *Management Following the Merger Executive Compensation* and *Management Following the Merger Director Compensation* beginning on pages 255 and 253, respectively.

Change of Control and Severance Benefit Agreements

See *The Merger Interests of Miragen Directors and Executive Officers in the Merger* beginning on page 108 for a description of these agreements.

Director and Officer Indemnification and Insurance

Miragen has entered into indemnification agreements with each of its officers and directors and purchased directors and officers liability insurance. The indemnification agreements and bylaws of Miragen require Miragen to indemnify its directors and officers to the fullest extent permitted under Delaware law.

Policies and Procedures Regarding Related Party Transactions

While Miragen does not have a formal written policy or procedure for the review, approval or ratification of related party transactions, Miragen s board of directors reviews and considers the interests of its directors, executive officers and principal stockholders in its review and consideration of transactions and obtains the approval of non-interested directors when it determines that such approval is appropriate under the circumstances.

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DESCRIPTION OF SIGNAL CAPITAL STOCK

Signal s authorized capital stock consists of 50,000,000 shares of common stock, par value $0.01 per share, and 5,000,000 shares of preferred stock, par value $0.01 per share.

As of December 31, 2016, there were outstanding:

- 742,293 shares of Signal common stock;
- zero shares of preferred stock;
- options exercisable for 37,465 shares of Signal common stock; and
- warrants exercisable for 13,534 shares of Signal common stock.

The following description of Signal capital stock is not complete and may not contain all the information you should consider before investing in Signal capital stock. This description is summarized from, and qualified in its entirety by reference to, Signal s certificate of incorporation, which has been publicly filed with the SEC. See *Where You Can Find More Information*.

Common Stock

Voting Rights

The holders of Signal common stock are entitled to one vote per share on all matters to be voted upon by the stockholders, except on matters relating solely to terms of preferred stock.

Dividend Rights

Subject to preferences that may be applicable to any outstanding preferred stock, the holders of common stock are entitled to receive ratably such dividends, if any, as may be declared from time to time by the board of directors out of funds legally available therefor.

Rights Upon Liquidation

In the event of Signal s liquidation, dissolution or winding up, the holders of common stock are entitled to share ratably in all assets remaining after payment of liabilities, subject to prior distribution rights of preferred stock, if any, then outstanding.

Other Rights

The holders of Signal s common stock have no preemptive or conversion rights or other subscription rights. There are no redemption or sinking fund provisions applicable to Signal s common stock.

Fully Paid and Nonassessable

All of Signal s outstanding shares of common stock are fully paid and nonassessable.

Preferred Stock

Signal s board of directors has the authority to issue preferred stock in one or more classes or series and to fix the designations, powers, preferences and rights, and the qualifications, limitations or restrictions thereof, including dividend rights, conversion right, voting rights, terms of redemption, liquidation preferences and the number of shares constituting any class or series, without further vote or action by the stockholders. Signal has no present

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plans to issue any shares of preferred stock. The issuance of shares of preferred stock, or the issuance of rights to purchase such shares, could decrease the amount of earnings and assets available for distribution to the holders of common stock, could adversely affect the rights and powers, including voting rights, of the common stock, and could have the effect of delaying, deterring or preventing a change of control of Signal or an unsolicited acquisition proposal.

Options

As of December 31, 2016, there were 37,465 shares of common stock issuable upon the exercise of outstanding stock options, at a weighted-average exercise price of $28.83 per share.

Warrants

As of December 31, 2016, there were 2,827 shares of common stock issuable upon the exercise of outstanding warrants at an exercise price of $187.50 per share, which expire on June 17, 2019, and 10,707 shares of common stock issuable upon the exercise of outstanding warrants at an exercise price of $52.50 per share, which expire on February 17, 2020. These warrants provide for cashless exercise at the option of the holder under certain conditions, and also contain provisions for the adjustment of the number of shares issuable upon the exercise of the warrant in the event of stock splits, stock dividends, recapitalizations, reclassifications and consolidations. The holders of the outstanding warrants, or their permitted transferees, are entitled to the registration rights described below with respect to registration of all or any portion of the shares underlying the warrants under the Securities Act of 1933. The shares underlying the warrants have been registered for resale under a registration statement initially declared effective on February 17, 2015. As a result, warrantholders do not have any active and ongoing registration rights in connection with the registration statement on Form S-4 of which this proxy statement/prospectus/information is a part, assuming the resale registration statement related to such warrant shares remains effective.

Demand Registration Rights

Upon the written request of at least 51% of the holders of the warrants and/or the underlying shares of such warrants, Signal must file a registration statement under the Securities Act of 1933 within 60 days after the receipt of such request and use its reasonable efforts to have the registration statement declared effective promptly thereafter. Signal is only required to file such registration statement once based on a written demand from such warrant holders and Signal does not need to file a registration statement pursuant to such demand in the event Signal has filed an existing registration statement to which the holders of such warrants are entitled to piggyback registration rights and either the holder has elected to participate in such existing registration statement or such existing registration statement relates to an underwritten primary offering of securities of Signal.

Piggyback Registration Rights

If Signal registers any securities for public sale, holders of registration rights will have the right to include their shares in the registration statement. The underwriters of any underwritten offering will have the right to limit or exclude the number of shares having registration rights to be included in the registration statement, but subject to some limitations. Such piggyback registration rights do not extend to the registration of securities filed by Signal pursuant to Form S-8 or in connection with a transaction contemplated under Rule 145 under the Securities Act of 1933, as amended, such as the Merger which is described in this joint proxy statement/prospectus/information statement.

Expenses of Registration

Generally, Signal is required to bear all registration and selling expenses incurred in connection with the demand and piggyback registrations described above, other than underwriting discounts and commissions and expenses for legal counsel selected by the holders of such warrants to represent the holders.

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Expiration of Registration Rights

The demand registration rights discussed above terminate concurrently with the expiration of the warrants. The piggyback registration rights described above terminate on June 17, 2021 for the shares underlying warrants which expire on June 17, 2019, and on February 17, 2022 for the shares underlying warrants which expire on February 17, 2020.

Anti-Takeover Effects of Delaware Law and Provisions of Signal s Charter Documents

The provisions of Delaware law, Signal s certificate of incorporation and its bylaws described below may have the effect of delaying, deferring or discouraging another party from acquiring control of Signal.

Delaware Anti-Takeover Law

Signal is subject to Section 203 of the Delaware General Corporation Law, or Section 203. Section 203 generally prohibits a public Delaware corporation from engaging in a business combination with an interested stockholder for a period of three years after the date of the transaction in which the person became an interested stockholder, unless:

- prior to the date of the transaction, the board of directors of the corporation approved either the business combination or the transaction which resulted in the stockholder becoming an interested stockholder;
- the interested stockholder owned at least 85% of the voting stock of the corporation outstanding upon consummation of the transaction, excluding for purposes of determining the number of shares outstanding (i) shares owned by persons who are directors and also officers and (ii) shares owned by employee stock plans in which employee participants do not have the right to determine confidentially whether shares held subject to the plan will be tendered in a tender or exchange offer; or
- on or subsequent to the consummation of the transaction, the business combination is approved by the board and authorized at an annual or special meeting of stockholders, and not by written consent, by the affirmative vote of at least 66 ⅔% of the outstanding voting stock which is not owned by the interested stockholder.

Section 203 defines a business combination to include:

- any merger or consolidation involving the corporation and the interested stockholder;
- any sale, transfer, pledge or other disposition involving the interested stockholder of 10% or more of the assets of the corporation;
- subject to exceptions, any transaction involving the corporation that has the effect of increasing the proportionate share of the stock of any class or series of the corporation beneficially owned by the interested

stockholder; and

the receipt by the interested stockholder of the benefit of any loans, advances, guarantees, pledges or other financial benefits provided by or through the corporation.

In general, Section 203 defines an interested stockholder as any entity or person beneficially owning 15% or more of the outstanding voting stock of the corporation and any entity or person affiliated with or controlling or controlled by the entity or person.

Certificate of Incorporation and Bylaws

Signal s certificate of incorporation and bylaws provide that:

the authorized number of directors can be changed only by resolution of Signal s board of directors;

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Signal s bylaws may be amended or repealed by Signal s board of directors or stockholders;

stockholders may not call special meetings of the stockholders or fill vacancies on the board of directors;

Signal s board of directors will be authorized to issue, without stockholder approval, preferred stock, the rights of which will be determined at the discretion of the board of directors and that, if issued, could operate as a poison pill to dilute the stock ownership of a potential hostile acquirer to prevent an acquisition that Signal s board of directors does not approve;

Signal stockholders do not have cumulative voting rights, and therefore Signal stockholders holding a majority of the shares of common stock outstanding will be able to elect all of Signal s directors; and

Signal stockholders must comply with advance notice provisions to bring business before or nominate directors for election at a stockholder meeting.

Potential Effects of Authorized but Unissued Stock

Signal has shares of common stock and preferred stock available for future issuance without stockholder approval. Signal may utilize these additional shares for a variety of corporate purposes, including future public offerings to raise additional capital, to facilitate corporate acquisitions or payment as a dividend on the capital stock.

The existence of unissued and unreserved common stock and preferred stock may enable Signal s board of directors to issue shares to persons friendly to current management or to issue preferred stock with terms that could render more difficult or discourage a third-party attempt to obtain control by means of a merger, tender offer, proxy contest or otherwise, thereby protecting the continuity of Signal s management. In addition, Signal s board of directors has the discretion to determine designations, rights, preferences, privileges and restrictions, including voting rights, dividend rights, conversion rights, redemption privileges and liquidation preferences of each series of preferred stock, all to the fullest extent permissible under the Delaware General Corporation Law and subject to any limitations set forth in Signal s certificate of incorporation. The purpose of authorizing the board of directors to issue preferred stock and to determine the rights and preferences applicable to such preferred stock is to eliminate delays associated with a stockholder vote on specific issuances. The issuance of preferred stock, while providing desirable flexibility in connection with possible financings, acquisitions and other corporate purposes, could have the effect of making it more difficult for a third party to acquire, or could discourage a third party from acquiring, a majority of Signal s outstanding voting stock.

Election and Removal of Directors

Signal stockholders may only remove directors for cause. Signal s board of directors may elect a director to fill a vacancy, including vacancies created by the expansion of the board of directors. This system of electing and removing directors may discourage a third party from making a tender offer or otherwise attempting to obtain control of Signal, because it generally makes it more difficult for stockholders to replace a majority of Signal s directors. Signal s certificate of incorporation and bylaws will not provide for cumulative voting in the election of directors.

Amendments to Signal s Governing Documents

Generally, the amendment of Signal s certificate of incorporation requires approval by its board of directors and a majority vote of stockholders. Any amendment to Signal s bylaws requires the approval of either a majority of Signal s board of directors or approval of at least a majority of the votes entitled to be cast by the holders of Signal s outstanding capital stock in elections of Signal s board of directors.

Listing

Signal s common stock is listed on the NASDAQ Capital Market under the symbol SGNL.

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Transfer Agent and Registrar

The transfer agent and registrar for Signal s common stock is VStock Transfer, LLC. Its address is 18 Lafayette Place, Woodmere, New York 11598.

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COMPARISON OF RIGHTS OF HOLDERS OF

SIGNAL CAPITAL STOCK AND MIRAGEN CAPITAL STOCK

General

Signal and Miragen are both incorporated under the laws of the State of Delaware. The rights of Signal stockholders and Miragen stockholders are generally governed by the DGCL. Upon completion of the Merger, Miragen stockholders will become stockholders of Signal, and their rights will be governed by the DGCL, the amended and restated bylaws of Signal and the certificate of incorporation of Signal, as amended, and, unless otherwise noted, assuming Signal Proposal Nos. 8 and 10 are approved by the Signal stockholders at the Signal special meeting.

The material differences between the current rights of Miragen stockholders under the Miragen amended and restated certificate of incorporation and bylaws and their rights as Signal stockholders, after the Merger, under the Signal certificate of incorporation and the amended and restated bylaws, both as will be in effect immediately following the completion of the Merger, are summarized below. The summary below does not purport to be complete and is subject to, and qualified in its entirety by reference to, the Delaware General Corporation Law and the governing corporate instruments that are subject to amendment in accordance with their terms. You should carefully read this entire document and the other referenced documents, including the governing corporate instruments, for a more complete understanding of the differences between being a stockholder of Signal or Miragen before the Merger and being a stockholder of Signal following the completion of the Merger. For more information on how to obtain these documents, see the section titled *Where You Can Find More Information* beginning on page 303.

Authorized Capital Stock

Miragen

Miragen s amended and restated certificate of incorporation, as amended, authorizes the issuance of up to 24,780,394 shares of common stock, $0.001 par value per share, and 18,655,494 shares of convertible preferred stock, $0.001 par value per share, of which 7,169,176 are designated Series A convertible preferred stock, 2,183,318 are designated Series B convertible preferred stock and 9,303,000 are designated Series C convertible preferred stock.

Signal

Signal s certificate of incorporation authorizes the issuance of up to 50,000,000 shares of common stock, par value $0.01 per share, and 5,000,000 shares of preferred stock, par value $0.01 per share, without giving effect to Signal Proposal No. 8. If the Signal stockholders approve Signal Proposal No. 8 the number of authorized shares of Signal common stock will be increased to 100,000,000.

Dividends

Miragen

Miragen s amended and restated certificate of incorporation, as amended, provides that the holders of Miragen convertible preferred stock will be entitled, if, when and as declared by Miragen s board of directors, on a pari passu basis, non-cumulative dividends at the rate of 8% of the applicable original issue price for each share convertible preferred stock in preference and priority to the holders of common stock.

After the payment or setting aside for payment of the dividends described above, any additional dividends (other than dividends on common stock payable solely in common stock) declared or paid shall be declared or paid among the holders of Miragen convertible preferred stock and Miragen common stock then outstanding in proportion to the greatest whole number of shares of Miragen common stock held by each such holder (assuming conversion of the Miragen convertible preferred stock).

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Signal

Under Signal s amended and restated bylaws, subject to any restrictions contained in the DGCL or the certificate of incorporation of Signal, Signal may declare and pay dividends upon shares of Signal s capital stock. Dividends may be paid in cash, in property, or in shares of capital stock. Signal s board of directors may set aside out of any funds of the corporation available for dividends reserves for any proper purposes, including equalizing dividends, repairing or maintaining corporate property and meeting contingencies and may abolish any such reserve.

Liquidation Preference

Miragen

Miragen s amended and restated certificate of incorporation, as amended, provides that in the event of any liquidation event (as defined in Miragen s amended and restated certificate of incorporation, as amended), the holders of Miragen convertible preferred stock are entitled to receive, on a pari passu basis, an amount per share of Miragen convertible preferred stock equal to the applicable original purchase price for each share of Miragen convertible preferred stock, plus all declared by unpaid dividends on each share of Miragen convertible preferred stock. The original purchase price is $3.00 for Miragen s Series A convertible preferred stock, $6.00 for Miragen s Series B convertible preferred stock and $4.43 for Miragen s Series C convertible preferred stock. After the payment of the full preferential amounts specified above, the remaining assets shall be distributed with equal priority and pro rata among the holders of Miragen convertible preferred stock and Miragen common stock in proportion to the number of shares of Miragen common stock held by them (assuming the conversion of all shares of Miragen convertible preferred stock into Miragen common stock).

Signal

Signal s certificate of incorporation and amended and restated bylaws do not provide for any liquidation preference for any series or class of Signal capital stock, but it does provide that Signal s board of directors is authorized and therefore may, subject to any limitations prescribed by the law, provide for the issuance of shares of Signal preferred stock in one or more series and to fix the designations, powers, preferences, relative, participating, optional or other special rights and any qualifications, limitations and restrictions of the shares of each such series.

Conversion Rights and Protective Provisions

Miragen

Miragen s amended and restated certificate of incorporation, as amended, provides that holders of Miragen convertible preferred stock have the right to convert such shares into shares of Miragen common stock at any time at a conversion rate in accordance with the terms of Miragen s amended and restated certificate of incorporation, as amended. In addition, upon the closing of a firm commitment underwritten initial public offering resulting in at least $35 million of proceeds (after deduction of underwriting discounts, commissions and fees) at the offering price per share of not less than $9.00 (as adjusted for any stock dividends, combinations, splits, recapitalizations and the like) or the receipt of written consent from at least 70% of the Miragen convertible preferred stock then outstanding voting together on an as-converted into common stock basis or later time as specified in such consent, each outstanding share of Miragen convertible preferred stock will be automatically converted into one share of Miragen common stock. Miragen s amended and restated certificate of incorporation, as amended, also provides for certain protective provisions, as described in more detail below.

As long as any shares of Miragen s Series A convertible preferred stock are outstanding, Miragen shall not amend, alter or repeal any provision of Miragen s amended and restated certificate of incorporation or bylaws if such amendment, alteration or repeal would alter or change the voting or other powers, preferences or special

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rights, privileges or restrictions of the Series A convertible preferred stock so as to affect them adversely and in a manner different from the other series of Miragen convertible preferred stock, without the approval of the holders of at least 65% of the outstanding shares of Miragen s Series A convertible preferred stock.

As long as any shares of Miragen s Series B convertible preferred stock are outstanding, Miragen shall not amend, alter or repeal any provision of Miragen s amended and restated certificate of incorporation or bylaws if such amendment, alteration or repeal would alter or change the voting or other powers, preferences or special rights, privileges or restrictions of the Series B convertible preferred stock so as to affect them adversely and in a manner different from the other series of Miragen convertible preferred stock, without the approval of the holders of a majority of the outstanding shares of Miragen s Series B convertible preferred stock.

As long as any shares of Miragen s Series C convertible preferred stock are outstanding, Miragen shall not (i) amend, alter or repeal any provision of Miragen s amended and restated certificate of incorporation or bylaws if such amendment, alteration or repeal would alter or change the voting or other powers, preferences or special rights, privileges or restrictions of the Series C convertible preferred stock so as to affect them adversely and in a manner different from the other series of Miragen convertible preferred stock or (ii) authorize or designate, whether by reclassification or otherwise, any new class or series of stock or any securities convertible into equity securities of Miragen or any increase in the authorized or designated number of any such new class or series, without the approval of the holders of a majority of the outstanding shares of Series C convertible preferred stock, which majority must include the affirmative vote of MRL Ventures or JAFCO for so long as such holders hold at least 100,000 shares of Miragen s Series C convertible preferred stock.

As long as 500,000 shares of Miragen convertible preferred stock are outstanding, the written consent of the holders of at least 70% of Miragen convertible preferred stock then outstanding, voting together on an as-converted into common stock basis, shall be required to effect or validate the following actions:

- any amendment, alteration, or repeal of any provision of Miragen s amended and restated certificate of incorporation, as amended, or amended and restated bylaws;
- any authorization or any designation, whether by reclassification or otherwise, of any new class or series of stock or any other securities convertible into equity securities of Miragen or any increase in the authorized or designated number of any such new class or series;
- any redemptions, repurchases or other acquisitions of any of Miragen s securities, other than certain redemptions set forth in Miragen s amended and restated certificate of incorporation, as amended;
- any declaration or payment of any dividends or distributions to the holders of shares of Miragen common stock or Miragen convertible preferred stock;
- any agreement by Miragen or its stockholders regarding an asset transfer or acquisition (each as defined in Miragen s amended and restated certificate of incorporation, as amended), any consolidation, merger or reorganization of Miragen that does not constitute an acquisition, or any consolidation, merger or

reorganization of any subsidiary of Miragen or any sale of all or substantially all the assets or outstanding capital stock of any subsidiary of Miragen;

any voluntary dissolution or liquidation of Miragen;

any increase or decrease in the authorized number of members of Miragen s board of directors;

any exclusive license of any material patents, trademarks, copyrights or other intangible assets of Miragen, other than in the ordinary course of business, that is not approved by Miragen s board of directors, including the investor directors (as defined in Miragen s amended and restated certificate of incorporation, as amended);

the incurrence of any obligation, contingent or otherwise, to guarantee, endorse or otherwise become directly or indirectly liable for the indebtedness of another person or entity;

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any grant of a security interest in the assets of Miragen, other than in the ordinary course of business, that is not approved by Miragen s board of directors, including the investor directors;

the creation of any subsidiary of Miragen;

any loan or advance, other than advances for reasonable business expenses incurred in the ordinary course of business, to any director, officer, employee, consultant or subsidiary of Miragen, or any other person or entity, that is not approve by Miragen s board of directors, including the investor directors;

any transaction with any director, officer, employee, consultant or subsidiary of Miragen or any associate (as defined in Rule 12b-2 promulgated under the Exchange Act) of any such person or entity except for (i) transactions made in the ordinary course of business and pursuant to reasonable requirements of Miragen s business that are approved by Miragen s board of directors, including the Investor Directors and (ii) transactions made upon fair and reasonable terms that are approved by Miragen s board of directors, including the investor directors;

any action that results in a change to the principal business of Miragen, the addition of a new line of business to Miragen or the termination of Miragen s then-existing lines of business;

the hiring of a new chief executive officer, termination of employment of the then-existing chief executive officer or the modification of the compensation of the then-existing chief executive officer, other than modifications to benefit plans applicable to all employees and grants of shares of Miragen common stock or convertible securities pursuant to stock purchase or stock option plans or other arrangements that are approved by Miragen s board of directors, including the investor directors;

any acquisition by Miragen of any other entity or all or a substantial portion of the assets of any other entity, whether by stock purchase, merger, consolidation or otherwise; or

any new borrowing by Miragen in excess of $250,000 (whether in a single or a series of related transactions).

Signal

Signal s certificate of incorporation does not provide that the holders of Signal capital stock have preemptive, conversion or other protective rights, but it does provide that Signal s board of directors is authorized and therefore may, subject to any limitations prescribed by the law, provide for the issuance of shares of Signal preferred stock in one or more series and to fix the designations, powers, preferences, relative, participating, optional or other special rights and any qualifications, limitations and restrictions of the shares of each such series.

Number of Directors

Miragen

Miragen s amended and restated certificate of incorporation, as amended, and the Voting Agreement sets the number of directors of Miragen s board of directors at eight. Miragen s amended and restated bylaws provide that the number of directors may be changed from time to time by resolutions of Miragen s board of directors, provided that pursuant to Miragen s amended and restated certificate of incorporation, as amended, as long as at least 500,000 shares of Miragen preferred stock remain outstanding, any increase or decrease of the authorized number of directors will require approval of at least 70% of the outstanding shares of Miragen preferred stock, voting together as a single class, on an as-converted into common stock basis.

Signal

Signal s amended and restated bylaws provide that Signal s board of directors consist of not less than three or more than 11 members, which number of directors shall be fixed from time to time exclusively by resolutions adopted by a majority of the authorized number of directors constituting Signal s board of directors, subject to any rights of holders of any series of Signal preferred stock to elect additional directors.

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Stockholder Nominations and Proposals

Miragen

Miragen s amended and restated bylaws provide that in order for a stockholder to make any director nomination or propose business at a Miragen annual stockholders meeting, the stockholder must provide timely notice in writing to Miragen s Secretary, which must be received not fewer than 90 and not more than 120 days in advance of the date that is the one year anniversary of the preceding year s annual stockholders meeting (with certain adjustments if the annual meeting is changed by more than 30 days from the first anniversary of the preceding year s annual meeting).

Signal

Signal s amended and restated bylaws provide that in order for a stockholder to make any director nomination or propose business at a Signal annual stockholders meeting, the stockholder must (i) provide timely notice in writing to Signal s Secretary and (ii) provide all updates and supplements to such notice, which must be received not fewer than 60 and not more than 90 days in advance of the date that is the one year anniversary of the preceding year s annual stockholders meeting (with certain adjustments if the annual meeting is change by more than 30 days from the first anniversary of the preceding year s annual meeting).

Signal s amended and restated bylaws provide that if the election of directors is a matter specified in the notice of meeting given by or at the direction of the person calling such special meeting, then for a stockholder to make any director nominations at a special meeting, the stockholder must (i) provide timely notice in writing to the Secretary and (ii) provide all updates and supplements to such notice, which must be received no later than 70 days prior to such special meeting or 10 days following the day the special meeting is first publicly announced.

Classification of Board of Directors

Miragen

Miragen s amended and restated certificate of incorporation, as amended, and amended and restated bylaws do not provide for the division of Miragen s board of directors into staggered classes.

Signal

Signal s certificate of incorporation and amended and restated bylaws do not provide for the division of Signal s board of directors into staggered classes.

Removal of Directors

Miragen

Miragen s amended and restated bylaws provide that, unless otherwise restricted by applicable law, any director may be removed from Miragen s board of directors at any time (i) with cause by the affirmative vote of the holders of a majority of the voting power of all then-outstanding shares of capital stock of Miragen entitled to vote generally at an election of directors or (ii) without cause by the affirmative vote of the holders of 66-2/3% of the voting power of all then-outstanding shares of capital stock of Miragen entitled to vote generally at an election of directors. Miragen s amended and restated certificate of incorporation, as amended, provides that a director may be removed from Miragen s board of directors without cause by the holders of a majority of the shares of such class of securities entitled

to elect such director and entitled to vote at an election of directors.

Signal

Under Signal s amended and restated bylaws, subject to any limitation imposed by law, any director may be removed from Signal s board of directors with or without cause by the affirmative vote of the holders of a majority of the then-outstanding shares of capital stock entitled to vote in the election of directors.

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Vacancies on the Board of Directors

Miragen

Miragen s amended and restated bylaws provide that vacancies and newly created directorship resulting from any increase in the authorized number of directors may be filled by a majority of the directors then in office, although less than a quorum, or by a sole remaining director. Miragen s amended and restated bylaws further provide that whenever the holders of any class or classes or series of stock thereof are entitled to elect one or more directors by the provisions of Miragen s amended and restated certificate of incorporation, as amended, vacancies that occur therefrom may be filled by a majority of the directors elected by such class or classes or series thereof then in office, or by a sole remaining director so elected; provided, however, that where such vacancy occurs among the directors elected by the holders of a class or classes or series of stock thereof, the holders of shares of such class or series may override the board of director s action to fill such vacancy.

Signal

Signal s amended and restated bylaws provide that vacancies and newly created directorship resulting from any increase in the authorized number of directors may be filled by a majority of the directors then in office, although less than a quorum, or by a sole remaining director. Signal s amended and restated bylaws further provide that whenever the holders of any class or classes or series of Signal preferred stock are entitled to elect one or more directors by the provisions of Signal s certificate of incorporation, vacancies that occur therefrom may be filled by a majority of the directors elected by such class or classes or series thereof then in office, or by a sole remaining director so elected.

Voting Stock

Miragen

Miragen s amended and restated certificate of incorporation, as amended, provides that the holders of Miragen common stock are entitled to one vote for each share of stock held by them and holders of Miragen convertible preferred stock are entitled to one vote for each share of common stock into which such share of Miragen convertible preferred stock is convertible; provided that the holders of Miragen s Series A convertible preferred stock, voting as a separate series, are entitled to elect two directors, the holders of Miragen s Series B convertible preferred stock, voting as a separate series, are entitled to elect one director and the holders of Miragen s Series C convertible preferred stock is entitled to elect two directors.

Signal

Signal s certificate of incorporation provides that each outstanding share shall entitle the holder thereof to one vote on each matter properly submitted to the stockholders for a vote; provided that, except as otherwise required by law, holders of Signal common stock shall not be entitled to vote on any amendment to the certificate of incorporation that relates solely to the terms of one or more outstanding series of Signal preferred stock if the holders of such affected series are entitled, either separately, or together as a class with the holders of one or more other series, to vote thereon by law or pursuant to the certificate of incorporation. Under Signal s amended and restated bylaws, in all matters other than the election of directors, the affirmative vote of the holders of a majority of the shares present in person, by remote communication or represented by proxy at a meeting of stockholders and entitled to vote on the subject matter shall be the act of the stockholders on that matter, unless the vote of a greater number is required by law, the amended and restated bylaws or the certificate of incorporation. Directors shall be elected by a plurality of the votes of the shares of capital stock present in person, by remote communication or represented by proxy at the meeting and

entitled to vote on the election of directors.

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Cumulative Voting

Miragen

Miragen s amended and restated certificate of incorporation, as amended, and amended and restated bylaws do not have a provision granting cumulative voting rights in the election of its directors.

Signal

Signal s certificate of incorporation and amended and restated bylaws do not have a provision granting cumulative voting rights in the election of its directors.

Stockholder Action by Written Consent

Miragen

Miragen s bylaws provide that unless otherwise provided in the amended and restated certificate of incorporation, as amended, or by statute, any action required or permitted to be taken at any annual or special meeting of stockholders may be taken without a meeting, without prior notice and without a vote, if a consent in writing or by electronic transmission setting forth the action so taken is signed by the holders of outstanding stock having not less than the minimum number of votes that would be necessary to authorize or take such action at a meeting at which all shares entitled to vote thereon were present and voted.

Signal

Signal s amended and restated bylaws provide that any action required or permitted to be taken at any annual or special meeting of stockholders may be taken without a meeting, without prior notice and without a vote, if a consent in writing or by electronic transmission setting forth the action so taken is signed by the holders of outstanding stock having not less than the minimum number of votes that would be necessary to authorize or take such action at a meeting at which all shares entitled to vote thereon were present and voted, without giving effect to Signal Proposal No. 10. If the Signal stockholders approve Signal Proposal No. 10, then the Signal certificate of incorporation will eliminate the ability of the Signal stockholders to act by written consent. If Signal stockholders approve Signal Proposal No. 10, Signal anticipates that its board of directors will approve a corresponding amendment to Signal s bylaws.

Notice of Stockholder Meeting

Miragen

Miragen s amended and restated bylaws provide that all notices of meetings with stockholders shall be in writing or by electronic submission and specify the place, date, and hour of the meeting, and in the case of a special meeting, the purpose or purposes for which the meeting is called. Miragen s amended and restated bylaws also provide that all such notices of meetings shall be sent not less than ten nor more than 60 days before the date of the meeting to each stockholder entitled to vote at such meeting.

Signal

Signal s amended and restated bylaws provide that the notice be given in writing or by electronic transmission and state the plate, time and date of the meeting, the means of remote communications if any, by which stockholders and proxy holders may be deemed to be present in person and vote at such meeting and, in the case of a special meeting, briefly describe the purpose or purpose of the meeting. Signal s amended and restated bylaws also provide that all such notices be given not less than ten or more than 60 days before the date of the meeting, to each stockholder of record entitled to vote at the meeting.

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Special Stockholder Meetings

Miragen

Miragen s amended and restated bylaws provide that a special meeting of the stockholders may be called at any time by the chairman of the board, the chief executive officer, Miragen s board of directors acting pursuant to a resolution adopted by a majority of the total number of authorized directors, or by one or more stockholders holding shares in the aggregate entitled to cast not less than 10% of the votes at the meeting.

Signal

Under Signal s amended and restated bylaws, special meetings of the stockholders may be called only by the chairman of the board, the president or by Signal s board of directors acting pursuant to a resolution adopted by a majority of the total number of authorized directors.

Indemnification

Miragen

Miragen s amended and restated bylaws provide that Miragen shall indemnify (including the advancement of expenses) its officers and directors to the fullest extent permitted by the DGCL or any other applicable law; provided, however, that Miragen shall not be required to indemnify any officer or director in connection with any proceeding initiated by such person unless the indemnification is expressly required to be made by law, the proceeding was authorized by Miragen s board of directors or such indemnification is provided for by Miragen.

Miragen s amended and restated bylaws further include the right to advancement of expenses; provided, however, that if required by the DGCL, an advancement of expenses incurred by an indemnitee in his or her capacity as a director or officer (and not in any other capacity in which service was or is rendered by such indemnitee) shall be made only upon delivery to Miragen of an undertaking, by or on behalf of such indemnitee, to repay all amounts so advanced if it shall ultimately be determined by final judicial decision that such indemnitee is not entitled to indemnification for such expenses.

Miragen s amended and restated bylaws further provide that Miragen shall have the power to indemnify (including the advancement of expenses) its employees and other agents as set forth in the DGCL or any other applicable law.

Signal

Signal s certificate of incorporation and amended and restated bylaws provide that Signal shall indemnify (including the advancement of expenses) its officers and directors to the fullest extent permitted by applicable law; provided, however, that Signal shall not be required to indemnify any officer or director in connection with any proceeding initiated by such person unless the indemnification is expressly required to be made by law, the proceeding was authorized by Signal s board of directors or such indemnification is provided for by Signal.

Signal s amended and restated bylaws includes the right to advancement of expenses; provided, however, that if required by the DGCL, an advancement of expenses incurred by an indemnitee in his or her capacity as a director or officer (and not in any other capacity in which service was or is rendered by such indemnitee) shall be made only upon delivery to Signal of an undertaking, by or on behalf of such indemnitee, to repay all amounts so advanced if it shall ultimately be determined that such indemnitee is not entitled to indemnification for such expenses.

Signal s amended and restated bylaws further provide that Signal shall have the power to indemnify (including the advancement of expenses) its employees and other agents as set forth in the DGCL or any other applicable law.

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Amendment of Certificate of Incorporation

Miragen

Other than as set forth in the protective provisions in Article IV, Section (D)2 of Miragen s amended and restated certificate of incorporation, as amended, as described above, and as provided by law, Miragen s amended and restated certificate of incorporation, as amended, does not have other restrictions for amending Miragen s amended and restated certificate of incorporation, as amended, except that neither any amendment nor repeal of Article V of Miragen s amended and restated certificate of incorporation (which pertains to indemnification) shall adversely affect any right or protection of any director, officer, employee or other agent of Miragen existing at the time of such amendment, repeal or modification.

Signal

Signal s certificate of incorporation provides that its provisions may be amended, altered or repealed in the manner and at the time prescribed by Delaware law. Additionally, under the certificate of incorporation, neither any amendment, repeal or modification of Article VIII (which pertains to personal liability of directors) or Article IX (which pertains to indemnification) or adoption of any provisions of the certificate of incorporation or the amended and restated bylaws inconsistent with Articles VIII or IX shall affect the rights or protections or increase the liability of any director in effect at the time of the alleged occurrence of any act or omission to act giving rise to liability or indemnification.

Amendment of Bylaws

Miragen

Under Miragen s amended and restated certificate of incorporation, as amended, Miragen s board of directors is expressly authorized to adopt, amend or repeal Miragen s bylaws, provided that Miragen s bylaws may not be amended without the separate written consent of at least 70% of the outstanding shares of Miragen convertible preferred stock, voting together as a single class on an as-converted to common stock basis. Miragen s amended and restated bylaws provide that the stockholders entitled to vote may adopt, amend or repeal Miragen s amended and restated bylaws.

Signal

Signal s certificate of incorporation and the amended and restated bylaws each provide that the Signals board of directors may exercise the power to adopt, amend or repeal Signal s amended and restated bylaws and that the stockholders also have the same power to adopt, amend or repeal Signal s amended and restated bylaws.

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PRINCIPAL STOCKHOLDERS OF SIGNAL

Except where specifically noted, the following information and all other information contained in this proxy statement/prospectus/information statement does not give effect to the proposed reverse stock split described in Signal Proposal No. 7, beginning on page 167 in this proxy statement/prospectus/information statement.

The following table sets forth certain information with respect to the beneficial ownership of Signal common stock as of December 31, 2016 (except where otherwise indicated) for:

- each person, or group of affiliated persons, who are known by Signal to beneficially own more than 5% of the outstanding shares of Signal common stock;
- each of the Signal directors as of December 31, 2016;
- each of the Signal named executive officers, as identified in Signal s definitive proxy statement filed with the SEC on May 9, 2016; and
- all of the current directors and executive officers of Signal as a group.

The number of shares owned, total shares beneficially owned and the percentage of common stock beneficially owned below assumes 742,293 shares of common stock outstanding on December 31, 2016, but does not give effect to any shares of Signal common stock to be issued in the Merger.

Beneficial ownership is determined under SEC rules and includes sole or shared power to vote or dispose of shares of Signal common stock. The number and percentage of shares beneficially owned by a person or entity also include shares of common stock subject to stock options that are currently exercisable or become exercisable within 60 days of December 31, 2016. However, these shares are not deemed to be outstanding for the purpose of computing the percentage of shares beneficially owned of any other person or entity. Except as indicated in footnotes to the table below or, where applicable, to the extent authority is shares by spouses under community property laws, the beneficial owners named in the table have, to Signal s knowledge, sole voting and dispositive power with respect to all shares of common stock shown to be beneficially owned by them. Unless otherwise indicated, the address for each stockholder listed is: c/o Signal Genetics, Inc., Carlsbad, California 92008.

Name	Number of Shares Beneficially Owned	Percentage Ownership(1)
5% or Greater Stockholders		
LeBow Alpha, LLLP(2)	148,841	20.1%
E. Jeffrey Peierls(3)	45,406	6.1%
Directors and Named Executive Officers		

Bennett S. LeBow(2)	151,574(4)	20.4%
Samuel D. Riccitelli	38,089	5.1%
Tamara A. Seymour	11,096(5)	1.5%
David A. Gonyer	3,499(6)	*
Douglas A. Schuling	3,499(7)	*
Robin L. Smith, M.D.	3,500(8)	*
All Executive Officers and Directors, as a group (six persons)	211,257(9)	27.9%

* Represents beneficial ownership of less than 1% of class.

(1) Based on 742,293 common shares outstanding as of December 31, 2016.

(2) Bennett S. LeBow is the sole partner of LeBow Alpha. By virtue of his position with LeBow Alpha, he is deemed to be the beneficial owner of these shares and has sole voting and dispositive power over the shares. The address of LeBow Alpha is 667 Madison Avenue, 14th Floor, New York, New York 10065.

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(3) Based solely on the Schedule 13G filed with the SEC on March 20, 2015, as of March 11, 2015, E. Jeffrey Peierls has sole voting and sole dispositive power over 5,700 shares, and shared voting and shared dispositive power over 39,706 shares. Brian E. Peierls has sole voting and sole dispositive power over 3,333 shares, and shared voting and shared dispositive power over 39,706 shares. E. Jeffrey Peierls, President and a Director of the Peierls Foundation, Inc., or Foundation, and Brian E. Peierls, Secretary/Treasurer of the Foundation, are co-trustees of UD E.S. Peierls for E. F. Peierls; and co-managers of 75 Brian L.L.C., 75 Jeff L.L.C, Life/Brian, L.L.C., Life/Jeff L.L.C., Jen/Brian, L.L.C., Jen/Jeff, L.L.C., Bypass 1, L.L.C., Unitrust1, L.L.C.; and, co-trustees of UW E.S. Peierls for Brian E. Peierls and UW E.S. Peierls for E. Jeffrey Peierls. Each of E. Jeffrey Peierls and Brian E. Peierls, as co-managers and as co-trustees may be deemed to indirectly own the securities owned by each Limited Liability Company and each Trust as well as being control persons of the Foundation. In such filing E. Jeffrey Peierls lists his address as 73 South Holman Way, Golden, Colorado, 80401 and Brian E. Peierls lists his address as 7808 Harvestman Cove, Austin, Texas, 78731.

(4) Includes 333 shares of common stock owned directly by Mr. LeBow, 148,841 shares owned by LeBow Alpha in which Mr. LeBow has a beneficial interest, and 2,400 shares that Mr. LeBow has the right to purchase from Signal upon the exercise of outstanding stock options within 60 days after December 31, 2016.

(5) Includes 7,096 shares of common stock owned directly by Ms. Seymour and 4,000 shares that Ms. Seymour has the right to purchase from Signal upon the exercise of outstanding stock options within 60 days after December 31, 2016.

(6) Includes 699 shares of common stock owned directly by Mr. Gonyer and 2,800 shares that Mr. Gonyer has the right to purchase from Signal upon the exercise of outstanding stock options within 60 days after December 31, 2016.

(7) Includes 699 shares of common stock owned directly by Mr. Schuling and 2,800 shares that Mr. Schuling has the right to purchase from Signal upon the exercise of outstanding stock options within 60 days after December 31, 2016.

(8) Includes 700 shares of common stock owned directly by Dr. Smith and 2,800 shares that Dr. Smith has the right to purchase from Signal upon the exercise of outstanding stock options within 60 days after December 31, 2016.

(9) Includes 196,457 aggregate shares of common stock owned outright by all executive officers and directors as a group and 14,800 shares that such persons have the right to purchase from Signal upon the exercise of outstanding options within 60 days after December 31, 2016.

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PRINCIPAL STOCKHOLDERS OF MIRAGEN

The following table sets forth certain information with respect to the beneficial ownership of Miragen capital stock, on an as-converted to common stock basis, as of December 31, 2016 (except where otherwise indicated) for:

- each person, or group of affiliated persons, who are known by Miragen to beneficially own more than 5% of the outstanding shares of Miragen capital stock;
- each of the Miragen directors as of December 31, 2016;
- each of the Miragen named executive officers as of December 31, 2016; and
- all of the current directors and executive officers of Miragen as a group.

The number of shares owned, total shares beneficially owned and the percentage of common stock beneficially owned below assumes, in each case, the conversion of all 7,149,176 shares of Miragen Series A convertible preferred stock into 7,149,176 shares of Miragen common stock as of December 31, 2016, all 2,166,651 shares of Miragen Series B convertible preferred stock into 2,166,651 shares of Miragen common stock as of December 31, 2016 and all 9,268,563 shares of Miragen Series C convertible preferred stock into 9,268,563 shares of Miragen common stock as of December 31, 2016, and a total of 1,185,812 shares of Miragen common stock outstanding as of December 31, 2016, for a total of 19,770,202 shares outstanding on an as-converted to common stock basis, but does not give effect to any shares of Miragen common stock to be issued in Miragen s concurrent financing in connection with the Merger.

Beneficial ownership is determined under SEC rules and includes sole or shared power to vote or dispose of shares of Miragen common stock. The number and percentage of shares beneficially owned by a person or entity also include shares of common stock subject to stock options that are currently exercisable or become exercisable within 60 days of December 31, 2016. However, these shares are not deemed to be outstanding for the purpose of computing the percentage of shares beneficially owned of any other person or entity. Except as indicated in footnotes to the table below or, where applicable, to the extent authority is shared by spouses under community property laws, the beneficial owners named in the table have, to Miragen s knowledge, sole voting and dispositive power with respect to all shares of common stock shown to be beneficially owned by them based on information provided to Miragen by such stockholders. Unless otherwise indicated, the address for each stockholder listed is: c/o Miragen Therapeutics, Inc., 6200 Lookout Road Boulder, Colorado 80301.

Name	Number of Shares Beneficially Owned	Percentage Ownership(1)
5% or Greater Stockholders		
Atlas Venture Fund VII, L.P.	4,469,607(2)	22.6%
BV Entities	2,850,548(3)	14.4
Remeditex Ventures LLC	3,052,163(4)	15.4
MRL Ventures Fund, LLC	1,580,135(5)	8.0
JAFCO SV4 Investment Limited Partnership	1,354,402(6)	6.9

BraMira LLC	1,128,668(7)	5.7
Directors and Named Executive Officers		
William S. Marshall, Ph.D.	764,940(8)	3.9
Adam S. Levy		*
Paul D. Rubin, M.D.		*
Thomas E. Hughes, Ph.D.	42,500(9)	*
Kevin Koch, Ph.D.	3,466(10)	*
Bruce L. Booth, Ph.D.	4,469,607(2)	22.6
Kyle A. Lefkoff	2,850,548(3)	14.4
John W. Creecy	3,052,163(4)	15.4
Reza Halse, Ph.D.	1,580,135(5)	8.0
All directors and officers as a group (10 persons)	12,905,600(11)	65.3%

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* Represents beneficial ownership of less than 1% of class.

(1) Based on 19,770,202 shares of capital stock outstanding as of December 31, 2016.

(2) Includes 83,250 shares of common stock, 2,661,454 shares of Series A convertible preferred stock, 479,401 shares of Series B convertible preferred stock and 1,245,502 shares of Series C convertible preferred stock. All shares are held directly by Atlas Venture VII, L.P., or Atlas Venture VII. Atlas Venture Associates VII, L.P., or AVA VII LP, is the general partner of Atlas Venture VII, and Atlas Venture Associates VII, Inc., or AVA VII Inc., is the general partner of AVA VII LP. Peter Barrett, Bruce L. Booth, Ph.D., Jean-Francois Formela and Jeff Fagnan is each a director of AVA VII Inc., or collectively, the Directors. The principal business address of Atlas Venture Fund VII, L.P. is 25 First Street, Suite 303, Cambridge, MA 02141. Atlas Venture Fund X, L.P., an affiliate of Atlas Venture VII, has agreed to purchase 1,145,835 shares of Miragen common stock in Miragen s concurrent financing, which are not reflected in the table above.

(3) Includes 55,500 shares of common stock, 1,691,598 shares of Series A convertible preferred stock, 306,027 shares of Series B convertible preferred stock and 797,423 shares of Series C convertible preferred stock. Includes shares held by Boulder Ventures V, L.P., or Boulder Ventures V, and shares held by Boulder Ventures VI, L.P., or Boulder Ventures VI and, collectively with Boulder Ventures V, the Boulder Ventures Funds. BV Partners V, L.L.C., or BV V, is the general partner of Boulder Ventures V. BV Partners VI, L.L.C., or BV VI, is the general partner of Boulder Ventures VI. BV V may be deemed to indirectly beneficially own the shares owned by Boulder Ventures V and BV VI may be deemed to indirectly beneficially own the shares owned by Boulder Ventures VI. Kyle A. Lefkoff, Peter A. Roshko and Jonathan L. Perl are managing members of BV V and Mr. Lefkoff, Mr. Roshko and Mr. Perl are managing members of BV VI, and each share voting and dispositive power over the shares held by the applicable Boulder Venture Funds. The principal business address of Boulder Ventures Funds is 1941 Pearl Street, Suite 300, Boulder, CO 80302. Boulder Ventures VI has agreed to purchase 147,419 shares of Miragen common stock in Miragen s concurrent financing, which are not reflected in the table above.

(4) Includes 1,083,333 shares of Series B Preferred Stock and 1,968,830 shares of Series C convertible preferred stock. All shares are held directly by Remeditex Ventures LLC, or Remeditex. John H. Creecy is the chief executive officer of Remeditex and may be deemed to be the indirect beneficial owner of the shares owned by Remeditex. The principal business address of Remeditex is 2727 N. Harwood Street, Suite 200, Dallas, TX 75201. Remeditex has agreed to purchase 797,308 shares of Miragen common stock in Miragen s concurrent financing, which are not reflected in the table above.

(5) Includes 1,580,135 shares of Series C convertible preferred stock. All shares are held directly by MRL Ventures Fund, LLC, or MRL Ventures. Reza Halse is a partner of MRL Ventures and may be deemed to be the indirect beneficial owner of the shares owned by MRL Ventures. The principal business address of MRL Ventures is 320 Bent Street, 4th Floor, Cambridge, MA 02141. MRL Ventures has agreed to purchase 412,774 shares of Miragen common stock in Miragen s concurrent financing, which are not reflected in the table above. Dr. Halse has informed Miragen that he will resign as a member of Miragen s board of directors immediately prior to the effectiveness of the Merger.

(6) Includes 1,354,402 shares of Series C convertible preferred stock. All shares are held director by JAFCO SV4 Investment Limited Partnership, or JAFCO LP. JAFCO Co., Ltd, or JAFCO Ltd, is the general partner of JAFCO LP. The principal business address of JAFCO LP is Otemachi First Square, West Tower 11F, 1-5-1 Otemachi, Chiyoda-ku, Tokyo 100-0004 Japan. JAFCO LP has agreed to purchase 353,806 shares of Miragen common stock in Miragen s concurrent financing, which are not reflected in the table above.

(7) Includes 1,128,668 shares of Series C convertible preferred stock. The principal business address of BraMira LLC is 155 Gibbs Street, Suite 406, Rockville, MD 20850. BraMira LLC has agreed to purchase 1,111,111 shares of Miragen common stock in the concurrent financing in connection with the Merger.

(8)

Includes 150,000 shares of common stock, 37,586 shares of Series A convertible preferred stock, 6,470 shares of Series B convertible preferred stock, 17,263 shares of Series C convertible preferred stock and 553,621 shares of common stock issuable upon exercise of options to purchase Miragen common stock within 60 days of December 31, 2016.

(9) Includes 20,000 shares of common stock and 22,500 shares of common stock issuable upon exercise of options to purchase Miragen common stock within 60 days of December 31, 2016.

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(10) Includes 3,466 shares of common stock issuable upon exercise of options to purchase Miragen common stock within 60 days of December 31, 2016.

(11) Includes 308,750 shares of common stock, 4,390,638 shares of Series A convertible preferred stock, 1,875,231 shares of Series B convertible preferred stock, 5,609,153 shares of Series C convertible preferred stock and 721,828 shares of common stock issuable upon exercise of options to purchase Miragen common stock within 60 days of December 31, 2016 held by Miragen s directors, officers, including William S. Marshall, Ph.D., Jason A. Leverone, Adam S. Levy, Paul D. Rubin, M.D., Thomas E. Hughes, Ph.D., Kevin Koch, Ph.D., Bruce L. Booth, Ph.D., Kyle A. Lefkoff, John W. Creecy and Reza Halse, Ph.D., and their affiliates. These directors, officers or their affiliates have agreed to purchase an aggregate of 2,503,336 shares of Miragen common stock in Miragen s concurrent financing, which are not reflected in the table above. Joseph L. Turner is not included among Miragen s directors and officers or in the table above, as he is not a director of Miragen as of December 31, 2016 and is designated to become a director of the combined company only upon the effectiveness of the Merger.

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LEGAL MATTERS

Pillsbury Winthrop Shaw Pittman LLP, San Diego, California will pass upon the validity of the Signal common stock offered by this proxy statement/prospectus/information statement. The material U.S. federal income tax consequences of the Merger will be passed upon for Signal by Pillsbury Winthrop Shaw Pittman LLP, Palo Alto, California and for Miragen by Cooley LLP, Broomfield, Colorado.

EXPERTS

The consolidated financial statements of Signal as of December 31, 2015 and 2014, and for each of the two years in the period ended December 31, 2015, included in this proxy statement/prospectus/information statement and in the Registration Statement, have been so included in reliance on the report of BDO USA, LLP, an independent registered public accounting firm, appearing elsewhere herein, given on the authority of said firm as experts in accounting and auditing.

The consolidated financial statements of Miragen as of December 31, 2015 and 2014, and for the years then ended, have been included herein in reliance upon the report of KPMG LLP, independent registered public accounting firm, appearing elsewhere herein, and upon the authority of said firm as experts in accounting and auditing.

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WHERE YOU CAN FIND MORE INFORMATION

Signal files annual, quarterly and special reports, proxy statements and other information are with the SEC. You may read and copy any reports, statements or other information that Signal files at the SEC public reference room in at 100 F Street, N.E., Washington, D.C. 20549. Please call the SEC at 1-800-SEC-0330 for further information on the public reference rooms. Signal SEC filings are also available to the public from commercial document retrieval services and on the SEC s website maintained by the SEC at *www.sec.gov*. Reports, proxy statements and other information concerning Signal also may be inspected at the offices of the National Association of Securities Dealers, Inc., Listing Section, 1735 K Street, Washington, D.C. 20006.

As of the date of this proxy statement/prospectus/information statement, Signal has filed a registration statement on Form S-4 to register with the SEC the Signal common stock that Signal will issue to Miragen stockholders in the Merger. This proxy statement/prospectus/information statement is a part of that registration statement and constitutes a prospectus of Signal, as well as a proxy statement of Signal for the Signal special meeting and an information statement for the purpose of Miragen for its written consent.

Signal has supplied all information contained in this proxy statement/prospectus/information statement relating to Signal and Miragen has supplied all information contained in this proxy statement/prospectus/information statement relating to Miragen.

If you would like to request documents from Signal or Miragen, please send a request in writing or by telephone to either Signal or Miragen at the following addresses:

Signal Genetics, Inc.	Miragen Therapeutics, Inc.
5740 Fleet Street	6200 Lookout Road
Carlsbad, CA 92008	Boulder, CO 80301
Attn: Investor Relations	Attn: Investor Relations
Tel: (760) 537-4100	Tel: (720) 407-4595
Email: investorrelations@signalgenetics.com	Email: investorrelations@miragenrx.com

If you are a Signal stockholder and would like additional copies, without charge, of this proxy statement/prospectus/information statement or if you have questions about the Merger, including the procedures for voting your shares, you should contact Signal s proxy solicitor:

ADVANTAGE PROXY

Telephone: (877) 870-8565 (toll free); (206) 870-8565 (collect)

Email: ksmith@advantageproxy.com

TRADEMARK NOTICE

Signal, MyPRS, and MyPRS Plus are registered and unregistered trademarks of Signal Genetics, Inc. in the United States. Miragen, miRagen and the Miragen logo and other trademarks, service marks, and trade names of Miragen are registered and unregistered marks of Miragen Therapeutics, Inc. Other third-party logos and product/trade names are registered trademarks or trade names of their respective companies.

OTHER MATTERS

Section 16(a) Beneficial Ownership Reporting Compliance

Section 16(a) of the Exchange Act requires Signal officers and directors, and persons who own more than 10% of a registered class of Signal equity securities, to file reports of ownership and changes in ownership with the SEC.

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Such officers, directors and ten-percent stockholders are also required by SEC rules to furnish Signal with copies of all forms that they file pursuant to Section 16(a). Based on Signal s review of the copies of such forms received by it and written representations from certain reporting persons, Signal believes that during fiscal 2015, its executive officers, directors and ten-percent stockholders complied with all other applicable filing requirements.

Stockholder Proposals

Stockholders may submit proposals for consideration at next year s annual meeting of Signal stockholders, provided such proposal is based on a proper subject for stockholder action. In order for a stockholder proposal to be considered for inclusion in the proxy statement in reliance on Rule 14a-8 of the Exchange Act and presented at Signal s 2017 annual meeting of stockholders, such proposal must be received by Signal not less than 120 days before May 26, 2017 (or by January 27, 2017), in such form as is required by the rules and regulations promulgated by the SEC. Stockholder proposals must be submitted in writing, to the attention of the Secretary of Signal Genetics, Inc., 5740 Fleet Street, Carlsbad, California 92008. A proposal submitted by a stockholder outside of the process of Rule 14a-8 for Signal s 2017 annual meeting of stockholders will not be considered timely unless such proposal is received by Signal no later than April 19, 2017 and no earlier than March 20, 2017. The proxy to be solicited on behalf of Signal s board of directors for its 2017 annual meeting of stockholders may confer discretionary authority to vote on any such proposal considered to have been received on a non-timely basis that nonetheless properly comes before Signal s 2017 annual meeting of stockholders.

Communications with Signal s Board of Directors

In accordance with Signal s policies regarding communication to non-management members of Signal s board of directors, stockholders may communicate with such members by writing to:

Corporate Secretary

Signal Genetics, Inc.

5740 Fleet Street

Carlsbad, California 92008

- or -

http://investors.signalgenetics.com/contactboard.cfm

The Secretary monitors such communications and provides summaries at regularly scheduled meetings of the board of directors. Where the nature of the communication warrants, the Secretary may determine, in her judgment as considered appropriate, to obtain the more immediate attention of the appropriate committee of the board of directors or non-management director, of independent advisors or of management.

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Signal Genetics, Inc.

INDEX TO SIGNAL CONSOLIDATED FINANCIAL STATEMENTS

Years ended December 31, 2015 and 2014 and Nine Months Ended September 30, 2016 and 2015

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

Board of Directors and Stockholders

Signal Genetics, Inc.

We have audited the accompanying consolidated balance sheets of Signal Genetics, Inc. and Subsidiaries (the Company) as of December 31, 2015 and 2014 and the related consolidated statements of operations, changes in stockholders equity and members deficiency, and cash flows for each of the two years in the period ended December 31, 2015. These financial statements are the responsibility of the Company s management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. Our audits included consideration of internal control over financial reporting as a basis for designing audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Company s internal control over financial reporting. Accordingly, we express no such opinion. An audit also includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of Signal Genetics, Inc. and Subsidiaries at December 31, 2015 and 2014, and the results of their operations and their cash flows for each of two years in the period ended December 31, 2015, in conformity with accounting principles generally accepted in the United States of America.

/s/ BDO USA, LLP

San Diego, California

March 21, 2016, except as to Note 9 which is dated November 4, 2016

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Signal Genetics, Inc.

Consolidated Balance Sheets

(in thousands, except share and par value data)

	December 31, 2015	2014
Assets		
Current assets:		
Cash and cash equivalents	$ 10,832	$ 5,119
Accounts receivable, net	394	1,088
Inventory	187	179
Prepaid expenses and other current assets	321	399
Total current assets	11,734	6,785
Property and equipment, net	1,153	1,214
Deferred offering costs		47
Security deposits	15	43
Total assets	$ 12,902	$ 8,089
Liabilities and stockholders equity		
Current liabilities:		
Accounts payable	$ 242	$ 255
Accrued liabilities	1,018	361
Note payable related party	1,105	
Amounts due to related party		1,045
Lease termination/abandonment payable current portion		248
Other current liabilities	103	80
Total current liabilities	2,468	1,989
Other noncurrent liabilities	24	109
Commitments and contingencies (Note 7)		
Stockholders equity:		
Preferred stock, $0.01 par value, 5,000,000 shares authorized, no shares issued or outstanding at December 31, 2015 or 2014		
Common stock, $0.01 par value, 50,000,000 shares authorized, 709,024 and 252,174 shares issued and outstanding at December 31, 2015 and 2014, respectively	7	3
Additional paid in capital	28,371	12,628
Accumulated deficit	(17,968)	(6,640)
Total stockholders equity	10,410	5,991
Total liabilities and stockholders equity	$ 12,902	$ 8,089

See accompanying notes to consolidated financial statements.

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Signal Genetics, Inc.

Consolidated Statements of Operations

(in thousands, except share and per share data)

	Years Ended December 31,	
	2015	**2014**
Net revenue	$ 2,538	$ 4,320
Operating expenses:		
Cost of revenue	2,472	3,366
Research and development	1,002	347
Selling and marketing	2,559	717
General and administrative	7,692	6,857
Gain on legal settlement		(100)
Total operating expenses	13,725	11,187
Loss from operations	(11,187)	(6,867)
Interest expense	(141)	(1,023)
Net loss attributable to members of Signal Genetics LLC		(1,250)
Net loss attributable to stockholders of Signal Genetics, Inc.	(11,328)	(6,640)
Net loss attributable to stockholders of Signal Genetics, Inc./members of Signal Genetics LLC	$ (11,328)	$ (7,890)
Net loss per common share, basic and diluted	$ (21.00)	$ (52.50)
Weighted-average number of shares outstanding, basic and diluted	539,460	150,390

See accompanying notes to consolidated financial statements.

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Signal Genetics, Inc.

Consolidated Statements of Changes in Stockholders Equity and Members Deficiency

(in thousands, except share and unit data)

	Common Stock Shares	Common Stock Amount	Additional Paid-in Capital	Accumulated Deficit	Total Stockholders Equity	Membership Units Class A	Membership Units Class B	Membership Units Class C	Members Deficiency[1]
Balance, December 31, 2013						72,500	41,088		$ (23,887)
Conversion of note payable to Class C Units								2,732,629	27,326
Net loss attributable to members of Signal Genetics LLC									(1,250)
Conversion from Limited Liability Company to Corporation	195,507	$ 2	$ 2,187	$	$ 2,189	(72,500)	(41,088)	(2,732,629)	(2,189)
Initial public offering of common stock, net of costs to issue	56,667	1	5,843		5,844				
Fair value of warrants and option for overallotment shares to underwriters issued in connection with initial public stock offering			300		300				
Stock-based compensation			4,298		4,298				
Net loss attributable to stockholders of Signal				(6,640)	(6,640)				

Genetics, Inc.

Balance, December 31, 2014	252,174	3	12,628	(6,640)	5,991		
Public offerings of common stock, net of costs to issue	428,762	4	12,761		12,765		
Fair value of warrants and option for overallotment shares to underwriters issued in connection with public stock offering			330		330		
Stock-based compensation			3,015		3,015		
Shares issued under employee stock incentive plan, net of shares repurchased to satisfy tax withholding obligations	28,088		(363)		(363)		
Net loss attributable to stockholders of Signal Genetics, Inc.				(11,328)	(11,328)		
Balance, December 31, 2015	709,024	$ 7	$ 28,371	$ (17,968)	$ 10,410		$

(1) Members deficiency was reclassified to additional paid-in capital upon conversion from the Limited Liability Company to the Corporation.

See accompanying notes to consolidated financial statements.

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Signal Genetics, Inc.

Consolidated Statements of Cash Flows

(in thousands)

	Years Ended December 31, 2015	2014
Operating activities		
Net loss	$ (11,328)	$ (7,890)
Adjustments to reconcile net loss to net cash used in operating activities:		
Stock-based compensation	3,015	4,298
Depreciation and amortization	184	144
Noncash interest on note payable related party	132	1,007
Lease termination		46
Gain on legal settlement		(100)
Changes in operating assets and liabilities:		
Accounts receivable	694	(94)
Inventory	(8)	178
Prepaid expenses and other current assets	28	191
Accounts payable and accrued liabilities	633	383
Lease termination/abandonment payable	(248)	(376)
Net cash used in operating activities	(6,898)	(2,213)
Investing activities		
Purchases of property and equipment	(123)	(266)
(Increase) decrease in security deposit on lease	28	(8)
Net cash used in investing activities	(95)	(274)
Financing activities		
Proceeds from issuances of common stock, net of costs to issue	13,095	6,644
Proceeds from issuance of note payable/amounts due to related party		795
Proceeds from cash released from restricted cash account securing a letter of credit	50	
Shares repurchased to satisfy tax withholding obligation for restricted stock awards	(363)	
Repayment of capital lease obligation and note payable	(76)	(42)
Net cash provided by financing activities	12,706	7,397
Net increase in cash	5,713	4,910
Cash and cash equivalents, beginning of period	5,119	209
Cash and cash equivalents, end of period	$ 10,832	$ 5,119

Supplemental disclosure of cash flow information				
Cash paid for interest	$	6	$	1
Noncash investing and financing activities:				
Conversion of amounts due to related party to note payable related party	$	1,045	$	
Fair value of warrants and options for overallotment shares to underwriters issued in connection with public stock offerings	$	330	$	300
Conversion of note payable to Class C Units	$		$	27,326
Asset acquired under capital lease	$		$	164

See accompanying notes to consolidated financial statements.

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Signal Genetics, Inc.

Notes to Consolidated Financial Statements

1. Basis of Presentation

Signal Genetics, Inc. (the Company) is a commercial stage, molecular genetic diagnostic company focused on providing innovative diagnostic services that help physicians make better-informed decisions concerning the care of their patients suffering from cancer. In 2010, the Company became the exclusive licensee to the intellectual property stemming from the renowned research on multiple myeloma (MM), performed at the University of Arkansas for Medical Sciences (UAMS). Myeloma Prognostic Risk Signature (MyPRS) is based upon 30 years of clinical research on over 10,000 MM patients who received their care at UAMS. The Company currently generates revenues from the performance of its MyPRS diagnostic test, which was launched in April 2011.

Basis of Presentation and Liquidity

The accompanying consolidated financial statements include the Company and its wholly-owned subsidiaries. All intercompany accounts and transactions have been eliminated in consolidation.

Since its inception, the Company has devoted substantial effort in developing its products and services and has incurred losses and negative cash flows from operations. Prior to its IPO, all financial support had been provided by the Company s majority member. As of December 31, 2015, however, following the ATM program, the 2015 Offering, the Debt Conversion, the Corporate Conversion and the IPO, each as defined below, the Company has positive working capital and stockholders equity. Although the Company is forecasting continued losses and negative cash flows as it funds its expanding selling and marketing activities, and research and development programs, the Company believes that it has enough cash and cash equivalents on hand to support operations for 12 to 15 months from the date of this report. Going forward, as the Company continues its expansion, it may seek additional financing and/or strategic investments. However, there can be no assurance that any additional financing or strategic investments will be available to the Company on acceptable terms, if at all. If events or circumstances occur such that the Company does not obtain additional funding, it will most likely be required to reduce its plans and/or certain discretionary spending, which could have a material adverse effect on the Company s ability to achieve its intended business objectives.

Public Offerings of Common Stock

On July 10, 2015, the Company filed a prospectus for the offering, issuance and sale of securities from time to time in one or more offerings (Shelf Registration) which was declared effective by the SEC on July 28, 2015. The amount of securities to be sold pursuant to the Shelf Registration is limited by the Company s public float. Concurrently with filing the Shelf Registration, the Company entered into a sales agreement with Cantor Fitzgerald & Co., to sell shares of its common stock, with aggregate gross sales proceeds of up to $4.45 million, from time to time, through an at-the-market equity offering program (the ATM program). During the year ended December 31, 2015, the Company sold 182,333 shares of common stock pursuant to this registration for total cash proceeds of $4.0 million, which is net of $429,000 in sales agent s commissions and offering expenses. Due to the size of the Company s public float, the current ATM program has been completed, unless and until the Company s public float increases.

On February 20, 2015, the Company completed a public offering (the 2015 Offering) of 214,286 shares of its common stock, at $42.00 per share, for total cash proceeds of $7.8 million, which is net of $1.2 million in underwriter commissions and offering expenses. On February 26, 2015, the underwriters exercised their overallotment option for

32,143 additional shares of the Company s common stock, for total cash proceeds of $1.3 million, which is net of $95,000 in underwriter commissions.

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Corporate Conversion and Initial Public Offering

On June 17, 2014, the Company completed a corporate conversion and Signal Genetics LLC converted from a limited liability company to a Delaware corporation (the Corporate Conversion). Immediately prior to the Corporate Conversion, $27.3 million of the Company s note payable related party was converted into 2,732,629 newly authorized Class C units (the Debt Conversion). In connection with the Corporate Conversion, all outstanding Class A and C units of Signal Genetics LLC were converted into 13,333 and 182,174 shares, respectively, for an aggregate of 195,507 shares of common stock of the Company, the members of Signal Genetics LLC became stockholders of the Company and the Company succeeded to the business of Signal Genetics LLC and its consolidated subsidiaries.

On June 23, 2014, the Company completed an initial public offering (the IPO) of 56,667 shares of its common stock, at $150.00 per share, for net cash proceeds of $6.1 million, which is net of $2.4 million in underwriter commissions and offering expenses. The net contribution to additional paid-in capital was $5.8 million after deducting the noncash fair values of warrants and the option for overallotment shares issued in connection with the IPO.

2. Significant Accounting Policies

Use of Estimates

The accompanying consolidated financial statements have been prepared in accordance with accounting principles generally accepted in the United States (GAAP). The preparation of financial statements in conformity with GAAP requires management to make judgments, assumptions and estimates that affect the amounts reported in the Company s consolidated financial statements and accompanying notes. Significant estimates in the consolidated financial statements have been made for revenue, accounts receivable and allowance for doubtful accounts, accounting for income taxes, depreciation of property and equipment and stock-based compensation. Actual results could differ materially from those estimates.

Cash and Cash Equivalents

Cash is comprised of cash on hand and deposits in banks. The Company considers all highly liquid investments with a maturity at date of purchase of three months or less to be cash equivalents, which, at December 31, 2015, are comprised of money market funds. At December 31, 2014, the Company had $50,000 in a restricted money market account that was held as cash collateral against an outstanding letter of credit for security on a lease. The restriction was removed during 2015 and the cash balance transferred into the Company s money market account.

Accounts Receivable, and Contractual Allowances and Allowance for Doubtful Accounts

Accounts receivable are recorded net of contractual allowances and an allowance for doubtful accounts. At December 31, 2015 and 2014, contractual allowances were $2.1 million and $1.5 million, respectively. The Company estimates an allowance for doubtful accounts based on the aging of the accounts receivable and the historical collection experience for each type of payor. Account balances are charged-off against the allowance when it is probable the receivable will not be recovered.

During the years ended December 31, 2015 and 2014, the Company recognized $33,000 and $177,000 in bad debt expense, respectively. At December 31, 2015 and 2014, there were no allowances for doubtful accounts.

Inventory

Inventory, which consists entirely of raw materials, and includes laboratory materials and supplies, is valued at the lower of cost or market using the first-in, first-out (FIFO) method.

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Property and Equipment

Property and equipment is carried at cost. Expenditures for major additions and betterments are capitalized. Maintenance and repairs are charged to operations as incurred. Depreciation and amortization are calculated using the straight-line method over the estimated useful lives of the assets, which range from three to ten years. Upon sale or retirement of property and equipment, the related cost and accumulated depreciation are removed from the accounts and any gain or loss is reflected in operations.

Long Lived Assets

Long-lived assets, consisting of property and equipment, are reviewed for impairment whenever events or changes in circumstances indicate that the carrying value of an asset may not be recoverable based on undiscounted cash flows. If long-lived assets are impaired, an impairment loss is recognized and is measured as the amount by which the carrying value exceeds the estimated fair value of the assets. No impairment charges were recorded during the years ended December 31, 2015 or 2014.

Deferred Offering Costs

During the year ended December 31, 2014, the Company incurred $47,000 in direct costs related to its anticipated public offering of common stock. These costs were deferred and recorded as a long-term asset at December 31, 2014 and reclassified as a reduction to additional paid-in capital upon completion of the 2015 Offering.

Deferred Rent

Where rent abatements are made available to the Company under the terms of a lease agreement, the abatements are accounted for as a reduction of rent expense over the life of the lease and rent expense is recognized on a straight-line basis over the entire term of the lease. The cumulative difference between actual rent payments and recognized rental expense is recorded as deferred rent in the consolidated balance sheets.

Revenue Recognition

Revenues that are derived from testing services are recognized in accordance with revenue recognition accounting guidance, which requires that four basic criteria be met before revenue can be recognized: (1) persuasive evidence that an arrangement exists; (2) delivery has occurred and title and the risks and rewards of ownership have been transferred to the client or services have been rendered; (3) the price is fixed or determinable; and (4) collectability is reasonably assured.

Revenues are recorded on an accrual basis when the contractual obligations are completed as tests are processed through the Company s laboratory and test results are delivered to ordering physicians. Revenues are billed to various payors, including Medicare, contracted insurance companies, directly billed customers (UAMS, pharmaceutical companies, reference laboratories and hospitals) and non-contracted insurance companies. Revenues from Medicare, contracted insurance companies and directly billed customers are reported based on the contractual rate. The difference between the amounts billed and the contractual rates from Medicare and contracted insurance companies are recorded as contractual allowances at the same time the revenue is recognized, to arrive at reported net revenue. The contractual rate is based on established agreed upon rates between the Company and the respective payor. Directly billed customers are invoiced at the contractual rate by the Company. Revenues from non-contracted insurance companies are reported based on the amount expected to be collected, which is based on the historical collection experience of each payor or payor group, as appropriate, and anticipated effects of changes in the healthcare

industry, if any. The difference between the amount billed and the amount estimated to be collected from non-contracted insurance companies is recorded as a contractual allowance at the same time the revenue is recognized, to arrive at reported net revenue. The Company does not

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record revenue from individuals for billings until cash is collected; as collectability is not assured at the time services are provided, therefore there are no accounts receivable from self-payors. Gross revenues from individuals have been immaterial to date.

The Company s estimates of net revenue for non-contracted insurance companies are subject to change based on the contractual status and payment policies of the third-party payors with whom the Company deals. The Company regularly refines its estimates in order to make estimated revenue as accurate as possible based on its most recent collection experience with each third-party payor. The Company regularly reviews its historical collection experience for non-contracted payors and anticipated changes in the healthcare industry and adjusts expected revenues for current and subsequent periods accordingly. During the year ended December 31, 2015, net unfavorable changes in estimates were recorded to revenue related to non-contracted revenues recorded in the prior year of $193,000. During the year ended December 31, 2014, net unfavorable changes in estimates were recorded to revenue related to non-contracted revenues recorded in prior years of $380,000, of which $106,000 and $274,000 related to revenues previously recorded during 2012 and 2013, respectively.

The table below shows the adjustments made to gross revenues to arrive at net revenues, the amount reported in the consolidated statements of operations (in thousands):

	Years Ended December 31,	
	2015	2014
Gross revenues	$ 5,706	$ 6,484
Less: contractual allowances	(3,168)	(2,164)
Net revenue	$ 2,538	$ 4,320

Contractual allowances recorded during the years ended December 31, 2015 and 2014 represented 56% and 33% of gross revenues, respectively. The increase in the contractual allowances is due to changes in the Company s estimates of net revenue for non-contracted payors based on the contractual status and payment policies of the payors, and anticipated changes in the healthcare industry.

Cost of Revenue

Cost of revenue represents the cost of materials, personnel costs, costs associated with processing specimens including pathological review, quality control analyses, and delivery charges necessary to render an individualized test result, depreciation, amortization and royalty expense. Costs associated with performing tests are recorded as the tests are processed.

Royalties

The Company licenses technology for patents for uses of a gene expression profiling (GEP) assay called MyPRS and its related technology. Under the terms of the license agreement, the Company is required to pay royalties to UAMS. The royalties are calculated as a fixed percentage of the net revenue received from third parties that the Company generates from using this technology. The Company accrues for such royalties when incurred, which is based on when revenue is collected. Such royalties are included in cost of revenue in the accompanying consolidated statements of operations.

Research and Development

Costs associated with research and development activities are expensed as incurred. Research and development costs primarily include personnel costs, laboratory supplies, reagents, consulting and sponsored research agreements.

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Income Taxes

Prior to the Corporate Conversion, the Company was a limited liability company, which is not a tax paying entity at the corporate level. Each member was instead individually responsible for such member s share of the Company s income or loss for income tax reporting purposes. Net operating losses incurred by the Company through the date of the Corporate Conversion have been, or will be, used by the members to offset gains on other interests and are, therefore, not able to be carried forward to the Company.

Effective as of the Corporate Conversion, deferred tax assets and liabilities are recorded for the expected future tax consequences of events that have been included in the consolidated financial statements or income tax returns. Deferred taxes are determined on the basis of the differences between the carrying amount of assets and liabilities for

financial statement and income tax purposes, as well as tax credit and net operating loss carryforwards, at enacted rates in effect for the years in which the differences are expected to reverse. Valuation allowances are established, when necessary, to reduce deferred tax assets to the amounts expected to be realized.

Applicable accounting guidance requires that a position taken or expected to be taken in a tax return be recognized in the financial statements when it is more likely than not that the position would be sustained upon examination by tax authorities. A recognized tax position is then measured at the largest amount of benefit that is greater than 50% likely of being realized upon ultimate settlement. Accounting provisions also require that a change in judgment that results in subsequent recognition, derecognition, or change in a measurement of a tax position taken in a prior annual period (including any related interest and penalties) be recognized as a discrete item in the period in which the change occurs. The Company regularly evaluates the likelihood of recognizing the benefit for income tax positions taken in various federal and state filings by considering all relevant facts, circumstances, and information available.

Any interest and penalties related to unrecognized tax benefits are classified as a component of income tax expense.

Stock-Based Compensation

Compensation expense for all stock-based payments made to employees, directors, and consultants are measured and recognized based on estimated fair value, net of an estimated forfeiture rate. These stock-based awards include stock options and restricted stock units. The Company estimates the fair value of stock options granted using the Black-Scholes-Merton (BSM), option-pricing model, which requires the use of estimates such as stock price volatility and expected option lives, as well as expected option forfeiture rates. The fair value of stock options granted to employees and directors is estimated at the date of grant.

The fair value of restricted stock units issued to employees and directors is based on the market price of the Company s common stock on the date of grant and, for non-employees, at the date when performance is complete. For stock-based compensation awards granted to non-employees, the fair value of the awards are remeasured at each reporting date until vested, with changes in the estimated fair value recognized as an adjustment to compensation expense in the period of change. Upon settlement of all or a portion of the award in cash, the recognized fair value of the corresponding amount of awards is reversed from additional paid-in capital and the excess of the cash payment over this amount is recognized as additional stock-based compensation expense.

Stock-based compensation cost is recognized on a straight-line basis over the requisite service period of the award. Stock-based compensation expense is recognized only for those awards that are ultimately expected to vest. The Company estimates forfeitures at the time of grant and revises the estimate, if necessary, in subsequent periods if actual forfeitures differ from those estimates. Changes in forfeiture estimates impact compensation cost in the period

in which the change in estimate occurs.

Due to the Company s net loss position, no tax benefits for stock-based compensation have been recognized in the statements of cash flows. The Company has not recognized, and does not expect to recognize in the near future, any tax benefit related to stock-based compensation cost as a result of its full valuation allowance on net deferred tax assets and net operating loss carryforwards.

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Fair Value of Financial Instruments

The Company s financial instruments that are measured at fair value on a recurring basis consist principally of cash and cash equivalents, restricted cash, accounts receivable, accounts payable and note payable-related party.

Fair value is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants on the measurement date. Accounting guidance also establishes a fair value hierarchy that requires an entity to maximize the use of observable inputs and minimize the use of unobservable inputs when measuring fair value. The standard describes three levels of inputs that may be used to measure fair value:

Level 1 Observable inputs that reflect quoted prices (unadjusted) for identical assets or liabilities in active markets.

Level 2 Includes other inputs that are directly or indirectly observable in the marketplace.

Level 3 Unobservable inputs that are supported by little or no market activities, therefore requiring an entity to develop its own assumptions.

At December 31, 2015 and 2014, the Company s cash equivalent instruments consisted of $10.4 million and $0, respectively, in a money market fund which is reported at fair value using Level 1 inputs. The carrying amounts of financial instruments such as restricted cash, accounts receivable, accounts payable and note payable-related party approximate their relative fair values due to the short-term maturities and market rates of interest of these instruments.

At December 31, 2014, the fair value of the Company s remaining lease liability on its vacated facility, which was paid in full during 2015, was measured using estimated net cash flows, discounted using a nominal risk-free rate, which are considered Level 3 inputs. The present value of the remaining lease liability at December 31, 2014 was $248,000.

Net Loss Per Share

Basic and diluted net loss per common share for the periods presented is computed by dividing net loss by the weighted-average number of common shares outstanding during the respective periods, without consideration of common stock equivalents. Basic and diluted net loss per common share includes vested, but unissued restricted stock units from the date of vesting.

Common stock equivalents, determined on a weighted-average outstanding basis, that could potentially reduce net income per common share in the future that were not included in the determination of diluted loss per common share as their effects were antidilutive are as follows:

	December 31,	
	2015	**2014**
Unvested restricted stock units	28,739	43,680
Options to purchase common stock	23,681	10,133
Warrants to purchase common stock	12,029	2,833
Total	64,449	56,646

Concentration of Credit Risk, Major Customers and Suppliers

Financial instruments that potentially subject the Company to concentrations of credit risk are primarily cash and cash equivalents. Cash is maintained at two financial institutions and, at times, balances may exceed federally insured limits. The Company has not experienced any losses related to these balances. The Company invests excess cash in money market funds under the custodianship of a major financial institution. This diversification of risk is consistent with the Company s policy to ensure safety of principal and maintain liquidity.

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The Company had two major customers, UAMS and H. Lee Moffitt Cancer Center and Research Institute (Moffitt). Revenue sourced either from or through UAMS accounted for 54% and 84% of net revenue during the years ended December 31, 2015 and 2014, respectively, and revenue sourced through Moffitt accounted for 10% and 9% of net revenue during the years ended December 31, 2015 and 2014 respectively. Accounts receivable from UAMS at December 31, 2015 and 2014 accounted for 19% and 42%, respectively, of total accounts receivable outstanding. At December 31, 2015 and 2014 the Company had no accounts receivable from Moffitt.

Inventory used in the Company s testing process is procured from one supplier. Any supply interruption or an increase in demand beyond such supplier s capabilities could have an adverse impact on the Company s business. Management believes it could identify alternative suppliers, if necessary, but it is possible such suppliers may not be identified in a timely manner to avoid an adverse impact on the Company s business.

Reclassifications

Reclassifications of certain operating expenses in the consolidated statement of operations have been made to year ended December 31, 2014 to conform to the 2015 presentation.

Recent Accounting Pronouncements

In February 2016, the Financial Accounting Standards Board (FASB) issued *Accounting Standards Update (ASU) No. 2016-02*, which replaces the existing accounting guidance for leases. This standard requires entities that lease assets to recognize the assets and liabilities for the rights and obligations created by those leases on the balance sheet. The standard is effective for fiscal years and the interim periods within those fiscal years beginning after December 15, 2018. The guidance is required to be applied by the modified retrospective transition approach and early adoption is permitted. The Company is currently assessing the impact that adoption of this guidance will have on its consolidated financial statements and footnote disclosures.

In July 2015, the FASB issued *ASU 2015-11*, which simplifies the measurement of inventories valued under most methods, including the Company s inventories valued under the FIFO method. Under this new guidance, inventories valued under these methods would be valued at the lower of cost and net realizable value, with net realizable value defined as the estimated selling price less reasonable costs to sell the inventory. The new guidance is effective prospectively for the Company s quarterly reporting period beginning January 1, 2017, with early adoption permitted. The Company is currently assessing the impact that this standard will have on its consolidated financial statements.

In May 2014, the FASB issued *ASU 2014-09, Revenue from Contracts with Customers*, which outlines a single comprehensive model for entities to use in accounting for revenue from contracts with customers and supersedes most current revenue recognition guidance in FASB ASC 605, Revenue Recognition, including industry-specific guidance. This standard is based on the principle that an entity should recognize revenue to depict the transfer of goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. This standard also requires additional disclosure about the nature, amount, timing and uncertainty of assets recognized from costs incurred to fulfill a contract and was originally effective for the Company s annual reporting period beginning January 1, 2018, including interim periods within that reporting period. In July 2015, the FASB voted to defer the effective date of this ASU by one year, which is effective for the Company s annual reporting period beginning January 1, 2019, with early adoption permitted beginning with the annual reporting period ending December 31, 2017. Entities have the option of using either a full retrospective or a modified retrospective approach for the adoption of the new standard. The Company is currently assessing the impact that this standard will have on its consolidated financial statements.

In August 2014, the FASB issued *ASU 2014-15, Presentation of Financial Statements Going Concern*, which provides guidance on management s responsibility in evaluating whether there is substantial doubt about a

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company s ability to continue as a going concern and the related footnote disclosure. For each reporting period, management will be required to evaluate whether there are conditions or events that raise substantial doubt about a company s ability to continue as a going concern within one year from the date the financials are issued. When management identifies conditions or events that raise substantial doubt about the entity s ability to continue as a going concern, this standard also outlines disclosures that are required in the company s footnotes based on whether or not there are any plans intended to mitigate the relevant conditions or events to alleviate the substantial doubt. This standard becomes effective for the Company s annual reporting period ending December 31, 2016, and for annual and interim periods thereafter. Early application is permitted. The Company does not expect the adoption of this standard to have a material impact on its consolidated financial statements.

Future Accounting Pronouncements

Section 107 of the Jumpstart Our Business Startups Act of 2012 (the JOBS Act) provides that an emerging growth company, such as the Company, may take advantage of an extended transition period for complying with new or revised accounting standards. Thus, an emerging growth company may delay the adoption of certain accounting standards until those standards would otherwise apply to private companies. Although, to date, the Company has not taken advantage of this delay, the Company has elected to avail itself of the extended transition period for adopting new or revised accounting standards in the future. As a result of this election, the Company s consolidated financial statements may not be comparable to companies that comply with public company effective dates.

3. Balance Sheet Accounts and Supplemental Disclosures

Property and Equipment

Property and equipment consist of the following (in thousands):

	December 31,	
	2015	**2014**
Laboratory and computer equipment	$ 1,817	$ 1,711
Furniture and fixtures	69	52
Leasehold improvements	6	6
	1,892	1,769
Less: accumulated depreciation and amortization	(739)	(555)
Total property and equipment, net	$ 1,153	$ 1,214

An asset with a cost of $300,000 recorded under a capital lease is included in the laboratory equipment balance at December 31, 2015 and 2014.

Accrued Expenses

Accrued expenses consist of the following (in thousands):

	December 31,	
	2015	2014
Accrued bonuses	$ 592	$ 183
Accrued compensation and related expenses	234	74
Accrued interest payable related party	73	
Accrued contract research and development	35	
Accrued offering costs		42
Other	84	62
Total accrued expenses	$ 1,018	$ 361

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4. Amount Due Related Party, Notes Payable and Capital

Note Payable Related Party and Amounts Due to Related Party

On March 6, 2015, the amounts due to related party, aggregating $1,045,000, were converted into an unsecured note payable related party, bearing interest at 8% per annum and due on demand. The principal amount of the note was increased by $60,000 over the amounts due to related party to $1,105,000 to provide the equivalent of 8% per annum interest for the period of time the amounts due to related party were held as a payable in exchange for a provision that the related party would not call the note prior to June 30, 2015. The increase in the principal amount of the note was deferred and amortized to interest expense over the initial term of the note to June 30, 2015. Interest expense related to this note during the year ended December 31, 2015 was $132,000. The note balance at December 31, 2015 was $1,105,000 and accrued interest payable of $73,000 is included in accrued liabilities in the consolidated balance sheet at December 31, 2015.

During the year ended December 31, 2014, the Company s then majority member, through various entities controlled by such member, loaned a net amount of $795,000 to the Company to support its operations. Pursuant to the terms of an Exchange Agreement, and prior to the Corporate Conversion, $27.3 million of the Secured Note payable as of June 17, 2014 was exchanged for 2,732,629 Class C units of Signal Genetics LLC and recorded to members equity. The remaining $1.0 million as of that date, along with an additional $45,000, which was advanced to pay for certain offering expenses, was reclassified as unsecured amounts due to related party in the consolidate balance sheet. Such amounts due were converted into an unsecured note payable related party as discussed above.

Prior to the Debt Conversion, the Secured Note bore interest at 8% compounded quarterly, was due on demand and collateralized by substantially all assets of the Company. The average amount of borrowings during the years ended December 31, 2014 (prior to conversion) were $27.4 million. Interest expense related to the note during the year ended December 31, 2014 was $1.1 million.

Capital Lease Obligation

In December 2014, the Company entered into a new two-year capital lease obligation for laboratory equipment which expires in January 2017, and provides for monthly rent of $7,200. The lease obligations at December 31, 2015 and 2014 were $88,000 and $164,000, which are net of $6,000 and $8,000, respectively, in unamortized discounts. Future maturities of this obligation at December 31, 2015 are $86,000 and $7,000 during 2016 and 2017, respectively. Laboratory equipment with a net book value of $270,000 at December 31, 2015 serves as collateral for this obligation.

5. Stockholders Equity

Preferred Shares

The Company has authorized 5,000,000 shares of preferred stock, of which no shares were issued or outstanding at December 31, 2015 or 2014. The Company s board of directors has the authority to issue preferred stock in one or more classes or series and to fix the designations, powers, preferences and rights, and the qualifications, limitations or restrictions thereof, including dividend rights, conversion right, voting rights, terms of redemption, liquidation preferences and the number of shares constituting any class or series, without further vote or action by the stockholders.

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Common Shares

The Company has authorized 50,000,000 shares of common stock, of which 709,024 and 252,174 shares were issued and outstanding at December 31, 2015 and 2014, respectively. Common shares reserved for future issuance upon the exercise, issuance or conversion of the respective equity instruments at December 31, 2015 is as follows:

Issued and Outstanding:	
Restricted stock units	23,450
Stock options	42,104
Warrants	13,534
Shares reserved for future award grants	46,350
Total	125,438

Public Offerings of Common Stock

During September 2015, the Company sold 182,333 shares of common stock for total cash proceeds of $4.0 million, which is net of $429,000 in sales agent s commissions and offering expenses, pursuant to its July 2015 ATM program. Due to the size of the Company s public float, the current ATM program has been completed, unless and until the Company s public float increases.

On February 20, 2015, the Company completed a public offering of 214,286 shares of its common stock, at $42.00 per share, for total cash proceeds of $7.8 million, which is net of $1.2 million in underwriter commissions and offering expenses. In connection with the offering, the Company granted a 45-day option to the underwriter to purchase up to 32,143 shares of common stock to cover overallotments, with an aggregate grant date fair value of $132,000. On February 26, 2015, the underwriters exercised the overallotment option for total cash proceeds of $1.3 million, which is net of $95,000 in underwriter commissions. In connection with this offering, as a portion of the underwriting compensation payable to the underwriters, the Company issued warrants to purchase 10,707 shares of its common stock to the representative of the underwriters with an aggregate grant date fair value of $198,000. The warrants are exercisable at any time from February 2016 through February 2020 at an exercise price of $52.50 per share. The aggregate fair values of the warrants and overallotment option issued were recorded as an increase to additional paid-in capital with an offset to the proceeds from the offering. The net contribution to additional paid-in capital was $8.7 million after deducting the noncash fair values of warrants and overallotment option issued in connection with the offering.

The estimated fair values of the warrants and overallotment option were determined on their respective measurement dates using the BSM option valuation model with the following assumptions:

	Warrants	Overallotment Option
Fair value of underlying common stock	$ 38.55	$ 39.30
Exercise price	$ 52.50	$ 39.00
Risk-free interest rate	1.61%	0.02%
Volatility	65.5%	73.0%
Dividend yield	0%	0%

Contractual term (in years)	5.0	0.12
Weighted-average measurement date fair value per share	$ 18.45	$ 4.05

Initial Public Offering

On June 23, 2014, the Company completed an IPO of 56,667 shares of its common stock, at $150.00 per share, for total net cash proceeds of $6.1 million, which is net of $2.4 million in underwriter commissions and offering

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expenses. The net contribution to additional paid-in capital was $5.8 million after deducting the noncash fair values of warrants and option for overallotment shares issued in connection with the IPO.

In connection with the IPO in June 2014, the Company issued warrants to certain designees of the underwriter to purchase an aggregate of 2,827 shares of common stock with an aggregate grant date fair value of $143,000. The warrants are exercisable at any time from June 17, 2015 through June 17, 2019. Also, in connection with the IPO, the Company granted a 45-day option to the underwriter to purchase up to 8,500 shares of common stock to cover overallotments, with an aggregate grant date fair value of $157,000. The aggregate fair values of the warrants and stock option issued were recorded as an increase to additional paid-in capital with an offset to the proceeds from the IPO.

The estimated fair values of the warrants and stock option award were determined on their respective measurement dates using the BSM option valuation model with the following assumptions:

	Warrants	Options
Fair value of common stock	$ 117.60	$ 150.00
Exercise price	$ 187.50	$ 139.50
Risk-free interest rate	1.72%	0.035%
Volatility	64.6%	63.0%
Dividend Yield	0%	0%
Contractual term (in years)	5.0	0.12
Weighted-average measurement date fair value per share	$ 50.70	$ 18.45

Corporate Conversion

Immediately prior to the Corporate Conversion, Signal Genetics LLC had issued and outstanding 72,500 Class A units and 41,088 Class B units (23,328 of which were unvested). In connection with the Debt Conversion, on June 17, 2014, the note payable related party was exchanged for 2,732,629 Class C units of the Company. On June 17, 2014, the outstanding Class A and Class C units of Signal Genetics LLC were converted into 13,333 and 182,174 shares, respectively, for an aggregate of 195,507 shares of common stock at $150.00 per share. All outstanding Class B units, which consisted of equity incentive units, were cancelled.

6. Stock Compensation Plan

The Company s 2014 Stock Incentive Plan (the Plan) provides for stock awards that may be made in the form of incentive or non-statutory stock options, stock appreciation rights, restricted or unrestricted stock awards, restricted stock units, performance awards, or other stock-based awards. No awards may be granted after June 16, 2024. On June 18, 2015, the Company s stockholders approved the First Amendment to the Plan which provided for an increase in the number of shares of common stock reserved for issuance under the Plan from 83,026 to 140,000, and an annual increase on the first day of each calendar year, beginning with January 1, 2016 that is equal to the lesser of four percent of the shares of common stock outstanding on the last day of the immediately preceding fiscal year or a smaller number of shares as determined by the board of directors. At December 31, 2015, up to 111,904 shares of common stock may be issued under the Plan, of which 65,554 shares are reserved for issuance upon the exercise of outstanding options and vesting of outstanding restricted stock units, and 46,350 shares are available for future grants.

Restricted Stock Units (RSUs)

All of the Company s outstanding RSU agreements provide for the settlement of the vested RSUs in shares of the Company s common stock equal to the number of vested RSUs or an amount in cash equal to the product of the fair market value of the common stock on the respective payment date and the number of vested RSUs, or some combination of common shares and cash as determined by the plan administrator as of each settlement date.

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RSUs generally vest over a period of one to four years, subject to earlier cancellation or forfeiture prior to vesting upon cessation of service to the Company. The total fair value of RSUs that vested during the year ended December 31, 2015 was $734,000. A summary of the activity related to RSUs during year ended December 31, 2015 is as follows:

	Number of Shares	Weighted-Average Grant Date Fair Value per Share
Unvested at December 31, 2014	43,676	$ 138.00
Granted	1,332	$ 24.30
Vested	(30,609)	$ 138.45
Unvested at December 31, 2015	14,399	$ 126.45

During the year ended December 31, 2015, the Company issued 28,088 shares in settlement of RSUs that vested in 2015 and 2014. As permitted under the Plan, the Company repurchased 12,461 shares with an aggregate value of $363,000 during the year ended December 31, 2015 to satisfy tax withholding obligations for employees in connection with the vesting of restricted stock units previously granted.

Stock Options

Stock options generally vest over a four-year period and have a maximum term of ten years from the date of grant, subject to earlier cancellation prior to vesting upon cessation of service to the Company. A summary of the activity related to stock option awards during the year ended December 31, 2015 is as follows:

	Shares Subject to Options	Weighted-Average Exercise Price per Share	Weighted-Average Remaining Contractual Term (in years)	Aggregate Intrinsic Value (in thousands)
Outstanding at December 31, 2014	10,133	$ 67.95		
Granted	34,226	$ 24.00		
Forfeitures and cancellations	(2,255)	$ 32.10		
Outstanding at December 31, 2015	42,104	$ 34.20	9.4	$
Options exercisable at December 31, 2015	5,200	$ 48.00	9.1	$
Options vested and expected to vest as of December 31, 2015	42,104	$ 34.20	9.4	$

Stock-Based Compensation Expense

The estimated fair value of each stock option award was determined on the date of grant using the BSM option valuation model with the following assumptions:

	Years Ended December 31,	
	2015	2014
Risk-free interest rate	1.34% - 1.94%	1.73% - 2.03%
Expected volatility	58.9% - 67.8%	65.3% - 66.9%
Weighted-average volatility	60.2%	66.3%
Dividend yield	0%	0%
Expected term (in years)	6.0	6.3
Weighted-average grant date fair value per share	$13.50	$42.15

The fair value of each stock option is estimated on the date of grant using the BSM option pricing model which requires the input of highly subjective assumptions. Because the option-pricing model is sensitive to change in the input assumptions, different determinations of the required inputs may result in different fair value estimates of the options. The risk-free interest rate is based on the rate currently available on U.S. Treasury issues with

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terms approximating the expected term of the option. Due to the Company s limited historical stock data, the estimated future stock price volatility is based upon the average historical volatilities of a group of peer companies. The Company has not paid any dividends on common stock since the Corporate Conversion and does not anticipate paying dividends on common stock in the foreseeable future. The Company did not issue options prior to the IPO and, therefore, has no history of option exercises. As such, the simplified method has been used to estimate the expected term of options.

Stock-based compensation expense is recognized only for those awards that are ultimately expected to vest. Forfeitures are required to be estimated at the time of grant and revised, if necessary, in subsequent periods if actual forfeitures differ from those estimates.

Total non-cash stock-based compensation expense for all stock awards that was recognized in the consolidated statements of operations is as follows (in thousands):

	Years Ended December 31,	
	2015	2014
Cost of revenue	$ 57	$ 257
Selling and marketing	62	16
Research and development	98	121
General and administrative	2,798	3,904
Total	$ 3,015	$ 4,298

At December 31, 2015, there was $1.5 million of unamortized compensation cost related to unvested RSUs which is expected to be recognized over a remaining weighted-average vesting period of 1.3 years. At December 31, 2015, there was $628,000 of unamortized compensation cost related to unvested stock option awards, which is expected to be recognized over a remaining weighted-average vesting period of 2.8 years.

7. Commitments and Contingencies

Operating Leases

During 2014, the Company entered into a new lease for office space for its corporate headquarters in California, which expires in October 2017. The lease provides for monthly rent of $14,000, which will increase at a rate of 3% annually, and includes three months of rent abatement during the first year with an option to renew the lease for one additional 36-month period.

The Company leases a laboratory and office facility under a non-cancellable operating lease agreement, which expires on March 31, 2016. Monthly rent expense is $6,400. Subsequent to December 31, 2015, in February 2016, the Company extended the lease for one year to March 2017, with monthly rent expense of $6,750.

Rent expense during the years ended December 31, 2015 and 2014 was $234,000 and $149,000, respectively. In addition, certain administrative functions were performed at an office location leased by the majority stockholder through September of 2014 at no charge to the Company. No amount has been charged for these functions as it is not deemed reasonable to estimate.

At December 31, 2015, the future minimum annual obligations under non-cancellable operating lease commitments, excluding the abandoned lease liability described below, are $173,000 and $148,000 during 2016 and 2017, respectively.

Lease Abandonment

In March 2014, the Company entered into a termination agreement with the landlord of one of its operating leases and agreed to a termination fee of $565,000, payable in monthly installments of $31,400, which were paid

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in full through August 2015. The present value of the remaining payments under the termination agreement at December 31, 2014 and reported in the consolidated balance sheet was $248,000. The termination agreement resulted in a change in estimate which is reported as an additional expense of $46,000 during the year ended December 31, 2014 and is included in general and administrative expenses in the consolidated statement of operations.

Licensing Agreement

The Company has a licensing agreement with UAMS for the exclusive use of patents used in the GEP assay, MyPRS and its related technology through April 2020. The agreement is effective through the earlier of the expiration of the related patents or termination of the agreement pursuant to its terms. The Company may terminate the agreement for any reason upon 90 days written notice. UAMS may terminate the agreement with 90 days written notice upon a material breach of the agreement by the Company or if the Company challenges the validity of any licensed patent in a court of competent jurisdiction. Under the terms of the license agreement, the Company is required to pay $30,000 in annual minimum royalties on sales to customers other than UAMS unless sales, as defined in the agreement, exceed certain thresholds in which case the additional royalties would range from 2% 4%. Total royalty expense during each of the years ended December 31, 2015 and 2014 was $30,000.

Services Agreement

The Company has a services agreement with a third party to assist with billing and collections from customers through March 2017. The agreement contains automatic one-year renewals, unless a 90-day termination notice is given by either party. Under the terms of the agreement, fees to the third party are based on a percentage of cash collections. The Company has a minimum commitment of $10,000 per month. During the years ended December 31, 2015 and 2014, the Company paid $126,000 and $142,000, respectively, to this vendor. At December 31, 2015, the future minimum commitments under this agreement are $120,000 and $30,000 during the years ended December 31, 2016 and 2017, respectively.

Litigation

The Company is, from time to time, involved in legal proceedings, regulatory actions, claims and litigation arising in the ordinary course of business. Currently, the Company is not a defendant in any lawsuit.

Litigation Settlement

In August 2013, the Company settled a lawsuit in which it was the plaintiff for a tortuous interference claim regarding a potential acquisition for a payment of at least $350,000, of which $250,000 was received in January 2014 and the remaining $100,000 was received in January 2015. At December 31, 2014 the Company recorded a receivable for $100,000 in prepaid expenses and other current assets in the consolidated balance sheets, and recognized the related gain for $100,000 during the year ended December 31, 2014.

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8. Income Taxes

The principal items accounting for the difference in income taxes computed at the federal statutory tax rate of 34% and the effective income tax rate for the Company s operations during the year ended December 31, 2015 and the period subsequent to the Corporate Conversion on June 17, 2014 through December 31, 2014 are as follows (in thousands):

	Year Ended December 31, 2015	June 17, 2014 to December 31, 2014
Federal tax at statutory rate	$ (3,851)	$ (2,682)
Signal Genetics LLC loss, prior to Corporate Conversion, not taxed at corporate level		425
State taxes, net of federal benefit	(277)	(141)
Change in valuation allowance	3,625	1,356
Nondeductible compensation	526	1,046
Credits and other	(23)	(4)
Total provision for income taxes	$	$

Significant components of the Company s deferred tax assets and liabilities are as follows (in thousands):

	December 31, 2015	2014
Deferred Tax Assets:		
Net operating loss carryforwards	$ 3,913	$ 853
Stock-based compensation	810	463
Accrued compensation	257	74
Deferred rent	14	
Credit carryforward	52	6
Total deferred tax assets	5,046	1,396
Valuation allowance	(4,696)	(1,196)
Deferred tax assets, net of valuation allowance	350	200
Deferred tax liabilities:		
Depreciation and amortization	(350)	(200)
Net deferred tax assets	$	$

A valuation allowance is established when it is more likely than not the future realization of all or some of the deferred tax assets will not be achieved. Based on the available evidence at December 31, 2015 and 2014, the Company was not able to conclude that it is more likely than not certain deferred tax assets will be realized, and, therefore, recorded valuation allowances of $4.7 million and $1.2 million, respectively, against deferred tax assets.

As of December 31, 2015, the Company had operating loss carryforwards for federal and state tax purposes of $10.6 million each, which will begin to expire in 2035. In addition, the Company has $52,000 in federal tax credits at December 31, 2015 that will begin to expire in 2035.

Internal Revenue Code Sections 382 and 383 limit the availability of income tax net operating losses and tax credit carryforwards that arise prior to certain cumulative changes in a corporation s ownership resulting in change of control of the Company should such changes in ownership occur. Pursuant to Internal Revenue Code Sections 382 and 383, use of the Company s net operating loss and credit carryforwards may be limited if a cumulative change in ownership of more than 50% occurs within a three-year period.

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The Company s 2015 and 2014 tax years remain open to examination by one or more major taxing jurisdictions to which the Company is subject.

9. Subsequent Events

On November 4, 2016, the Company filed with the Secretary of State of the State of Delaware a Certificate of Amendment of Certificate of Incorporation of the Company, to effect a one-for-15 reverse stock split of its shares of common stock (Reverse Split), effective following the close of trading on the NASDAQ Capital Market on November 4, 2016, which decreased the number of shares of its common stock issued and outstanding from approximately 11.1 million shares to approximately 740,000 shares. The Company s authorized shares of common stock will not be affected by the Reverse Split.

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Signal Genetics, Inc.

Condensed Balance Sheets

(in thousands, except share and par value data)

	September 30, 2016 (unaudited)	December 31, 2015
Assets		
Current assets:		
Cash and cash equivalents	$ 5,351	$ 10,832
Accounts receivable, net	733	394
Inventory	62	187
Prepaid expenses and other current assets	366	321
Total current assets	6,512	11,734
Property and equipment, net	1,014	1,153
Security deposits	15	15
Total assets	$ 7,541	$ 12,902
Liabilities and stockholders equity		
Current liabilities:		
Accounts payable	$ 51	$ 242
Accrued liabilities	1,649	1,018
Note payable related party	1,105	1,105
Other current liabilities	48	103
Total current liabilities	2,853	2,468
Other noncurrent liabilities	2	24
Commitments and contingencies		
Stockholders equity:		
Preferred stock, $0.01 par value, 5,000,000 shares authorized, no shares issued or outstanding at September 30, 2016 or December 31, 2015		
Common stock, $0.01 par value, 50,000,000 shares authorized, 719,353 and 709,024 shares issued and outstanding at September 30, 2016 and December 31, 2015, respectively	7	7
Additional paid in capital	29,751	28,371
Accumulated deficit	(25,072)	(17,968)
Total stockholders equity	4,686	10,410
Total liabilities and stockholders equity	$ 7,541	$ 12,902

See accompanying notes to unaudited condensed financial statements.

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Signal Genetics, Inc.

Unaudited Condensed Statements of Operations

(in thousands, except share and per share data)

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2016	2015	2016	2015
Net revenue	$ 889	$ 501	$ 2,581	$ 1,879
Operating expenses:				
Cost of revenue	599	577	1,856	2,016
Research and development	226	253	867	546
Selling and marketing	373	796	1,438	1,804
General and administrative	1,507	2,003	5,455	5,743
Total operating expenses	2,705	3,629	9,616	10,109
Loss from operations	(1,816)	(3,128)	(7,035)	(8,230)
Interest expense	(23)	(24)	(69)	(118)
Net loss	$ (1,839)	$ (3,152)	$ (7,104)	$ (8,348)
Net loss per common share, basic and diluted	$ (2.55)	$ (5.85)	$ (9.90)	$ (17.25)
Weighted-average number of shares outstanding, basic and diluted	719,189	541,675	716,957	482,308

See accompanying notes to unaudited condensed financial statements.

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Signal Genetics, Inc.

Unaudited Condensed Statements of Cash Flows

(in thousands)

	Nine Months Ended September 30,	
	2016	**2015**
Operating activities		
Net loss	$ (7,104)	$ (8,348)
Adjustments to reconcile net loss to net cash used in operating activities:		
Stock-based compensation	1,441	2,258
Depreciation and amortization	142	137
Noncash interest on note payable related party	66	110
Changes in operating assets and liabilities:		
Accounts receivable	(339)	541
Inventory	125	(185)
Prepaid expenses and other current assets	(45)	(171)
Accounts payable and other current liabilities	360	307
Lease termination/abandonment payable		(248)
Net cash used in operating activities	(5,354)	(5,599)
Investing activities		
Purchases of property and equipment	(3)	(100)
Decrease in security deposit on lease		28
Net cash used in investing activities	(3)	(72)
Financing activities		
Proceeds from issuance of common stock, net of costs to issue		13,095
Shares repurchased to satisfy tax withholding obligation for restricted stock awards	(61)	(363)
Repayment of capital lease obligation	(63)	(56)
Net cash provided by (used in) financing activities	(124)	12,676
Net increase (decrease) in cash	(5,481)	7,005
Cash and cash equivalents, beginning of period	10,832	5,119
Cash and cash equivalents, end of period	$ 5,351	$ 12,124
Noncash financing and investing activities		
Conversion of amounts due to related party to note payable related party	$	$ 1,045
Fair value of warrants and options for overallotment shares to underwriters issued in connection with public stock offering	$	$ 330

See accompanying notes to unaudited condensed financial statements.

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Signal Genetics, Inc.

Notes to Unaudited Condensed Financial Statements

1. Basis of Presentation

Signal Genetics, Inc. (the Company) is a commercial stage, molecular genetics diagnostic company focused on providing innovative diagnostic services that help physicians make better-informed decisions concerning the care of their patients suffering from cancer. In 2010, the Company became the exclusive licensee to the intellectual property stemming from the renowned research on multiple myeloma (MM), performed at the University of Arkansas for Medical Sciences (UAMS). Myeloma Prognostic Risk Signature (MyPRS) is based upon 30 years of clinical research on over 10,000 MM patients who received their care at UAMS. The Company currently generates revenues from the performance of its MyPRS diagnostic test, which was launched in April 2011.

Basis of Presentation and Liquidity

The Company s unaudited condensed financial statements for the three and nine months ended September 30, 2016 have been prepared on the assumption that it will continue as a going concern, which assumes that the Company will continue to operate for the foreseeable future and will be able to realize its assets and discharge its liabilities in the normal course of business.

Since its inception, the Company has devoted substantial effort in developing its products and services and has incurred losses and negative cash flows from operations. Existing cash resources will not be sufficient to meet the Company s operating plan for the full 12-month period after the date of this filing. Based on available resources, the Company believes it can maintain current operations into the second quarter of 2017. As a result, to continue to fund ongoing operations beyond the second quarter of 2017, the Company would need to (1) raise additional capital through the issuance of equity, debt or other securities, (2) convert existing debt into equity, (3) enter into strategic partnerships, alliances, collaborations or other similar transactions or (4) a combination thereof. The unaudited condensed financial statements do not include any adjustments to the amounts and classification of assets and liabilities that might be necessary should the Company be unable to continue as a going concern.

Due to current market conditions, the Company s current liquidity position and its depressed stock price, the Company believes it may be difficult to obtain additional equity or debt financing on acceptable terms, if at all, thus raising substantial doubt about the Company s ability to continue as a going concern. If it is unable to raise additional capital or successfully complete a strategic partnership, alliance, collaboration or other similar transaction, the Company will need to delay or reduce expenses or limit or curtail operations, any of which would have a material adverse effect on its business. Further, if the Company is unable to raise additional capital or successfully complete a strategic partnership, alliance, collaboration or other similar transaction on a timely basis and on terms that are acceptable, the Company would also be required to sell or license its assets, sell the Company or otherwise liquidate all or a portion of its assets and/or cease its operations altogether.

The accompanying unaudited financial statements have been prepared pursuant to the rules and regulations of the Securities and Exchange Commission (SEC). Certain information and note disclosures normally included in annual audited financial statements prepared in accordance with generally accepted accounting principles have been omitted. The accompanying unaudited financial statements include all known adjustments necessary for a fair presentation of the results of interim periods as required by accounting principles generally accepted in the United States. These adjustments consist primarily of normal recurring accruals and estimates that impact the carrying value of assets and liabilities. Actual results may materially differ from these estimates. Operating results for the three and nine months

ended September 30, 2016 are not necessarily indicative of the results that may be expected for the year ending December 31, 2016. The financial statements should be read in conjunction with the Company s audited financial statements for the year ended December 31, 2015, which are included in the Company s Annual Report on Form 10-K filed with the SEC on March 21, 2016.

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2. Significant Accounting Policies

Use of Estimates

The accompanying financial statements have been prepared in accordance with accounting principles generally accepted in the United States (GAAP). The preparation of financial statements in conformity with GAAP requires management to make judgments, assumptions and estimates that affect the amounts reported in the Company s financial statements and accompanying notes. Significant estimates in the financial statements have been made for revenue, accounts receivable and allowance for doubtful accounts, accounting for income taxes, depreciation of property and equipment and stock-based compensation. Actual results could differ materially from those estimates.

Cash and Cash Equivalents

Cash is comprised of cash on hand and deposits in banks. The Company considers all highly liquid investments with a maturity at date of purchase of three months or less to be cash equivalents, which, at September 30, 2016, are comprised of money market funds.

Accounts Receivable, Contractual Allowances and Allowance for Doubtful Accounts

Accounts receivable are recorded net of contractual allowances and an allowance for doubtful accounts. At September 30, 2016 and December 31, 2015, accounts receivable were $733,000 and $394,000, respectively, and are net of contractual allowances of $3.1 million and $2.1 million, respectively. The Company estimates an allowance for doubtful accounts based on the aging of the accounts receivable and the historical collection experience for each type of payor. Account balances are charged-off against the allowance when it is probable the receivable will not be recovered.

During the three months ended September 30, 2016 and 2015, the Company recognized $7,000 and $4,000, respectively, in bad debt expense. During the nine months ended September 30, 2016 and 2015, the Company recognized $8,000 and $32,000, respectively, in bad debt expense. At September 30, 2016 and December 31, 2015, allowances for doubtful accounts were $10,000 and $0, respectively.

Inventory

Inventory, which consists entirely of raw materials, and includes laboratory materials and supplies, is valued at the lower of cost or market using the first-in, first-out (FIFO) method.

Revenue Recognition

Revenues that are derived from testing services are recognized in accordance with revenue recognition accounting guidance, which requires that four basic criteria be met before revenue can be recognized: (1) persuasive evidence that an arrangement exists; (2) delivery has occurred and title and the risks and rewards of ownership have been transferred to the client or services have been rendered; (3) the price is fixed or determinable; and (4) collectability is reasonably assured.

Revenues are recorded on an accrual basis when the contractual obligations are completed as tests are processed through the Company s laboratory and test results are delivered to ordering physicians. Revenues are billed to various payors, including Medicare, contracted insurance companies, directly billed customers (UAMS, pharmaceutical companies, reference laboratories and hospitals) and non-contracted insurance companies. Revenues from Medicare,

contracted insurance companies and directly billed customers are reported based on the contractual rate. The difference between the amounts billed and the contractual rates from Medicare and contracted insurance companies are recorded as contractual allowances at the same time the revenue is recognized, to arrive at reported net revenue. The contractual rate is based on established agreed upon rates

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between the Company and the respective payor. Directly billed customers are invoiced at the contractual rate by the Company. Revenues from non-contracted insurance companies are reported based on the amount expected to be collected, which is based on the historical collection experience of each payor or payor group, as appropriate, and anticipated effects of changes in the healthcare industry, if any. The difference between the amount billed and the amount estimated to be collected from non-contracted insurance companies is recorded as a contractual allowance at the same time the revenue is recognized, to arrive at reported net revenue. The Company does not record revenue from individuals for billings until cash is collected; as collectability is not assured at the time services are provided, therefore there are no accounts receivable from self-payors. Gross revenues from individuals have been immaterial to date.

The Company s estimates of net revenue for non-contracted insurance companies are subject to change based on the contractual status and payment policies of the third-party payors with whom the Company deals. The Company regularly refines its estimates in order to make estimated revenue as accurate as possible based on its most recent collection experience with each third-party payor. The Company regularly reviews its historical collection experience for non-contracted payors and anticipated changes in the healthcare industry and adjusts expected revenues for current and subsequent periods accordingly. During the three and nine months ended September 30, 2016, net favorable changes in estimates were recorded to revenue related to non-contracted revenues recorded in the prior year of $6,000 and $229,000, respectively. During the three and nine months ended September 30, 2015, net unfavorable changes in estimates were recorded to revenue related to non-contracted revenues recorded in the prior year of $64,000 and $137,000, respectively.

The table below shows the adjustments made to gross revenues to arrive at net revenues, the amount reported in the statements of operations (in thousands):

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2016	2015	2016	2015
Gross revenues	$ 2,238	$ 1,335	$ 6,397	$ 4,089
Less: contractual allowances	(1,349)	(834)	(3,816)	(2,210)
Net revenue	$ 889	$ 501	$ 2,581	$ 1,879
Contractual allowances as a percentage of gross revenues	60%	62%	60%	54%

The increase in the contractual allowances is due to an increase in the volume of tests billed to third-party payors including non-contracted payors for which Signal estimates net revenues based on historical collections.

Stock-Based Compensation

Compensation expense for all stock-based payments made to employees, directors, and consultants are measured and recognized based on estimated fair value. These stock-based awards include stock options and restricted stock units. The Company estimates the fair value of stock options granted using the Black-Scholes-Merton (BSM), option-pricing model, which requires the use of estimates such as stock price volatility and expected option lives. The fair value of stock options granted to employees and directors is estimated at the date of grant.

The fair value of restricted stock units issued to employees and directors is based on the market price of the Company s common stock on the date of grant and, for non-employees, at the date when performance is complete. For

stock-based compensation awards granted to non-employees, the fair value of the awards are remeasured at each reporting date until vested, with changes in the estimated fair value recognized as an adjustment to compensation expense in the period of change. Upon settlement of all or a portion of the award in cash, the recognized fair value of the corresponding amount of awards is reversed from additional paid-in capital and the excess of the cash payment over this amount is recognized as additional stock-based compensation expense.

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Stock-based compensation cost is recognized on a straight-line basis over the requisite service period of the award. The Company accounts for forfeitures when they occur and reverses any compensation cost previously recognized for awards for which the requisite service has not been completed in the period that the awards are forfeited.

Due to the Company s net loss position, no tax benefits for stock-based compensation have been recognized in the statements of cash flows. The Company has not recognized, and does not expect to recognize in the near future, any tax benefit related to stock-based compensation cost as a result of its full valuation allowance on net deferred tax assets, including those related to net operating loss carryforwards.

Fair Value of Financial Instruments

The Company s financial instruments that are measured at fair value on a recurring basis consist principally of cash and cash equivalents, accounts receivable, accounts payable and note payable-related party.

Fair value is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants on the measurement date. Accounting guidance also establishes a fair value hierarchy that requires an entity to maximize the use of observable inputs and minimize the use of unobservable inputs when measuring fair value. The standard describes three levels of inputs that may be used to measure fair value:

Level 1 Observable inputs that reflect quoted prices (unadjusted) for identical assets or liabilities in active markets.

Level 2 Includes other inputs that are directly or indirectly observable in the marketplace.

Level 3 Unobservable inputs that are supported by little or no market activities, therefore requiring an entity to develop its own assumptions.

At September 30, 2016 and December 31, 2015, the Company s cash equivalent instruments consisted of $5.1 million and $10.4 million, respectively, in money market funds that were measured at fair value using the net asset value per share that have not been classified using the fair value hierarchy. The fund invests primarily in short-term U.S. Treasury and government securities.

The carrying amounts of financial instruments such as accounts receivable, accounts payable and note payable-related party approximate their relative fair values due to the short-term maturities and market rates of interest of these instruments.

Net Loss Per Share

Basic and diluted net loss per common share for the periods presented is computed by dividing net loss by the weighted-average number of common shares outstanding during the respective periods, without consideration of common stock equivalents. Basic and diluted net loss per common share includes vested, but unissued restricted stock units from the date of vesting.

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Common stock equivalents, determined on a weighted-average outstanding basis, that could potentially reduce net income per common share in the future that were not included in the determination of diluted loss per common share as their effects were antidilutive are as follows:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2016	2015	2016	2015
Unvested restricted stock units	44,452	24,213	37,725	31,130
Options to purchase common stock	40,788	27,756	40,792	17,104
Warrants to purchase common stock	13,547	13,547	13,547	11,523
Total	98,787	65,516	92,064	59,757

Concentration of Credit Risk, Major Customers and Suppliers

Financial instruments that potentially subject the Company to concentrations of credit risk are primarily cash and cash equivalents. Cash is maintained at two financial institutions and, at times, balances may exceed federally insured limits. The Company has not experienced any losses related to these balances. The Company invests excess cash in money market funds under the custodianship of a major financial institution. This diversification of risk is consistent with the Company s policy to ensure safety of principal and maintain liquidity.

During the three and nine months ended September 30, 2016, the Company had three major customers, including UAMS. Revenue sourced either from or through UAMS as a percentage of net revenue during the three months ended September 30, 2016 and 2015 accounted for 21% and 35%, respectively, and 22% and 64% during the nine months ended September 30, 2016 and 2015, respectively. Revenue sourced either from or through the other two major customers as a percentage of net revenue during the three months ended September 30, 2016 and 2015 accounted for 29% and 3%, and 9% and 16%, respectively, and 27% and 1%, and 11% and 11% during the nine months ended September 30, 2016 and 2015, respectively.

Accounts receivable from the Company s three major customers as a percentage of total accounts receivable as of September 30, 2016 and December 31, 2015 were 12% and 19%, respectively. UAMS accounted for 9% and 19% of total accounts receivable as of September 30, 2016 and December 31, 2015, respectively. The Company has minimal accounts receivable from the other two major customers since revenue sourced through them is billed to various third-party payors, depending on a patient s medical insurance policy.

Inventory used in the Company s testing process is procured from one supplier. Any supply interruption or an increase in demand beyond such supplier s capabilities could have an adverse impact on the Company s business. Management believes it could identify alternative suppliers, if necessary, but it is possible such suppliers may not be identified in a timely manner to avoid an adverse impact on the Company s business.

Recently Adopted Accounting Pronouncements

In March 2016, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update (ASU) No. 2016-09, which simplifies several aspects of the accounting for share-based payment transactions, including the income tax consequences, classification of awards as either equity or liabilities, and classification on the statement of cash flows. The update is effective for fiscal years and the interim periods within those fiscal years beginning after

December 15, 2016, with early adoption permitted. Amendments related to the timing of when excess tax benefits are recognized, minimum statutory withholding requirements and forfeitures are applied using a modified retrospective transition method by means of a cumulative-effect adjustment to equity as of the beginning of the period in which the guidance is adopted. Amendments related to the presentation of employee taxes paid on the statement of cash flows when an employer withholds shares to meet the minimum statutory withholding requirement is applied retrospectively. Amendments requiring recognition of excess tax benefits and

tax deficiencies in the income statement are applied prospectively. The Company elected to early adopt this guidance effective January 1, 2016. The impact of adoption of this guidance had no effect on the Company s financial position, statements of operations or statements of cash flows.

In May 2015, the FASB issued ASU No. 2015-07 that eliminates the requirement to categorize investments within the fair value hierarchy if their fair value is measured using the net asset value per share practical expedient in the FASB s fair value measurement guidance. The amendments also limit certain disclosures to investments for which the entity has elected to measure at fair value using the net asset value per share practical expedient. The amendments were applied retrospectively by removing from the fair value hierarchy any investments for which fair value is measured using the net asset value per share practical expedient. Adoption of this guidance did not have an impact on the Company s financial position or results of operations.

Recent Accounting Pronouncements

In February 2016, the FASB issued *ASU No. 2016-02*, which replaces the existing accounting guidance for leases. This standard requires entities that lease assets to recognize the assets and liabilities for the rights and obligations created by those leases on the balance sheet. The standard is effective for fiscal years and the interim periods within those fiscal years beginning after December 15, 2018. The guidance is required to be applied by the modified retrospective transition approach and early adoption is permitted. The Company is currently assessing the impact that adoption of this guidance will have on its financial statements and footnote disclosures.

In November 2015, the FASB issued *ASU 2015-17* that provides guidance on the presentation of deferred income taxes which requires deferred tax assets and liabilities, along with related valuation allowances, to be classified as noncurrent on the balance sheet. As a result, each tax jurisdiction will now only have one net noncurrent deferred tax asset or liability. The new guidance does not change the existing requirement that prohibits offsetting deferred tax liabilities from one jurisdiction against deferred tax assets of another jurisdiction. The new guidance is effective for financial statements issued for annual periods beginning after December 15, 2016, and interim periods within those annual periods, with early application permitted. The amendments may be applied either prospectively to all deferred tax liabilities and assets or retrospectively to all periods presented. The Company does not expect the adoption of this standard to have a material impact on its financial statements.

In July 2015, the FASB issued *ASU 2015-11*, which simplifies the measurement of inventories valued under most methods, including the Company s inventories valued under the FIFO method. Under this new guidance, inventories valued under these methods would be valued at the lower of cost and net realizable value, with net realizable value defined as the estimated selling price less reasonable costs to sell the inventory. The new guidance is effective prospectively for the Company s quarterly reporting period beginning January 1, 2017, with early adoption permitted. The Company is currently assessing the impact that this standard will have on its financial statements.

In May 2014, the FASB issued *ASU 2014-09, Revenue from Contracts with Customers*, which outlines a single comprehensive model for entities to use in accounting for revenue from contracts with customers and supersedes most current revenue recognition guidance in FASB ASC 605, Revenue Recognition, including industry-specific guidance. This standard is based on the principle that an entity should recognize revenue to depict the transfer of goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. This standard also requires additional disclosure about the nature, amount, timing and uncertainty of assets recognized from costs incurred to fulfill a contract and was originally effective for the Company s annual reporting period beginning January 1, 2018, including interim periods within that reporting period. In July 2015, the FASB voted to defer the effective date of this ASU by one year, which is effective for the Company s annual reporting period beginning January 1, 2019, with early adoption permitted beginning with the annual reporting

period ending December 31, 2017. Entities have the option of using either a full retrospective or a modified retrospective approach for the adoption of the new standard. The Company is currently assessing the impact that this standard will have on its financial statements.

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In August 2014, the FASB issued *ASU 2014-15, Presentation of Financial Statements Going Concern*, which provides guidance on management s responsibility in evaluating whether there is substantial doubt about a company s ability to continue as a going concern and the related footnote disclosure. For each reporting period, management will be required to evaluate whether there are conditions or events that raise substantial doubt about a company s ability to continue as a going concern within one year from the date the financials are issued. When management identifies conditions or events that raise substantial doubt about the entity s ability to continue as a going concern, this standard also outlines disclosures that are required in the company s footnotes based on whether or not there are any plans intended to mitigate the relevant conditions or events to alleviate the substantial doubt. This standard becomes effective for the Company s annual reporting period ending December 31, 2016, and for annual and interim periods thereafter. Early application is permitted. The Company does not expect the adoption of this standard to have a material impact on its financial statements.

Reverse Stock Split

Effective November 4, 2016, the Company completed a one-for-15 reverse stock split (Reverse Split) of shares of its common stock. Share and per share amounts in the accompanying condensed financial statements and notes to the financial statements reflect the Reverse Split.

3. Balance Sheet Accounts and Supplemental Disclosures

Property and Equipment

Property and equipment consist of the following (in thousands):

	September 30, 2016	December 31, 2015
Laboratory and computer equipment	$ 1,820	$ 1,817
Furniture and fixtures	69	69
Leasehold improvements	6	6
	1,895	1,892
Less: accumulated depreciation and amortization	(881)	(739)
Total property and equipment, net	$ 1,014	$ 1,153

An asset with a cost of $300,000 recorded under a capital lease is included in the laboratory equipment balances at September 30, 2016 and December 31, 2015.

Accrued Expenses

Accrued expenses consist of the following (in thousands):

	September 30, 2016	December 31, 2015

Accrued bonuses	$ 722	$ 592
Accrued contract research and development	310	35
Accrued compensation and related expenses	250	234
Accrued interest payable related party	139	73
Other	228	84
Total accrued expenses	$ 1,649	$ 1,018

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4. Note Payable Related Party and Capital Lease Obligations

Note Payable Related Party

On March 6, 2015, the amounts due to related party, aggregating $1,045,000, were converted into an unsecured note payable related party, bearing interest at 8% per annum and due on demand. The principal amount of the note was increased by $60,000 over the amounts due to related party to $1,105,000 to provide the equivalent of 8% per annum interest for the period of time the amounts due to related party were held as a payable in exchange for a provision that the related party would not call the note prior to June 30, 2015. The increase in the principal amount of the note was deferred and amortized to interest expense over the initial term of the note to June 30, 2015. Interest expense related to this note during each of the three months ended September 30, 2016 and 2015 was $22,000, and during the nine months ended September 30, 2016 and 2015 was $66,000 and $110,000, respectively. The note balance at September 30, 2016 and December 31, 2015 was $1,105,000. Accrued interest payable of $139,000 and $73,000 is included in accrued liabilities in the balance sheets at September 30, 2016 and December 31, 2015, respectively.

Capital Lease Obligation

The Company has a two-year capital lease obligation for laboratory equipment which expires in January 2017, and provides for monthly rent of $7,200. The lease obligations at September 30, 2016 and December 31, 2015 were $25,000 and $88,000, which are net of $3,000 and $6,000, respectively, in unamortized discounts. Future maturities of this obligation at September 30, 2016 are $22,000 and $7,000 during the remainder of 2016 and 2017, respectively. Laboratory equipment with a net book value of $247,000 at September 30, 2016 serves as collateral for this obligation.

5. Stockholders Equity

Changes in common shares outstanding and total stockholders equity during the nine months ended September 30, 2016 were as follows:

	Shares of Common Stock	Total Stockholders Equity (in thousands)
Balance, December 31, 2015	709,024	$ 10,410
Stock-based compensation		1,441
Shares issued under employee stock incentive plan, net of shares repurchased to satisfy tax withholding obligations	10,329	(61)
Net loss		(7,104)
Balance, September 30, 2016	719,353	$ 4,686

Common Shares

The Company has authorized 50,000,000 shares of common stock, of which 719,353 and 709,024 shares were issued and outstanding at September 30, 2016 and December 31, 2015, respectively. Common shares reserved for future issuance upon the exercise, issuance or conversion of the respective equity instruments at September 30, 2016 is as

follows:

Issued and Outstanding:	
Restricted stock units	42,591
Stock options	38,729
Warrants	13,534
Shares reserved for future award grants	47,283
Total	142,137

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Public Offerings of Common Stock

During the three and nine months ended September 30, 2015, the Company sold 182,333 shares of common stock for cash proceeds of $4.0 million, which is net of $429,000 in sales agent s commissions and offering expenses, pursuant to its July 2015 at the market offering program.

On February 20, 2015, the Company completed a public offering of 214,286 shares of its common stock, at $42.00 per share, for cash proceeds of $7.8 million, which is net of $1.2 million in underwriter commissions and offering expenses. In connection with the offering, the Company granted a 45-day option to the underwriter to purchase up to 32,143 shares of common stock to cover overallotments, with an aggregate grant date fair value of $132,000. On February 26, 2015, the underwriters exercised the overallotment option for cash proceeds of $1.3 million, which is net of $95,000 in underwriter commissions. In connection with this offering, as a portion of the underwriting compensation payable to the underwriters, the Company issued warrants to purchase 10,707 shares of its common stock to the representative of the underwriters with an aggregate grant date fair value of $198,000. The warrants are exercisable at any time from February 2016 through February 2020 at an exercise price of $52.50 per share. The aggregate fair values of the warrants and overallotment option issued were recorded as an increase to additional paid-in capital with an offset to the proceeds from the offering. The net contribution to additional paid-in capital was $8.8 million after deducting the noncash fair values of warrants and overallotment option issued in connection with the offering.

The estimated fair values of the warrants and overallotment option were determined on their respective measurement dates using the BSM option valuation model with the following assumptions:

	Warrants	Overallotment Option
Fair value of underlying common stock	$ 38.55	$ 39.30
Exercise price	$ 52.50	$ 39.00
Risk-free interest rate	1.61%	0.02%
Volatility	65.50%	73.00%
Dividend yield	0.00%	0.00%
Contractual term (in years)	5.00	0.12
Weighted-average measurement date fair value per share	$ 18.45	$ 4.05

6. Stock Compensation Plan

The Company s 2014 Stock Incentive Plan, as amended (the Plan), provides for stock awards that may be made in the form of incentive or non-statutory stock options, stock appreciation rights, restricted or unrestricted stock awards, restricted stock units, performance awards, or other stock-based awards. No awards may be granted after June 16, 2024. The Plan provides for an annual increase in the number of shares of common stock available for grant on the first day of each calendar year that is equal to the lesser of four percent of the shares of common stock outstanding on the last day of the immediately preceding fiscal year or a smaller number of shares as determined by the board of directors. Under this provision, the number of shares of common stock reserved for issuance under the Plan was increased from 140,000 to 168,361 as of January 1, 2016. At September 30, 2016, up to 128,603 shares of common stock may be issued under the Plan, of which 81,320 shares are reserved for issuance upon the exercise of outstanding options and issuance of outstanding restricted stock units, and 47,283 shares are available for future grants.

Restricted Stock Units (RSUs)

All of the Company s outstanding RSU agreements provide for the settlement of the vested RSUs in shares of the Company s common stock equal to the number of vested RSUs or an amount in cash equal to the product of the fair market value of the common stock on the respective payment date and the number of vested RSUs, or some combination of common shares and cash as determined by the plan administrator as of each settlement date.

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RSUs generally vest over a period of one to four years, subject to earlier cancellation or forfeiture prior to vesting upon cessation of service to the Company. The total fair value of RSUs that vested during the three and nine months ended September 30, 2016 was $12,000 and $73,000, respectively, and during the three and nine months ended September 30, 2015 was $67,000 and $605,000, respectively. A summary of the activity related to RSUs is as follows:

	Number of Shares	Weighted-Average Grant Date Fair Value per Share
Unvested at December 31, 2015	14,399	$ 126.45
Granted during the period	39,735	$ 7.65
Vested during the period	(10,286)	$ 139.05
Forfeitures and cancelations	(1,466)	$ 7.65
Unvested at September 30, 2016	42,382	$ 16.20

The Company issued shares of common stock in settlement of RSUs that vested and were issued during the period aggregating 834 and 10,329 shares during the three and nine months ended September 30, 2016, respectively, and 3,659 and 28,088 shares during the three and nine months ended September 30, 2015, respectively. As permitted under the Plan, to satisfy tax withholding obligations for employees in connection with the vesting of restricted stock units previously granted, the Company repurchased 699 and 8,798 shares of common stock, with aggregate values of $5,000 and $61,000 during the three and nine months ended September 30, 2016, respectively, and 705 and 12,461 shares with aggregate values of $18,000 and $363,000 during the three and nine months ended September 30, 2015, respectively.

Stock Options

Stock options generally vest over a four-year period and have a maximum term of ten years from the date of grant, subject to earlier cancellation prior to vesting upon cessation of service to the Company. A summary of the activity related to stock option awards is as follows:

	Shares Subject to Options	Weighted-Average Exercise Price per Share	Weighted-Average Remaining Contractual Term (in years)	Aggregate Intrinsic Value (in thousands)
Outstanding at December 31, 2015	42,104	$ 34.20		
Granted	5,786	$ 7.65		
Forfeitures and cancellations	(9,161)	$ 39.60		
Outstanding at September 30, 2016	38,729	$ 28.95	8.8	$

Options exercisable at September 30, 2016	17,479	$	31.20	8.8	$
Options vested and expected to vest as of September 30, 2016	38,729	$	28.95	8.8	$

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Stock-Based Compensation Expense

The estimated fair value of each stock option award was determined on the date of grant using the BSM option valuation model with the following assumptions:

	Nine Months Ended September 30,	
	2016	**2015**
Risk-free interest rate	0.52% - 1.38%	1.34% - 1.94%
Expected volatility	66.2% - 75.4%	58.9% - 67.8%
Weighted-average volatility	73.9%	60.1%
Dividend yield	0%	0%
Weighted-average expected term (in years)	1.8	6.0
Weighted-average grant date fair value per share	$2.55	$13.65

The fair value of each stock option is estimated on the date of grant using the BSM option pricing model which requires the input of highly subjective assumptions. Because the option-pricing model is sensitive to change in the input assumptions, different determinations of the required inputs may result in different fair value estimates of the options. The risk-free interest rate is based on the rate currently available on U.S. Treasury issues with terms approximating the expected term of the option. Due to the Company s limited historical stock data, the estimated future stock price volatility is based upon the average historical volatilities of a group of peer companies. The Company has not paid any dividends on common stock and does not anticipate paying dividends on common stock in the foreseeable future. Due to the Company s limited historical stock option exercise data, the simplified method has been used to estimate the expected term of options.

Total non-cash stock-based compensation expense for all stock awards, net of forfeitures recognized as they occur, that was recognized in the statements of operations is as follows (in thousands):

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2016	**2015**	**2016**	**2015**
Cost of revenue	$ 7	$ 12	$ 20	$ 45
Research and development	7	27	16	69
Selling and marketing	14	15	49	38
General and administrative	65	784	1,356	2,106
Total	$ 93	$ 838	$ 1,441	$ 2,258

At September 30, 2016, there was $485,000 of unamortized compensation cost related to unvested RSUs which is expected to be recognized over a remaining weighted-average vesting period of 2.7 years. At September 30, 2016, there was $316,000 of unamortized compensation cost related to unvested stock option awards, which is expected to be recognized over a remaining weighted-average vesting period of 2.2 years.

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Miragen Therapeutics, Inc.

INDEX TO MIRAGEN CONSOLIDATED FINANCIAL STATEMENTS

Years ended December 31, 2015 and 2014 and

nine months ended September 30, 2016 and 2015

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INDEPENDENT AUDITORS REPORT

The Board of Directors and Stockholders

Miragen Therapeutics, Inc.:

We have audited the accompanying consolidated financial statements of Miragen Therapeutics, Inc. and its subsidiary, which comprise the consolidated balance sheets as of December 31, 2015 and 2014, and the related consolidated statements of operations, preferred stock and stockholders deficit, and cash flows for the years then ended, and the related notes to the consolidated financial statements.

Management s Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these consolidated financial statements in accordance with U.S. generally accepted accounting principles; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of consolidated financial statements that are free from material misstatement, whether due to fraud or error.

Auditors Responsibility

Our responsibility is to express an opinion on these consolidated financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the consolidated financial statements. The procedures selected depend on the auditors judgment, including the assessment of the risks of material misstatement of the consolidated financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity s preparation and fair presentation of the consolidated financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity s internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of Miragen Therapeutics, Inc. and its subsidiary as of December 31, 2015 and 2014, and the results of their operations and their cash flows for the years then ended, in accordance with U.S. generally accepted accounting principles.

/s/ KPMG LLP

Boulder, Colorado

April 27, 2016, except as to notes 7, 11 and 12, which are as of December 2, 2016 and note 13, which is as of December 22, 2016

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Miragen Therapeutics, Inc.

Consolidated Balance Sheets

	December 31, 2015	December 31, 2014
Assets		
Current:		
Cash and cash equivalents	$ 21,235,000	$ 5,114,000
Prepaid expenses and other current assets	1,327,000	1,324,000
Total current assets	22,562,000	6,438,000
Property and equipment, net	716,000	681,000
Other assets	258,000	
Total assets	$ 23,536,000	$ 7,119,000
Liabilities, Preferred Stock, and Stockholders Deficit		
Current liabilities:		
Accounts payable	$ 715,000	$ 459,000
Accrued and other liabilities	1,808,000	1,726,000
Current portion of notes payable	269,000	
Current portion of deferred revenue	519,000	1,180,000
Total current liabilities	3,311,000	3,365,000
Notes payable, less current portion	4,665,000	
Deferred revenue, less current portion		519,000
Total liabilities	7,976,000	3,884,000
Series A redeemable convertible preferred stock, $0.001 par value; 7,169,176 shares authorized; 7,149,176 shares issued and outstanding; liquidation preference of $21,448,000; stated at accreted redemption value	23,116,000	23,098,000
Series B redeemable convertible preferred stock, $0.001 par value; 2,183,318 shares authorized; 2,166,651 shares issued and outstanding; liquidation preference of $13,000,000 at December 31, 2015; stated at accreted redemption value	12,970,000	12,959,000
Series C redeemable convertible preferred stock, $0.001 par value; 9,303,000 shares authorized; 5,636,226 shares issued and outstanding at December 31, 2015; liquidation preference of $24,968,000 at December 31, 2015; stated at accreted redemption value	24,764,000	
Stockholders deficit:		
Common stock, $0.001 par value. 24,780,394 shares authorized; 855,734 shares issued and outstanding	1,000	1,000
Additional paid-in capital	4,462,000	1,210,000
Accumulated deficit	(49,753,000)	(34,033,000)

Total stockholders deficit	(45,290,000)	(32,822,000)
Total liabilities, preferred stock, and stockholders deficit	$ 23,536,000	$ 7,119,000

See accompanying notes to these consolidated financial statements.

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Miragen Therapeutics, Inc.

Consolidated Statements of Operations

	Year Ended December 31, 2015	2014
Revenue:		
Revenue under strategic alliance and collaboration	$ 4,977,000	$ 7,641,000
Grant revenue	27,000	
Total revenue	5,004,000	7,641,000
Operating expenses:		
Research and development	13,312,000	9,488,000
General and administrative	3,850,000	4,068,000
Total operating expenses	17,162,000	13,556,000
Loss from operations	(12,158,000)	(5,915,000)
Other income:		
Interest and other income	3,000	9,000
Interest and other related expense	(3,531,000)	
Net loss	(15,686,000)	(5,906,000)
Accretion of preferred stock to redemption value	(34,000)	(30,000)
Net loss applicable to common stockholders	$ (15,720,000)	$ (5,936,000)
Net loss per share, basic and diluted	$ (18.37)	$ (7.03)
Shares used in computing net loss per share, basic and diluted	855,734	844,093

See accompanying notes to these consolidated financial statements.

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Miragen Therapeutics, Inc.

Consolidated Statements of Preferred Stock and Stockholders Deficit

Redeemable Convertible Preferred Stock						Stockholders deficit			
Series A		Series B		Series C		Common stock		Additional paid-in capital	Accumulated deficit
Shares	Amount	Shares	Amount	Shares	Amount	Shares	Amount		
7,149,176	$ 23,080,000	999,991	$ 5,961,000		$	834,776	$ 1,000	$ 972,000	$ (28,097,000)
		1,166,660	6,986,000						
						20,958		9,000	
								229,000	
	18,000		12,000						(30,000)
									(5,906,000)
7,149,176	$ 23,098,000	2,166,651	$ 12,959,000		$	855,734	$ 1,000	$ 1,210,000	$ (34,033,000)
				3,632,342	15,882,000				

				2,003,884	8,877,000				
								2,960,000	
								292,000	
	18,000		11,000		5,000				(34,000)
									(15,686,000)
7,149,176	$ 23,116,000	2,166,651	$ 12,970,000	5,636,226	$ 24,764,000	855,734	$ 1,000	$ 4,462,000	$ (49,753,000)

See accompanying notes to these consolidated financial statements.

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Miragen Therapeutics, Inc.

Consolidated Statements of Cash Flows

	Year Ended December 31,	
	2015	2014
Cash flows from operating activities:		
Net loss	$ (15,686,000)	$ (5,906,000)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization	280,000	388,000
Stock-based compensation	292,000	229,000
Gain on sale or disposition of property and equipment	(3,000)	(1,000)
Interest expense and other charges related to convertible notes	2,978,000	
Interest expense on convertible notes converted into equity	377,000	
Amortization and accretion expenses on notes payable	112,000	
Decrease in value of preferred stock warrants	(44,000)	(5,000)
Changes in operating assets and liabilities:		
Prepaid expenses and other assets	(261,000)	172,000
Deferred revenue	(1,180,000)	(3,348,000)
Accounts payable	256,000	(246,000)
Accrued and other liabilities	(71,000)	1,013,000
Net cash used in operating activities	(12,950,000)	(7,704,000)
Cash flows from investing activities:		
Purchases of marketable securities		(327,000)
Sale and maturities of marketable securities		2,299,000
Proceeds from sale of property and equipment	3,000	
Purchases of property and equipment	(315,000)	(71,000)
Net cash provided by (used in) investing activities	(312,000)	1,901,000
Cash flows from financing activities:		
Proceeds from issuance of redeemable convertible preferred stock	16,091,000	7,000,000
Redeemable convertible preferred stock issuance costs	(133,000)	(14,000)
Proceeds from issuance of convertible notes payable	8,500,000	
Convertible notes payable issuance costs	(18,000)	
Proceeds from issuance of notes payable	5,000,000	
Notes payable issuance costs	(57,000)	
Proceeds from issuance of common stock		9,000
Net cash provided by financing activities	29,383,000	6,995,000
Net increase in cash and cash equivalents	16,121,000	1,192,000
Cash and cash equivalents at beginning of period	5,114,000	3,922,000

Cash and cash equivalents at end of period	$ 21,235,000	$ 5,114,000
Noncash investing and financing activities:		
Preferred stock issued in conjunction with notes payable	$ 121,000	$
Conversion of convertible notes payable into Series C Preferred	$ 8,500,000	$
Conversion of interest payable into Series C Preferred	$ 377,000	$
Series C preferred stock issuance costs included in accrued liabilities	$ 76,000	$

See accompanying notes to these consolidated financial statements.

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Miragen Therapeutics, Inc.

Notes to Consolidated Financial Statements

(1) Description of Business

Miragen Therapeutics, Inc. was originally formed as a Delaware corporation in February 2006. The corporation changed its name to Miragen Therapeutics, Inc. in July 2007 and the Company began its operations. In January 2011, Miragen Therapeutics Europe Limited (Miragen Europe) was formed as a wholly-owned subsidiary of Miragen Therapeutics, Inc. for the sole purpose of submitting regulatory filings in Europe. Miragen Europe has no employees or operations. As used in this report, unless the context suggests otherwise, the Company, and Miragen means Miragen Therapeutics, Inc.

Miragen is a clinical-stage biopharmaceutical company discovering and developing proprietary RNA-targeted therapeutics with a specific focus on microRNAs and their role in diseases where there is a high unmet medical need. microRNAs are short RNA molecules, or oligonucleotides, that regulate gene expression or activity and play a vital role in influencing the pathways responsible for many disease processes. Miragen uses its expertise in systems biology and oligonucleotide chemistry to discover and develop a pipeline of product candidates. Miragen s two lead product candidates, MRG-106 and MRG-201, are currently in Phase 1 clinical trials. Miragen s clinical product candidate for the treatment of certain cancers, MRG-106, is an inhibitor of microRNA-155, or miR-155, which is found at abnormally high levels in several blood cancers. Miragen s clinical product candidate for the treatment of pathological fibrosis, MRG-201, is a replacement for miR-29, which is found at abnormally low levels in a number of pathological fibrotic conditions, including cardiac, renal, hepatic, and pulmonary fibrosis, as well as systemic sclerosis. In addition to Miragen s clinical programs, it is developing a pipeline of pre-clinical product candidates. The goal of Miragen s translational medicine strategy is to progress rapidly to first in human studies once it has established the pharmacokinetics (the movement of drug into, through, and out of the body), pharmacodynamics (the effect and mechanism of action of a drug) and safety of the product candidate in pre-clinical studies.

Liquidity

Miragen has funded its operations to date principally through proceeds from the sale of its preferred stock of $56 million (including notes payable that have converted to preferred stock) and $32 million in proceeds under its strategic alliance with Les Laboratoires Servier and Institute de Recherches Servier (together, Servier). Since Miragen s inception and through December 31, 2015, Miragen has generated cumulative losses of $50 million. Miragen s ability to fund ongoing operations is highly dependent upon its ability to raise additional capital through sales of its equity securities, continued performance under Miragen s strategic alliance with Servier, securing additional partnerships and collaborations, and issuing debt or other financing vehicles. Miragen s ability to secure capital is dependent upon success in developing its technology and drug product candidates. Miragen can provide no assurance that additional capital will be available on acceptable terms. The sale of additional equity or issuance of debt securities would likely result in substantial additional dilution to Miragen s stockholders. If Miragen raises additional funds through the incurrence of indebtedness, the obligations related to such indebtedness could be senior to rights of holders of Miragen s capital stock and could contain covenants that may restrict its operations. Should additional capital not be available to Miragen in the near term, or not be available on acceptable terms, Miragen may be unable to realize value from Miragen s assets and discharge its liabilities in the normal course of business, which may, among other alternatives, cause Miragen to further delay, substantially reduce, or discontinue operational activities to conserve Miragen s cash resources.

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Miragen believes that the $21.2 million of cash and cash equivalents on hand at December 31, 2015 will be sufficient to fund its operations in the normal course of business and allow Miragen to meet its liquidity needs through at least December 31, 2016.

(2) Summary of Significant Accounting Policies

Basis of Presentation and Consolidation

The accompanying consolidated financial statements have been prepared in accordance with U.S. generally accepted accounting principles (U.S. GAAP) and include all adjustments necessary for the fair presentation of Miragen s financial position, results of operations and cash flows for the periods presented. The accompanying consolidated financial statements included the accounts of Miragen and its wholly-owned subsidiary. All significant intercompany balances have been eliminated in consolidation. Miragen s management performed an evaluation of its activities through the date of filing of these financial statements and concluded that there are no subsequent events, other than as disclosed.

Use of Estimates

Miragen s consolidated financial statements are prepared in accordance with U.S. GAAP, which requires Miragen to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and contingent liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Although these estimates are based on Miragen s knowledge of current events and actions it may undertake in the future, actual results may ultimately differ from these estimates and assumptions.

Revenue Recognition

Miragen recognizes revenue principally from upfront payments for licenses or options to obtain licenses in the future, milestone payments that are generated from defined research or development events, as well as amounts for other research and development services under strategic alliance and collaboration agreements. Miragen recognizes revenue when all four of the following criteria are met: (1) persuasive evidence of an arrangement exists; (2) products have been delivered or services rendered; (3) the selling price is fixed or determinable; and (4) collectability is reasonably assured.

Multiple element arrangements are examined to determine whether the deliverables can be separated or must be accounted for as a single unit of accounting. The Servier Collaboration Agreement, for example, includes a combination of upfront license fees, payments for research and development activities, and milestone payments that are evaluated to determine whether each deliverable under the agreement has value to the customer on a stand-alone basis and whether reliable evidence of fair value for the deliverable exists. Deliverables in an arrangement that do not meet this separation criteria are treated as a single unit of accounting, generally applying applicable revenue recognition guidance for the final deliverable to the combined unit of accounting.

Miragen recognizes revenue from non-refundable upfront license fees over the term of performance under the Servier Collaboration Agreement. When the performance period is not specified, Miragen estimates the performance period based upon provisions contained within the agreement, such as the duration of the research or development term, the existence, or likelihood of achievement of development commitments and any other significant commitments. These advance payments are deferred and recorded as deferred revenue upon receipt, pending recognition, and are classified as a short-term or long-term liability in the accompanying consolidated balance sheets. Expected performance periods

are reviewed periodically and, if applicable, the amortization period is adjusted which, Miragen may accelerate or decelerate revenue recognition. The timing of revenue recognition, specifically as it relates to the amortization of upfront license fees, is significantly influenced by Miragen s estimates.

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Stock-Based Compensation

Miragen accounts for stock-based compensation expense related to stock options granted to employees and members of its board of directors under its 2008 Equity Incentive Plan (the 2008 Equity Plan) by estimating the fair value of each stock option or award on the date of grant using the Black-Scholes model. Miragen recognizes stock-based compensation expense on a straight-line basis over the vesting term. Compensation expense is reduced for estimated forfeitures, which are estimated at the time of grant and revised, if necessary, in subsequent periods if actual forfeitures differ from those estimates.

Miragen accounts for stock options issued to non-employees by valuing the award using an option pricing model and remeasuring such awards to the current fair value until the awards are vested or a performance commitment has otherwise been reached.

Research and Development

Research and development costs are expensed as incurred and include compensation and related benefits, stock-based compensation, license fees, laboratory supplies, facilities, and overhead costs. Miragen often makes non-refundable advance payments for goods and services that will be used in future research and development activities. These payments are capitalized and recorded as expense in the period that Miragen receives the goods or when the services are performed.

Miragen records upfront and milestone payments to acquire contractual rights to licensed technology as research and development expenses when incurred if there is uncertainty in Miragen receiving future economic benefit from the acquired contractual rights. Miragen considers future economic benefits from acquired contractual rights to licensed technology to be uncertain until such a drug candidate is approved by the U.S. Food and Drug Administration (the FDA) or when other significant risk factors are abated.

Clinical Trial and Pre-clinical Study Accruals

Miragen makes estimates of its accrued expenses as of each balance sheet date in its consolidated financial statements based on certain facts and circumstances at that time. Miragen s accrued expenses for pre-clinical studies and clinical trials are based on estimates of costs incurred for services provided by clinical research organizations, manufacturing organizations, and for other trial related activities. Payments under Miragen s agreements with external service providers depend on a number of factors such as site initiation, patient screening, enrollment, delivery of reports, and other events. In accruing for these activities, Miragen obtains information from various sources and estimate level of effort or expense allocated to each period. Adjustments to Miragen s research and development expenses may be necessary in future periods as its estimates change. As these activities are generally material to Miragen s overall financial statements, subsequent changes in estimates may result in a material change in its accruals.

Cash and Cash Equivalents

Miragen classifies all highly liquid investments that have maturities of 90 days or less at the date of purchase as cash equivalents. Cash equivalents are reported at cost, which approximates fair value due to the short maturities of these instruments.

Fair Value of Financial Instruments

The carrying amounts of financial instruments, including cash and cash equivalents, accrued compensation, pre-clinical study accruals and accounts payable, approximate fair value due to their short-term maturities. The carrying amount of the note payable approximates its fair value as its terms are comparable to what would be included in similar debt instruments.

The Company accounts for its preferred stock warrants pursuant to ASC Topic 480, *Distinguishing Liabilities from Equity*, and classifies warrants for redeemable preferred stock as liabilities. The warrants are reported at their estimated fair value and any changes in fair value are reflected in interest expense and other related expenses.

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Fair value is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. Inputs used to measure fair value are classified into the following hierarchy:

Level 1 Unadjusted quoted prices in active markets for identical assets or liabilities

Level 2 Unadjusted quoted prices in active markets for similar assets or liabilities; unadjusted quoted prices for identical or similar assets or liabilities in markets that are not active; or inputs other than quoted prices that are observable for the asset or liability

Level 3 Unobservable inputs for the asset or liability

Assets and liabilities measured at fair value on a recurring basis consisted of the following:

	As of December 31, 2015		As of December 31, 2014	
	Level 1	Level 3	Level 1	Level 3
Assets measured at fair value:				
Short-term investment (included in cash and cash equivalents)	$ 248,000	$	$ 248,000	$
Liabilities measured at fair value:				
Preferred stock warrants	$	$ 169,000	$	$ 92,000

A reconciliation of the beginning and ending balances of Miragen s liabilities measured at fair value using significant unobservable, or Level 3, inputs are as follows:

Balance of liability as of December 31, 2013	$ 97,000
Change in estimated value of warrants	(5,000)
Balance of liability as of December 31, 2014	92,000
Issuance of Series B preferred stock warrants	121,000
Change in estimated value of warrants	(44,000)
Balance of liability as of December 31, 2015	$ 169,000

Concentrations of Credit Risk

Financial instruments that potentially subject Miragen to concentrations of credit risk consist primarily of cash equivalents, which include short-term investments that all have maturities of less than three months. Miragen maintains deposits in federally insured financial institutions in excess of federally insured limits. Miragen has not

experienced any losses in such accounts. Miragen invests its excess cash primarily in deposits and money market funds held with two financial institutions. There were no elements of comprehensive loss during the years ended December 31, 2015 and 2014.

Property and Equipment

Miragen carries its property and equipment at cost, less accumulated depreciation and amortization. Depreciation is computed using the straight-line method over the estimated useful lives of the assets, generally three to five years. Leasehold improvements are amortized over the shorter of the life of the lease (including any renewal periods that are deemed to be reasonably assured) or the estimated useful life of the assets. Construction in progress is not depreciated until placed in service. Repairs and maintenance costs are expensed as incurred and expenditures for major improvements are capitalized.

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Impairment of Long-Lived Assets

Miragen assesses the carrying amount of its property and equipment whenever events or changes in circumstances indicate the carrying amount of such assets may not be recoverable. No impairment charges were recorded during the year ended December 31, 2015 or 2014.

Net Loss per Share

Basic net loss per share is calculated by dividing the net loss applicable to common stockholders by the weighted average number of shares of common stock outstanding during the period without consideration of common stock equivalents. Since Miragen was in a loss position for all periods presented, diluted net loss per share is the same as basic net loss per share for all periods as the inclusion of all potential common shares outstanding would have been anti-dilutive.

Comprehensive Loss

Comprehensive loss is defined as the change in equity during a period from transactions and other events and/or circumstances from non-owner sources. Comprehensive gains (losses) are reflected in the statements of operations and comprehensive loss and as a separate component in the statements of stockholders equity. There were no elements of comprehensive loss during the years ended December 31, 2015 and 2014.

Income Taxes

Miragen accounts for income taxes by using an asset and liability method of accounting for deferred income taxes. Deferred tax assets and liabilities are recognized for the future tax consequences attributable to differences between the financial statement carrying amounts of existing assets and liabilities and their respective tax bases. A valuation allowance is recorded to the extent it is more likely than not that a deferred tax asset will not be realized. Deferred tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to be recovered or settled. The effect on deferred tax assets and liabilities of a change in tax rates is recognized in operations in the period that includes the enactment date.

Miragen s only significant deferred tax assets are for net operating loss carryforwards and capitalized start-up costs. Miragen has provided a valuation allowance for its entire net deferred tax assets since inception as, due to uncertainty as to future utilization of its net operating loss carryforwards, and its history of operating losses, Miragen has concluded that it is not more likely than not that its deferred tax assets will be realized.

Miragen has no unrecognized tax benefits. Miragen classifies interest and penalties arising from the underpayment of income taxes in the consolidated statements of operations as general and administrative expenses.

Segment Information

Miragen operates in one operating segment and, accordingly, no segment disclosures have been presented herein. All of Miragen s equipment, leasehold improvements and other fixed assets are physically located within the United States, and all agreements with its partners are denominated in U.S. dollars, except where noted.

Recent Accounting Pronouncements

In May 2014, the Financial Accounting Standards Board (FASB) issued *ASU No. 2014-09, Revenue from Contracts with Customers*, an updated standard on revenue recognition. ASU No. 2014-09 provides

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enhancements to the quality and consistency of how revenue is reported by companies while also improving comparability in the financial statements of companies reporting using International Financial Reporting Standards or U.S. GAAP. The main purpose of the new standard is for companies to recognize revenue to depict the transfer of goods or services to customers in amounts that reflect the consideration to which a company expects to be entitled in exchange for those goods or services. The new standard also will result in enhanced disclosures about revenue, provide guidance for transactions that were not previously addressed comprehensively and improve guidance for multiple-element arrangements. In July 2015, the FASB voted to approve a one-year deferral of the effective date of ASU No. 2014-09, which will be effective for the Company in the first quarter of fiscal year 2018 and may be applied on a full retrospective or modified retrospective approach. The Company is currently evaluating the impact of implementation and transition approach of ASU 2014-09 on its financial statements and related disclosures.

In March 2016, the FASB issued *ASU No. 2016-08, Revenue from Contracts with Customers (Topic 606): Principal versus Agent Considerations*. The purpose of ASU No. 2016-08 is to clarify the implementation of guidance on principal versus agent considerations. For public entities, the amendments in ASU No. 2016-08 are effective for interim and annual reporting periods beginning after December 15, 2017. The Company is currently evaluating the impact of ASU No. 2016-08 on its financial statements and related disclosures.

In August 2014, the FASB issued *ASU No. 2014-15, Presentation of Financial Statements-Going Concern*, which defines management s responsibility to assess an entity s ability to continue as a going concern, and requires related footnote disclosures if there is substantial doubt about its ability to continue as a going concern. ASU No. 2014-15 is effective for the Company for the fiscal year ending on December 31, 2016, with early adoption permitted. The Company is currently evaluating the impact of ASU No. 2014-15 on its financial statements and related disclosures.

In November 2015, the FASB issued *ASU No. 2015-17, Balance Sheet Classification of Deferred Taxes*. ASU No. 2015-17 requires that deferred tax liabilities and assets be classified as noncurrent in a classified statement of financial position. ASU No. 2015-17 is effective for financial statements issued for fiscal years beginning after December 15, 2016, and interim periods within those fiscal years. The Company currently does not believe the impact of adopting ASU No. 2014-15 will have a material impact on its financial statements and related disclosures.

In January 2016, the FASB issued *ASU No. 2016-01, Recognition and Measurement of Financial Assets and Financial Liabilities*. ASU No. 2016-01 requires equity investments to be measured at fair value with changes in fair value recognized in net income; simplifies the impairment assessment of equity investments without readily determinable fair values by requiring a qualitative assessment to identify impairment; eliminates the requirement for public business entities to disclose the method(s) and significant assumptions used to estimate the fair value that is required to be disclosed for financial instruments measured at amortized cost on the balance sheet; requires public business entities to use the exit price notion when measuring the fair value of financial instruments for disclosure purposes; requires an entity to present separately in other comprehensive income the portion of the total change in the fair value of a liability resulting from a change in the instrument-specific credit risk when the entity has elected to measure the liability at fair value in accordance with the fair value option for financial instruments; requires separate presentation of financial assets and financial liabilities by measurement category and form of financial assets on the balance sheet or the accompanying notes to the financial statements and clarifies that an entity should evaluate the need for a valuation allowance on a deferred tax asset related to available-for-sale securities in combination with the entity s other deferred tax assets. ASU No. 2016-01 is effective for financial statements issued for fiscal years beginning after December 15, 2017, and interim periods within those fiscal years. The Company is currently evaluating the impact of ASU No. 2016-01 on its financial statements and related disclosures.

In February 2016, the FASB issued *ASU No. 2016-02, Leases (Topic 842), which supersedes FASB ASC Topic 840, Leases (Topic 840)* and provides principles for the recognition, measurement, presentation and disclosure of leases for

both lessees and lessors. The new standard requires lessees to apply a dual approach,

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classifying leases as either finance or operating leases based on the principle of whether or not the lease is effectively a financed purchase by the lessee. This classification will determine whether lease expense is recognized based on an effective interest method or on a straight-line basis over the term of the lease, respectively. A lessee is also required to record a right-of-use asset and a lease liability for all leases with a term of greater than twelve months regardless of classification. Leases with a term of twelve months or less will be accounted for similar to existing guidance for operating leases. The standard is effective for annual and interim periods beginning after December 15, 2018, with early adoption permitted upon issuance. The Company is currently evaluating the impact of ASU 2016-02 on its financial statements and related disclosures.

In March 2016, the FASB issued *ASU No. 2016-09, Compensation Stock Compensation (Topic 718): Improvements to Employee Share-Based Payment Accounting*. The amendment is to simplify several aspects of the accounting for stock-based payment transactions including the income tax consequences, classification of awards as either equity or liabilities, and classification on the statement of cash flows. The amendments in ASU No. 2016-09 are effective for interim and annual reporting periods beginning after December 15, 2016. The Company is currently assessing the impact of ASU No. 2016-09 on its financial statements and related disclosures.

In April 2016, the FASB issued *ASU No. 2016-10, Revenue from Contracts with Customer*. The new guidance is an update to ASC 606 and provides clarity on: identifying performance obligations and licensing implementation. For public companies, ASU No. 2016-10 is effective for annual periods, including interim periods within those annual periods, beginning after December 15, 2016. The Company is currently evaluating the impact of ASU No. 2016-10 on its financial statements and related disclosures.

In June 2016, the FASB issued *ASU No. 2016-13, Financial Instruments Credit Losses: Measurement of Credit Losses on Financial Instruments*. ASU 2016-13 requires that expected credit losses relating to financial assets measured on an amortized cost basis and available-for-sale debt securities be recorded through an allowance for credit losses. ASU 2016-13 limits the amount of credit losses to be recognized for available-for-sale debt securities to the amount by which carrying value exceeds fair value and also requires the reversal of previously recognized credit losses if fair value increases. The new standard will be effective for Miragen on January 1, 2020. Early adoption will be available on January 1, 2019. The Company is currently evaluating the impact of ASU 2016-13 on its financial statements and related disclosures.

(3) Strategic Alliance and Collaboration with Servier

In October 2011, Miragen entered into a strategic alliance with Les Laboratoires Servier and the Institut de Recherches Servier (Servier) for the research, development, and commercialization of RNA-targeting therapeutics in cardiovascular disease (the Servier Collaboration Agreement) which was subsequently amended in May 2013, May 2014 and May 2015. Under the Servier Collaboration Agreement, Miragen granted Servier an exclusive license to research, develop, and commercialize RNA-targeting therapeutics for three targets in the cardiovascular field. Under the terms of the amended Servier Collaboration Agreement, Servier has the limited right to replace each of the three original targets once through October 2016. As of December 31, 2015, three named targets exist under the Servier Collaboration Agreement, two of which are replaceable by Servier. Additionally, Servier has a limited right of first negotiation for the license of additional targets from Miragen in the cardiovascular field through October 2016. These rights and the collaboration term below can be extended by mutual agreement between Miragen and Servier at any time on or before October 2016.

Servier s rights to each of the targets are limited to therapeutics in the cardiovascular field in their territory, which is worldwide except for the United States and Japan. Miragen retains all rights for each named target in the United States

and Japan and for any products or product candidates outside of the cardiovascular field.

In connection with entering into the strategic alliance with Servier, Miragen received a nonrefundable upfront payment of $8.4 million (6.0 million) in 2011 and an additional $4.0 million (3.0 million) in 2013

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when Servier exercised their right to name a third target under the agreement. Miragen is also eligible to receive development milestone payments of 5.8 million to 13.8 million ($6.3 million to $15.1 million as of December 31, 2015) and regulatory milestone payments of 10.0 million to 40.0 million ($10.9 million to $43.6 million as of December 31, 2015) for each target. Additionally, Miragen may receive up to 175 million ($191 million as of December 31, 2015) in commercialization milestones as well as quarterly royalty payments between the low-double digits to the mid-teens (subject to reductions for patent expiration, generic competition, third-party royalty and costs of goods) on the net sales of any licensed product commercialized by Servier. Additionally, if Miragen undergoes a change of control in specified circumstances, Servier has agreed to increase this royalty by an additional percentage in the low-single digits if it seeks to use any of the acquiror s intellectual property in the development of product candidates under the Servier Collaboration Agreement. Servier is obligated to make any such royalty payment for a specified period under the Servier Collaboration Agreement.

As part of the Servier Collaboration Agreement, Miragen established a multiple-year research collaboration, under which Miragen jointly performs agreed upon research activities directed to the identification and characterization of named targets and oligonucleotides in the cardiovascular field, which Miragen refers to as the Research Collaboration. The initial three-year term of the Research Collaboration was extended by two additional years in May 2014 through October 2016. Servier is responsible for funding all of the costs of the Research Collaboration, as defined under the Servier Collaboration Agreement. During the years ended December 31, 2015 and 2014, Miragen recognized as revenue amounts reimbursable to Miragen under the Servier Collaboration Agreement for research and development activities of $3.8 million and $4.3 million, respectively.

Refer to Note 13 for disclosure of amendments to the Servier Collaboration Agreement entered into subsequent to December 31, 2015.

The development of each product candidate (commencing with registration enabling toxicology studies) under the Servier Collaboration Agreement is performed pursuant to a mutually agreed upon development plan to be conducted by the parties as necessary to generate data useful for both parties to obtain regulatory approval of such product candidates. Servier is responsible for a specified percentage of the cost of research and development activities through the completion of one or more Phase 2 clinical trials and will reimburse Miragen for a specified portion of such costs Miragen incurs. The costs of Phase 3 clinical trials for each product candidate will be allocated between the parties at a specied percentage of costs between the parties upon the occurrence of specified events under the Servier Colloboration Agreement, including if Miragen enters into a third-party agreement for the development and/or commercialization of a product in the United States at least 180 days before the initiation of the first Phase 3 clinical trial or if Miragen subsequently enters into a U.S. partner agreement or if Miragen does not enter into a U.S. partner agreement, but files for approval in the United States using data from the Phase 3 clinical trial. Miragen is responsible, by itself or through a third-party manufacturer, for the manufacture and supply of all licensed oligonucleotides during the pre-clinical phase of development under the Sevier Collaboration Agreement while Servier is primarily responsible for manufacture and supply of all licensed oligonucleotides and product during the clinical phase of development under the Servier Collaboration Agreement. The parties are each responsible for the commercial supply of any licensed product to be sold in each s respective territory under the Servier Collaboration Agreement.

Under the Servier Collaboration Agreement, Miragen also granted Servier a royalty-free, non-exclusive license to develop a companion diagnostic for any therapeutic product which may be developed by Servier under the Servier Collaboration Agreement. Miragen also granted Servier an exclusive, royalty free license to commercialize such a companion diagnostic for use in connection with such therapeutic product in its territory.

The Servier Collaboration Agreement will expire as to each underlying product candidate when Servier s royalty obligations as to such product candidate have expired. Servier may also terminate the Servier Collaboration

Agreement for (i) convenience upon a specified number of days prior notice to Miragen or

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(ii) upon determination of a safety issue relating to development under the agreement upon a specified number of days prior notice to Miragen. Either party may terminate the Servier Collaboration Agreement upon a material breach by the other party which is not cured within a specified number of days. Miragen may also terminate the agreement if Servier challenges any of the patents licensed by Miragen to Servier.

Miragen determined that the elements within the Servier Collaboration Agreement should be treated as a single unit of accounting because the delivered elements, the licenses, did not have standalone value to Servier at the time the license was granted. As such, Miragen recognizes license fees earned under the Servier Collaboration Agreement as revenue on a proportional performance basis over the estimated period to complete the activities under the Research Collaboration. The total period of performance is estimated to be equal to the term of the Research Collaboration. Through May 2014, the $12.4 million (9.0 million) in non-refundable license fees Miragen earned under the Servier Collaboration Agreement was being recognized as revenue through October 2014, the end of the three-year initial term of its Research Collaboration. In May 2014, Miragen changed its estimate as a result of Servier s extension of the period under which Miragen expected to perform services and, as such, began recognizing the remaining unamortized license revenue through October 2016, the estimated end of the Research Collaboration. Miragen measures its progress under the proportional performance method based on actual and estimated full-time equivalents. During the years ended December 31, 2015 and 2014, Miragen recognized license revenue of $1.2 million and $3.3 million, respectively,

In total, for the years ended December 31, 2015 and 2014, Miragen recognized $5.0 million and $7.6 million, respectively, as revenue under the Servier Collaboration Agreement. As of December 31, 2015 and 2014, deferred revenue totaled $0.5 million and $1.7 million, respectively. In addition, amounts incurred but not billed to Servier for research activities performed totaled $0.8 million as of December 31, 2015 and $1.0 million as of December 31, 2014. These amounts are included in prepaid expenses and other current assets in Miragen s consolidated balance sheets.

(4) Property and Equipment

Property and equipment consisted of the following:

	As of December 31,	
	2015	**2014**
Property and equipment, at cost:		
Lab equipment	$ 2,066,000	$ 2,010,000
Furniture and fixtures	54,000	44,000
Computer hardware and software	192,000	167,000
Leasehold improvements	629,000	449,000
	2,941,000	2,670,000
Less accumulated depreciation and amortization	(2,225,000)	(1,989,000)
Property and equipment, net	$ 716,000	$ 681,000

Depreciation and amortization expense was $0.3 million and $0.4 million for the years ended December 31, 2015 and 2014, respectively.

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(5) Accrued and Other Liabilities

Accrued and other liabilities consisted of the following:

	As of December 31, 2015	2014
Accrued employee compensation and related taxes	$ 496,000	$ 450,000
Deferred and accrued facility lease obligations	174,000	43,000
Accrued legal fees	24,000	142,000
Value of warrants on redeemable convertible preferred stock	169,000	92,000
Accrued property and franchise taxes	35,000	29,000
Accrued outsourced clinical and pre-clinical studies	859,000	938,000
Accrued consulting, supplies, and other expenses	51,000	32,000
	$ 1,808,000	$ 1,726,000

(6) Notes Payable

Convertible Notes Payable Issued to Investors

In February 2015, Miragen s stockholders approved the issuance of up to $20 million of convertible promissory notes and in February 2015, Miragen issued convertible promissory notes totaling $8.5 million (the Convertible Notes) to holders of its Series B redeemable convertible preferred stock (Series B). The Convertible Notes were issued in lieu of the third tranche under the Series B purchase agreement. The Convertible Notes accrued interest at a fixed rate of 6% per year and were scheduled to become due and payable any time on or after August 3, 2016 upon the demand of holders of a required threshold of the outstanding notes. The Convertible Notes and accrued interest thereon, were subject to an automatic conversion into a class of equity securities issued upon a financing that met specific criteria, which occurred in October 2015 upon the sale of Series C redeemable convertible preferred stock (Series C) (see Note 8). Under the terms of the Convertible Notes, the notes together with accrued interest were to convert at a conversion rate equal to 75% of the per share price paid for shares of Series C. However, this provision was waived by the note holders, and in October 2015, the Convertible Notes and accrued interest thereon totaling $8.9 million converted into 2,003,884 shares of Series C at a conversion rate equal to $4.43 per share, the per share price of the Series C.

Miragen concluded that the right to receive a 25% discount on the conversion to a class of equity securities in a qualified financing was a put option that needed to be valued separately. As such, Miragen recorded proceeds from the Convertible Notes based on the estimated fair value of the embedded put option ($2.7 million) and the Convertible Notes, which resulted in a debt discount of $2.7 million related to the value of the put option. This debt discount was being amortized over the term of the Convertible Notes. Upon conversion of the Convertible Notes in October 2015, Miragen recorded a loss on extinguishment of the Convertible Notes of $1.4 million, which reflects the difference between the fair value of the Series C issued in the conversion and the carrying value of the Convertible Notes.

Interest and related expenses recorded for the Convertible Notes in 2015 are as follows:

Interest based on the stated interest rate	$ 377,000

Amortization of debt discount	1,310,000
Loss on extinguishment	1,354,000
Increase in the estimated fair value of the put option	296,000
Total	$ 3,337,000

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In October 2015, the note holders waived the 25% discount. At that time and upon conversion, the put option was terminated and its estimated value of $3.0 million was transferred to additional paid-in capital. The gain was recorded to additional paid-in capital as the note holders were also holders of Series B.

2015 Notes Payable to Silicon Valley Bank

In April 2015, Miragen entered into a new loan and security agreement with Silicon Valley Bank to borrow up to $10 million in two separate tranches. The first tranche of $5.0 million was funded in May 2015 and is scheduled to be repaid over a 48-month period with interest only payments during the first 18 months (the 2015 Notes). Accelerated payments are due under certain circumstances. Amounts outstanding bear interest at the prime rate minus 0.25% (3.25% at December 31, 2015) with a final payment fee equal to 5.50% of amounts borrowed. Borrowings are secured by a priority security interest, right, and title in all business assets, excluding Miragen s intellectual property, which is subject to a negative pledge.

In April 2015 and in connection with the first tranche, Miragen issued detachable warrants to purchase up to 16,667 shares of its Series B at an exercise price of $6.00 per share. Miragen estimated the fair value of the warrants and the holder put right (see below), to be $0.1 million at the time of issuance. The fair value of the warrants was estimated using a valuation model with the following assumptions: risk free interest rate of 2.1%; 84% volatility; and contractual term of 10 years. The holder put right was valued using a probability adjusted present value method with the following assumptions as of December 31, 2015; term of two years, discount rate of 4.78%, and probability of 89.3%.

If the second tranche is requested and funded, Miragen will be required to issue additional warrants to purchase Series B. The warrants contain a put right under which Miragen may be required to repurchase the outstanding warrants for a purchase price of $0.2 million, which amount is prorated based on the proportion of the $10 million funded. The warrants were classified as a liability at the date of grant and are subject to re-measurement at each balance sheet date.

Amounts outstanding under notes payable as of December 31, 2015 are as follows:

Principal amount outstanding	$ 5,000,000
Unamortized debt discount	(89,000)
Unamortized debt issuance costs	(43,000)
Accretion of final payment fee	66,000
	4,934,000
Less: current maturities	(269,000)
Long-term notes payable	$ 4,665,000

Future annual principal payments under the 2015 Notes Payable to Silicon Valley Bank as of December 31, 2015 are as follows:

2016	$ 333,000
2017	2,000,000
2018	2,000,000

2019	667,000
Total	$ 5,000,000

(7) Commitments and Contingencies

Indemnifications

The Company has agreements whereby it indemnifies its directors and officers for certain events or occurrences while the individual is, or was, serving as a director, officer, employee, or other agent of the Company. The maximum potential amount of future payments the Company could be required to make under these indemnification agreements is unlimited.

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Employment Agreements

The Company has entered into agreements with its executives that provide for base salary, severance, eligibility for bonuses, and other generally available benefits. The agreements provide that we may terminate the employment of our executives at any time with or without cause. If an executive is terminated without cause or an executive resigns for good reason, as defined, then the executive is entitled to receive, upon the execution of a release agreement, a severance package consisting of: (i) the equivalent of 6 to 12 months of the executive s base salary as in effect immediately prior to date of termination, (ii) acceleration of vesting of the equivalent of 6 to 12 months of vesting of the executive s outstanding unvested options and other stock awards issued under our equity incentive plan, and (iii) other benefits. For the Company s chief executive, if such termination occurs one month before or thirteen months following a change of control, then, upon the execution of a release agreement, the executive is entitled to: (i) the equivalent of 24 months of the executive s base salary as in effect immediately prior to the date of termination, (ii) acceleration of vesting of all of the executive s outstanding unvested options to purchase common stock, and (iii) other benefits.

License Agreements with the University of Texas

As of December 31, 2015, Miragen had eight exclusive patent licenses agreements (the UT License Agreements) with the Board of Regents of The University of Texas System (the University of Texas). Under each of the UT License Agreements, the University of Texas granted Miragen exclusive and nonexclusive licenses to certain patent and technology rights. The University of Texas is a minority stockholder of the Company.

In consideration of rights granted by the University of Texas, Miragen agreed to (i) pay a nonrefundable upfront license documentation fee in the amount of $10 thousand per license, (ii) pay an annual license maintenance fee in the amount of $10 thousand per license starting one year from the date of each agreement, (iii) reimburse the University of Texas for actual costs incurred in conjunction with the filing, prosecution, enforcement, and maintenance of patent rights prior to the effective date, and (iv) bear all future costs of and manage the filing, prosecution, enforcement, and maintenance of patent rights. In 2015 and 2014, Miragen incurred upfront and maintenance fees under the UT License Agreements totaling $0.1 million, and recorded the amounts as research and development expense. All costs related to the filing, prosecution, enforcement, and maintenance of patent and technology rights are recorded as general and administrative expense when incurred.

Under the terms of the UT License Agreements, Miragen may be obligated to make the following future milestone payments for each licensed product candidate: (i) up to $0.6 million upon the initiation of defined clinical trials, (ii) $2.0 million upon regulatory approval in the United States, and (iii) $0.5 million per region upon regulatory approval in other specified regions. Additionally, if Miragen successfully commercializes any product candidate subject to the UT License Agreements, Miragen is responsible for royalty payments in the low-single digits and payments up to a percentage in the mid-teens of any sublicense income, subject to specified exceptions, based upon net sales of such licensed products. UT s right to these royalty payments will expire as to each license agreement upon the expiration of the last patent claim subject to the applicable UT License Agreement.

The license term extends on a country by country basis until the expiration of the last to expire of the licensed patents that covers such product in such country. Upon expiration of the royalty payment obligation, Miragen will have a fully paid license in such country. Miragen may also terminate each UT License Agreement for convenience upon a specified number of days prior notice to the University of Texas. The University of Texas also has the right to earlier terminate the UT License Agreements after a defined date under specified circumstances where Miragen has effectively abandoned its research and development efforts or has no sales. The UT License Agreements will terminate under customary termination provisions including Miragen s bankruptcy or insolvency, material breach, and

upon mutual written consent. Miragen has expensed all charges incurred under the UT License Agreements to date, due to the uncertainty as to future economic benefit from the acquired rights.

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Sponsored Research Agreements with the Hubrecht Institute

In 2013, Miragen entered into two separate sponsored research agreements (the Hubrecht Research Agreements) with the Hubrecht Institute (Hubrecht). Under the terms of the Hubrecht Research Agreements, Hubrecht is to provide the personnel, facilities, and equipment necessary to carry out a research program for Miragen s benefit. Miragen incurred expenses under these agreements of $0.1 million and $0.2 million during the years ended December 31, 2015 and 2014, respectively.

License Agreement with Roche Innovation Center Copenhagen A/S (formerly Santaris Pharma A/S)

In June 2010, Miragen entered into a license agreement with the Santaris Pharma A/S, which has changed its name to Roche Innovation Center Copenhagen A/S (RICC), which was subsequently amended in October 2011 and amended and restated in December 2012 (the RICC License Agreement). In 2014, Santaris Pharma A/S was acquired by F. Hoffmann-La Roche Ltd (Roche) and has become a wholly owned subsidiary of Roche.

Under the RICC License Agreement, Miragen received exclusive and nonexclusive licenses from RICC to use specified technology of RICC (the RICC Technology) for specified uses including research, development, and commercialization of pharmaceutical products using this technology worldwide. Under the RICC License Agreement, Miragen has the right to develop and commercialize the RICC Technology directed to four specified targets and the option to obtain exclusive product licenses for up to six additional targets. The acquisition of Santaris Pharma A/S by Roche was considered a change-of-control under the agreement, and as such, certain terms and conditions of the RICC License Agreement changed, as contemplated and in accordance with the RICC License Agreement. These changes primarily relate to milestone payments reflected in the disclosures below. As consideration for the grant of the license and option, Miragen previously paid RICC $2.3 million and issued RICC 856,806 shares of its Series A preferred stock, which are now owned by Roche Finance Ltd, an affiliate of Roche. If Miragen exercises its option to obtain additional product licenses or to replace the target families, Miragen will be required to make additional payments to RICC.

Under the terms of the RICC License Agreement, milestone payments were previously decreased by a specified percentage as a result of the change of control by RICC referenced above. Miragen is obligated to make future milestone payments for each licensed product for up to $5.2 million. Certain of these milestones will be increased by a specified percentage if Miragen undergoes a change in control during the term of the RICC License Agreement. If Miragen grants a third party a sublicense to the RICC Technology, in lieu of the fixed milestone payments noted above, Miragen is required to remit to Roche up to a specified percentage of the upfront and milestone payments Miragen receives under its sublicense.

If Miragen successfully commercializes any product candidate subject to the RICC License Agreements, then RICC is entitled to royalty payments in the mid-single digits on the net sales of such product, provided that if such net sales are made by a sublicensee under the RICC License Agreement, RICC is entitled to royalty payments equal to the lesser of a percentage in the mid-single digits on the net sales of such product or a specified percentage of the royalties paid to Miragen by such sublicensee, subject to specified restrictions. Miragen is obligated to make any such royalty payments until the later of (i) a specified anniversary of the first commercial sale of the applicable product or (ii) the expiration of the last valid patent claim licensed by RICC under the RICC License Agreement underlying such product. Upon the occurrence of specified events, the royalty owed to RICC will be decreased by a specified percentage.

The RICC License Agreement will terminate upon the latest of the expiration of all of RICC s royalty rights, the termination of the last Miragen target or the expiration of its right to obtain a product license for a new target under

the RICC License Agreement. Miragen may also terminate the RICC License Agreement for convenience upon a specified number of days prior notice to RICC, subject to specified terms and conditions. Either party may terminate the RICC License Agreement upon an uncured material breach by the other party and RICC may terminate the RICC License Agreement upon the occurrence of other specified events that are not cured within a specified number of days.

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Miragen has expensed all charges incurred under the RICC License Agreement to date, due to the uncertainty as to future economic benefit from the acquired rights.

Subcontract Agreement with Yale University

In October 2014, Miragen entered into a subcontract agreement (the Yale Agreement) with Yale University (Yale) which was subsequently amended in February 2016 and November 2016. Under the Yale Agreement, Miragen agreed to provide specified services regarding the development of a proprietary compound that targets microRNA-29 in the indication of idiopathic pulmonary fibrosis. Yale entered into the Yale Agreement in connection with a grant that Yale received from the National Institutes of Health (NIH) for the development a microRNA-29 mimicry as a potential therapy for pulmonary fibrosis.

In consideration of Miragen s services under the Yale Agreement, Yale has agreed to pay Miragen up to $1.1 million. Under the terms of the Yale Agreement, Miragen retains all rights to any and all intellectual property developed solely by Miragen in connection with the Yale Agreement. Yale has also agreed to provide Miragen with an exclusive option to negotiate in good faith for an exclusive, royalty-bearing license from Yale for any intellectual property developed by Yale or jointly by the parties under the Yale Agreement. Yale is responsible for filing, prosecuting and maintaining foreign and domestic patent applications and patents on all inventions jointly developed by the parties under the Yale Agreement.

The Yale Agreement terminates automatically on the date that Yale delivers its final research report to the NIH under the terms of the grant underlying the Yale Agreement. Either party may also terminate the Yale Agreement upon a specified number of days notice in the event that the NIH s grant funding is reduced or terminated or upon material breach by the other party.

License Agreements with the t2cure GmbH

In October 2010, Miragen entered into a license and collaboration agreement (the t2cure Agreement) with the t2cure GmbH (t2cure), which was subsequently amended in July 2014. Under the t2cure Agreement, Miragen received a worldwide, royalty bearing, and exclusive license to specified patent and technology rights to develop and commercialize product candidates targeted at miR-92.

In consideration of rights granted by t2cure, Miragen paid a onetime upfront fee of $46 thousand and agreed to: (i) pay an annual license maintenance fee in the amount of 3 thousand ($3 thousand at December 31, 2015), and (ii) reimburse t2cure for 100% of actual costs incurred in conjunction with the filing, prosecution, enforcement, and maintenance of patent rights prior to the effective date. All costs related to the filing, prosecution, enforcement, and maintenance of patent and technology rights are recorded as general and administrative expense when incurred.

Under the terms of the t2cure Agreement, Miragen is obligated to make the following future milestone payments for each licensed product: (i) up to $0.7 million upon the initiation of certain defined clinical trials, (ii) $2.5 million upon regulatory approval in the United States, and (iii) up to $1.5 million per region upon regulatory approval in the European Union or Japan. Additionally, if Miragen successfully commercializes any product candidate subject to the t2cure Agreement, Miragen is responsible for royalty payments in the low-single digits upon net sales of licensed products and sublicense fees equal to a percentage in the low-twenties of sublicense income to Miragen. Miragen is obligated to make any such royalty payment until the later of (i) the tenth anniversary of the first commercial sale of the applicable product or (ii) the expiration of the last valid claim to a patent licensed by t2cure under the t2cure Agreement covering such product. If such patent claims expire prior to the end of the ten year term, then the royalty owed to t2cure will be decreased by a specified percentage.

The license term extends on a country by country basis until the later of: (i) the tenth anniversary of the first commercial sale of a licensed product in a country, and (ii) the expiration of the last to expire valid claim that claims such licensed product in such country. Upon expiration of the royalty payment obligation,

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Miragen will have a fully paid license in such country. Miragen has the right to terminate the t2cure Agreement at will, on a country-by-country basis, after 60 days written notice.

Miragen has expensed all charges incurred under the t2cure Agreement to date, due to the uncertainty as to future economic benefit from the acquired rights.

Facility Lease

In December 2010, Miragen entered into a lease agreement for office and lab space (Crestview Lease) and in 2015, Miragen amended this lease agreement to extend its term through August 2020.

In April 2013, Miragen entered into separate lease agreement for additional office space (Westview Lease) and in 2015, Miragen amended this lease agreement to extend its term by four months through October 2015. This lease expired in 2015 and was not renewed.

Miragen s Crestview Lease is noncancelable. Minimum base lease payments, including the impact of tenant improvement allowances, under the operating lease are recognized on a straight-line basis over the full term of the lease. Rent expense for the Crestview and Westview Leases was $0.2 million during 2015 and 2014. Miragen is also required to pay for a portion of the operating expenses for each facility and during 2015 and 2014, Miragen expensed $0.2 million related to this additional rent expense.

Future minimum payments under the Crestview Lease is as follows:

2016	$ 328,000
2017	379,000
2018	391,000
2019	404,000
2020	277,000
Total	$ 1,779,000

(8) Capital Stock

Miragen is authorized to issue 43,435,888 shares of its stock; 24,780,394 shares have been designated as common stock with a par value of $0.001 per share (Common Stock); and 18,655,494 shares have been designated as preferred stock (Series Preferred) with a par value of $0.001 per share. Of the 18,655,494 shares of preferred stock, 7,169,176 shares are designated as Series A redeemable convertible preferred stock (Series A); 2,183,318 shares are designated as Series B; and 9,303,000 shares are designated as Series C. The number of authorized shares of Common Stock may be increased or decreased by the affirmative vote of the holders of a majority of Miragen s stock who are entitled to vote.

Common Stock

Each share of Common Stock is entitled to one vote. Subject to prior rights of the Series Preferred, the holders of Miragen s Common Stock are entitled to receive dividends when and as declared or paid by its board of directors.

Series Preferred

In June 2014, Miragen sold 1,166,660 shares of its Series B at $6.00 per share. Total proceeds were $7.0 million, net of $14 thousand in issuance costs.

In October 2015, Miragen sold 3,632,342 shares of its Series C at $4.43 per share. Total proceeds were $15.9 million, net of $0.2 million in issuance costs. Concurrent with this financing, all of the outstanding Convertible Notes together with interest accrued thereon together totaling $8.9 million converted into 2,003,884 shares of Series C at a conversion rate equal to $4.43 per share.

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Holders of Series Preferred have the following rights and preferences:

Dividends Provisions

Holders of Series Preferred, in preference to holders of common stock, are entitled to receive when, as, and if declared by Miragen s board of directors, noncumulative dividends at the rate of 8% of the original purchase price per year.

Except for certain defined exclusions, as long as shares of Series Preferred are outstanding, no i) payment or declaration of any dividend, ii) distribution on Common Stock, or iii) purchase for value any shares of Common Stock shall occur until dividends on Series Preferred have been paid or declared.

Liquidation Preferences

With respect to rights on liquidation, shares of preferred stock rank senior and prior to the shares of Common Stock. In the event of any liquidation, dissolution, or winding up of the Company or an acquisition or asset transfer, each as defined, preferred stockholders shall be entitled to receive an amount per share equal to the original purchase price, plus all declared but unpaid preferred stock dividends, if any, before any payment shall be made to the holders of Common Stock. After payment of the full liquidation preference to Series Preferred, the holders of Series Preferred participate with holders of Common Stock in the remaining proceeds on an as-if-converted to Common Stock basis. At December 31, 2015, the aggregate liquidation preference of the Series A, B, and C was $21.5 million, $13.0 million and, $25.0 million, respectively.

Redemption Rights

At the election of the holders of at least 70% of the then outstanding Series Preferred, Miragen is required to redeem, in three annual installments beginning not prior to the fifth anniversary of the original issue date of the Series C (not prior to October 2020), all of the shares of Series Preferred then outstanding at a redemption price per share equal to the sum of the original issue price of $3.00 per share for Series A preferred, $6.00 per share for Series B, and $4.43 per share for Series C, plus declared but unpaid dividends, if any.

As the Series Preferred stockholders can collectively control the redemption of the Series Preferred stock, Miragen has elected to present the Series Preferred within temporary equity.

Conversion to Common Stock

Series Preferred stockholders have the right, at any time, to convert any or all of their Series Preferred into fully paid and nonassessable shares of Common Stock in a ratio equal to the quotient of the original purchase price ($3.00 per share for Series A, $6.00 per share for Series B, and $4.43 per share for Series C) divided by the Series Preferred conversion price, as adjusted ($3.00 per share for Series A, $6.00 per share for Series B, and $4.43 per share for Series C at December 31, 2015). Automatic conversion of all outstanding shares of Series Preferred into shares of Common Stock occurs if elected by at least 70% of the holders of Series Preferred or immediately upon the closing of a firm commitment underwritten public offering pursuant to an effective registration statement under the Securities Act of 1933, in which the per share price is at least $9.00, as adjusted, and net cash proceeds are at least $35 million.

The conversion price of the Series Preferred is subject to customary anti-dilution provisions and automatic downward adjustments in the event of certain sales or issuances of Miragen s Common Stock or equivalents thereof, subject to specified exceptions, at a price below the conversion price of the Series Preferred ($3.00 per Series A share, $6.00 per Series B share, and $4.43 per Series C share at December 31, 2015). Miragen evaluated this contingently adjustable

conversion feature and concluded that incremental intrinsic value

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should be recognized when and if such an anti-dilution adjustment is triggered. In 2015, Miragen issued Series C at $4.43 per share, which was below the Series B Preferred conversion price of $6.00 per share. Concurrent with this transaction, holders of Series B Preferred waived the contingently adjustable conversion feature for this transaction. The impact of this anti-dilution adjustment and subsequent waiver was immaterial to Miragen s financial statements.

At December 31, 2015, Miragen had 14,952,053 shares of Common Stock reserved for the conversion of Series Preferred into common stock.

Voting Rights

Each holder of Series Preferred is entitled to the number of votes equal to the number of shares of common stock into which shares of preferred stock could be converted. Under certain circumstances, however, holders of Series Preferred are entitled to vote as a separate class or separate classes, as the case may be.

For so long as at least 500,000 shares Series Preferred remain outstanding, the vote of the holders of at least 70% of the outstanding Series Preferred is required for certain actions including but not limited to: authorization of a new class of stock, amendment to the bylaws of the company, declaration or payment of dividends, approval of asset transfers, mergers, liquidation of the company, exclusive license of intellectual property, change in the authorized number of members of Miragen s board of directors, changes in chief executive officer, and new borrowings of the company in excess of $250,000.

The consent of holders of at least 65% of Series A and a holders of a majority of Series B, as the case may be, is required for any changes to Miragen s certificate of incorporation or bylaws that alters the voting or other powers, preferences, or rights of the respective Series A and Series B so as to affect them adversely in a manner different from other Series Preferred.

The consent of a majority of the outstanding shares of Series C, which shall include the affirmative vote of at least one of two named Series C, is required for: a) any changes to Miragen s certificate of incorporation or bylaws that alters the voting or other powers, preferences, or rights of the respective Series C adversely in a manner different from other Series Preferred; and b) any authorization or designation of any new class or series of stock or any other convertible securities or any increase in the authorized or designated number of any such new class or series.

For so long as at least 300,000 shares of Series A, B, and C remain outstanding, the holders of Series A, B, and C Preferred each voting as a separate class are entitled to elect a total of five members of Miragen s board of directors (two by Series A holders, one by Series B holders, and two by Series C holders). Voting as a single class, the Series A, Series B, Series C, and common stockholders are entitled to elect all remaining members of Miragen s board of directors. Miragen s bylaws provide that the number of directors shall be fixed by the board of directors from time to time. Currently, there are seven members of Miragen s board of directors and one open Series C seat.

(9) Stock-Based Compensation

Equity Incentive Plan

In 2008, Miragen s board of directors approved the 2008 Equity Plan. The 2008 Equity Plan was subsequently amended in June 2009, April 2012, and October 2015 to increase the number of shares authorized for issuance. As of December 31, 2015, there were 3,672,515 shares authorized for issuance as awards under the Equity Plan, of which 922,991 shares remain available for future issuances.

The 2008 Equity Plan provides for the issuance of rights to receive common stock including stock options, restricted stock awards, and other similar awards. Common stock options granted under the 2008 Equity Plan may be either incentive or nonstatutory stock options. Incentive stock options, or ISOs, may only be granted to employees. Nonstatutory stock options may be granted to employees, directors, and non-employee consultants.

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The 2008 Equity Plan is administered by Miragen s board of directors, which has the authority to select individuals to whom awards will be granted, the number of shares, vesting, exercise price, and term of each option grant. Options granted under the 2008 Equity Plan have an exercise price equal to the market value of the underlying shares at the date of grant and expire 10 years from the date of grant. Generally, options vest 25% on the first anniversary of the vesting commencement date and 75% ratably in equal monthly installments over the remaining 36 months. Miragen has also granted options that vest in equal monthly or quarterly amounts over periods ranging from 24 to 48 months.

Fair Value Assumptions

Miragen uses the Black-Scholes option pricing model to estimate the fair values of stock options. The Black-Scholes model requires inputs for risk-free interest rate, dividend yield, volatility, and expected lives of the options. Since Miragen has a limited history of stock purchase and sale activity, expected volatility is based on historical data from public companies similar to Miragen in size and nature of operations. Miragen will continue to use similar entity volatility information until its historical volatility is relevant to measure expected volatility for option grants. Miragen has not applied a forfeiture rate to its assumptions as the impact would not be material to the consolidated financial statements. The risk-free rate for periods within the contractual life of each option is based on the U.S. Treasury yield curve in effect at the time of the grant for a period commensurate with the expected term of the grant. The expected term (without regard to forfeitures) for options granted represents the period of time that options granted are expected to be outstanding and is derived from the contractual terms of the options granted and expected option exercise behaviors. Miragen estimates the fair value of underlying common shares using a third-party valuation report that has derived the fair value using the probability-weighted expected return method.

The fair values of employee stock options were estimated at the date of grant using the Black-Scholes model with the following weighted-average assumptions and had the following estimated weighted average grant-date fair value per share during the years ended December 31, 2015 and 2014:

	2015	2014
Expected term	5 years	5 years
Expected volatility	84%	95%
Risk-free interest rate	1.68%	1.66%
Expected dividend yield	0.00%	0.00%
Weighted-average fair value of underlying common stock at the grant date	$ 0.74	$ 0.79
Weighted-average grant date fair value per option	$ 0.49	$ 0.57

Miragen accounts for stock options issued to non-employees by valuing the awards using the Black-Scholes option pricing model and adjusting the value of such awards to current fair value each reporting period until the awards are vested or a performance commitment has otherwise been reached. The following weighted-average assumptions were used to value non-employee stock options granted or vested during the years ended December 31, 2015 and 2014:

	2015	2014
Remaining contractual term	9.94 years	9.70 years
Expected volatility	84%	95%
Risk-free interest rate	2.27%	2.17%
Expected dividend yield	0.00%	0.00%

Weighted-average fair value of underlying common stock	$	0.74	$	0.78
Weighted-average fair value per option	$	0.62	$	0.68

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Summary of Activity

A summary of stock options activity under the 2008 Equity Plan for the years ended December 31, 2015 and 2014 is as follows:

	Number of options	Weighted-average exercise price	Weighted-average remaining contractual term (years)	Aggregate intrinsic value
Options outstanding at December 31, 2013	2,436,000	$ 0.66		
Granted	282,000	0.79		
Exercised	(21,000)	0.42		
Canceled	(14,000)	0.76		
Options outstanding at December 31, 2014	2,683,000	0.67		
Granted	18,000	0.74		
Canceled	(22,000)	0.71		
Options outstanding at December 31, 2015	2,679,000	0.67	5.57	$ 353,000
Vested or expected to vest at December 31, 2015	2,679,000	0.67	5.57	$ 353,000
Exercisable as of December 31, 2015	2,360,000	$ 0.65	5.25	$ 353,000

The total intrinsic value of stock options exercised was $8 thousand during the year ended December 31, 2014. Cash received from the exercise of stock options was approximately $9 thousand for the year ended December 31, 2014. No options were exercised during the year ended December 31, 2015

Stock-Based Compensation Expense

Stock-based compensation related to employee stock options is included in the consolidated statements of operations as follows:

	Year ended December 31, 2015	2014
Research and development	$ 43,000	$ 39,000
General and administrative	94,000	92,000

	$ 137,000	$ 131,000

As of December 31, 2015, Miragen had $0.15 million of total unrecognized employee stock-based compensation costs, which Miragen expects to be recognized over a weighted-average remaining period of 1.68 years.

Miragen recognized $0.2 and $0.1 million of stock-based compensation related to non-employee stock options during the years ended December 31, 2015 and 2014, respectively. The amounts are included in general and administrative expenses in the consolidated statements of operations. As of December 31, 2015, based on Miragen s current estimate of fair value, it estimates that the remaining unrecognized stock-based compensation expense related to non-employees of $30 thousand will be expensed over a weighted-average remaining period of 2.67 years.

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(10) Warrants

Warrant activity for the years ended December 31, 2015 and 2014 is as follows:

	Common Stock Warrants		Preferred Stock Warrants	
	Number	Weighted-Average Exercise Price	Number	Weighted Average Exercise Price
Outstanding at December 31, 2013	10,000	$ 0.40	20,000	$ 3.00
Granted				
Outstanding at December 31, 2014	10,000	$ 0.40	20,000	$ 3.00
Granted			16,667	6.00
Outstanding at December 31, 2015	10,000	$ 0.40	36,667	$ 4.36

A summary of outstanding warrants as of December 31, 2015 is as follows:

Common Stock Warrants

Number of underlying shares	Exercise Price	Expiration Date
10,000	$ 0.40	2018

Preferred Stock Warrants

Number of underlying shares	Series of Preferred	Exercise Price	Expiration Date
20,000	A	$ 3.00	2018
16,667	B	6.00	2025
36,667			

At December 31, 2015 and 2014, Miragen estimated the fair value of the warrants to purchase Series A to be $50 thousand and $92 thousand, respectively. The fair value of the warrants was estimated using the Black-Scholes option pricing model with the following assumptions as of December 31, 2015: risk-free interest rate of 1.06%; 84% volatility; remaining contractual term of approximately three years; no dividend yield; and an estimated fair value of the underlying redeemable convertible preferred stock of $4.43 per share.

As of December 31, 2015, Miragen estimated the fair value of the warrants to purchase Series B and the holder put right to be $0.1 million. The fair value of the warrants was estimated using a valuation model with the following assumptions as of December 31, 2015: risk free interest rate of 2.1%; 84% volatility; and contractual term of 10 years.

The holder put right was valued using a probability adjusted present value method with the following assumptions as of December 31, 2015; term of 2 years, discount rate of 4.78%, and probability of 89.3%. See Note 6 for further discussion of the terms and conditions of the warrants.

(11) Income Taxes

Since its inception, Miragen has incurred net taxable losses, and accordingly, no current provision for income taxes has been recorded. This amount differs from the amount computed by applying the U.S. federal income tax rate of 35% to pretax loss due to the provision of a valuation allowance to the extent of Miragen s net deferred tax asset, as well as to state income taxes and nondeductible expenses. The tax effects of temporary differences related to net operating loss and tax credit carryforwards, start-up costs, property and equipment, accrued liabilities, and stock-based compensation give rise to significant portions of the deferred tax assets and deferred tax liabilities.

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The effective tax rate of the provision for income taxes differs from the federal statutory rate as follows:

	Year ended December 31,	
	2015	2014
Federal statutory income tax rate	35.00%	35.00%
State income taxes, net of federal benefit	3.25	3.25
Federal and state tax credits	3.71	6.79
Amortization of interest and related charges	(8.74)	
Change in valuation allowance	(33.22)	(44.08)
Other, net		(0.96)
Net deferred tax assets	%	%

The components of the deferred tax assets and liabilities are as follows:

	As of December 31,	
	2015	2014
Deferred tax assets:		
Net operating loss carryforwards	$ 14,904,000	$ 9,839,000
Tax credits	1,882,000	1,300,000
Start-up costs	1,558,000	1,702,000
Deferred revenue	198,000	650,000
Accruals and reserves	371,000	212,000
Gross deferred tax assets	18,913,000	13,703,000
Valuation allowance	(18,913,000)	(13,703,000)
Net deferred tax assets	$	$

At December 31, 2015, Miragen had approximately $39.0 million and $1.9 million of net operating loss and research and experimentation tax carryforwards, respectively, which are set to expire beginning in 2027. The Internal Revenue Code contains provisions that may limit the net operating loss carryovers available to be used in any year if certain events occur, including significant changes in ownership interest.

As of December 31, 2015 and 2014, Miragen s net deferred tax assets before valuation allowance totaled approximately $18.9 million and $13.7 million, respectively. In assessing the realizability of its deferred tax assets, Miragen considers whether it is more likely than not that some portion or all of its deferred tax assets will not be realized. The ultimate realization of deferred tax assets is dependent upon the generation of future taxable income during the periods in which those temporary differences become deductible. Miragen considers the scheduled reversal of deferred tax liabilities, projected future taxable income, and tax planning strategies in making this assessment. As Miragen does not have any historical taxable income, projections of future taxable income over the periods in which the deferred tax assets are deductible, and after consideration of its history of operating losses, Miragen does not believe it is more likely than not that Miragen will realize the benefits of its net deferred tax assets, and accordingly, Miragen has established a valuation allowance equal to 100% of its net deferred tax assets at December 31, 2015 and

2014. The increase in valuation allowance was $5.2 million in 2015 and $2.6 million in 2014.

Miragen has concluded that there were no significant uncertain tax positions relevant to the jurisdictions where Miragen is required to file income tax returns requiring recognition in the consolidated financial statements for the years ended 2015 and 2014.

Miragen has recognized no interest for the years ended 2015 and 2014 related to uncertain tax positions. As of December 31, 2015 and 2014, Miragen had no accrued interest related to uncertain tax positions.

Miragen monitors proposed and issued tax law, regulations, and cases to determine the potential impact of uncertain income tax positions. At December 31, 2015, Miragen had not identified any potential subsequent events that would have a material impact on unrecognized income tax benefits within the next twelve months.

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Miragen s federal and state returns for 2011 through 2015 remain open to examination by tax authorities.

(12) Net Loss per Share

Basic net loss per share is computed by dividing the net loss by the weighted-average number of common shares outstanding. Diluted net loss per share is computed similarly to basic net loss per share except that the denominator is increased to include the number of additional common shares that would have been outstanding if the potential common shares had been issued and if the additional common shares were dilutive. Diluted net loss share is the same as basic net loss per common share, since the effects of potentially dilutive securities are antidilutive.

As of December 31, 2015 and 2014, potentially dilutive securities include:

	2015	2014
Convertible preferred stock	14,952,053	9,315,827
Warrants to purchase preferred stock	36,667	20,000
Warrants to purchase common stock	10,000	10,000
Options to purchase common stock	2,678,566	2,682,538
Total	17,677,286	12,028,365

(13) Subsequent Events

Merger Agreement

Signal Genetics, Inc. (Signal) and Miragen have entered into an Agreement and Plan of Merger and Reorganization, dated October 31, 2016 (the Merger Agreement). The Merger Agreement contains the terms and conditions of the proposed business combination of Signal and Miragen. Under the Merger Agreement, Signal Merger Sub, Inc., a wholly-owned subsidiary of Signal, will merge with and into Miragen, with Miragen surviving as a wholly-owned subsidiary of Signal. After the completion of the Merger, Signal will change its corporate name to Miragen Therapeutics, Inc. as required by the Merger Agreement.

Subscription Agreement

On October 31 2016, Miragen entered into a subscription agreement with certain current stockholders of Miragen and certain new investors pursuant to which the purchasers agreed to purchase an aggregate of 9,045,126 shares of Miragen s common stock at a price per share of $4.50 for an aggregate consideration of approximately $40.7 million immediately prior to the consummation of the Merger, subject to specified conditions in the subscription agreement.

Engagement of WedBush

Miragen entered into an agreement with Wedbush Securities Inc. (Wedbush), in August 2016, under which Miragen agreed to engage Wedbush to act as exclusive placement agent in connection with a private financing. Miragen paid a non-refundable, creditable retainer of $25 thousand in August 2016 and agreed to pay a financing fee of 6% of the gross proceeds, as defined, from capital raised in a transaction. Miragen also agreed to a minimum fee of $1.0 million

which will become due and payable if and when gross proceeds from all investors equals or exceeds $10 million. The initial term of this agreement extends for 12 months to August 2017, provided however, that either party may terminate with the appropriate written notice. The financing fee will apply during the initial term plus a 12-month tail period, as defined in the agreement.

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License Agreement with The Brigham and Women s Hospital

In May 2016, the Company entered into an exclusive patent license agreement (the BWH License Agreement) with The Brigham and Women s Hospital (BWH). Under the BWH License Agreement, BWH granted Miragen an exclusive, worldwide license, including a right to sublicense, to specified technology and patent rights of BWH. As consideration for this exclusive license, the Company paid BWH a specified issue fee and is obligated to pay a specified annual license fee. BWH is also entitled to milestone payments of up to $2.6 million for any of the Company s product candidates developed based on the patent rights subject to the BWH License Agreement plus a one-time sales milestone payment of $0.25 million for all product candidates developed based on the patent rights subject to the BWH License Agreement. If the Company were to successfully commercialize any product candidate subject to the BWH License Agreement, then BWH is entitled to royalty payments in the low- single digits on the net sales of such product. BWH s right to these royalty payments will expire upon the expiration of the last patent claim subject to BWH License Agreement. BWH is also entitled to a percentage in the low-double digits of any sublicense income from such product, subject to specified exceptions. The Company is also responsible for all costs associated with the preparation, filing, prosecution and maintenance of the patent rights subject to the BWH License Agreement.

Additionally, the Company is obligated to use commercially reasonable efforts to develop a product under the BWH License Agreement and to meet specified diligence milestones thereunder. The BWH License Agreement will terminate upon the expiration of all issued patents and patent applications subject to the patent rights under the agreement. Miragen may also terminate the BWH License Agreement for convenience upon a specified number of days prior notice to BWH. BWH may terminate the BWH License Agreement upon a material breach by the Company of its payment obligations and upon the occurrence of other specified events that are not cured within a specified number of days.

Amendment of Servier Agreement

Miragen entered into an amendment of the Servier Collaboration Agreement, effective September 2016. Under the terms of the amendment, Servier agreed to extend the Research Collaboration from October 2016 to October 2017.

Amendment of Silicon Valley Bank Loan and Security Agreement

In December 2016, Miragen amended its loan and security agreement with Silicon Valley Bank to extend the draw period of the second tranche from December 31, 2016 to July 31, 2017.

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Miragen Therapeutics, Inc.

Condensed Consolidated Balance Sheets

(Unaudited)

	September 30, 2016	December 31, 2015
Assets		
Current:		
Cash and cash equivalents	$ 24,598,000	$ 21,235,000
Short-term investments	1,001,000	
Accounts receivable	9,000	
Prepaid expenses and other current assets	1,872,000	1,327,000
Total current assets	27,480,000	22,562,000
Property and equipment, net	696,000	716,000
Other assets	258,000	258,000
Total assets	$ 28,434,000	$ 23,536,000
Liabilities, Preferred Stock, and Stockholders Deficit		
Current liabilities:		
Accounts payable	$ 130,000	$ 715,000
Accrued and other liabilities	2,657,000	1,808,000
Current portion of notes payable	1,805,000	269,000
Current portion of deferred revenue	80,000	519,000
Total current liabilities	4,672,000	3,311,000
Notes payable, less current portion	3,293,000	4,665,000
Total liabilities	7,965,000	7,976,000
Series A redeemable convertible preferred stock, $0.001 par value; 7,169,176 shares authorized; 7,149,176 shares issued and outstanding; liquidation preference of $21,448,000; stated at accreted redemption value	23,122,000	23,116,000
Series B redeemable convertible preferred stock, $0.001 par value; 2,183,318 shares authorized; 2,166,651 shares issued and outstanding; liquidation preference of $13,000,000; stated at accreted redemption value	12,974,000	12,970,000
Series C redeemable convertible preferred stock, $0.001 par value; 9,303,000 shares authorized; 9,268,563 and 5,636,226 shares issued and outstanding, respectively; liquidation preference of $41,060,000; stated at accreted redemption value	40,871,000	24,764,000
Stockholders deficit:		
Common stock, $0.001 par value; 24,780,394 shares authorized; 855,734 shares issued and outstanding	1,000	1,000

Additional paid-in capital	4,591,000	4,462,000
Accumulated deficit	(61,090,000)	(49,753,000)
Total stockholders deficit	(56,498,000)	(45,290,000)
Total liabilities, preferred stock, and stockholder s deficit	$ 28,434,000	$ 23,536,000

See accompanying notes to these unaudited interim condensed consolidated financial statements.

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Miragen Therapeutics, Inc.

Condensed Consolidated Statements of Operations

(Unaudited)

	Nine Months Ended September 30,	
	2016	**2015**
Revenue		
Revenue under strategic alliance and collaboration	$ 2,479,000	$ 3,997,000
Grant revenue	490,000	19,000
Total revenue	2,969,000	4,016,000
Operating expenses:		
Research and development	9,786,000	9,918,000
General and administrative	4,255,000	2,902,000
Total operating expenses	14,041,000	12,820,000
Loss from operations	(11,072,000)	(8,804,000)
Other income (expense):		
Interest and other income	21,000	2,000
Interest and other related expense	(250,000)	(1,601,000)
Net loss	(11,301,000)	(10,403,000)
Accretion of preferred stock to redemption value	(36,000)	(24,000)
Net loss available to common stockholders	$ (11,337,000)	$ (10,427,000)
Net loss per share, basic and diluted	$ (13.25)	$ (12.18)
Shares used in computing net loss per share, basic and diluted	855,734	855,734

See accompanying notes to these unaudited interim condensed consolidated financial statements.

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Miragen Therapeutics, Inc.

Condensed Consolidated Statements of Preferred Stock and Stockholders Deficit

(Unaudited)

Redeemable Convertible Preferred Stock						Stockholders deficit			
Series A		Series B		Series C		Common stock		Additional paid-in capital	Accumulated deficit
Shares	Amount	Shares	Amount	Shares	Amount	Shares	Amount		
7,149,176	$ 23,116,000	2,166,651	$ 12,970,000	5,636,226	$ 24,764,000	855,734	$ 1,000	$ 4,462,000	$ (49,753,000)
				3,632,337	16,081,000				
								129,000	
	6,000		4,000		26,000				(36,000)
									(11,301,000)
7,149,176	$ 23,122,000	2,166,651	$ 12,974,000	9,268,563	$ 40,871,000	855,734	$ 1,000	$ 4,591,000	$ (61,090,000)

See accompanying notes to these unaudited condensed consolidated financial statements.

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Miragen Therapeutics, Inc.

Condensed Consolidated Statements of Cash Flows

(Unaudited)

	Nine months Ended September 30,	
	2016	**2015**
Cash flows from operating activities:		
Net loss	$ (11,301,000)	$ (10,403,000)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization	253,000	208,000
Stock-based compensation	129,000	175,000
Amortization of premium/discount on short-term investments	8,000	
Interest expense and other charges related to convertible notes		1,173,000
Amortization and accretion expenses on notes payable	125,000	65,000
Change in value of preferred stock warrants	2,000	(36,000)
Changes in operating assets and liabilities:		
Accounts receivable	(9,000)	(28,000)
Prepaid expenses and other assets	(545,000)	(336,000)
Deferred revenue	(439,000)	(964,000)
Accounts payable and accrued liabilities	308,000	34,000
Net cash used in operating activities	(11,469,000)	(10,112,000)
Cash flows from investing activities:		
Purchases of marketable securities	(1,009,000)	
Purchases of property and equipment	(240,000)	(52,000)
Net cash used in investing activities	(1,249,000)	(52,000)
Cash flows from financing activities:		
Proceeds from issuance of preferred stock	16,091,000	
Preferred stock issuance costs	(10,000)	
Proceeds from issuance of convertible notes payable		8,500,000
Convertible notes payable issuance costs		(23,000)
Proceeds from issuance of notes payable		5,000,000
Notes payable issuance costs		(58,000)
Net cash provided by financing activities	16,081,000	13,419,000
Net increase in cash and cash equivalents	3,363,000	3,255,000
Cash and cash equivalents at beginning of period	21,235,000	5,114,000

Cash and cash equivalents at end of period	$ 24,598,000	$ 8,369,000
Noncash investing and financing activities:		
Preferred stock warrants issued in conjunction with notes payable	$	$ 121,000

See accompanying notes to these unaudited interim condensed consolidated financial statements.

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Miragen Therapeutics, Inc.

Notes to Unaudited Interim Condensed Consolidated Financial Statements

(1) Organization and Basis of Presentation

Miragen Therapeutics, Inc. was originally formed as a Delaware corporation in February 2006. The corporation changed its name to Miragen Therapeutics, Inc. in July 2007 and the Company began its operations. In January 2011, Miragen Therapeutics Europe Limited (Miragen Europe) was formed as a wholly-owned subsidiary of Miragen Therapeutics, Inc. for the sole purpose of submitting regulatory filings in Europe. Miragen Europe has no employees or operations. As used in this report, unless the context suggests otherwise, the Company, and Miragen means Miragen Therapeutics, Inc.

Miragen is a clinical-stage biopharmaceutical company discovering and developing proprietary RNA-targeted therapeutics with a specific focus on microRNAs and their role in diseases where there is a high unmet medical need. microRNAs are short RNA molecules, or oligonucleotides, that regulate gene expression or activity and play a vital role in influencing the pathways responsible for many disease processes. Miragen uses its expertise in systems biology and oligonucleotide chemistry to discover and develop a pipeline of product candidates. Miragen s two lead product candidates, MRG-106 and MRG-201, are currently in Phase 1 clinical trials. Miragen s clinical product candidate for the treatment of certain cancers, MRG-106, is an inhibitor of microRNA-155, or miR-155, which is found at abnormally high levels in several blood cancers. Miragen s clinical product candidate for the treatment of pathological fibrosis, MRG-201, is a replacement for miR-29, which is found at abnormally low levels in a number of pathological fibrotic conditions, including cardiac, renal, hepatic, and pulmonary fibrosis, as well as systemic sclerosis. In addition to Miragen s clinical programs, it is developing a pipeline of pre-clinical product candidates. The goal of Miragen s translational medicine strategy is to progress rapidly to first in human studies once it has established the pharmacokinetics (the movement of drug into, through, and out of the body), pharmacodynamics (the effect and mechanism of action of a drug) and safety of the product candidate in pre-clinical studies.

Liquidity

Miragen has funded its operations to date principally through proceeds from the sale of its preferred stock of $72 million (including convertible notes that have converted to preferred stock) and $33.8 million in proceeds under Miragen s strategic alliance with Les Laboratoires Servier and Institute de Recherches Servier (together, Servier). Since Miragen s inception and through September 30, 2016, Miragen has generated cumulative losses of $61.1 million. Miragen s ability to fund ongoing operations is highly dependent upon its ability to raise additional capital through sales of its equity securities, continued performance under Miragen s strategic alliance with Servier, securing additional partnerships and collaborations, and issuing debt or other financing vehicles. Miragen s ability to secure capital is dependent upon success in developing its technology and product candidates. Miragen can provide no assurance that additional capital will be available on acceptable terms. The sale of additional equity or issuance of debt securities would likely result in substantial additional dilution to Miragen s stockholders. If Miragen raises additional funds through the incurrence of indebtedness, the obligations related to such indebtedness could be senior to rights of holders of Miragen s capital stock and could contain covenants that may restrict its operations. Should additional capital not be available to Miragen in the near term, or not be available on acceptable terms, Miragen may be unable to realize value from its assets and discharge its liabilities in the normal course of business, which may, among other alternatives, cause Miragen to further delay, substantially reduce, or discontinue operational activities to conserve Miragen s cash resources.

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Miragen believes that the $24.6 million of cash, cash equivalents, and short term investments of $1.0 million reported at September 30, 2016, will be sufficient to fund its operations in the normal course of business and allow Miragen to meet its liquidity needs through at least September 30, 2017.

Unaudited Interim Consolidated Financial Statements

The interim condensed consolidated balance sheet as of September 30, 2016, the condensed consolidated statements of operations and cash flows for the nine months ended September 30, 2016 and 2015 and the condensed consolidated statement of preferred stock and stockholders deficit for the nine months ended September 30, 2016 are unaudited. The unaudited interim consolidated financial statements have been prepared on the same basis as the audited annual consolidated financial statements and reflect, in the opinion of management, all adjustments of a normal and recurring nature that are necessary for the fair presentation of Miragen s financial position as of September 30, 2016 and results of operations and cash flows for the nine months ended September 30, 2016 and 2015. The results of operations for the nine months ended September 30, 2016 are not necessarily indicative of the results to be expected for the year ending December 31, 2016 or for any other future annual or interim period. The condensed consolidated balance sheet as of December 31, 2015 included herein was derived from the audited consolidated financial statements as of that date. These unaudited condensed consolidated financial statements should be read in conjunction with Miragen s audited consolidated financial statements included elsewhere in this prospectus. Miragen s management performed an evaluation of its activities through the date of filing of these financial statements and concluded that there are no subsequent events, other than as disclosed.

(2) Summary of Significant Accounting Policies

The Company s other significant accounting policies are described in Note 2 to its audited financial statements for the year ended December 31, 2015, included elsewhere in this prospectus.

Fair Value of Financial Instruments

The carrying amounts of financial instruments, including cash and cash equivalents, short-term investments, accrued compensation, pre-clinical study accruals and accounts payable, approximate fair value due to their short-term maturities. The carrying amount of the note payable approximates its fair value as its terms are comparable to what would be included in similar debt instruments.

The Company accounts for its preferred stock warrants pursuant to ASC Topic 480, *Distinguishing Liabilities from Equity*, and classifies warrants for redeemable preferred stock as liabilities. The warrants are reported at their estimated fair value and any changes in fair value are reflected in interest expense and other related expenses.

Fair value is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. Inputs used to measure fair value are classified into the following hierarchy:

Level 1 Unadjusted quoted prices in active markets for identical assets or liabilities

Level 2 Unadjusted quoted prices in active markets for similar assets or liabilities; unadjusted quoted prices for identical or similar assets or liabilities in markets that are not active; or inputs other than quoted prices that are observable for the asset or liability.

Level 3 Unobservable inputs for the asset or liability.

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Assets and liabilities measured at fair value on a recurring basis consisted of the following:

	As of September 30, 2016		As of December 31, 2015	
	Level 1	Level 3	Level 1	Level 3
Assets measured at fair value:				
Short-term investments (including amounts recorded as cash equivalents)	$ 5,251,000	$	$ 248,000	$
Liabilities measured at fair value:				
Preferred stock warrants	$	$ 132,000	$	$ 169,000

A reconciliation of the beginning and ending balances of Miragen s liabilities measured at fair value using significant unobservable, or Level 3, inputs are as follows:

Balance of liability as of December 31, 2015	$ 169,000
Change in estimated value of warrants	2,000
Other	(39,000)
Balance of liability as of September 30, 2016	$ 132,000

(3) Balance Sheet Components

Property and Equipment, Net

Property and equipment, net consisted of the following:

	September 30, 2016	December 31, 2015
Property and equipment, at cost:		
Lab equipment	$ 2,154,000	$ 2,066,000
Furniture and fixtures	51,000	54,000
Computer hardware and software	273,000	192,000
Leasehold improvements	688,000	629,000
	3,166,000	2,941,000
Less accumulated depreciation and amortization	(2,470,000)	(2,225,000)
Property and equipment, net	$ 696,000	$ 716,000

Depreciation and amortization expense was $0.3 million and $0.2 million for the nine months ended September 30, 2016 and 2015, respectively.

Accrued and Other Liabilities

Accrued and other liabilities consisted of the following:

	September 30, 2016	December 31, 2015
Accrued employee compensation and related taxes	$ 639,000	$ 496,000
Deferred and accrued facility lease obligations	219,000	174,000
Accrued legal fees	1,011,000	24,000
Value of warrants on redeemable convertible preferred stock	132,000	169,000
Accrued property and franchise taxes	22,000	35,000
Accrued outsourced clinical and pre-clinical studies	508,000	859,000
Accrued consulting, supplies, and other expenses	126,000	51,000
	$ 2,657,000	$ 1,808,000

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(4) Strategic Alliance and Collaboration with Servier

In October 2011, Miragen entered into a strategic alliance with Les Laboratoires Servier and the Institut de Recherches Servier (Servier) for the research, development, and commercialization of RNA-targeting therapeutics in cardiovascular disease (the Servier Collaboration Agreement), which was subsequently amended in May 2013, May 2014, May 2015 and September 2016. Under the Servier Collaboration Agreement, Miragen granted Servier an exclusive license to research, develop, and commercialize RNA-targeting therapeutics for three targets in the cardiovascular field. Under the terms of the amended Servier Collaboration Agreement, Servier has the limited right to replace each of the three original targets once through October 2017. As of September 30, 2016, three named targets exist under the Servier Collaboration Agreement, two of which are replaceable by Servier. Additionally, Servier has a limited right of first negotiation for the license of additional targets from Miragen in the cardiovascular field through October 2016. These rights and the collaboration term below can be extended by mutual agreement between Miragen and Servier at any time on or before October 2017.

Servier s rights to each of the targets are limited to therapeutics in the cardiovascular field in their territory, which is worldwide except for the United States and Japan. Miragen retains all rights for each named target in the United States and Japan and for any products or product candidates outside of the cardiovascular field.

In connection with entering into the strategic alliance with Servier, Miragen received a nonrefundable upfront payment of $8.4 million (6.0 million) in 2011 and an additional $4.0 million (3.0 million) in 2013 when Servier exercised their right to name a third target under the agreement. Miragen is also eligible to receive development milestone payments of 5.8 million to 13.8 million ($6.5 million to $15.5 million as of September 30, 2016) and regulatory milestone payments of 10.0 million to 40.0 million ($11.2 million to $44.8 million as of September 30, 2016) for each target. Additionally, Miragen may receive up to 175 million ($196 million as of September 30, 2016) in commercialization milestones as well as quarterly royalty payments between the low-double digits to the mid-teens (subject to reductions for patent expiration, generic competition, third-party royalty and costs of goods) on the net sales of any licensed product commercialized by Servier. Additionally, if Miragen undergoes a change of control in specified circumstances, Servier has agreed to increase this royalty by an additional percentage in the low-single digits if it seeks to use any of the acquiror s intellectual property in the development of product candidates under the Servier Collaboration Agreement. Servier is obligated to make any such royalty payment for a specified period under the Servier Collaboration Agreement.

As part of the Servier Collaboration Agreement, Miragen established a multiple-year research collaboration, under which Miragen jointly performs agreed upon research activities directed to the identification and characterization of named targets and oligonucleotides in the cardiovascular field, which Miragen refers to as the Research Collaboration. The initial three-year term of the Research Collaboration was extended by two additional years in May 2014 and again by one additional year in September 2016 through October 2017. Servier is responsible for funding all of the costs of the Research Collaboration, as defined under the Servier Collaboration Agreement. During the nine months ended September 30, 2016 and 2015, Miragen recognized as revenue amounts reimbursable to Miragen under the Servier Collaboration Agreement for research and development activities of $2.1 million and $3.0 million, respectively.

The development of each product candidate (commencing with registration enabling toxicology studies) under the Servier Collaboration Agreement is performed pursuant to a mutually agreed upon development plan to be conducted by the parties as necessary to generate data useful for both parties to obtain regulatory approval of such product candidates. Servier is responsible for a specified percentage of the cost of research and development activities through the completion of one or more Phase 2 clinical trials and will reimburse Miragen for a specified portion of such costs Miragen incurs. The costs of Phase 3 clinical trials for each product candidate will be allocated between the parties at a specied percentage of costs between the parties upon the occurrence of specified events under the Servier Colloboration Agreement, including if Miragen enters into a third-party agreement for the development and/or

commercialization of a product in the United

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States at least 180 days before the initiation of the first Phase 3 clinical trial or if Miragen subsequently enters into a U.S. partner agreement or if Miragen does not enter into a U.S. partner agreement, but files for approval in the United States using data from the Phase 3 clinical trial. Miragen is responsible, by itself or through a third-party manufacturer, for the manufacture and supply of all licensed oligonucleotides during the pre-clinical phase of development under the Sevier Collaboration Agreement while Servier is primarily responsible for manufacture and supply of all licensed oligonucleotides and product during the clinical phase of development under the Servier Collaboration Agreement. The parties are each responsible for the commercial supply of any licensed product to be sold in each s respective territory under the Servier Collaboration Agreement.

Under the Servier Collaboration Agreement, Miragen also granted Servier a royalty-free, non-exclusive license to develop a companion diagnostic for any therapeutic product which may be developed by Servier under the Servier Collaboration Agreement. Miragen also granted Servier an exclusive, royalty free license to commercialize such a companion diagnostic for use in connection with such therapeutic product in its territory.

The Servier Collaboration Agreement will expire as to each underlying product candidate when Servier s royalty obligations as to such product candidate have expired. Servier may also terminate the Servier Collaboration Agreement for (i) convenience upon a specified number of days prior notice to Miragen or (ii) upon determination of a safety issue relating to development under the agreement upon a specified number of days prior notice to Miragen. Either party may terminate the Servier Collaboration Agreement upon a material breach by the other party which is not cured within a specified number of days. Miragen may also terminate the agreement if Servier challenges any of the patents licensed by Miragen to Servier.

Miragen determined that the elements within the Servier Collaboration Agreement should be treated as a single unit of accounting because the delivered elements, the licenses, did not have standalone value to Servier at the time the license was granted. As such, Miragen recognizes license fees earned under the Servier Collaboration Agreement as revenue on a proportional performance basis over the estimated period to complete the activities under the Research Collaboration. The total period of performance is estimated to be equal to the term of the Research Collaboration. Through May 2014, the $12.4 million (9.0 million) in non-refundable license fees Miragen earned under the Servier Collaboration Agreement was being recognized as revenue through October 2014, the end of the three-year initial term of Miragen s Research Collaboration. In May 2014, Miragen changed its estimate as a result of Servier s extension of the period under which Miragen expected to perform services and, as such, began recognizing the remaining unamortized license revenue through October 2016, the estimated end of the Research Collaboration. Miragen measure its progress under the proportional performance method based on actual and estimated full-time equivalents. During the nine months ended September 30, 2016 and 2015, Miragen recognized license revenue of $0.4 million and $1.0 million, respectively.

In total, for the nine months ended September 30, 2016 and 2015, Miragen recognized $2.5 million and $4.0 million, respectively, as revenue under the Servier Collaboration Agreement. As of September 30, 2016 and December 31, 2015, deferred revenue totaled $0.1 million and $0.5 million, respectively. In addition, amounts incurred but not billed to Servier for research activities performed totaled $0.6 and $0.8 million as of September 30, 2016 and December 31, 2015, respectively. These amounts are included in prepaid expenses and other current assets in Miragen s unaudited interim condensed consolidated balance sheets.

(5) Notes Payable

Convertible Notes Payable Issued to Investors

In February 2015, Miragen s stockholders approved the issuance of up to $20 million of convertible promissory notes and in February 2015, Miragen issued convertible promissory notes totaling $8.5 million (the Convertible Notes) to holders of Miragen s Series B redeemable convertible preferred stock (Series B). The Convertible Notes were issued in lieu of the third tranche under the Series B purchase agreement.

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The Convertible Notes accrued interest at a fixed rate of 6% per year and were scheduled to become due and payable any time on or after August 3, 2016 upon the demand of holders of a required threshold of the outstanding notes. The Convertible Notes and accrued interest thereon, were subject to an automatic conversion into a class of equity securities issued upon a financing that met specific criteria, which occurred in October 2015 upon the sale of Series C redeemable convertible preferred stock (Series C) (see Note 7). Under the terms of the Convertible Notes, the Convertible Notes, together with accrued interest, were to convert at a conversion rate equal to 75% of the per share price paid for shares of Series C. However, this provision was waived by the note holders, and in October 2015, the Convertible Notes and accrued interest thereon totaling $8.9 million converted into 2,003,884 shares of Series C at a conversion rate equal to $4.43 per share, the per share price of the Series C.

Miragen concluded that the right to receive a 25% discount on the conversion to a class of equity securities in a qualified financing was a put option that needed to be valued separately. As such, Miragen recorded proceeds from the Convertible Notes based on the estimated fair value of the embedded put option ($2.7 million) and the Convertible Notes, which resulted in a debt discount of $2.7 million related to the value of the put option. This debt discount was being amortized over the term of the Convertible Notes. Upon conversion of the Convertible Notes in October 2015, Miragen recorded a loss on extinguishment of the Convertible Notes of $1.4 million, which reflects the difference between the fair value of the Series C issued in the conversion and the carrying value of the Convertible Notes.

Interest and related expenses recorded under the Convertible Notes during the nine months ended September 30, 2015 are as follows:

Interest based on the stated interest rate	$ 335,000
Amortization of debt discount	1,164,000
Total	$ 1,499,000

2015 Notes Payable to Silicon Valley Bank

In April 2015, Miragen entered into a new loan and security agreement with Silicon Valley Bank to borrow up to $10 million in two separate tranches. The first tranche of $5.0 million was funded in May 2015 and is scheduled to be repaid over a 48-month period with interest only payments during the first 18 months (the 2015 Notes). Accelerated payments are due under certain circumstances. Amounts outstanding bear interest at the prime rate minus 0.25% (3.25% at September 30, 2016 and December 31, 2015) with a final payment fee equal to 5.50% of amounts borrowed. Borrowings are secured by a priority security interest, right, and title in all business assets, excluding Miragen s intellectual property, which is subject to a negative pledge.

In April 2015 and in connection with the first tranche, Miragen issued detachable warrants to purchase up to 16,667 shares of its Series B at an exercise price of $6.00 per share. Miragen estimated the fair value of the warrants and the holder put right (see below), to be $0.1 million at the time of issuance. The fair value of the warrants was estimated using a valuation model with the following assumptions: risk free interest rate of 2.1%; 84% volatility; and contractual term of 10 years. The holder put right was valued using a probability adjusted present value method with the following assumptions as of December 31, 2015; term of two years, discount rate of 4.78%, and probability of 89.3%.

If the second tranche is requested and funded, Miragen will be required to issue additional warrants to purchase Series B. The warrants contain a put right under which Miragen may be required to repurchase the outstanding warrants for a purchase price of $0.2 million, which amount is prorated based on the proportion of the $10 million funded. The

warrants were classified as a liability at the date of grant and are subject to remeasurement at each balance sheet date.

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Amounts outstanding under notes payable are as follows:

	September 30, 2016	December 31, 2015
Principal amount outstanding	$ 5,000,000	$ 5,000,000
Unamortized debt discount	(17,000)	(89,000)
Unamortized debt issuance costs	(28,000)	(43,000)
Accretion of final payment fee	143,000	66,000
	5,098,000	4,934,000
Less: current maturities	(1,805,000)	(269,000)
Long-term notes payable	$ 3,293,000	$ 4,665,000

Future principal payments as of September 30, 2016 under the 2015 Notes Payable to Silicon Valley Bank for the twelve months ended September 30, are as follows:

September 30, 2017	$ 1,833,000
September 30, 2018	2,000,000
September 30, 2019	1,167,000
Total	$ 5,000,000

(6) Commitments and Contingencies

Indemnifications

Miragen has agreements whereby Miragen indemnifies its directors and officers for certain events or occurrences while the individual is, or was, serving as a director, officer, employee, or other agent of the Company. The maximum potential amount of future payments Miragen could be required to make under these indemnification agreements is unlimited.

Employment Agreements

Miragen has entered into agreements with its executives that provide for base salary, severance, eligibility for bonuses, and other generally available benefits. The agreements provide that Miragen may terminate the employment of its executives at any time with or without cause. If an executive is terminated without cause or an executive resigns for good reason, as defined, then the executive is entitled to receive, upon the execution of a release agreement, a severance package consisting of: (i) the equivalent of six to 12 months of the executive s base salary as in effect immediately prior to date of termination, (ii) acceleration of vesting of the equivalent of six to 12 months of vesting of the executive s outstanding unvested options and other stock awards issued under our equity incentive plan, and (iii) other benefits. For the Company s chief executive, if such termination occurs one month before or thirteen months following a change of control, then, upon the execution of a release agreement, the executive is entitled to: (i) the

equivalent of 24 months of the executive s base salary as in effect immediately prior to the date of termination, (ii) acceleration of vesting of all of the executive s outstanding unvested options to purchase common stock, and (iii) other benefits.

License Agreements with the University of Texas

As of September 30, 2016, Miragen had five exclusive patent licenses agreements (the UT License Agreements) with the Board of Regents of The University of Texas System (the University of Texas). Under each of the UT License Agreements, the University of Texas granted Miragen exclusive and nonexclusive licenses to certain patent and technology rights. The University of Texas is a minority stockholder of the Company.

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In consideration of rights granted by the University of Texas, Miragen agreed to (i) pay a nonrefundable upfront license documentation fee in the amount of $10 thousand per license, (ii) pay an annual license maintenance fee in the amount of $10 thousand per license starting one year from the date of each agreement, (iii) reimburse the University of Texas for actual costs incurred in conjunction with the filing, prosecution, enforcement, and maintenance of patent rights prior to the effective date, and (iv) bear all future costs of and manage the filing, prosecution, enforcement, and maintenance of patent rights. During the nine month periods ended September 30, 2015 and 2014, Miragen incurred upfront and maintenance fees under the UT License Agreements totaling $0.1 million, and recorded the amounts as research and development expense. All costs related to the filing, prosecution, enforcement, and maintenance of patent and technology rights are recorded as general and administrative expense when incurred.

Under the terms of the UT License Agreements, Miragen may be obligated to make the following future milestone payments for each licensed product candidate: (i) up to $0.6 million upon the initiation of defined clinical trials, (ii) $2.0 million upon regulatory approval in the United States, and (iii) $0.5 million per region upon regulatory approval in other specified regions. Additionally, if Miragen successfully commercializes any product candidate subject to the UT License Agreements, Miragen is responsible for royalty payments in the low-single digits and payments up to a percentage in the mid-teens of any sublicense income, subject to specified exceptions, based upon net sales of such licensed products. UT s right to these royalty payments will expire as to each license agreement upon the expiration of the last patent claim subject to the applicable UT License Agreement.

The license term extends on a country by country basis until the expiration of the last to expire of the licensed patents that covers such product in such country. Upon expiration of the royalty payment obligation, Miragen will have a fully paid license in such country. Miragen may also terminate each UT License Agreement for convenience upon a specified number of days prior notice to the University of Texas. The University of Texas also has the right to earlier terminate the UT License Agreements after a defined date under specified circumstances where Miragen has effectively abandoned its research and development efforts or has no sales. The UT License Agreements will terminate under customary termination provisions including Miragen s bankruptcy or insolvency, material breach, and upon mutual written consent. Miragen has expensed all charges incurred under the UT License Agreements to date, due to the uncertainty as to future economic benefit from the acquired rights.

Sponsored Research Agreements with the Hubrecht Institute

In 2013, Miragen entered into two separate sponsored research agreements (the Hubrecht Research Agreements) with the Hubrecht Institute (Hubrecht). Under the terms of the Hubrecht Research Agreements, Hubrecht is to provide the personnel, facilities, and equipment necessary to carry out a research program for Miragen s benefit. Under these agreements, Miragen incurred $0.1 million during the nine months ended September 30, 2016 and 2015.

License Agreement with Roche Innovation Center Copenhagen A/S (formerly Santaris Pharma A/S)

In June 2010, Miragen entered into a license agreement with the Santaris Pharma A/S, which has changed its name to Roche Innovation Center Copenhagen A/S (RICC) which was subsequently amended in October 2011 and amended and restated in December 2012 (the RICC License Agreement). In 2014, Santaris Pharma A/S was acquired by F. Hoffmann-La Roche Ltd (Roche), and has become a wholly owned subsidiary of Roche.

Under the RICC License Agreement, Miragen received exclusive and nonexclusive licenses from RICC to use specified technology of RICC (the RICC Technology) for specified uses including research, development, and commercialization of pharmaceutical products using this technology worldwide. Under the RICC License Agreement, Miragen has the right to develop and commercialize the RICC Technology directed to four specified targets and the option to obtain exclusive product licenses for up to six additional

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targets. The acquisition of Santaris Pharma A/S by Roche was considered a change-of-control under Miragen s agreement, and as such, certain terms and conditions of the RICC License Agreement changed, as contemplated and in accordance with the RICC License Agreement. These changes primarily relate to milestone payments reflected in the disclosures below. As consideration for the grant of the license and option, Miragen previously paid RICC $2.3 million and issued RICC 856,806 shares of its Series A preferred stock, which are now owned by Roche Finance Ltd, an affiliate of Roche. If Miragen exercises its option to obtain additional product licenses or to replace the target families, Miragen will be required to make additional payments to RICC.

Under the terms of the RICC License Agreement, milestone payments were previously decreased by a specified percentage as a result of the change of control by RICC referenced above. Miragen is obligated to make future milestone payments for each licensed product for up to $5.2 million. Certain of these milestones will be increased by a specified percentage if Miragen undergoes a change in control during the term of the RICC License Agreement. If Miragen grants a third party a sublicense to the RICC Technology, in lieu of the fixed milestone payments noted above, Miragen is required to remit to Roche up to a specified percentage of the upfront and milestone payments Miragen receives under its sublicense.

If Miragen successfully commercializes any product candidate subject to the RICC License Agreements, then RICC is entitled to royalty payments in the mid-single digits on the net sales of such product, provided that if such net sales are made by a sublicensee under the RICC License Agreement, RICC is entitled to royalty payments equal to the lesser of a percentage in the mid-single digits on the net sales of such product or a specified percentage of the royalties paid to Miragen by such sublicensee, subject to specified restrictions. Miragen is obligated to make any such royalty payments until the later of (i) a specified anniversary of the first commercial sale of the applicable product or (ii) the expiration of the last valid patent claim licensed by RICC under the RICC License Agreement underlying such product. Upon the occurrence of specified events, the royalty owed to RICC will be decreased by a specified percentage.

The RICC License Agreement will terminate upon the latest of the expiration of all of RICC s royalty rights, the termination of the last Miragen target or the expiration of its right to obtain a product license for a new target under the RICC License Agreement. Miragen may also terminate the RICC License Agreement for convenience upon a specified number of days prior notice to RICC, subject to specified terms and conditions. Either party may terminate the RICC License Agreement upon an uncured material breach by the other party and RICC may terminate the RICC License Agreement upon the occurrence of other specified events that are not cured within a specified number of days.

Miragen has expensed all charges incurred under the RICC License Agreement to date, due to the uncertainty as to future economic benefit from the acquired rights.

License Agreements with the t2cure GmbH

In October 2010, Miragen entered into a license and collaboration agreement (the t2cure Agreement) with the t2cure GmbH (t2cure), which was subsequently amended in July 2014. Under the t2cure Agreement, Miragen received a worldwide, royalty bearing, and exclusive license to specified patent and technology rights to develop and commercialize product candidates targeted at miR-92.

In consideration of rights granted by t2cure, Miragen paid a onetime upfront fee of $46 thousand and agreed to: (i) pay an annual license maintenance fee in the amount of 3 thousand ($3 thousand at September 30, 2016), and (ii) reimburse t2cure for 100% of actual costs incurred in conjunction with the filing, prosecution, enforcement, and maintenance of patent rights prior to the effective date. All costs related to the filing, prosecution, enforcement, and maintenance of patent and technology rights are recorded as general and administrative expense when incurred.

Under the terms of the t2cure Agreement, Miragen is obligated to make the following future milestone payments for each licensed product: (i) up to $0.7 million upon the initiation of certain defined clinical trials, (ii) $2.5 million upon regulatory approval in the United States and (iii) up to $1.5 million per region

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upon regulatory approval in the European Union or Japan. Additionally, if Miragen successfully commercializes any product candidate subject to the t2cure Agreement, Miragen is responsible for royalty payments in the low-single digits upon net sales of licensed products and sublicense fees equal to a percentage in the low-twenties of sublicense income to Miragen. Miragen is obligated to make any such royalty payment until the later of (i) the tenth anniversary of the first commercial sale of the applicable product or (ii) the expiration of the last valid claim to a patent licensed by t2cure under the t2cure Agreement covering such product. If such patent claims expire prior to the end of the ten year term, then the royalty owed to t2cure will be decreased by a specified percentage.

The license term extends on a country by country basis until the later of: (i) the tenth anniversary of the first commercial sale of a licensed product in a country, and (ii) the expiration of the last to expire valid claim that claims such licensed product in such country. Upon expiration of the royalty payment obligation, Miragen will have a fully paid license in such country. Miragen has the right to terminate the t2cure Agreement at will, on a country-by-country basis, after 60 days written notice.

Miragen has expensed all charges incurred under the t2cure Agreement to date, due to the uncertainty as to future economic benefit from the acquired rights.

License Agreement with The Brigham and Women s Hospital

In May 2016, the Company entered into an exclusive patent license agreement (the BWH License Agreement) with The Brigham and Women s Hospital (BWH).

Under the BWH License Agreement, BWH granted Miragen an exclusive, worldwide license, including a right to sublicense, to specified technology and patent rights of BWH. As consideration for this exclusive license, the Company paid BWH a specified issue fee and is obligated to pay a specified annual license fee. BWH is also entitled to milestone payments of up to $2.6 million for any of the Company s product candidates developed based on the patent rights subject to the BWH License Agreement plus a one-time sales milestone payment of $0.25 million for all product candidates developed based on the patent rights subject to the BWH License Agreement. If the Company were to successfully commercialize any product candidate subject to the BWH License Agreement, then BWH is entitled to royalty payments in the low-single digits on the net sales of such product. BWH s right to these royalty payments will expire upon the expiration of the last patent claim subject to BWH License Agreement. BWH is also entitled to a percentage in the low-double digits of any sublicense income from such product, subject to specified exceptions. The Company is also responsible for all costs associated with the preparation, filing, prosecution and maintenance of the patent rights subject to the BWH License Agreement.

Additionally, the Company is obligated to use commercially reasonable efforts to develop a product under the BWH License Agreement and to meet specified diligence milestones thereunder.

The BWH License Agreement will terminate upon the expiration of all issued patents and patent applications subject to the patent rights under the agreement. Miragen may also terminate the BWH License Agreement for convenience upon a specified number of days prior notice to BWH. BWH may terminate the BWH License Agreement upon a material breach by the Company of its payment obligations and upon the occurrence of other specified events that are not cured within a specified number of days.

Subcontract Agreement with Yale University

In October 2014, Miragen entered into a subcontract agreement (the Yale Agreement) with Yale University (Yale) which was subsequently amended in February 2016 and November 2016. Under the Yale Agreement, Miragen

agreed to provide specified services regarding the development of a proprietary compound that targets microRNA-29 in the indication of idiopathic pulmonary fibrosis. Yale entered into the Yale Agreement in connection with a grant that Yale received from the National Institutes of Health (NIH) for the development a microRNA-29 mimicry as a potential therapy for pulmonary fibrosis.

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In consideration of Miragen s services under the Yale Agreement, Yale has agreed to pay Miragen up to $1.1 million. Under the terms of the Yale Agreement, Miragen retains all rights to any and all intellectual property developed solely by Miragen in connection with the Yale Agreement. Yale has also agreed to provide Miragen with an exclusive option to negotiate in good faith for an exclusive, royalty-bearing license from Yale for any intellectual property developed by Yale or jointly by the parties under the Yale Agreement. Yale is responsible for filing, prosecuting and maintaining foreign and domestic patent applications and patents on all inventions jointly developed by the parties under the Yale Agreement.

The Yale Agreement terminates automatically on the date that Yale delivers its final research report to the NIH under the terms of the grant underlying the Yale Agreement. Either party may also terminate the Yale Agreement upon a specified number of days notice in the event that the NIH s grant funding is reduced or terminated or upon material breach by the other party.

Engagement of WedBush

The Company entered into an agreement with Wedbush Securities Inc. (Wedbush) in August 2016, under which the Company agreed to engage Wedbush to act as exclusive placement agent in connection with a private financing. The Company paid a non-refundable, creditable retainer of $25 thousand in August 2016 and agreed to pay a financing fee of 6% of the gross proceeds, as defined, from capital raised in a transaction. The Company also agreed to a minimum fee of $1.0 million which will become due and payable if and when gross proceeds from all investors equals or exceeds $10 million. The initial term of this agreement extends for 12 months to August 2017, provided however, that either party may terminate with the appropriate written notice. The financing fee will apply during the initial term plus a 12-month tail period, as defined in the agreement.

Facility Lease

In December 2010, Miragen entered into a lease agreement for office and lab space (Crestview Lease) and in 2015, Miragen amended this lease agreement to extend its term through August 2020.

In April 2013, Miragen entered into separate lease agreement for additional office space (Westview Lease) and in 2015, Miragen amended this lease agreement to extend its term by four months through October 2015. This lease expired in 2015 and was not renewed.

Miragen s Crestview Lease is noncancelable. Minimum base lease payments, including the impact of tenant improvement allowances, under the operating lease are recognized on a straight-line basis over the full term of the lease. Rent expense for the Crestview and Westview Leases during the nine months ended September 30, 2016 and 2015 was $0.3 million and $0.2 million, respectively. Miragen is also required to pay for a portion of the operating expenses for each facility and during the nine months ended September 30, 2016 and 2015 Miragen expensed $0.3 million and $0.2 million, respectively, related to this additional rent expense.

Minimum payments as of September 30, 2016 under the Crestview Lease for the twelve months ended September 30, are as follows:

September 30, 2017	$ 369,000
September 30, 2018	388,000
September 30, 2019	401,000

September 30, 2020	378,000
Total	$ 1,536,000

(7) Capital Stock

Miragen is authorized to issue 43,435,888 shares of its stock; 24,780,394 shares have been designated as common stock with a par value of $0.001 per share (Common Stock); and 18,655,494 shares have been

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designated as preferred stock (Series Preferred) with a par value of $0.001 per share. Of the 18,655,494 shares of preferred stock, 7,169,176 shares are designated as Series A redeemable convertible preferred stock (Series A); 2,183,318 shares are designated as Series B; and 9,303,000 shares are designated as Series C. The number of authorized shares of Common Stock may be increased or decreased by the affirmative vote of the holders of a majority of Miragen s stock who are entitled to vote.

Series Preferred

In October 2015, Miragen sold 3,632,342 shares of its Series C at $4.43 per share. Total proceeds were $15.9 million, net of $0.2 million in issuance costs. Concurrent with this financing, all of the outstanding Convertible Notes together with interest accrued thereon together totaling $8.9 million converted into 2,003,884 shares of Series C at a conversion rate equal to $4.43 per share.

In September 2016, Miragen sold 3,632,337 shares of its Series C at $4.43 per share. Total proceeds were $16.1 million, net of then thousand in issuance costs.

(8) Stock-Based Compensation

Equity Incentive Plan

In 2008, Miragen s board of directors approved the 2008 Equity Incentive Plan (the 2008 Equity Plan). The 2008 Equity Plan was subsequently amended in June 2009, April 2012, and October 2015 to increase the number of shares authorized for issuance. As of September 30, 2016, there were 3,672,515 shares authorized for issuance as awards under the Equity Plan, of which 379,524 shares remain available for future issuances.

A summary of stock options activity under the 2008 Equity Plan for the nine months ended September 30, 2016 is as follows:

	Number of options	Weighted-average exercise price	Weighted-average remaining contractual term (years)
Options outstanding at December 31, 2015	2,679,000	$ 0.67	
Granted	789,000	0.74	
Canceled	(246,000)	0.73	
Options outstanding at September 30, 2016	3,222,000	0.68	5.70
Exercisable as of September 30, 2016	2,560,000	$ 0.67	

The fair values of employee stock options were estimated at the date of grant using the Black-Scholes model with the following weighted-average assumptions and had the following estimated weighted average grant-date fair value per

share during the nine months ended September 30, 2016. Miragen did not grant common stock options during the nine months ended September 30, 2015:

	Nine months ended September 30,	
	2016	**2015**
Expected term	5 years	
Expected volatility	84%	
Risk-free interest rate	1.14%	
Expected dividend yield	0.00%	

Miragen accounts for stock options issued to non-employees by valuing the awards using the Black-Scholes option pricing model and adjusting the value of such awards to current fair value each reporting period until

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the awards are vested or a performance commitment has otherwise been reached. Miragen did not grant stock options to non-employees during the nine months ended September 30, 2016 and 2015.

Stock-Based Compensation Expense

Stock-based compensation related to employee and non-employee stock options is included in the interim condensed consolidated statements of operations as follows:

	Nine months ended September 30,	
	2016	2015
Research and development	$ 22,000	$ 30,000
General and administrative	107,000	145,000
Total	$ 129,000	$ 175,000

As of September 30, 2016, Miragen had $0.3 million of total unrecognized employee stock-based compensation costs, which Miragen expects to be recognized over a weighted-average remaining period of 3.4 years. As of September 30, 2016, based on Miragen s current estimate of fair value, Miragen estimates that the remaining unrecognized stock-based compensation expense related to non-employees of $19 thousand will be expensed over a weighted-average remaining period of 1.94 years.

(9) Warrants

Warrant activity for the nine months ended September 30, 2016 is as follows:

	Common Stock Warrants		Preferred Stock Warrants	
	Number	Weighted-Average Exercise Price	Number	Weighted Average Exercise Price
Outstanding at December 31, 2015	10,000	$ 0.40	36,667	$ 4.36
Granted				
Outstanding at September 30, 2016	10,000	$ 0.40	36,667	$ 4.36

A summary of outstanding warrants as of September 30, 2016 is as follows:

Common Stock Warrants		
Number of underlying	Exercise Price	Expiration Date

shares		
10,000	$0.40	2018

Preferred Stock Warrants

Number of underlying Shares	Series of Preferred	Exercise Price	Expiration Date
20,000	A	$3.00	2018
16,667	B	6.00	2025
36,667			

At September 30, 2016 and December 31, 2015, Miragen estimated the fair value of warrants to purchase Series A to be $50 thousand. The fair value of the warrants was estimated using the Black-Scholes option pricing model with the following assumptions as of September 30, 2016: risk-free interest rate of 0.77%; 85% volatility; remaining contractual term of approximately 2.07 years; no dividend yield; and an estimated fair value of the underlying redeemable convertible preferred stock of $4.43 per share.

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As of September 30, 2016 and December 31, 2015, Miragen estimated the fair value of the warrants to purchase Series B and the holder put right to be $0.1 million. The fair value of the warrants was estimated using a valuation model with the following assumptions as of September 30, 2016: risk free interest rate of 2.1%; 84% volatility; and contractual term of 10 years. The holder put right was valued using a probability adjusted present value method with the following assumptions as of September 30, 2016; term of 2 years, discount rate of 4.57%, and probability of 89.3%. See Note 5 for further discussion of terms and conditions of the warrant.

(10) Net Loss per Share

Basic net loss per share is computed by dividing the net loss by the weighted-average number of common shares outstanding. Diluted net loss per share is computed similarly to basic net loss per share except that the denominator is increased to include the number of additional common shares that would have been outstanding if the potential common shares had been issued and if the additional common shares were dilutive. Diluted net loss share is the same as basic net loss per common share, since the effects of potentially dilutive securities are antidilutive.

As of September 30, 2016 and 2015, potentially dilutive securities include:

	September 30,	
	2016	**2015**
Convertible preferred stock	18,584,390	9,315,827
Warrants to purchase preferred stock	36,667	36,667
Warrants to purchase common stock	10,000	10,000
Options to purchase common stock	3,222,033	2,660,066
Total	21,853,090	12,022,560

(11) Subsequent Events

Merger Agreement

Signal Genetics, Inc. (Signal) and Miragen have entered into an Agreement and Plan of Merger and Reorganization, dated October 31, 2016 (the Merger Agreement). The Merger Agreement contains the terms and conditions of the proposed business combination of Signal and Miragen. Under the Merger Agreement, Signal Merger Sub, Inc., a wholly-owned subsidiary of Signal will merge with and into Miragen, with Miragen surviving as a wholly-owned subsidiary of Signal. After the completion of the Merger, Signal will change its corporate name to Miragen Therapeutics, Inc. as required by the Merger Agreement.

Subscription Agreement

On October 31 2016, Miragen entered into a subscription agreement with certain current stockholders of Miragen and certain new investors pursuant to which the purchasers agreed to purchase an aggregate of 9,045,126 shares of Miragen s common stock at a price per share of $4.50 for an aggregate consideration of approximately $40.7 million immediately prior to the consummation of the Merger, subject to specified conditions in the subscription agreement.

Amendment of 2015 Notes Payable to Silicon Valley Bank Loan and Security Agreement

In December 2016, Miragen amended its loan and security agreement with Silicon Valley Bank to extend the draw period of the second tranche from December 31, 2016 to July 31, 2017.

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INDEX TO UNAUDITED PRO FORMA CONDENSED COMBINED FINANCIAL STATEMENTS

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UNAUDITED PRO FORMA CONDENSED COMBINED FINANCIAL STATEMENTS

Except where specifically noted, the following information gives effect to Signal s one-for-15 reverse stock split of its common stock, which was effective at 5:01 p.m. Eastern Time on November 4, 2016, but does not give effect to the proposed reverse stock split described in Signal Proposal No. 7.

The following unaudited pro forma condensed combined financial statements give effect to the merger between Signal and Miragen (the Merger) and were prepared in accordance with the regulations of the Securities and Exchange Commission (SEC). For accounting purposes, Miragen is considered to be acquiring Signal in the Merger. Miragen was determined to be the accounting acquirer based upon the terms of the Merger and other factors including: (i) Miragen security holders will own approximately 96% of the combined company immediately following the closing of the Merger, (ii) Miragen directors will hold all board seats in the combined company, and (iii) Miragen management will hold all key positions in the management of the combined company. The transaction will be accounted for under the acquisition method of accounting under generally accepted accounting principles (GAAP). Under the acquisition method of accounting for the purpose of these unaudited pro forma condensed combined financial statements, management of Signal and Miragen have determined a preliminary estimated purchase price, calculated as described in Note 2 to these unaudited pro forma condensed combined financial statements. The net tangible and intangible assets acquired and liabilities assumed in connection with the transaction are recorded at their estimated acquisition date fair values. A final determination of these estimated fair values will be based on the actual net tangible and intangible assets of Signal that exist as of the date of completion of the transaction.

The unaudited pro forma condensed combined balance sheet as of September 30, 2016 assumes that the Merger took place on September 30, 2016 and combines the historical balance sheets of Signal and Miragen as of September 30, 2016. The unaudited pro forma condensed combined statement of operations for the nine months ended September 30, 2016 and for the year ended December 31, 2015 assumes that the Merger took place as of January 1, 2015, and combines the historical results of Signal and Miragen for the nine months ended September 30, 2016. for the year ended December 31, 2015, respectively. The historical financial statements of Signal and Miragen, which are provided elsewhere in this proxy statement/prospectus/information statement, have been adjusted to give pro forma effect to events that are (i) directly attributable to the Merger, (ii) factually supportable, and (iii) with respect to the statements of operations, expected to have a continuing impact on the combined results.

The unaudited pro forma condensed combined financial statements are based on the assumptions and adjustments that are described in the accompanying notes. The unaudited pro forma condensed combined financial statements and pro forma adjustments have been prepared based on preliminary estimates of fair value of assets acquired and liabilities assumed. Differences between these preliminary estimates and the final acquisition accounting will occur and these differences could have a material impact on the accompanying unaudited pro forma condensed combined financial statements and the combined company s future results of operations and financial position. The actual amounts recorded as of the completion of the Merger may differ materially from the information presented in these unaudited pro forma combined financial statements as a result of the amount, if any, of capital raised by Miragen between entering the Merger Agreement and closing of the Merger; the amount of cash used by Signal s operations between the signing of the Merger Agreement and the closing of the Merger; the timing of closing of the Merger; and other changes in the Signal assets and liabilities that occur prior to the completion of the Merger.

The unaudited pro forma condensed combined financial statements do not give effect to the potential impact of current financial conditions, regulatory matters, operating efficiencies or other savings or expenses that may be associated with the acquisition. The unaudited pro forma condensed combined financial statements have been prepared for illustrative purposes only and are not necessarily indicative of the financial position or results of operations in future periods or the results that actually would have been realized had Signal and Miragen been a combined company

during the specified period. The unaudited pro forma condensed combined financial statements, including the notes thereto, should be read in conjunction with the Signal and Miragen historical audited financial statements for the year ended December 31, 2015 and the unaudited condensed financial statements for the nine months ended September 30, 2016 included elsewhere in this proxy statement/prospectus/information statement.

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Unaudited Pro Forma Condensed Combined Balance Sheet

September 30, 2016

(In thousands)

	Signal	Miragen	Pro Forma Merger Adjustments		Pro Forma Combined
Assets					
Current assets:					
Cash and cash equivalents	$ 5,351	$ 24,598	$ 39,423	D	$ 70,197
			825	I	
Short-term investments		1,001			1,001
Accounts receivable, net	733	9	(733)	I	9
Inventory	62		(62)	I	
Prepaid expenses and other current assets	366	1,872	(151)	I	2,087
Total current assets	6,512	27,480	39,302		73,294
Property and equipment, net	1,014	696	(960)	I	750
Other assets	15	258			273
Total assets	$ 7,541	$ 28,434	$ 38,342		$ 74,317
Liabilities and stockholders equity					
Current liabilities:					
Accounts payable and accrued expenses	$ 1,700	$ 2,787	$ 2,229	E	$ 7,185
			(50)	G	
			(1,396)	I	
			(139)	J	
			2,054	M	
Note payable related party	1,105		(1,105)	J	
Current portion of notes payable		1,805			1,805
Current portion of deferred revenue		80			80
Other current liabilities	48		(25)	I	23
Total current liabilities	2,853	4,672	1,568		9,093
Notes payable, less current portion		3,293			3,293
Other noncurrent liabilities	2				2
Total liabilities	2,855	7,965	1,568		12,388
Stockholders equity:					
Redeemable Convertible preferred stock		76,967	(76,967)	C	
Common stock	7	1	(10)	A	199
			5	B	
			130	C	
			63	D	

			3	J	
Additional paid-in capital	29,751	4,591	(29,349)	A	123,549
			(5)	B	
			76,837	C	
			39,360	D	
			50	G	
			1,513	J	
			485	L	
			316	N	
Accumulated deficit	(25,072)	(61,090)	29,359	A	(61,819)
			(2,229)	E	
			340	I	
			(272)	J	
			(485)	L	
			(2,054)	M	
			(316)	N	
Total stockholders equity	4,686	(56,498)	113,741		61,929
Total liabilities, preferred stock and stockholders equity	$ 7,541	$ 28,434	$ 38,342		$ 74,317

See accompanying notes to the unaudited pro forma condensed combined financial statements.

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Unaudited Pro Forma Condensed Combined Statement of Operations

(In thousands, except share and per share data)

	For Nine Months Ended September 30, 2016				
			Pro Forma		
	Signal	Miragen	Merger Adjustment		Pro Forma Combined
Revenue, net	$ 2,581	$ 2,969	$ (2,581)	I	$ 2,969
Operating expenses:					
Cost of revenue	1,856		(1,856)	I	
Research and development	867	9,786	(867)	I	9,786
Selling and marketing	1,438		(1,438)	I	
General and administrative	5,455	4,255	(922)	F	7,706
			(1,082)	I	
Total operating expenses	9,616	14,041	(6,165)		17,492
Loss from operations	(7,035)	(11,072)	3,584		(14,523)
Interest and other income		21			21
Interest and other related expense	(69)	(250)	2	G	(251)
			66	J	
Net loss	(7,104)	$ (11,301)	3,652		(14,753)
Accretion of offering costs to redemption value of preferred stock		(36)	36	H	
Net loss applicable to common shareholders	$ (7,104)	$ (11,337)	$ 3,688		$ (14,753)
Basic and diluted net loss per share	(9.90)	(13.25)			(0.70)
Weighted average common share outstanding basic and diluted	716,957	855,734	19,369,106	K	20,941,797

See accompanying notes to the unaudited pro forma condensed combined financial statements.

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Unaudited Pro Forma Condensed Combined Statement of Operations

(In thousands, except share and per share data)

	For Year Ended December 31, 2015 Pro Forma				
	Signal	Miragen	Merger Adjustment		Pro Forma Combined
Revenue, net	$ 2,538	$ 5,004	$ (2,538)	I	$ 5,004
Operating expenses:					
Cost of revenue	2,472		(2,472)	I	
Research and development	1,002	13,312	(1,002)	I	13,628
			316	N	
Selling and marketing	2,559		(2,559)	I	
General and administrative	7,692	3,850	(1,293)	I	10,249
Total operating expenses	13,725	17,162	(7,010)		23,877
Loss from operations	(11,187)	(12,158)	4,472		(18,873)
Interest and other income		3			3
Interest and other related expense	(141)	(3,531)	44	G	(3,496)
			132	J	
Net loss	(11,328)	(15,686)	4,648		(22,366)
Accretion of offering costs to redemption value of preferred stock		(34)	34	H	
Net loss applicable to common shareholders	$ (11,328)	$ (15,720)	$ 4,682		$ (22,366)
Basic and diluted net loss per share	$ (21.00)	$ (18.37)			$ (1.28)
Weighted average common share outstanding basic and diluted	539,460	855,734	16,102,170	K	17,497,364

See accompanying notes to the unaudited pro forma condensed combined financial statements.

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NOTES TO THE UNAUDITED PRO FORMA CONDENSED COMBINED FINANCIAL INFORMATION

1. Description of Transaction and Basis of Presentation

Description of Transaction

On October 31, 2016, Signal Genetics, Inc. (Signal) entered into an Agreement and Plan of Merger and Reorganization (the Merger Agreement) with pre-Merger Miragen Therapeutics (Private Miragen), with Private Miragen becoming a wholly-owned subsidiary of Signal and the surviving corporation following completion of the merger (the Merger) in accordance with the Merger Agreement.

Immediately after the Merger, Miragen securityholders will own approximately 96% of the fully-diluted common stock of the combined company, with Signal securityholders owning approximately 4% of the fully-diluted common stock of the combined company, each assuming that Miragen closes its concurrent financing immediately prior to the effective time of the Merger. If the concurrent financing does not close, then Miragen s securityholders would own approximately 94% of the fully-diluted common stock of the combined company and Signal s securityholders would own approximately 6% of the fully-diluted common stock of the combined company. These estimates are based on the anticipated pre-split Exchange Ratio and post-split Exchange Ratios and are subject to adjustment.

Concurrent with Private Miragen s entry into the Merger Agreement, certain third parties, including Private Miragen s existing stockholders entered into an agreement to purchase shares of Private Miragen s common stock in a private financing prior to consummation of the Merger for an aggregate purchase price of approximately $40.7 million.

Basis of Presentation

The unaudited pro forma condensed combined financial statements were prepared in accordance with the regulations of the Securities and Exchange Commission (SEC). The unaudited pro forma condensed combined balance sheet as of September 30, 2016 is presented as if the Merger had been completed on September 30, 2016. The unaudited pro forma condensed combined statement of operations for the nine months ended September 30, 2016 and for the year ended December 31, 2015 assumes that the Merger took place as of January 1, 2015, and combines the historical results of Signal and Miragen for the nine months ended September 30, 2016., and for the year ended December 31, 2015, respectively. Based on the terms of the Merger, Private Miragen is deemed to be the acquiring company for accounting purposes and the transaction will be accounted for as an asset acquisition in accordance with accounting principles generally accepted in the United States (U.S. GAAP). Accordingly, the assets and liabilities of Private Miragen will be recorded as of the Merger closing date at their respective carrying value and the acquired net assets of Signal will be recorded as of the Merger closing date at their fair value. For the purpose of these unaudited pro forma financial statements, management of Private Miragen and Signal have determined a preliminary estimated purchase price for the asset acquisition, and such amount has been calculated as described in Note 2 to these unaudited pro forma condensed combined financial statements. The net assets acquired in connection with the transaction are at their estimated fair values. A final determination of these estimated fair values will be based on the actual net acquired assets of Signal as of the Merger closing date.

2. Preliminary Purchase Price

The estimated fair value of the net assets of Signal, on a pro forma basis after given effect to the concurrent sale of Signal s test business and conversion of Signal s note payable to related party, on September 30, 2016 was $2.4 million. As Signal s net assets are predominantly comprised of cash offset by current liabilities, the pro forma carrying value of Signal s net assets is considered to be the best indicator of the fair value and, therefore, the preliminary estimated

purchase price as of September 30, 2016. The estimated preliminary purchase price at

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the Merger closing date will change due to the amount of cash used by Signal s operations after September 30, 2016 to the closing of the Merger and other changes in the Signal assets and liabilities that occur through the completion of the Merger.

The preliminary acquired net assets of Signal based on their pro forma estimated fair values as of September 30, 2016 are as follows (in thousands):

Cash and cash equivalents	$ 6,176
Prepaid and other current assets	215
Property and equipment, net	54
Other assets	15
Current liabilities	(4,035)
Other liabilities	(25)
Net acquired tangible assets	$ 2,400

The allocation of the estimated purchase price is preliminary because the proposed Merger has not yet been completed. The purchase price allocation will remain preliminary until Miragen determines the fair values of assets acquired and liabilities assumed. The final determination of the purchase price allocation is anticipated to be completed as soon as practicable after completion of the Merger and will be based on the fair values of the assets acquired and liabilities assumed as of the Merger closing date. Miragen does not expect to acquire or assign any value to intangible assets. The final amounts allocated to assets acquired and liabilities assumed could differ significantly from the amounts presented in the unaudited pro forma condensed combined financial statements.

3. Pro Forma Adjustments

The unaudited pro forma condensed combined financial statements include pro forma adjustments to give effect to certain significant transactions of Private Miragen as a direct result of the Merger, or for accounting purposes, the acquisition of Signal s net assets by Private Miragen, and the sale of Signal s intellectual property assets related to its MyPRS test concurrent with the Merger. The pro forma adjustments reflecting the completion of the Merger are based upon the accounting analysis conclusion that the Merger should be accounted for as an asset acquisition and upon the assumptions set forth below.

A. To reflect the elimination of Signal s historical stockholders equity balances and accumulated deficit, including the impact of the pro forma adjustments below.

B. To reflect $39.4 million in proceeds to be received by Miragen, net of $1.3 million in estimated transaction costs, in connection with the consummation of a private financing. The private financing is contingent upon the Merger and is expected to close concurrent with the Merger. If the Merger does not close, investors who have agreed to the financing are not required to complete the financing. While the Merger is not contingent upon Miragen completing the private financing, Miragen considers the financing directly related to the Merger.

C. To reflect the conversion of Private Miragen s redeemable convertible preferred stock to Signal s common stock in connection with the Merger.

D. To reflect the $40.7 million capital to be raised by Private Miragen prior to the Merger and the issuance of Private Miragen s common stock in connection with the consummation of the private financing, net of $1.3 million in estimated transaction costs.

E. To record estimated transaction costs, such as advisor fees, legal and accounting expenses, and tail insurance that were not incurred as of September 30, 2016.

F. To reflect elimination of transaction costs, such as legal and accounting fees, of both Signal and Private Miragen.

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G. To reflect reclassification of preferred stock warrants to common stock warrants as a result of the Merger and the related elimination of amounts recorded for change in value of preferred stock warrants.

H. To reflect the elimination of accretion of offering costs on Miragen redeemable preferred stock to be converted into Private Miragen common stock in advance and as a result of the Merger.

I. To reflect the sale and disposition of Signal s intellectual property assets related to its MyPRS test concurrent with the Merger.

J. To reflect the conversion of Signal s note payable to related party to common stock concurrent with the Merger and the related elimination of amounts recorded for interest expense.

K. To reflect additional shares issued as a result of the Merger, conversion of Signal s note payable to related party, Private Miragen s financings, and acceleration of Signal restricted stock units in connection with the Merger.

L. To reflect the acceleration of Signal s restricted stock units in conjunction with the Merger.

M. To record estimated severance and retention charges to be incurred by Signal in connection with the Merger.

N. To record the issuance of Private Miragen Common Stock required to be issued by Miragen as a result of the Merger under a pre-existing subscription agreement.

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Annex A

AGREEMENT AND PLAN OF MERGER

AND REORGANIZATION

among

SIGNAL GENETICS, INC.,

SIGNAL MERGER SUB, INC., and

MIRAGEN THERAPEUTICS, INC.

Dated as of October 31, 2016

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AGREEMENT AND PLAN OF MERGER AND REORGANIZATION

THIS AGREEMENT AND PLAN OF MERGER AND REORGANIZATION (this ***Agreement***) is made and entered into as of October 31, 2016, by and among **Signal Genetics, Inc.,** a Delaware corporation (***Signal***), **Signal Merger Sub, Inc.**, a Delaware corporation (***Merger Sub***), and **Miragen Therapeutics, Inc.**, a Delaware corporation (***Miragen***). Certain capitalized terms used in this Agreement are defined in Exhibit A.

RECITALS

A. Signal and Miragen intend to effect a merger of Merger Sub into Miragen (the ***Merger***) in accordance with this Agreement and the DGCL. Upon consummation of the Merger, Merger Sub will cease to exist, and Miragen will become a wholly-owned subsidiary of Signal.

B. The Parties intend, by approving resolutions authorizing this Agreement, to adopt this Agreement as a plan of reorganization within the meaning of Section 368(a) of the Code, and to cause the Merger to qualify as a reorganization under the provisions of Section 368(a) of the Code and the Treasury Regulations promulgated thereunder.

C. The Signal Board of Directors (i) has determined that the Merger is fair to, and in the best interests of, Signal and the Signal Stockholders, (ii) has deemed advisable and approved this Agreement, the Merger, the Signal Stockholder Matters, the Other Signal Stockholder Matters, and other actions contemplated by this Agreement; and (iii) has determined to recommend that the Signal Stockholders vote to approve the Signal Stockholder Matters and the Other Signal Stockholder Matters.

D. The Board of Directors of Merger Sub (i) has determined that the Merger is fair to, and in the best interests of, Merger Sub and its sole stockholder, (ii) has deemed advisable and approved this Agreement, the Merger, and the applicable Contemplated Transactions, and (iii) has determined to recommend that the stockholder of Merger Sub vote to adopt this Agreement and thereby approve the Merger and the applicable Contemplated Transactions.

E. The Miragen Board of Directors (i) has determined that the Merger is advisable and fair to, and in the best interests of, Miragen and the Miragen Stockholders, (ii) has deemed advisable and approved the Miragen Stockholder Matters and other actions contemplated by this Agreement, and (iii) has determined to recommend that the Miragen Stockholders vote to approve the Miragen Stockholder Matters.

F. In order to induce Signal to enter into this Agreement and to cause the Merger to be consummated, the officers and directors of Miragen and the Miragen Stockholders, in each case, listed on Schedule A hereto are executing concurrently with the execution and delivery of this Agreement support agreements in favor of Signal in the form substantially attached hereto as Exhibit B (the ***Miragen Stockholder Support Agreements***).

G. In order to induce Miragen to enter into this Agreement and to cause the Merger to be consummated, the officers and directors of Signal and the Signal Stockholders, in each case, listed on Schedule B hereto are executing support agreements in favor of Miragen concurrently with the execution and delivery of this Agreement in the form substantially attached hereto as Exhibit C (the ***Signal Stockholder Support Agreements***).

H. It is expected that within five Business Days after the Form S-4 Registration Statement is declared effective by the SEC under the Securities Act, Miragen will deliver the Miragen Stockholder Written Consent.

I. Immediately prior to the execution and delivery of this Agreement, certain investors have executed a Subscription Agreement substantially in the form attached hereto as Exhibit E among Miragen and the Persons

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named therein, pursuant to which such Persons have agreed to purchase the number of shares of Miragen Capital Stock set forth therein prior to the Closing in connection with the Miragen Pre-Closing Financing (the ***Subscription Agreement***).

J. Prior to the execution and delivery of this Agreement, and as a condition of the willingness of Miragen to enter into this Agreement, Signal has entered into a letter of intent dated October 19, 2016, providing for the sale of all of Signal s intellectual property assets related to the Lab Business.

AGREEMENT

The parties to this Agreement, intending to be legally bound, agree as follows:

ARTICLE 1. DESCRIPTION OF TRANSACTION

1.1 Structure of the Merger. Upon the terms and subject to the conditions set forth in this Agreement and in accordance with the DGCL, at the Effective Time, (a) Merger Sub shall be merged with and into Miragen, and (b) the separate existence of Merger Sub shall cease and Miragen will continue its corporate existence under the DGCL as the surviving corporation in the Merger (the ***Surviving Corporation***).

1.2 Effects of the Merger. The Merger shall have the effects set forth in this Agreement and in the applicable provisions of the DGCL. As a result of the Merger, Miragen will become a wholly-owned subsidiary of Signal.

1.3 Closing; Effective Time. Unless this Agreement is earlier terminated pursuant to the provisions of Section 9.1, and subject to the satisfaction or waiver of the conditions set forth in Article 6, Article 7 and Article 8, the closing of the Merger (the ***Closing***) shall take place at the offices of Cooley LLP, 380 Interlocken Crescent, Suite 900, Broomfield, Colorado, as promptly as practicable (but in no event later than the second Business Day following the satisfaction or waiver of the last to be satisfied or waived of the conditions set forth in Article 6, Article 7 and Article 8, other than those conditions that by their nature are to be satisfied at the Closing, but subject to the satisfaction or waiver of each of such conditions), or at such other time, date and place as Signal and Miragen may mutually agree in writing; *provided, however*, that if Miragen is not prepared to close the Miragen Pre-Closing Financing at such time, Miragen has the right, in its sole discretion to delay the Closing for up to five Business Days. The date on which the Closing actually takes place is referred to as the ***Closing Date***. At the Closing, the Parties hereto shall cause a certificate of merger (the ***Certificate of Merger***) to be executed, acknowledged and filed with the Secretary of State of the State of Delaware in accordance with the applicable requirements of the DGCL and shall make all other filings or recordings required under the DGCL. The Merger will become effective at such time as the Certificate of Merger has been duly filed with the Secretary of State of the State of Delaware or at such later time as may be specified in such Certificate of Merger with the consent of Signal and Miragen (the time as of which the Merger becomes effective being referred to as the ***Effective Time***).

1.4 Certificate of Incorporation and Bylaws; Directors and Officers. At the Effective Time:

(a) the certificate of incorporation of the Surviving Corporation shall be amended and restated in its entirety to read as set forth in Exhibit D until thereafter amended as provided by the DGCL and such certificate of incorporation;

(b) the certificate of incorporation of Signal shall be the certificate of incorporation of Signal immediately prior to the Effective Time, until thereafter amended as provided by the DGCL and such certificate of incorporation; *provided*, *however*, that at the Effective Time, Signal shall file one or more amendments to its certificate of incorporation, to the extent approved by the holders of Signal Common Stock as contemplated by

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Section 5.3, to (i) change the name of Signal to Miragen Therapeutics, Inc. , (ii) effect the Miragen Reverse Split, to the extent requested by Miragen prior to the filing with the SEC of the Proxy Statement / Prospectus / Information Statement, (iii) increase the authorized shares of Signal Common Stock, to the extent requested by Miragen prior to the filing with the SEC of the Proxy Statement / Prospectus / Information Statement, (iv) prohibit the ability of Signal Stockholders to act by written consent, and (v) make such other changes as are mutually agreeable to Signal and Miragen;

(c) the bylaws of the Surviving Corporation shall be amended and restated in their entirety to read identically to the bylaws of Merger Sub as in effect immediately prior to the Effective Time, until thereafter amended in accordance with the terms of such bylaws, the certificate of incorporation of the Surviving Corporation and the DGCL;

(d) the bylaws of Signal shall be the bylaws of Signal immediately prior to the Effective Time; *provided, however*, that effective at the Effective Time, Signal shall amend its bylaws, to (i) prohibit the ability of Signal Stockholders to act by written consent and (ii) make such other changes as are mutually agreeable to Signal and Miragen;

(e) the directors and officers of Signal, each to hold office in accordance with the certificate of incorporation and bylaws of Signal, shall be as set forth in Section 5.13; and

(f) the directors and officers of the Surviving Corporation, each to hold office in accordance with the certificate of incorporation and bylaws of the Surviving Corporation, shall be the directors and officers of Signal as set forth in Section 5.13, after giving effect to the provisions of Section 5.13.

1.5 Conversion of Shares and Issuance of Warrants.

(a) At the Effective Time, by virtue of the Merger and without any further action on the part of Signal, Merger Sub, Miragen or any Miragen Stockholder:

(i) each share of Miragen Common Stock or Miragen Preferred Stock held as treasury stock or held or owned by Miragen, any Miragen Subsidiary, Signal, or Merger Sub, immediately prior to the Effective Time shall be canceled and retired and shall cease to exist, and no consideration shall be delivered in exchange therefor; and

(ii) subject to Section 1.5(c), each share of Miragen Common Stock (including any shares of Miragen Common Stock issued pursuant to the Miragen Pre-Closing Financing) outstanding immediately prior to the Effective Time (excluding shares to be canceled pursuant to Section 1.5(a)(i) and Dissenting Shares, and after giving effect to the Preferred Stock Conversion) shall be converted solely into the right to receive a number of shares of Signal Common Stock equal to the Exchange Ratio (the ***Merger Consideration***).

(b) If any shares of Miragen Common Stock outstanding immediately prior to the Effective Time are unvested or are subject to a repurchase option or the risk of forfeiture under any applicable restricted stock purchase agreement or other agreement with Miragen, then the shares of Signal Common Stock issued in exchange for such shares of Miragen Common Stock will to the same extent be unvested and subject to the same repurchase option or risk of forfeiture, and the book-entry shares of Signal Common Stock shall accordingly be marked with appropriate legends. Miragen shall take all actions that may be necessary to ensure that, from and after the Effective Time, Signal is entitled to exercise any such repurchase option or other right set forth in any such restricted stock purchase agreement or other agreement.

(c) No fractional shares of Signal Common Stock shall be issued in connection with the Merger, and no certificates or scrip for any such fractional shares shall be issued. Any holder of Miragen Common Stock who would otherwise be

entitled to receive a fraction of a share of Signal Common Stock (after aggregating all

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fractional shares of Signal Common Stock issuable to such holder) shall, in lieu of such fraction of a share and upon surrender by such holder of a letter of transmittal in accordance with Section 1.8 and accompanying documents as required therein, be paid in cash the dollar amount (rounded to the nearest whole cent), without interest, determined by multiplying such fraction by the closing price of a share of Signal Common Stock on The NASDAQ Capital Market (or such other NASDAQ market on which the Signal Common Stock then trades) on the date the Merger becomes effective.

(d) All Miragen Options outstanding immediately prior to the Effective Time under the 2008 Plan and all Miragen Warrants outstanding immediately prior to the Effective Time shall be assumed by Signal and converted into options to purchase Signal Common Stock or warrants to purchase Signal Common Stock, as applicable, in accordance with Section 5.5.

(e) Each share of Common Stock, $0.001 par value per share, of Merger Sub issued and outstanding immediately prior to the Effective Time shall be converted into and exchanged for one validly issued, fully paid and nonassessable share of Common Stock, $0.001 par value per share, of the Surviving Corporation. Each stock certificate of Merger Sub evidencing ownership of any such shares shall, as of the Effective Time, evidence ownership of such shares of Common Stock of the Surviving Corporation.

(f) If, between the time of calculating the Exchange Ratio and the Effective Time, the outstanding shares of Miragen Capital Stock or Signal Common Stock have been changed into, or exchanged for, a different number of shares or a different class, by reason of any stock dividend, subdivision, reclassification, recapitalization, split (including the NASDAQ Reverse Split and the Miragen Reverse Split to the extent either such split has not previously been taken into account in calculating the Exchange Ratio), combination or exchange of shares, the Exchange Ratio shall be correspondingly adjusted to provide the holders of Miragen Common Stock, Miragen Options and Miragen Warrants the same economic effect as contemplated by this Agreement prior to such event.

1.6 Calculation of Net Cash.

(a) For the purposes of this Agreement, the ***Determination Date*** shall be the date that is 10 calendar days prior to the anticipated date for Closing, as agreed upon by Signal and Miragen at least 10 calendar days prior to the Signal Stockholders Meeting (the ***Anticipated Closing Date***). On or prior to the Determination Date, Signal shall provide Miragen with a list of all Liabilities of Signal as of the Determination Date that are individually in excess of $10,000 or in excess of $25,000 in the aggregate, which had not previously been disclosed to Miragen in the Signal Disclosure Schedule. Within five calendar days following the Determination Date, Signal shall deliver to Miragen a schedule (the ***Net Cash Schedule***) setting forth, in reasonable detail, Signal s good faith, estimated calculation of Net Cash (using an estimate of Signal s accounts payable and accrued expenses, in each case as of the Anticipated Closing Date and determined in a manner substantially consistent with the manner in which such items were determined for Signal s most recent SEC filings) (the ***Net Cash Calculation***) as of the Anticipated Closing Date prepared and certified by Signal s Chief Financial Officer (or if there is no Chief Financial Officer, the principal accounting officer for Signal). Signal shall make the work papers and back-up materials used or useful in preparing the Net Cash Schedule, as reasonably requested by Miragen, available to Miragen and, if requested by Miragen, its accountants and counsel at reasonable times and upon reasonable notice.

(b) Within three calendar days after Signal delivers the Net Cash Schedule (the ***Response Date***), Miragen will have the right to dispute any part of such Net Cash Schedule by delivering a written notice to that effect to Signal (a ***Dispute Notice***). Any Dispute Notice shall identify in reasonable detail the nature of any proposed revisions to the Net Cash Calculation.

(c) If on or prior to the Response Date, (i) Miragen notifies Signal in writing that it has no objections to the Net Cash Calculation or (ii) Miragen fails to deliver a Dispute Notice as provided in Section 1.6(b), then the Net Cash Calculation as set forth in the Net Cash Schedule shall be deemed to have been finally determined for purposes of this Agreement and to represent the Net Cash at the Anticipated Closing Date for purposes of this Agreement.

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(d) If Miragen delivers a Dispute Notice on or prior to the Response Date, then Representatives of Signal and Miragen shall promptly meet and attempt in good faith to resolve the disputed item(s) and negotiate an agreed-upon determination of Net Cash, which agreed upon Net Cash amount shall be deemed to have been finally determined for purposes of this Agreement and to represent the Net Cash at the Anticipated Closing Date for purposes of this Agreement.

(e) If Representatives of Signal and Miragen are unable to negotiate an agreed-upon determination of Net Cash at the Anticipated Closing Date pursuant to Section 1.6(d) within three calendar days after delivery of the Dispute Notice (or such other period as Signal and Miragen may mutually agree upon), then Signal and Miragen shall jointly select an independent auditor of recognized national standing (the ***Accounting Firm***) to resolve any remaining disagreements as to the Net Cash Calculation. Signal shall promptly deliver to the Accounting Firm the work papers and back-up materials used in preparing the Net Cash Schedule, and Signal and Miragen shall use commercially reasonable efforts to cause the Accounting Firm to make its determination within 10 calendar days of accepting its selection. Miragen and Signal shall be afforded the opportunity to present to the Accounting Firm any material related to the unresolved disputes and to discuss the issues with the Accounting Firm; *provided, however*, that no such presentation or discussion shall occur without the presence of a Representative of each of Miragen and Signal. The determination of the Accounting Firm shall be limited to the disagreements submitted to the Accounting Firm. The determination of the amount of Net Cash made by the Accounting Firm shall be deemed to have been finally determined for purposes of this Agreement and to represent the Net Cash at the Anticipated Closing Date for purposes of this Agreement, and the Parties shall delay the Closing until the resolution of the matters described in this Section 1.6(e). The fees and expenses of the Accounting Firm shall be allocated between Signal and Miragen in the same proportion that the disputed amount of the Net Cash that was unsuccessfully disputed by such Party (as finally determined by the Accounting Firm) bears to the total disputed amount of the Net Cash amount (and for the avoidance of doubt the fees and expenses to be paid by Signal shall reduce the Net Cash). If this Section 1.6(e) applies as to the determination of the Net Cash at the Anticipated Closing Date described in Section 1.6(a), upon resolution of the matter in accordance with this Section 1.6(e), the Parties shall not be required to determine Net Cash again even though the Closing Date may occur later than the Anticipated Closing Date, except that either Party may request a redetermination of Net Cash if the Closing Date is more than five Business Days after the Anticipated Closing Date.

1.7 Closing of Miragen s Transfer Books. At the Effective Time: (a) all shares of Miragen Common Stock outstanding immediately prior to the Effective Time (after giving effect to the Preferred Stock Conversion) shall be treated in accordance with Section 1.5(a), and all holders of certificates representing shares of Miragen Capital Stock that were outstanding immediately prior to the Effective Time shall cease to have any rights as Miragen Stockholders; and (b) the stock transfer books of Miragen shall be closed with respect to all shares of Miragen Capital Stock outstanding immediately prior to the Effective Time. No further transfer of any such shares of Miragen Capital Stock shall be made on such stock transfer books after the Effective Time. If, after the Effective Time, a valid certificate previously representing any shares of Miragen Capital Stock, including any valid certificate representing any shares of Miragen Preferred Stock previously converted into shares of Miragen Common Stock in connection with the Preferred Stock Conversion, outstanding immediately prior to the Effective Time (an ***Miragen Stock Certificate***) is presented to the Exchange Agent or to the Surviving Corporation, such Miragen Stock Certificate shall be canceled and shall be exchanged as provided in Section 1.5 and Section 1.8.

1.8 Surrender of Certificates.

(a) On or prior to the Closing Date, Signal and Miragen shall agree upon and select a reputable bank, transfer agent or trust company to act as exchange agent in the Merger (the ***Exchange Agent***). At the Effective Time, Signal shall deposit with the Exchange Agent: (i) the aggregate number of book-entry shares representing the Merger Consideration issuable to Miragen Stockholders pursuant to Section 1.5(a) and (ii) cash sufficient to make payments

in lieu of fractional shares in accordance with Section 1.5(c). The book-entry shares of Signal Common Stock and cash amounts so deposited with the Exchange Agent, together with any dividends or distributions received by the Exchange Agent with respect to such shares, are referred to collectively as the ***Exchange Fund***.

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(b) Promptly after the Effective Time, the Parties shall cause the Exchange Agent to mail to the Persons who were record holders of Miragen Stock Certificates immediately prior to the Effective Time, as set forth on the Allocation Certificate: (i) a letter of transmittal in customary form; and (ii) instructions for effecting the surrender of Miragen Stock Certificates in exchange for book-entry shares of Signal Common Stock. Upon surrender of an Miragen Stock Certificate to the Exchange Agent for exchange, together with a duly executed letter of transmittal and such other documents as may be reasonably required by the Exchange Agent: (A) the holder of such Miragen Stock Certificate shall be entitled to receive in exchange therefor one or more book-entry shares representing the portion of the Merger Consideration (in a number of whole shares of Signal Common Stock) that such holder has the right to receive pursuant to the provisions of Section 1.5(a) (and cash in lieu of any fractional share of Signal Common Stock pursuant to the provisions of Section 1.5(c)); and (B) upon delivery of such consideration to the applicable holder in accordance with Section 1.5, the Miragen Stock Certificate so surrendered shall be canceled. Until surrendered as contemplated by this Section 1.8(b), each Miragen Stock Certificate shall be deemed, from and after the Effective Time, to represent only the right to receive shares of Signal Common Stock (and cash in lieu of any fractional share of Signal Common Stock). If any Miragen Stock Certificate has been lost, stolen or destroyed, Signal may, in its discretion and as a condition precedent to the delivery of any shares of Signal Common Stock, require the owner of such lost, stolen or destroyed Miragen Stock Certificate to provide an applicable affidavit with respect to such Miragen Stock Certificate and post a bond indemnifying Signal against any claim suffered by Signal related to the lost, stolen or destroyed Miragen Stock Certificate or any Signal Common Stock issued in exchange therefor as Signal may reasonably request.

(c) No dividends or other distributions declared or made with respect to Signal Common Stock with a record date after the Effective Time shall be paid to the holder of any unsurrendered Miragen Stock Certificate with respect to the shares of Signal Common Stock that such holder has the right to receive in the Merger until such holder surrenders such Miragen Stock Certificate or an affidavit of loss or destruction in lieu thereof in accordance with this Section 1.8 (at which time such holder shall be entitled, subject to the effect of applicable abandoned property, escheat or similar laws, to receive all such dividends and distributions, without interest).

(d) Any portion of the Exchange Fund that remains undistributed to holders of Miragen Stock Certificates six months after the Closing Date shall be delivered to Signal upon demand, and any holders of Miragen Stock Certificates who have not theretofore surrendered their Miragen Stock Certificates in accordance with this Section 1.8 shall thereafter look only to Signal for satisfaction of their claims for Signal Common Stock, cash in lieu of fractional shares of Signal Common Stock and any dividends or distributions with respect to shares of Signal Common Stock.

(e) Each of the Exchange Agent, Signal and the Surviving Corporation shall be entitled to deduct and withhold from any consideration deliverable pursuant to this Agreement to any holder of any Miragen Stock Certificate such amounts as are required to be deducted or withheld from such consideration under the Code or under any other applicable Legal Requirement and shall be entitled to request any reasonably appropriate Tax forms, including an IRS Form W-9 (or the appropriate IRS Form W-8, as applicable), from any recipient of payments hereunder. To the extent such amounts are so deducted or withheld, and remitted to the appropriate Tax authority, such amounts shall be treated for all purposes under this Agreement as having been paid to the Person to whom such amounts would otherwise have been paid.

(f) No party to this Agreement shall be liable to any holder of any Miragen Stock Certificate or to any other Person with respect to any shares of Signal Common Stock (or dividends or distributions with respect thereto) or for any cash amounts delivered to any public official pursuant to any applicable abandoned property law, escheat law or similar Legal Requirement.

1.9 Appraisal Rights.

(a) Notwithstanding any provision of this Agreement to the contrary, shares of Miragen Capital Stock that are outstanding immediately prior to the Effective Time (other than shares canceled pursuant to Section

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1.5(a)(i)) and are held by an Miragen Stockholder who has not voted in favor of adoption of this Agreement or consented thereto in writing and who has properly exercised and perfected appraisal rights for such shares of Miragen Common Stock in accordance with the DGCL (collectively, the ***Dissenting Shares***) shall not be converted into or represent the right to receive the portion of the Merger Consideration attributable to such Dissenting Shares, but instead shall be entitled to only such rights as are granted by Section 262 of the DGCL; *provided, however*, that if after the Effective Time, such stockholder fails to perfect or effectively withdraws or otherwise loses such holder s appraisal rights under the DGCL or if a court of competent jurisdiction determines that such holder is not entitled to the relief provided by Section 262 of the DGCL, such shares of Miragen Common Stock shall be deemed to be converted into and to have become exchangeable for, as of the Effective Time, the right to receive the portion of the Merger Consideration attributable to such Dissenting Shares upon their surrender in the manner provided in Section 1.5, without interest thereon.

(b) Miragen shall give Signal prompt written notice of any demands by dissenting stockholders received by Miragen, withdrawals of such demands and any other instruments served on Miragen and any material correspondence received by Miragen in connection with such demands.

1.10 Further Action. If, at any time after the Effective Time, any further action is determined by the Surviving Corporation to be necessary or desirable to carry out the purposes of this Agreement or to vest the Surviving Corporation with full right, title and possession of and to all rights and property of Miragen, then the officers and directors of the Surviving Corporation shall be fully authorized, and shall use their commercially reasonable efforts (in the name of Miragen, in the name of Merger Sub and otherwise) to take such action.

1.11 Tax Consequences. For federal income Tax purposes, the Merger is intended to constitute a reorganization within the meaning of Section 368(a) of the Code and the Treasury Regulations promulgated thereunder. The parties to this Agreement adopt this Agreement as a plan of reorganization within the meaning of Treasury Regulations Section 1.368-2(g).

1.12 Certificates.

(a) Signal will prepare and delivery to Miragen at least two Business Days Prior to the Closing Date, a certificate signed by the Chief Financial Officer of Signal in a form reasonable acceptable to Miragen, which sets forth a true and complete list, as of immediately prior to the Effective Time of the number of Signal Outstanding Shares and each component thereof (broken down by outstanding shares of Signal Common Stock, Signal Options, Signal RSUs, Signal Warrants, and other relevant securities) (***Signal Outstanding Shares Certificate***).

(b) Miragen will prepare and deliver to Signal at least one Business Day prior to the Closing Date a certificate signed by the Chief Financial Officer of Miragen in a form reasonably acceptable to Signal, which sets forth a true and complete list, as of immediately prior to the Effective Time (giving effect to the Preferred Stock Conversation and the closing of the Miragen Pre-Closing Financing) of: (a) the record holders of Miragen Common Stock, Miragen Options and Miragen Warrants; (b) the number of shares of Miragen Common Stock owned and/or underlying the Miragen Options or Miragen Warrants held by such holders and the per share exercise price for each such Miragen Option and Miragen Warrant; and (c) the portion of the Merger Consideration each such holder is entitled to receive pursuant to Section 1.5 (the ***Allocation Certificate***).

ARTICLE 2. REPRESENTATIONS AND WARRANTIES OF Miragen

Miragen represents and warrants to Signal and Merger Sub as follows, except as set forth in the written disclosure schedule delivered by Miragen to Signal (the ***Miragen Disclosure Schedule***) (it being understood that the

representations and warranties in this Article 2 are qualified by: (a) any exceptions and disclosures set forth in the section or subsection of the Miragen Disclosure Schedule corresponding to the particular section or subsection in this Article 2 in which such representation and warranty appears; (b) any exceptions or disclosures

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explicitly cross-referenced in such section or subsection of the Miragen Disclosure Schedule by reference to another section or subsection of the Miragen Disclosure Schedule; and (c) any exceptions or disclosures set forth in any other section or subsection of the Miragen Disclosure Schedule to the extent it is reasonably apparent from the wording of such exception or disclosure that such exception or disclosure qualifies such representation and warranty). The inclusion of any information in the Miragen Disclosure Schedule shall not be deemed to be an admission or acknowledgement, in and of itself, that such information is required by the terms hereof to be disclosed, is material, has resulted in or would result in an Miragen Material Adverse Effect, or is outside the Ordinary Course of Business.

2.1 Subsidiaries; Due Organization; Organizational Documents.

(a) Section 2.1(a) of the Miragen Disclosure Schedule identifies each Subsidiary of Miragen (the ***Miragen Subsidiaries***). Neither Miragen nor any Entity identified on this Section 2.1(a) of the Miragen Disclosure Schedule owns any capital stock of, or any equity interest of any nature in, any other Entity. Miragen has not agreed nor is obligated to make, nor is bound by any Contract under which it may become obligated to make, any future investment in or capital contribution to any other Entity. Miragen has not, at any time, been a general partner of, or has otherwise been liable for any of the debts or other obligations of, any general partnership, limited partnership or other Entity.

(b) Each of Miragen and the Miragen Subsidiaries is a corporation or limited liability company, as applicable, duly organized, validly existing and in good standing under the laws of the jurisdiction of its incorporation or organization, as applicable, and has all necessary power and authority: (i) to conduct its business in the manner in which its business is currently being conducted; (ii) to own and use its assets in the manner in which its assets are currently owned and used; and (iii) to perform its obligations under all Miragen Contracts.

(c) Each of Miragen and the Miragen Subsidiaries is qualified to do business as a foreign corporation or limited liability company, as applicable, and is in good standing, under the laws of all jurisdictions where the nature of its business requires such qualification other than in jurisdictions where the failure to be so qualified would not constitute an Miragen Material Adverse Effect.

(d) Each director and officer of Miragen as of the date of this Agreement is set forth in Section 2.1(d) of the Miragen Disclosure Schedule.

(e) Miragen has delivered or made available to Signal accurate and complete copies of the certificate of incorporation, bylaws and other charter and organizational documents, including all currently effective amendments thereto, for Miragen and each Miragen Subsidiary.

2.2 Authority; Vote Required.

(a) Miragen has all necessary corporate power and authority to enter into and to perform its obligations under this Agreement. The Miragen Board of Directors has: (i) determined that the Merger is fair to, and in the best interests of Miragen and Miragen Stockholders; (ii) duly authorized and approved by all necessary corporate action, the execution, delivery and performance of this Agreement and the Contemplated Transactions; (iii) recommended the approval of the Miragen Stockholder Matters by the Miragen Stockholders and directed that the Miragen Stockholder Matters be submitted for consideration by Miragen Stockholders in connection with the solicitation of the Required Miragen Stockholder Vote; and (iv) approved the Miragen Stockholder Support Agreements and the transactions contemplated thereby. This Agreement has been duly executed and delivered by Miragen and, assuming the due authorization, execution and delivery by Signal and Merger Sub, constitutes the legal, valid and binding obligation of Miragen, enforceable against Miragen in accordance with its terms, subject to: (A) laws of general application relating to bankruptcy, insolvency and the relief of debtors; and (B) rules of law governing specific performance, injunctive

relief and other equitable remedies.

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(b) The affirmative vote of the holders of (i) a majority of the shares of Miragen Preferred Stock and Common Stock, voting together as a single class; and (ii) at least 70% of the shares of Miragen Preferred Stock, voting together as a single class, in each case, as outstanding on the record date for the written consent in lieu of a meeting pursuant to Section 228 of the DGCL approving the Miragen Stockholder Matters, in a form reasonably acceptable to Signal (each, an ***Miragen Stockholder Written Consent*** and collectively, the ***Miragen Stockholder Written Consents***) and entitled to vote thereon (collectively, the ***Required Miragen Stockholder Vote***), is the only vote of the holders of any class or series of Miragen Capital Stock necessary to approve the Miragen Stockholder Matters. The shares of Miragen Capital Stock covered by the Miragen Stockholder Support Agreements are sufficient to obtain the Required Miragen Stockholder Vote.

2.3 Non-Contravention; Consents.

(a) The execution and delivery of this Agreement by Miragen does not, and the performance of this Agreement by Miragen will not, (i) conflict with or violate the certificate of incorporation or bylaws of Miragen or the equivalent organizational documents of any of its Subsidiaries; (ii) subject to obtaining the Required Miragen Stockholder Vote and compliance with the requirements set forth in Section 2.3(b) below, conflict with or violate any Legal Requirement applicable to Miragen or any of its Subsidiaries or by which its or any of their respective properties is bound or affected, except for any such conflicts or violations that would not constitute an Miragen Material Adverse Effect; or (iii) require Miragen or any of its Subsidiaries to make any filing with or give any notice or make any payment to a Person, or obtain any Consent from a Person, or result in any breach of or constitute a default (or an event that with notice or lapse of time or both would become a default) under, or impair Miragen s rights or alter the rights or obligations of any third party under, or give to others any rights of termination, amendment, acceleration or cancelation of, or result in the creation of an Encumbrance on any of the properties or assets of Miragen or any of its Subsidiaries pursuant to, any Miragen Material Contract.

(b) No material Consent or order of, or registration, declaration or filing with, any Governmental Body is required by or with respect to Miragen or any of the Miragen Subsidiaries in connection with the execution and delivery of this Agreement or the consummation of the Contemplated Transactions, except for (i) the filing of the Certificate of Merger with the Secretary of State of the State of Delaware pursuant to the DGCL, (ii) any required filings under the HSR Act and any foreign antitrust Legal Requirement and (iii) such Consents, orders, registrations, declarations and filings as may be required under applicable federal and state securities laws.

2.4 Capitalization.

(a) The authorized capital stock of Miragen as of the date of this Agreement consists of: (i) 24,780,394 shares of common stock, par value $0.001 per share (the ***Miragen Common Stock***), of which 875,734 shares are issued and outstanding as of the date of this Agreement; and (ii) 18,655,494 shares of preferred stock, par value $0.001 per share, of which 7,169,176 shares are designated as Series A Preferred Stock, of which 7,149,176 shares are issued and outstanding as of the date of this Agreement, and of which 2,183,318 shares are designated as Series B Preferred Stock, of which 2,166,651 shares are issued and outstanding as of the date of this Agreement, and of which 9,303,000 shares are designated as Series C Preferred Stock, of which 9,268,563 shares are issued and outstanding as of the date of this Agreement (collectively, the ***Miragen Preferred Stock***). Miragen does not hold any of its capital stock in treasury. All of the outstanding shares of Miragen Capital Stock have been duly authorized and validly issued, and are fully paid and nonassessable. As of the date of this Agreement, there are outstanding Miragen Warrants to purchase 10,000 shares of Miragen Common Stock, 20,000 shares of Series A Preferred Stock of Miragen, and 16,667 shares of Series B Preferred Stock of Miragen. Section 2.4(a) of the Miragen Disclosure Schedule lists, as of the date of this Agreement (i) each record holder of issued and outstanding Miragen Capital Stock and the number and type of shares of Miragen Capital Stock held by such holder; and (ii) (A) each holder of issued and outstanding Miragen Warrants,

(B) the number and type of shares subject to such Miragen Warrants, (C) the exercise price of each such Miragen Warrant, and (D) the termination date of each such Miragen Warrant. Each share of Miragen Preferred Stock is convertible into one share of Miragen Common Stock.

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(b) Except for the Miragen 2008 Equity Incentive Plan (the ***2008 Plan***), Miragen does not have any stock option plan or any other plan, program, agreement or arrangement providing for any equity-based compensation for any Person. Miragen has reserved 3,672,515 shares of Miragen Common Stock for issuance under the 2008 Plan. As of the date of this Agreement, of such reserved shares of Miragen Common Stock, 90,958 shares have been issued pursuant to the exercise of outstanding options, options to purchase 3,202,033 shares have been granted and are currently outstanding, and 379,524 shares of Miragen Common Stock remain available for future issuance pursuant to the 2008 Plan. Section 2.4(b) of the Miragen Disclosure Schedule sets forth the following information with respect to each Miragen Option outstanding, as of the date of this Agreement: (A) the name of the optionee; (B) the number of shares of Miragen Common Stock subject to such Miragen Option as of the date of this Agreement; (C) the exercise price of such Miragen Option; (D) the date on which such Miragen Option was granted; and (E) the date on which such Miragen Option expires. No vesting of Miragen Options will accelerate as a result of the Merger.

(c) Except for the outstanding Miragen Warrants set forth on Section 2.4(a) of the Miragen Disclosure Schedule and for the Miragen Options set forth on Section 2.4(b) of the Miragen Disclosure Schedule, there is no: (i) outstanding subscription, option, call, warrant or right (whether or not currently exercisable) to acquire any shares of the capital stock or other securities of Miragen or any of its Subsidiaries; (ii) outstanding security, instrument or obligation that is or may become convertible into or exchangeable for any shares of the capital stock or other securities of Miragen or any of its Subsidiaries; (iii) stockholder rights plan (or similar plan commonly referred to as a poison pill) or Contract under which Miragen or any of its Subsidiaries is or may become obligated to sell or otherwise issue any shares of its capital stock or any other securities; or (iv) condition or circumstance that may give rise to or provide a basis for the assertion of a claim by any Person to the effect that such Person is entitled to acquire or receive any shares of capital stock or other securities of Miragen or any of its Subsidiaries. There are no outstanding or authorized stock appreciation, phantom stock, profit participation, restricted stock units, equity-based or other similar rights with respect to Miragen or any of its Subsidiaries.

(d) (i) None of the outstanding shares of Miragen Capital Stock are entitled or subject to any preemptive right, right of repurchase or forfeiture, right of participation, right of maintenance or any similar right; (ii) none of the outstanding shares of Miragen Capital Stock are subject to any right of first refusal in favor of Miragen; (iii) there are no outstanding bonds, debentures, notes or other indebtedness of Miragen or its Subsidiaries having a right to vote on any matters on which the Miragen Stockholders have a right to vote; (iv) there is no Miragen Contract to which Miragen or its Subsidiaries are a party relating to the voting or registration of, or restricting any Person from purchasing, selling, pledging or otherwise disposing of (or from granting any option or similar right with respect to), any shares of Miragen Capital Stock. Neither Miragen nor any of its Subsidiaries is under any obligation, or is bound by any Contract pursuant to which it may become obligated, to repurchase, redeem or otherwise acquire any outstanding shares of Miragen Capital Stock or other securities.

(e) All outstanding shares of Miragen Capital Stock, as well as all Miragen Options and all Miragen Warrants, have been issued and granted, as applicable, in material compliance with all applicable securities laws and other applicable Legal Requirements.

2.5 Financial Statements.

(a) Section 2.5(a) of the Miragen Disclosure Schedule includes true and complete copies of (i) Miragen s audited consolidated balance sheets at December 31, 2014 and December 31, 2015, (ii) the Miragen Unaudited Interim Balance Sheet, (iii) Miragen s audited consolidated statements of income, cash flow and stockholders equity for the years ended December 31, 2014 and December 31, 2015, and (iv) Miragen s unaudited statements of income, cash flow and shareholders equity for the six months ended June 30, 2016 (collectively, the ***Miragen Financials***). The Miragen Financials (A) were prepared in accordance with United States generally accepted accounting principles

(***GAAP***) (except as may be indicated in the footnotes to such Miragen Financials and that unaudited financial statements may not have notes thereto and other presentation

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items that may be required by GAAP and are subject to normal and recurring year-end adjustments that are not reasonably expected to be material in amount) applied on a consistent basis unless otherwise noted therein throughout the periods indicated and (B) fairly present the financial condition and operating results of Miragen and its consolidated Subsidiaries as of the dates and for the periods indicated therein.

(b) Each of Miragen and its Subsidiaries maintains a system of internal accounting controls designed to provide reasonable assurance that: (i) transactions are executed in accordance with management s general or specific authorizations; (ii) transactions are recorded as necessary to permit preparation of financial statements in conformity with GAAP and to maintain asset accountability; (iii) access to assets is permitted only in accordance with management s general or specific authorization; and (iv) the recorded accountability for assets is compared with the existing assets at reasonable intervals and appropriate action is taken with respect to any differences. Miragen and each of its Subsidiaries maintains internal control over financial reporting that provides reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with GAAP.

2.6 Absence of Changes. Since June 30, 2016 through the date of this Agreement, each of Miragen and its Subsidiaries has conducted its business in the Ordinary Course of Business and there has not been (a) any event that has had an Miragen Material Adverse Effect or (b) or any action, event or occurrence that would have required consent of Signal pursuant to Section 4.3(b) of this Agreement had such action, event or occurrence taken place after the execution and delivery of this Agreement.

2.7 Title to Assets. Each of Miragen and the Miragen Subsidiaries owns, and has good and valid title to, or, in the case of leased properties and assets, valid leasehold interests in, all tangible properties or assets and equipment used or held for use in its business or operations or purported to be owned by it, in each case, free and clear of any Encumbrances, except for: (i) any lien for current Taxes not yet due and payable or for Taxes that are being contested in good faith and for which adequate reserves have been made on the Miragen Unaudited Interim Balance Sheet; (ii) minor liens that have arisen in the Ordinary Course of Business and that do not (in any case or in the aggregate) materially detract from the value of the assets subject thereto or materially impair the operations of Miragen or any Miragen Subsidiary; and (iii) liens listed in Section 2.7 of the Miragen Disclosure Schedule.

2.8 Real Property; Leaseholds. Neither Miragen nor any Miragen Subsidiary currently owns or has ever owned any real property or any interest in real property, except for the leaseholds created under the real property leases (including any amendments thereto) identified in Section 2.8 of the Miragen Disclosure Schedule (the ***Miragen Leases***), which are each in full force and effective, with no existing material default thereunder.

2.9 Intellectual Property.

(a) Miragen, directly or through an Miragen Subsidiary, owns, or has the right to use, and has the right to bring actions for the infringement of, all Miragen IP Rights, except for any failure to own or have the right to use, or have the right to bring actions that would not constitute an Miragen Material Adverse Effect.

(b) Section 2.9(b) of the Miragen Disclosure Schedule is an accurate, true and complete listing of all Miragen Registered IP.

(c) Section 2.9(c) of the Miragen Disclosure Schedule accurately identifies (i) all Miragen IP Rights licensed to Miragen or any Miragen Subsidiary (other than (A) any non-customized software that (1) is so licensed solely in executable or object code form pursuant to a non-exclusive, internal use software license and other Intellectual Property associated with such software and (2) is not incorporated into, or material to the development,

manufacturing, or distribution of, any of Miragen s or any Miragen Subsidiary s products or services and (B) any Intellectual Property licensed ancillary to the purchase or use of equipment, reagents or other materials); (ii) the corresponding Miragen Contracts pursuant to which such Miragen IP Rights are licensed

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to Miragen or any Miragen Subsidiary; (iii) whether the license or licenses granted to Miragen or any Miragen Subsidiary are exclusive or non-exclusive; and (iv) whether any funding, facilities or personnel of any Governmental Body were used, directly or indirectly, to develop or create, in whole or in part, such Miragen IP Rights.

(d) Section 2.9(d) of the Miragen Disclosure Schedule accurately identifies each Miragen Contract pursuant to which any Person (other than Miragen or any Miragen Subsidiary) has been granted any license or option to obtain a license under, or otherwise has received or acquired any right (whether or not currently exercisable) or interest in, any Miragen IP Rights. Miragen is not bound by, and no Miragen IP Rights are subject to, any Contract containing any covenant or other provision that in any way limits or restricts the ability of Miragen or any Miragen Subsidiary to use, exploit, assert or enforce any Miragen IP Rights anywhere in the world, in each case as would materially limit the business of Miragen as currently conducted or planned to be conducted.

(e) Miragen or one of its Subsidiaries solely owns all right, title, and interest to and in Miragen IP Rights (other than Miragen IP Rights (i) exclusively or non-exclusively licensed to Miragen or one of its Subsidiaries, as identified in Section 2.9(c) of the Miragen Disclosure Schedule, (ii) any non-customized software that (A) is so licensed solely in executable or object code form pursuant to a non-exclusive, internal use software license and other Intellectual Property associated with such software and (B) is not incorporated into, or material to the development, manufacturing, or distribution of, any of Miragen s or any Miragen Subsidiary s products or services, and (iii) any Intellectual Property licensed ancillary to the purchase or use of equipment, reagents or other materials) free and clear of any Encumbrances. Without limiting the generality of the foregoing:

(i) All documents and instruments necessary to register or apply for or renew registration of all Miragen Registered IP have been validly executed, delivered and filed in a timely manner with the appropriate Governmental Body except for any such failure, individually or collectively, that would not constitute an Miragen Material Adverse Effect.

(ii) Each Person who is or was an employee or contractor of Miragen or any Miragen Subsidiary and who is or was involved in the creation or development of any Miragen IP Rights has signed a valid, enforceable agreement containing an assignment of such Intellectual Property to Miragen or such Subsidiary and confidentiality provisions protecting trade secrets and confidential information of Miragen and its Subsidiaries. To the Knowledge of Miragen and its Subsidiaries, no current or former stockholder, officer, director, employee or contractor of Miragen or any of its Subsidiaries has any claim, right (whether or not currently exercisable), or interest to or in any Miragen IP Rights. To the Knowledge of Miragen and its Subsidiaries, no employee or contractor of Miragen or any or any Miragen Subsidiary is (a) bound by or otherwise subject to any Contract restricting him or her from performing his or her duties for Miragen or such Subsidiary or (b) in breach of any Contract with any current or former employer or other Person concerning Miragen IP Rights or confidentiality provisions protecting trade secrets and confidential information comprising Miragen IP Rights.

(iii) No funding, facilities or personnel of any Governmental Body were used, directly or indirectly, to develop or create, in whole or in part, any Miragen IP Rights in which Miragen or any of its Subsidiaries has an ownership interest.

(iv) Miragen and each of its Subsidiaries has taken reasonable steps to maintain the confidentiality of and otherwise protect and enforce its rights in all proprietary information that Miragen or such Subsidiary holds, or purports to hold, as a trade secret.

(v) Neither Miragen nor any of its Subsidiaries has assigned or otherwise transferred ownership of, or agreed to assign or otherwise transfer ownership of, any Miragen IP Rights to any other Person.

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(vi) To the Knowledge of Miragen and its Subsidiaries, the Miragen IP Rights constitute all Intellectual Property necessary for Miragen and its Subsidiaries to conduct its business as currently conducted or planned to be conducted.

(f) The manufacture, marketing, license, sale or intended use of any product or service currently approved or sold or under preclinical or clinical development by Miragen or any of its Subsidiaries (i) does not violate or constitute a breach of any license or agreement between Miragen or its Subsidiaries and any third party, and, (ii) to the Knowledge of Miragen and its Subsidiaries, does not infringe or misappropriate any Intellectual Property right of any other party. Miragen has disclosed in correspondence to Signal the third-party patents and patent applications found during all freedom to operate searches that were conducted by Miragen or its Subsidiaries related to any product or technology currently licensed or sold or under development by Miragen or its Subsidiaries. To the Knowledge of Miragen and its Subsidiaries, no third party is infringing upon or misappropriating, or violating any license or agreement with Miragen or its Subsidiaries relating to, any Miragen IP Rights. There is no current or, to the Knowledge of Miragen, pending challenge, claim or Legal Proceeding (including opposition, interference or other proceeding in any patent or other government office) contesting the validity, enforceability, ownership or right to use, sell, license or dispose of any Miragen IP Rights, nor has Miragen or any of its Subsidiaries received any written notice asserting that the manufacture, marketing, license, sale or intended use of any product or service currently approved or sold or under preclinical or clinical development by Miragen or any of its Subsidiaries conflicts with or infringes or misappropriates or will conflict with or infringe or misappropriate the rights of any other Person.

(g) Each item of Miragen IP Rights that is Miragen Registered IP is and at all times has been filed and maintained in compliance with all applicable Legal Requirements and all filings, payments and other actions required to be made or taken to maintain such item of Miragen Registered IP in full force and effect have been made by the applicable deadline, except for any failure to perform any of the foregoing, individually or collectively, that would not constitute an Miragen Material Adverse Effect.

(h) No trademark (whether registered or unregistered) or trade name owned, used, or applied for by Miragen or any of its Subsidiaries conflicts or interferes with any trademark (whether registered or unregistered) or trade name owned, used, or applied for by any other Person. None of the goodwill associated with or inherent in any trademark (whether registered or unregistered) in which Miragen or any of its Subsidiaries has or purports to have an ownership interest has been impaired as determined by Miragen or any of its Subsidiaries in accordance with GAAP.

2.10 Material Contracts.

(a) Section 2.10(a) of the Miragen Disclosure Schedule lists the following Miragen Contracts, effective as of the date of this Agreement (each, an ***Miragen Material Contract*** and collectively, the ***Miragen Material Contracts***):

(i) each Miragen Contract relating to any material bonus, deferred compensation, severance, incentive compensation, pension, profit-sharing or retirement plans, or any other employee benefit plans or arrangements;

(ii) each Miragen Contract requiring payments by Miragen after the date of this Agreement in excess of $150,000 pursuant to its express terms relating to the employment of, or the performance of employment-related services by, any Person, including any employee, consultant or independent contractor, or entity providing employment related, consulting or independent contractor services, not terminable by Miragen or its Subsidiaries on 90 calendar days or less notice without liability, except to the extent general principles of wrongful termination law may limit Miragen s, Miragen s Subsidiaries or such successor s ability to terminate employees at will;

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(iii) each Miragen Contract relating to any agreement or plan, including any stock option plan, stock appreciation right plan or stock purchase plan, any of the benefits of which will be increased, or the vesting of benefits of which will be accelerated, by the occurrence of any of the Contemplated Transactions (either alone or in conjunction with any other event, such as termination of employment), or the value of any of the benefits of which will be calculated on the basis of any of the Contemplated Transactions;

(iv) each Miragen Contract relating to any agreement of indemnification or guaranty not entered into in the Ordinary Course of Business;

(v) each Miragen Contract containing (A) any covenant limiting the freedom of Miragen, its Subsidiaries or the Surviving Corporation to engage in any line of business or compete with any Person, (B) any most-favored pricing arrangement, (C) any exclusivity provision, or (D) any non-solicitation provision;

(vi) each Miragen Contract relating to capital expenditures and requiring payments after the date of this Agreement in excess of $250,000 pursuant to its express terms and not cancelable without penalty;

(vii) each Miragen Contract relating to the disposition or acquisition of material assets or any ownership interest in any Entity;

(viii) each Miragen Contract relating to any mortgages, indentures, loans, notes or credit agreements, security agreements or other agreements or instruments relating to the borrowing of money or extension of credit in excess of $250,000 or creating any material Encumbrances with respect to any assets of Miragen or any Miragen Subsidiary or any loans or debt obligations with officers or directors of Miragen;

(ix) each Miragen Contract requiring payment by or to Miragen after the date of this Agreement in excess of $250,000 pursuant to its express terms relating to: (A) any distribution agreement (identifying any that contain exclusivity provisions); (B) any agreement involving provision of services or products with respect to any pre-clinical or clinical development activities of Miragen; (C) any dealer, distributor, joint marketing, alliance, joint venture, cooperation, development or other agreement currently in force under which Miragen has continuing obligations to develop or market any product, technology or service, or any agreement pursuant to which Miragen has continuing obligations to develop any Intellectual Property that will not be owned, in whole or in part, by Miragen; or (D) any Contract to license any third party to manufacture or produce any product, service or technology of Miragen or any Contract to sell, distribute or commercialize any products or service of Miragen, in each case, except for Miragen Contracts entered into in the Ordinary Course of Business;

(x) each Miragen Contract with any Person, including any financial advisor, broker, finder, investment banker or other Person, providing advisory services to Miragen in connection with the Contemplated Transactions;

(xi) each Miragen IP Rights Agreement other than those that are immaterial;

(xii) each Miragen Lease; or

(xiii) any other Miragen Contract that is not terminable at will (with no penalty or payment) by Miragen and (A) which involves payment or receipt by Miragen or its Subsidiaries after the date of this Agreement under any such agreement, contract or commitment of more than $250,000 in the aggregate, or obligations after the date of this Agreement in excess of $250,000 in the aggregate, or (B) that is material to the business or operations of Miragen and its Subsidiaries.

(b) Miragen has delivered or made available to Signal accurate and complete (except for applicable redactions thereto) copies of all Miragen Material Contracts, including all amendments thereto. There are no Miragen Material Contracts that are not in written form. Neither Miragen nor any of its Subsidiaries has, nor to

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Miragen s Knowledge, as of the date of this Agreement has any other party to an Miragen Material Contract, breached, violated or defaulted under, or received notice that it has breached, violated or defaulted under, any of the terms or conditions of any Miragen Material Contract in such manner as would permit any other party to cancel or terminate any such Miragen Material Contract, or would permit any other party to seek damages that constitutes an Miragen Material Adverse Effect. As to Miragen and its Subsidiaries, as of the date of this Agreement, each Miragen Material Contract is valid, binding, enforceable and in full force and effect, subject to: (i) laws of general application relating to bankruptcy, insolvency and the relief of debtors; and (ii) rules of law governing specific performance, injunctive relief and other equitable remedies.

2.11 Undisclosed Liabilities. As of the date of this Agreement, neither Miragen nor any Miragen Subsidiary has any liability, indebtedness, obligation, expense, claim, deficiency, guaranty or endorsement of any kind, whether accrued, absolute, contingent, matured, or unmatured (whether or not required to be reflected in the financial statements in accordance with GAAP) (each a ***Liability***), except for: (a) Liabilities identified as such in the liabilities column of the Miragen Unaudited Interim Balance Sheet; (b) normal and recurring current Liabilities that have been incurred by Miragen or its Subsidiaries since the date of the Miragen Unaudited Interim Balance Sheet in the Ordinary Course of Business and that are not in excess of $250,000 in the aggregate; (c) Liabilities for performance in the Ordinary Course of Business of obligations of Miragen or any Miragen Subsidiary under Miragen Contracts, including the reasonably expected performance of such Miragen Contracts in accordance with their terms (which would not include, for example, any instances of breach or indemnification); (d) Liabilities incurred in connection with the Contemplated Transactions; and (f) Liabilities listed in Section 2.11 of the Miragen Disclosure Schedule.

2.12 Compliance; Permits; Restrictions.

(a) Miragen and each Miragen Subsidiary are, and since January 1, 2011 have been, in compliance with all applicable Legal Requirements except for any non-compliance that would not constitute an Miragen Material Adverse Effect. No investigation, claim, suit, proceeding, audit or other action by any Governmental Body or authority is pending or, to the Knowledge of Miragen, threatened against Miragen or any Miragen Subsidiary. There is no Contract, judgment, injunction, order or decree binding upon Miragen or any Miragen Subsidiary which (i) has or would reasonably be expected to have the effect of prohibiting or materially impairing any business practice of Miragen or any Miragen Subsidiary, any acquisition of material property by Miragen or any Miragen Subsidiary or the conduct of business by Miragen or any Miragen Subsidiary as currently conducted, (ii) would reasonably be expected to have an adverse effect on Miragen s ability to comply with or perform any covenant or obligation under this Agreement, or (iii) would reasonably be expected to have the effect of preventing, delaying, making illegal or otherwise interfering with the Merger or any of the Contemplated Transactions.

(b) Miragen and the Miragen Subsidiaries hold all required Governmental Authorizations which are material to the operation of the business of Miragen (the ***Miragen Permits***) as currently conducted. Section 2.12(b) of the Miragen Disclosure Schedule identifies each Miragen Permit. As of the date of this Agreement, each of Miragen and each Miragen Subsidiary is in material compliance with the terms of the Miragen Permits. No action, proceeding, revocation proceeding, amendment procedure, writ, injunction or claim is pending or, to the Knowledge of Miragen, threatened, which seeks to revoke, limit, suspend, or materially modify any Miragen Permit. The rights and benefits of each material Miragen Permit will be available to the Surviving Corporation immediately after the Effective Time on terms substantially identical to those enjoyed by Miragen and its Subsidiaries immediately prior to the Effective Time.

(c) There are no proceedings pending or, to the Knowledge of Miragen, threatened with respect to an alleged violation by Miragen or any of its Subsidiaries of the Federal Food, Drug, and Cosmetic Act (***FDCA***), Food and Drug Administration (***FDA***) regulations adopted thereunder, the Controlled Substances Act or any other similar Legal Requirements promulgated by the FDA or other comparable Governmental Body responsible for regulation of the

development, clinical testing, manufacturing, sale, marketing, distribution and importation or exportation of drug products (***Drug Regulatory Agency***).

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(d) Miragen and each of its Subsidiaries holds all required Governmental Authorizations issuable by any Drug Regulatory Agency necessary for the conduct of the business of Miragen or such Subsidiary as currently conducted, and development, clinical testing, manufacturing, marketing, distribution and importation or exportation, as currently conducted, of any of its products or product candidates (the ***Miragen Product Candidates***) (collectively, the ***Miragen Regulatory Permits***), and no such Miragen Regulatory Permit has been (i) revoked, withdrawn, suspended, canceled or terminated or (ii) modified in any adverse manner, other than immaterial adverse modifications. Miragen and each Miragen Subsidiary is in compliance in all material respects with the Miragen Regulatory Permits and has not received any written notice or other written communication from any Drug Regulatory Agency regarding (A) any material violation of or failure to comply materially with any term or requirement of any Miragen Regulatory Permit or (B) any revocation, withdrawal, suspension, cancelation, termination or material modification of any Miragen Regulatory Permit. Miragen has made available to Signal all information requested by Signal in Miragen s or its Subsidiaries possession or control relating to the Miragen Product Candidates and the development, clinical testing, manufacturing, importation and exportation of the Miragen Product Candidates, including complete copies of the following (to the extent there are any): adverse event reports; clinical study reports and material study data; inspection reports, notices of adverse findings, warning letters, filings and letters and other written correspondence to and from any Drug Regulatory Agency; and meeting minutes with any Drug Regulatory Agency.

(e) All clinical, pre-clinical and other studies and tests conducted by or on behalf of, or sponsored by, Miragen or its Subsidiaries or in which Miragen or its Subsidiaries or their respective current products or product candidates, including the Miragen Product Candidates, have participated were, and if still pending are being, conducted in all material respects in accordance with standard medical and scientific research procedures and in compliance with the applicable regulations of the Drug Regulatory Agencies and other applicable Legal Requirements, including 21 C.F.R. Parts 50, 54, 56, 58 and 312. Since January 1, 2011, neither Miragen nor any of its Subsidiaries has received any notices, correspondence or other communications from any Drug Regulatory Agency requiring, or to the Knowledge of Miragen threatening to initiate, the termination or suspension of any clinical studies conducted by or on behalf of, or sponsored by, Miragen or any of its Subsidiaries or in which Miragen or any of its Subsidiaries or their respective current products or product candidates, including the Miragen Product Candidates, have participated.

(f) Neither Miragen nor any of the Miragen Subsidiaries is the subject of any pending, or to the Knowledge of Miragen or the Miragen Subsidiaries, threatened investigation in respect of its business or products by the FDA pursuant to its Fraud, Untrue Statements of Material Facts, Bribery, and Illegal Gratuities Final Policy set forth in 56 Fed. Reg. 46191 (September 10, 1991) and any amendments thereto. To the Knowledge of Miragen or any of the Miragen Subsidiaries, neither Miragen nor any of the Miragen Subsidiaries has committed any acts, made any statement, or failed to make any statement, in each case in respect of its business or Miragen Product Candidates that would violate the FDA s Fraud, Untrue Statements of Material Facts, Bribery, and Illegal Gratuities Final Policy, and any amendments thereto. None of Miragen, any of its Subsidiaries or to the Knowledge of Miragen, any of their respective officers, employees or agents has been convicted of any crime or engaged in any conduct that would reasonably be expected to result in a debarment or exclusion (i) under 21 U.S.C. Section 335a or (ii) any similar applicable Legal Requirement. To the Knowledge of Miragen, no debarment or exclusionary claims, actions, proceedings or investigations in respect of their business or products are pending or threatened against Miragen, any Miragen Subsidiary or any of their respective officers, employees or agents.

2.13 Tax Matters.

(a) Miragen and each Miragen Subsidiary have timely filed all federal income Tax Returns and other material Tax Returns that they were required to file under applicable Legal Requirements. All such Tax Returns were correct and complete in all material respects and have been prepared in material compliance with all applicable Legal Requirements. Neither Miragen nor any Miragen Subsidiary is currently the beneficiary of any extension of time

within which to file any Tax Return. No claim has ever been made by an authority in a jurisdiction where Miragen or any Miragen Subsidiary does not file Tax Returns that it is subject to taxation by that jurisdiction.

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(b) All material Taxes due and owing by Miragen or any Miragen Subsidiary on or before the date hereof (whether or not shown on any Tax Return) have been paid. The unpaid Taxes of Miragen and any Miragen Subsidiary have been reserved for on the Miragen Unaudited Interim Balance Sheet in accordance with GAAP. Since the date of the Miragen Unaudited Interim Balance Sheet, neither Miragen nor any Miragen Subsidiary has incurred any Liability for Taxes outside the Ordinary Course of Business or otherwise inconsistent with past custom and practice.

(c) Miragen and each Miragen Subsidiary have withheld and paid all Taxes required to have been withheld and paid in connection with any amounts paid or owing to any employee, independent contractor, creditor, stockholder or other third party.

(d) There are no Encumbrances for Taxes (other than Taxes not yet due and payable or Taxes that are being contested in good faith and for which adequate reserves have been made on Miragen s Unaudited Interim Balance Sheet) upon any of the assets of Miragen or any Miragen Subsidiary.

(e) No material deficiencies for Taxes with respect to Miragen or any Miragen Subsidiary have been claimed, proposed or assessed by any Governmental Body in writing. There are no pending (or, based on written notice, threatened) audits, assessments or other actions for or relating to any liability in respect of Taxes of Miragen or any Miragen Subsidiary. No issues relating to Taxes of Miragen or any Miragen Subsidiary were raised by the relevant Tax authority in any completed audit or examination that would reasonably be expected to result in a material amount of Taxes in a later taxable period. Miragen has delivered or made available to Signal complete and accurate copies of all federal income Tax and all other material Tax Returns of Miragen and each Miragen Subsidiary (and predecessors of each) for all taxable years remaining open under the applicable statute of limitations, and complete and accurate copies of all examination reports and statements of deficiencies assessed against or agreed to by Miragen and each Miragen Subsidiary (and predecessors of each), with respect to federal income Tax and all other material Taxes. Neither Miragen nor any Miragen Subsidiary (or any of their predecessors) has waived any statute of limitations in respect of Taxes or agreed to any extension of time with respect to a Tax assessment or deficiency, nor has any request been made in writing for any such extension or waiver.

(f) All material elections with respect to Taxes affecting Miragen or any Miragen Subsidiary as of the date hereof are set forth on Schedule 2.13(f). Neither Miragen nor any Miragen Subsidiary (i) has consented at any time under former Section 341(f)(1) of the Code to have the provisions of former Section 341(f)(2) of the Code apply to any disposition of the assets of Miragen or any Miragen Subsidiary; (ii) has agreed, or is required, to make any adjustment under Section 481(a) of the Code by reason of a change in accounting method or otherwise; (iii) has made an election, or is required, to treat any of its assets as owned by another Person for Tax purposes or as a tax-exempt bond financed property or tax-exempt use property within the meaning of Section 168 of the Code; (iv) has acquired or owns any assets that directly or indirectly secure any debt the interest on which is tax exempt under Section 103(a) of the Code; (v) has made or will make a consent dividend election under Section 565 of the Code; (vi) has elected at any time to be treated as an S corporation within the meaning of Sections 1361 or 1362 of the Code; or (vii) has made any of the foregoing elections or is required to apply any of the foregoing rules under any comparable provision of state, local or foreign law.

(g) Neither Miragen nor any Miragen Subsidiary has been a United States real property holding corporation within the meaning of Section 897(c)(2) of the Code during the applicable period specified in Section 897(c)(1)(A)(ii) of the Code.

(h) Neither Miragen nor any Miragen Subsidiary is a party to any Tax allocation, Tax sharing or similar agreement (including indemnity arrangements), other than commercial contracts entered into in the Ordinary Course of Business with vendors, customers and landlords.

(i) Neither Miragen nor any Miragen Subsidiary has ever been a member of an affiliated group filing a consolidated, combined or unitary Tax Return (other than a group the common parent of which is Miragen) for

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federal, state, local or foreign Tax purposes. Neither Miragen nor any Miragen Subsidiary has any Liability for the Taxes of any Person (other than Miragen and any Miragen Subsidiary) under Treasury Regulations Section 1.1502-6 (or any similar provision of state, local, or foreign law), as a transferee or successor, by Contract, or otherwise.

(j) Neither Miragen nor any Miragen Subsidiary has distributed stock of another Person, or has had its stock distributed by another Person, in a transaction that was purported or intended to be governed in whole or in part by Section 355 of the Code or Section 361 of the Code.

(k) Neither Miragen nor any Miragen Subsidiary will be required to include any item of income in, or exclude any item of deduction from, taxable income for any period (or any portion thereof) ending after the Closing Date as a result of any (i) installment sale or other open transaction disposition made on or prior to the Closing Date, or (ii) agreement with any Tax authority (including any closing agreement described in Section 7121 of the Code or any similar provision of state, local or foreign law) made or entered into on or prior to the Closing Date.

(l) Neither Miragen nor any Miragen Subsidiary is a partner for Tax purposes with respect to any joint venture, partnership, or, to the Knowledge of Miragen, other arrangement or contract which is treated as a partnership for Tax purposes.

(m) Neither Miragen nor any Miragen Subsidiary has entered into any transaction identified as a listed transaction for purposes of Treasury Regulations Sections 1.6011-4(b)(2) or 301.6111-2(b)(2).

(n) Neither Miragen nor any Miragen Subsidiary has taken any action, or has any knowledge of any fact or circumstance, that would reasonably be expected to prevent the Contemplated Transactions from qualifying as a reorganization within the meaning of Section 368(a) of the Code.

2.14 Employee and Labor Matters; Benefit Plans.

(a) The employment of each of the Miragen and Miragen Subsidiary employees is terminable by Miragen or the applicable Miragen Subsidiary at will (or otherwise in accordance with general principles of wrongful termination law).

(b) Neither Miragen nor any Miragen Subsidiary is a party to or bound by, nor has a duty to bargain under, any collective bargaining agreement or other Contract with a labor organization representing any of its employees, and there are no labor organizations representing, purporting to represent or, to the Knowledge of Miragen, seeking to represent any employees of Miragen or any Miragen Subsidiary.

(c) There has never been, nor, to the Knowledge of Miragen has there been any threat of, any strike, slowdown, work stoppage, lockout, job action, union organizing activity or any similar activity or dispute, affecting Miragen or any Miragen Subsidiary.

(d) Neither Miragen nor any Miragen Subsidiary is or has been engaged in any unfair labor practice within the meaning of the National Labor Relations Act. There is no Legal Proceeding, claim, labor dispute or grievance pending or, to the Knowledge of Miragen, threatened or reasonably anticipated relating to any employment contract, privacy right, labor dispute, wages and hours, leave of absence, plant closing notification, workers compensation policy, long-term disability policy, harassment, retaliation, immigration, employment statute or regulation, safety or discrimination matter involving any Miragen Associate, including charges of unfair labor practices or discrimination complaints.

(e) Section 2.14(e) of the Miragen Disclosure Schedule lists, as of the date of this Agreement, all written and describes all non-written employee benefit plans (as defined in Section 3(3) of ERISA) and all bonus,

equity-based, retention, incentive, deferred compensation, retirement or supplemental retirement, profit sharing, severance, golden parachute, disability, life or accident insurance, paid time off, vacation, cafeteria, dependent care, medical care, employee assistance program, education or tuition assistance programs, fringe or employee benefit, and all other compensation, plans, programs, agreements or arrangements, including but not limited to any employment, consulting, independent contractor, severance or executive compensation agreements or arrangements (other than regular salary or wages), written or otherwise, which are currently in effect relating to any present or former employee, independent contractor or director of Miragen or any Miragen Subsidiary or any Miragen Affiliate or which is maintained by, administered or contributed to by, or required to be contributed to by, Miragen, any Miragen Subsidiary or any Miragen Affiliate, or under which Miragen or any Miragen Subsidiary or any Miragen Affiliate has any current or would reasonably be expected to incur liability after the date hereof (each, an ***Miragen Employee Plan***).

(f) With respect to Miragen Options granted pursuant to the 2008 Plan, to the Knowledge of Miragen, (i) each Miragen Option intended to qualify as an incentive stock option under Section 422 of the Code so qualifies, (ii) each grant of an Miragen Option was duly authorized no later than the date on which the grant of such Miragen Option was by its terms to be effective (the ***Grant Date***) by all necessary corporate action, including, as applicable, approval by the Miragen Board of Directors (or a duly constituted and authorized committee thereof) and any required stockholder approval by the necessary number of votes or written consents, and the award agreement governing such grant (if any) was duly executed and delivered by each party thereto, (iii) each Miragen Option grant was made in accordance with the terms of the 2008 Plan and all other applicable Legal Requirements and (iv) the per share exercise price of each Miragen Option was not less than the fair market value of a share of Miragen Common Stock on the applicable Grant Date.

(g) Each Miragen Employee Plan that is intended to be qualified under Section 401(a) of the Code has received a favorable determination or may rely on a favorable opinion letter with respect to such qualified status from the Internal Revenue Service. To the Knowledge of Miragen, nothing has occurred that would reasonably be expected to adversely affect the qualified status of any such Miragen Employee Plan or the exempt status of any related trust.

(h) Each Miragen Employee Plan has been maintained in compliance, in all material respects, with its terms and, both as to form and operation, with all applicable Legal Requirements, including the Code and ERISA. Miragen and each Miragen Affiliate has performed all obligations required to be performed by it under, is not in default under or in violation of, and has no knowledge of any default or violation by any other party to, any of the Miragen Employee Plans. Neither Miragen nor any Miragen Affiliate is subject to any Liability or penalty under Sections 4976 through 4980 of the Code or Title I of ERISA with respect to any of the Miragen Employee Plans. All contributions required to be made by Miragen or any Miragen Affiliate to any Miragen Employee Plan have been made on or before their due dates (and no further contributions will be due or will have accrued thereunder as of the Closing Date, other than contributions accrued in the ordinary course of business consistent with past practice). No suit, administrative proceeding, action or other litigation has been initiated against, or to the Knowledge of Miragen, is threatened against or with respect to any Miragen Employee Plan, including any audit or inquiry by the IRS, the United States Department of Labor or other Governmental Body.

(i) Neither Miragen nor any Miragen Subsidiary has engaged in any transaction in violation of Sections 404 or 406 of ERISA or any prohibited transaction, as defined in Section 4975(c)(1) of the Code, for which no exemption exists under Section 408 of ERISA or Section 4975(c)(2) or (d) of the Code, or has otherwise violated the provisions of Part 4 of Title I, Subtitle B of ERISA. Neither Miragen nor any Miragen Subsidiary has knowingly participated in a violation of Part 4 of Title I, Subtitle B of ERISA by any plan fiduciary of any Miragen Employee Plan subject to ERISA and neither Miragen nor any Miragen Subsidiary has been assessed any civil penalty under Section 502(l) of ERISA.

(j) No Miragen Employee Plan is subject to Title IV or Section 302 of ERISA or Section 412 of the Code, and neither Miragen nor any Miragen Subsidiary or Miragen Affiliate has ever maintained, contributed to or partially or completely withdrawn from, or incurred any obligation or liability with respect to, any such

plan. No Miragen Employee Plan is a Multiemployer Plan, and neither Miragen nor any Miragen Subsidiary or Miragen Affiliate has ever contributed to or had an obligation to contribute, or incurred any liability in respect of a contribution, to any Multiemployer Plan.

(k) No Miragen Employee Plan provides for medical or death benefits beyond termination of service or retirement, other than (i) pursuant to COBRA or an analogous state law requirement or (ii) death or retirement benefits under an Miragen Employee Plan qualified under Section 401(a) of the Code. Neither Miragen nor any Miragen Subsidiary sponsors or maintains any self-funded employee benefit plan. No Miragen Employee Plan is subject to any Legal Requirement of a foreign jurisdiction outside of the United States.

(l) Neither Miragen nor any Miragen Subsidiary is a party to any Contract that has resulted or would reasonably be expected to result, separately or in the aggregate, in the payment of (i) any excess parachute payment within the meaning of section 280G of the Code as a result of the Contemplated Transactions and (ii) any amount the deduction for which would be disallowed under Section 162(m) of the Code.

(m) To the Knowledge of Miragen, no payment pursuant to any Miragen Employee Plan or other arrangement to any service provider (as such term is defined in Section 409A of the Code and the United States Treasury Regulations and IRS guidance thereunder) from Miragen, including the grant, vesting or exercise of any stock option, would subject any Person to tax pursuant to Section 409A(1) of the Code, whether pursuant to the Contemplated Transactions or otherwise.

(n) No Miragen Option, stock appreciation rights or other equity-based awards issue or granted by Miragen are subject to the requirements of Code Section 409A. Each nonqualified deferred compensation plan (as such term is defined under Section 409A(d)(1) of the Code and guidance thereunder) maintained by or under which Miragen makes, is obligated to make or promises to make, payments (each a ***Miragen 409A Plan***) complies in all material respects, in both form and operation, with the requirements of Code Section 409A and the guidance thereunder. No payment to be made under any Miragen 409A Plan is, or to the Knowledge of Miragen will be, subject to the penalties of Code Section 409A(a)(1).

(o) Miragen and each of its Subsidiaries has complied in all material respects with all state and federal laws applicable to employees, including but not limited to COBRA, FMLA, CFRA, HIPAA, the Women s Health and Cancer Rights Act of 1998, the Newborn s and Mothers Health Protection Act of 1996, and any similar provisions of state law applicable to its employees. To the extent required under HIPAA and the regulations issued thereunder, Miragen and each of its Subsidiaries has, prior to the Closing Date, performed all obligations under the medical privacy rules of HIPAA (45 C.F.R. Parts 160 and 164), the electronic data interchange requirements of HIPAA (45 C.F.R. Parts 160 and 162), and the security requirements of HIPAA (45 C.F.R. Part 142). Neither Miragen nor any of its Subsidiaries has any material unsatisfied obligations to any employees or qualified beneficiaries pursuant to COBRA, HIPAA or any state law governing health care coverage or extension. Miragen and each Miragen Affiliate is in compliance in all material respects with all applicable requirements of the Patient Protection and Affordable Care Act of 2010, as amended, and all regulations thereunder (together, the ***ACA***), including all requirements relating to eligibility waiting periods and the offer of or provision of minimum essential coverage that is compliant with Section 36B(c)(2)(C) of the Code and the regulations issued thereunder to full-time employees as defined in Section 4980H(c)(4) of the Code and the regulations issued thereunder. No excise tax or penalty under the ACA, including Sections 4980D and 4980H of the Code, is outstanding, has accrued, or has arisen with respect to any period prior to the Closing, with respect to any Miragen Employee Plan. Neither Miragen nor any Miragen Affiliate has any unsatisfied obligations to any employees or qualified beneficiaries pursuant to the ACA, or any state or local Legal Requirement governing health care coverage or benefits that would reasonably be expected to result in any material liability to Miragen. Miragen and each Miragen Affiliate has maintained all records necessary to demonstrate its compliance with the ACA.

(p) Miragen and each of its Subsidiaries is in material compliance with all applicable foreign, federal, state and local laws, rules, regulations, orders, rulings, judgments, decrees or arbitration awards respecting

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employment, employment practices, terms and conditions of employment, worker classification, tax withholding, prohibited discrimination, equal employment, fair employment practices, meal and rest periods, immigration status, employee safety and health, wages (including overtime wages), compensation, hours of work, labor relations, leave of absence requirements, occupational health and safety, privacy, harassment, retaliation, immigration and wrongful discharge and in each case, with respect to employees: (i) has withheld and reported all amounts required by law or by agreement to be withheld and reported with respect to wages, salaries and other payments to employees, (ii) is not liable for any arrears of wages, severance pay or any Taxes or any penalty of any material amount for failure to comply with any of the foregoing, and (iii) is not liable for any payment to any trust or other fund governed by or maintained by or on behalf of any Governmental Body, with respect to unemployment compensation benefits, social security or other benefits or obligations for employees (other than routine payments to be made in the normal course of business and consistent with past practice). There are no actions, suits, claims or administrative matters pending, or to the Knowledge of Miragen, threatened or reasonably anticipated against Miragen or any of its Subsidiaries relating to any employee, employment agreement, independent contractor, independent contractor agreement or Miragen Employee Plan. There are no pending or, to the Knowledge of Miragen, threatened or reasonably anticipated claims or actions against Miragen, any of its Subsidiaries, any Miragen trustee or any trustee of any Subsidiary under any worker s compensation policy or long-term disability policy. Neither Miragen nor any Subsidiary thereof is party to a conciliation agreement, consent decree or other agreement or order with any federal, state or local agency or governmental authority with respect to employment practices.

(q) No current or former independent contractor of Miragen or any of its Subsidiaries would reasonably be deemed to be a misclassified employee. Neither Miragen nor any of its Subsidiaries has any material liability with respect to any misclassification of: (A) any Person as an independent contractor rather than as an employee, (B) any employee leased from another employer or (C) any employee currently or formerly classified as exempt from overtime wages. Neither Miragen nor any Subsidiary has taken any action which would constitute a plant closing or mass layoff within the meaning of the WARN Act or similar state or local law, issued any notification of a plant closing or mass layoff required by the WARN Act or similar state or local law, or incurred any liability or obligation under WARN or any similar state or local law that remains unsatisfied. No terminations of employees of Miragen or any of its Subsidiaries prior to the Closing would trigger any notice or other obligations under the WARN Act or similar state or local law.

(r) Except as set forth in Section 2.14(r) of the Miragen Disclosure Schedule, none of the execution and delivery of this Agreement, or the consummation of the Contemplated Transactions or any termination of employment or service or any other event in connection therewith or subsequent thereto will, individually or together or with the occurrence of some other event, (i) result in any payment (including severance, unemployment compensation, golden parachute, bonus or otherwise) becoming due to any employee, independent contractor or director of Miragen, (ii) materially increase or otherwise enhance any benefits otherwise payable by Miragen, (iii) result in the acceleration of the time of payment or vesting of any such benefits, except as required under Section 411(d)(3) of the Code, (iv) increase the amount of compensation due to any Person by Miragen or (v) result in the forgiveness in whole or in part of any outstanding loans made by Miragen to any Person.

(s) With respect to each Miragen Employee Plan, Miragen has made available to Signal a true and complete copy of, to the extent applicable, (i) such Miragen Employee Plan, (ii) the three most recent annual reports (Form 5500) as filed with the Internal Revenue Service, (iii) each currently effective trust agreement related to such Miragen Employee Plan, (iv) the most recent summary plan description for each Miragen Employee Plan for which such description is required, along with all summaries of material modifications, amendments, resolutions and all other material plan documentation related thereto in the possession of Miragen, and (v) the most recent Internal Revenue Service determination or opinion letter or analogous ruling under foreign law issued with respect to any Miragen Employee Plan.

2.15 Environmental Matters. Miragen and each Miragen Subsidiary is in material compliance with all applicable Environmental Laws, which compliance includes the possession by Miragen of all permits and other

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Governmental Authorizations required under applicable Environmental Laws and compliance with the terms and conditions thereof other than any failure to be in compliance or possess any such permits and authorized that is not an Miragen Material Adverse Effect. Neither Miragen nor any of its Subsidiaries has received since January 1, 2011 any written notice or other communication (in writing or otherwise), whether from a Governmental Body, citizens group, employee or otherwise, that alleges that Miragen is not in compliance with any Environmental Law, and, to the Knowledge of Miragen, there are no circumstances that may prevent or interfere with Miragen s compliance with any Environmental Law in the future. To the Knowledge of Miragen: (i) no current or prior owner of any property leased or controlled by Miragen or any of its Subsidiaries has received since January 1, 2011 any written notice or other communication relating to property owned or leased at any time by Miragen or any of its Subsidiaries, whether from a Governmental Body, citizens group, employee or otherwise, that alleges that such current or prior owner or Miragen or any of its Subsidiaries is not in compliance with or has violated any Environmental Law relating to such property and (ii) neither it nor any of its Subsidiaries has any material liability under any Environmental Law.

2.16 Insurance.

(a) Miragen has delivered or made available to Signal accurate and complete copies of all material insurance policies and all material self-insurance programs and arrangements relating to the business, assets, liabilities and operations of Miragen and each Miragen Subsidiary, as of the date of this Agreement. Each of such insurance policies is in full force and effect and Miragen and each Miragen Subsidiary are in compliance with the terms thereof. As of the date of this Agreement, other than customary end of policy notifications from insurance carriers, since January 1, 2011, neither Miragen nor any Miragen Subsidiary has received any notice or other communication regarding any actual or possible: (a) cancelation or invalidation of any insurance policy; (b) refusal or denial of any coverage, reservation of rights or rejection of any material claim under any insurance policy; or (c) material adjustment in the amount of the premiums payable with respect to any insurance policy. There is no pending workers compensation or other claim under or based upon any insurance policy of Miragen or any Miragen Subsidiary. Information provided to insurance carriers (in applications and otherwise) on behalf of Miragen and each Miragen Subsidiary is accurate and complete. Miragen and each Miragen Subsidiary have provided timely written notice to the appropriate insurance carrier(s) of each Legal Proceeding pending or threatened against Miragen or any Miragen Subsidiary, and no such carrier has issued a denial of coverage or a reservation of rights with respect to any such Legal Proceeding, or informed Miragen or any Miragen Subsidiary of its intent to do so.

(b) Miragen has delivered to Signal accurate and complete copies of the existing policies (primary and excess) of directors and officers liability insurance maintained by Miragen and each Miragen Subsidiary as of the date of this Agreement (the ***Existing Miragen D&O Policies***). Section 2.16(b) of the Miragen Disclosure Schedule accurately sets forth, as of the date of this Agreement, the most recent annual premiums paid by Miragen and each Miragen Subsidiary with respect to the Existing Miragen D&O Policies. All premiums for the Existing Miragen D&O Policies have been paid as of the date hereof.

2.17 Legal Proceedings; Orders.

(a) There is no pending Legal Proceeding, and, to the Knowledge of Miragen, no Person has threatened in writing to commence any Legal Proceeding: (i) that involves Miragen or any of its Subsidiaries, or to the Knowledge of Miragen, any director or officer of Miragen (in his or her capacity as such) or any of the material assets owned or used by Miragen or its Subsidiaries; or (ii) that challenges, or that would reasonably be expected to have the effect of preventing, delaying, making illegal or otherwise interfering with, the Contemplated Transactions, in each case, except for any Legal Proceedings that would not constitute an Miragen Material Adverse Effect. To the Knowledge of Miragen, no event has occurred, and no claim, dispute or other condition or circumstance exists, that will, or that would reasonably be expected to, give rise to or serve as a basis for the commencement of any such Legal Proceeding.

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(b) There is no order, writ, injunction, judgment or decree to which Miragen or any Miragen Subsidiary, or any of the material assets owned or used by Miragen or any Miragen Subsidiary, is subject. To the Knowledge of Miragen, no officer of Miragen or any Miragen Subsidiary is subject to any order, writ, injunction, judgment or decree that prohibits such officer of Miragen from engaging in or continuing any conduct, activity or practice relating to the business of Miragen or any Miragen Subsidiary or to any material assets owned or used by Miragen or any Miragen Subsidiary.

2.18 Inapplicability of Anti-takeover Statutes. The Miragen Board of Directors has taken and will take all actions necessary to ensure that the restrictions applicable to business combinations contained in Section 203 of the DGCL are, and will be, inapplicable to the execution, delivery and performance of this Agreement and the Miragen Stockholder Support Agreements and to the consummation of the Contemplated Transactions. No other state takeover statute or similar Legal Requirement applies or purports to apply to the Merger, this Agreement, the Miragen Stockholder Support Agreements or any of the other Contemplated Transactions.

2.19 No Financial Advisor. No broker, finder or investment banker is entitled to any brokerage fee, finder s fee, opinion fee, success fee, transaction fee or other fee or commission in connection with the Contemplated Transactions based upon arrangements made by or on behalf of Miragen or any of its Subsidiaries.

2.20 Subscription Agreement. The Subscription Agreement has not been amended or modified in any manner prior to the date of this Agreement. Neither Miragen nor, to the Knowledge of Miragen, any of its Affiliates has entered into any agreement, side letter or other arrangement relating to the Miragen Pre-Closing Financing, or the transactions contemplated by the Subscription Agreement, other than as set forth in the Subscription Agreement. As of the date of this Agreement, the respective obligations and agreements contained in the Subscription Agreement have not been withdrawn or rescinded in any respect. The Subscription Agreement is in full force and effect and represents a valid, binding and enforceable obligation of Miragen and, to the Knowledge of Miragen, of each other party thereto, subject to the qualification that such enforceability may be limited by bankruptcy, insolvency, reorganization or other laws of general application relating to or affecting rights of creditors. As of the date of this Agreement, no event has occurred which, with or without notice, lapse of time or both, would constitute a breach or default on the part of Miragen or, to the Knowledge of Miragen, any other party thereto, under the Subscription Agreement. To the Knowledge of Miragen as of the date hereof, no party thereto will be unable to satisfy on a timely basis any term of the Subscription Agreement. There are no conditions precedent related to the consummation of the Miragen Pre-Closing Financing contemplated by the Subscription Agreement, other than the satisfaction or waiver of the conditions expressly set forth in Article 5 of the Subscription Agreement. To the Knowledge of Miragen as of the date hereof, the funds from the Miragen Pre-Closing Financing will be made available to Miragen prior to the consummation of the Merger.

2.21 Disclosure. The information supplied by Miragen and each Miragen Subsidiary for inclusion in the Proxy Statement / Prospectus / Information Statement (including any Miragen Financials) will not, as of the date of the Proxy Statement / Prospectus / Information Statement or as of the date such information is first mailed to Signal Stockholders, (i) contain any untrue statement of any material fact or (ii) omit to state any material fact necessary in order to make such information, in the light of the circumstances under which such information is provided, not false or misleading.

2.22 Exclusivity of Representations; Reliance.

(a) Except as expressly set forth in this Article 2, neither Miragen nor any Person on behalf of Miragen has made, nor are any of them making, any representation or warranty, written or oral, express or implied, at law or in equity, including with respect to merchantability or fitness for any particular purpose, in respect of Miragen or its business in connection with the transactions contemplated hereby, including any representations or warranties about the accuracy

or completeness of any information or documents previously provided (including with respect to any financial or other projections therein), and any other such representations and warranties are hereby expressly disclaimed.

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(b) Miragen acknowledges and agrees that, except for the representations and warranties of Signal and Merger Sub set forth in Article 3, neither Miragen nor its Representatives is relying on any other representation or warranty of Signal, Merger Sub, or any other Person made outside of Article 3 of this Agreement, including regarding the accuracy or completeness of any such other representations or warranties or the omission of any material information, whether express or implied, in each case with respect to the Contemplated Transactions.

ARTICLE 3. REPRESENTATIONS AND WARRANTIES OF SIGNAL AND MERGER SUB

Signal and Merger Sub represent and warrant to Miragen as follows, except as set forth in the written disclosure schedule delivered by Signal to Miragen (the ***Signal Disclosure Schedule***) (it being understood that the representations and warranties in this Article 3 are qualified by: (a) any exceptions and disclosures set forth in the section or subsection of the Signal Disclosure Schedule corresponding to the particular section or subsection in this Article 3 in which such representation and warranty appears; (b) any exceptions or disclosures explicitly cross-referenced in such section or subsection of the Signal Disclosure Schedule by reference to another section or subsection of the Signal Disclosure Schedule; and (c) any exceptions or disclosures set forth in any other section or subsection of the Signal Disclosure Schedule to the extent it is reasonably apparent from the wording of such exception or disclosure that such exception or disclosure qualifies such representation and warranty). The inclusion of any information in the Signal Disclosure Schedule shall not be deemed to be an admission or acknowledgement, in and of itself, that such information is required by the terms hereof to be disclosed, is material, has resulted in or would result in a Signal Material Adverse Effect, or is outside the Ordinary Course of Business.

3.1 Subsidiaries; Due Organization; Organizational Documents.

(a) Other than Merger Sub, Signal does not have any Subsidiaries and Signal does not own any capital stock of, or any equity interest of any nature in, any other Entity. Signal has not agreed nor is obligated to make, nor is bound by any Contract under which it may become obligated to make, any future investment in or capital contribution to any other Entity. Signal has not, at any time, been a general partner of, or has otherwise been liable for any of the debts or other obligations of, any general partnership, limited partnership or other Entity.

(b) Each of Signal and Merger Sub is a corporation duly organized, validly existing and in good standing under the laws of the jurisdiction of its incorporation and has all necessary power and authority: (i) to conduct its business in the manner in which its business is currently being conducted; (ii) to own and use its assets in the manner in which its assets are currently owned and used; and (iii) to perform its obligations under all Signal Contracts.

(c) Each of Signal and Merger Sub is qualified to do business as a foreign corporation, and is in good standing, under the laws of all jurisdictions where the nature of its business requires such qualification other than in jurisdictions where the failure to be so qualified would not constitute a Signal Material Adverse Effect.

(d) Each director and officer of Signal and Merger Sub as of the date of this Agreement is set forth in Section 3.1(d) of the Signal Disclosure Schedule.

(e) Merger Sub was formed solely for the purpose of engaging in the Contemplated Transactions. Except for obligations and liabilities incurred in connection with its incorporation and the Contemplated Transactions, Merger Sub has not, and will not have, incurred, directly or indirectly, any obligations or liabilities or engaged in any business activities of any type or kind whatsoever or entered into any agreements or arrangements with any Person.

(f) Signal has delivered or made available to Miragen accurate and complete copies of (i) the certificate of incorporation, bylaws and other charter and organizational documents, including all currently effective amendments

thereto, for Signal and Merger Sub; and (ii) any code of conduct or similar policy adopted by Signal or by the Signal Board of Directors or any committee thereof.

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3.2 Authority; Vote Required.

(a) Each of Signal and Merger Sub has all necessary corporate power and authority to enter into and to perform its obligations under this Agreement. The Signal Board of Directors has: (i) determined that the Merger is fair to, and in the best interests of, Signal and Signal Stockholders; (ii) duly authorized and approved by all necessary corporate action, the execution, delivery and performance of this Agreement and the Contemplated Transactions; (iii) recommended the approval of the Signal Stockholder Matters and the Other Signal Stockholder Matters by the Signal Stockholders and directed that the Signal Stockholder Matters and the Other Signal Stockholder Matters be submitted for consideration by Signal Stockholders in connection with the solicitation of the Required Signal Stockholder Vote; and (iv) approved the Signal Stockholder Support Agreements and the transactions contemplated thereby. The board of directors of Merger Sub has (A) determined that the Merger is fair to, and in the best interests of, Merger Sub and its sole stockholder; (B) duly authorized and approved by all necessary corporate action, the execution, delivery and performance of this Agreement and the Contemplated Transactions; and (C) recommended that the sole stockholder of Merger Sub adopt this Agreement and thereby approve the Merger and the applicable Contemplated Transactions. This Agreement has been duly executed and delivered by Signal and Merger Sub and, assuming the due authorization, execution and delivery by Miragen, constitutes the legal, valid and binding obligation of Signal and Merger Sub, enforceable against Signal and Merger Sub in accordance with its terms, subject to: (1) laws of general application relating to bankruptcy, insolvency and the relief of debtors; and (2) rules of law governing specific performance, injunctive relief and other equitable remedies.

(b) (i) The affirmative vote of the holders of a majority of outstanding shares of Signal Common Stock is the only vote of the holders of any class or series of Signal Capital Stock necessary to approve the Signal Stockholder Matters (the ***Required Signal Stockholder Vote***) and the Other Signal Stockholder Matters and (ii) the affirmative vote of the sole stockholder of Merger Sub is the only vote of the holders of any class or series of Merger Sub Capital Stock necessary to adopt this Agreement and approve the Merger and the applicable Contemplated Transactions (the ***Required Merger Sub Stockholder Vote***).

3.3 Non-Contravention; Consents.

(a) The execution and delivery of this Agreement by Signal does not, and the performance of this Agreement by Signal and Merger Sub will not, (i) conflict with or violate the certificate of incorporation or bylaws of Signal or Merger Sub; (ii) subject to obtaining the Required Signal Stockholder Vote and the Required Merger Sub Stockholder Vote and compliance with the requirements set forth in Section 3.3(b) below, conflict with or violate any Legal Requirement applicable to Signal or Merger Sub or by which its or any of their respective properties is bound or affected, except for any such conflicts or violations that would not constitute a Signal Material Adverse Effect; or (iii) require Signal or Merger Sub to make any filing with or give any notice to a Person or make any payment, or obtain any Consent from a Person, or result in any breach of or constitute a default (or an event that with notice or lapse of time or both would become a default) under, or impair Signal s or Merger Sub s rights or alter the rights or obligations of any third party under, or give to others any rights of termination, amendment, acceleration or cancelation of, or result in the creation of an Encumbrance on any of the properties or assets of Signal or Merger Sub pursuant to, any Signal Material Contract.

(b) No material Consent, order of, or registration, declaration or filing with any Governmental Body is required by or with respect to Signal or Merger Sub in connection with the execution and delivery of this Agreement or the consummation of the Contemplated Transactions, except for (i) the filing of the Certificate of Merger with the Secretary of State of the State of Delaware pursuant to the DGCL, (ii) any required filings under the HSR Act and any foreign antitrust Legal Requirement and (iii) such Consents, orders, registrations, declarations and filings as may be required under applicable federal and state securities laws.

3.4 Capitalization.

(a) The authorized capital stock of Signal as of the date of this Agreement consists of: (i) 50,000,000 shares of shares of common stock, par value $0.01 per share (the ***Signal Common Stock***), of which 11,123,382

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shares are issued and outstanding as of the date of this Agreement, and (ii) 5,000,000 shares of preferred stock, par value $0.01 per share, of which no shares are outstanding as of the date of this Agreement. Signal does not hold any shares of its capital stock in treasury. All of the issued and outstanding shares of Signal Common Stock have been duly authorized and validly issued, and are fully paid and nonassessable. As of the date of this Agreement, there are outstanding Signal Warrants to purchase 203,214 shares of Signal Common Stock. Section 3.4(a) of the Signal Disclosure Schedule lists, as of the date of this Agreement (A) each record holder of issued and outstanding Signal Common Stock and the number of shares of Signal Common Stock held by each such record holder and (B) (1) each holder of issued and outstanding Signal Warrants, (2) the number and type of shares subject to such Signal Warrants, (3) the exercise price of each such Signal Warrant, and (4) the termination date of each such Signal Warrant.

(b) Except for the Signal Stock Incentive Plan (the ***2014 Plan***), Signal does not have any stock option plan or any other plan, program, agreement or arrangement providing for any equity-based compensation for any Person. Signal has reserved 2,525,418 shares of Signal Common Stock for issuance under the 2014 Plan. As of the date of this Agreement, of such reserved shares of Signal Common Stock, (i) no shares have been issued pursuant to the exercise of outstanding options and options to purchase 580,941 shares have been granted and are currently outstanding, (ii) 909,343 have been issued pursuant to settlement of Signal RSUs and 18,820 shares are issuable upon settlement of currently outstanding RSUs, and (iii) 939,970 shares of Signal Common Stock remain available for future issuance pursuant to the 2014 Plan. Section 3.4(b) of the Signal Disclosure Schedule sets forth the following information (A) with respect to each Signal Option outstanding, as of the date of this Agreement: (1) the name of the optionee, (2) the number of shares of Signal Common Stock subject to such Signal Option as of the date of this Agreement, (3) the exercise price of such Signal Option, (4) the date on which such Signal Option was granted, (5) the date on which such Signal Option expires, and (6) the vesting schedule applicable to such Signal Option, including the extent vested to date and whether by its terms the vesting of such Signal Option would be accelerated by the Contemplated Transactions; and (B) with respect to each Signal RSU outstanding as of the date of this Agreement: (1) the name of the holder, (2) the vesting terms of each such Signal RSU, (3) the date on which each such Signal RSU was granted, (4) the date on which each such Signal RSU expires, and (5) the vesting schedule applicable to such Signal RSU, including the extent vested to date and whether by its terms the vesting of such Signal RSU would be accelerated by the Contemplated Transactions.

(c) Except for the outstanding Signal Warrants set forth on Section 3.4(a) of the Signal Disclosure Schedule and for the Signal Options and Signal RSUs set forth on Section 3.4(b) of the Signal Disclosure Schedule, there is no: (i) outstanding subscription, option, call, warrant or right (whether or not currently exercisable) to acquire any shares of the capital stock or other securities of Signal or Merger Sub; (ii) outstanding security, instrument or obligation that is or may become convertible into or exchangeable for any shares of the capital stock or other securities of Signal or Merger Sub; (iii) stockholder rights plan (or similar plan commonly referred to as a poison pill) or Contract under which Signal or Merger Sub is or may become obligated to sell or otherwise issue any shares of its capital stock or any other securities; or (iv) condition or circumstance that may give rise to or provide a basis for the assertion of a claim by any Person to the effect that such Person is entitled to acquire or receive any shares of capital stock or other securities of Signal or Merger Sub. There are no outstanding or authorized stock appreciation, phantom stock, profit participation, restricted stock units, equity-based awards or other similar rights with respect to Signal or Merger Sub.

(d) Except as set forth in Section 3.4(d) of the Signal Disclosure Schedule, (i) none of the outstanding shares of Signal Capital Stock or Merger Sub Capital Stock are entitled or subject to any preemptive right, right of repurchase or forfeiture, right of participation, right of maintenance or any similar right; (ii) none of the outstanding shares of Signal Capital Stock or Merger Sub Capital Stock are subject to any right of first refusal in favor of Signal or Merger Sub, as applicable; (iii) there are no outstanding bonds, debentures, notes or other indebtedness of Signal or Merger Sub having a right to vote on any matters on which the Signal Stockholders or the sole stockholder of Merger Sub, as applicable, have a right to vote; (iv) there is no Signal Contract to which Signal or Merger Sub are a party relating to

the voting or registration of, or restricting any Person from

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purchasing, selling, pledging or otherwise disposing of (or from granting any option or similar right with respect to), any shares of Signal Capital Stock or Merger Sub Capital Stock. Neither Signal nor Merger Sub is under any obligation, nor is bound by any Contract pursuant to which it may become obligated, to repurchase, redeem or otherwise acquire any outstanding shares of Signal Capital Stock, Merger Sub Capital Stock or other securities.

(e) The authorized capital of Merger Sub consists of 1,000 shares of common stock, par value $0.001 per share (***Merger Sub Capital Stock***), all of which are, and at the Effective Time will be, issued and outstanding and held of record by Signal. The issued and outstanding shares of Merger Sub Capital Stock are duly authorized, validly issued, fully paid and nonassessable. Merger Sub has not at any time granted any stock options, restricted stock, phantom stock, profit participation, restricted stock units, equity-based awards or other similar rights.

(f) All outstanding shares of Signal Capital Stock and Merger Sub Capital Stock, as well as all Signal Options, all Signal RSUs and all Signal Warrants, have been issued and granted, as applicable, in material compliance with all applicable securities laws and other applicable Legal Requirements.

3.5 SEC Filings; Financial Statements.

(a) Signal has made available to Miragen accurate and complete copies of all registration statements, proxy statements, Certifications (as defined below) and other statements, reports, schedules, forms and other documents filed by Signal with the SEC since January 1, 2014 (the ***Signal SEC Documents***), other than such documents that can be obtained on the SEC s website at www.sec.gov. All statements, reports, schedules, forms and other documents required to have been filed by Signal or its officers with the SEC have been so filed on a timely basis. As of the time it was filed with the SEC (or, if amended or superseded by a filing prior to the date of this Agreement, then on the date of such filing), each of the Signal SEC Documents complied in all material respects with the applicable requirements of the Securities Act or the Exchange Act (as the case may be) and, as of the time they were filed, none of the Signal SEC Documents contained any untrue statement of a material fact or omitted to state a material fact required to be stated therein or necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading. The certifications and statements required by (A) Rule 13a-14 under the Exchange Act and (B) 18 U.S.C. §1350 (Section 906 of the Sarbanes-Oxley Act) relating to the Signal SEC Documents (collectively, the ***Certifications***) are accurate and complete and comply as to form and content with all applicable Legal Requirements. As used in this Article 3, the term file and variations thereof shall be broadly construed to include any manner in which a document or information is furnished, supplied or otherwise made available to the SEC.

(b) The financial statements (including any related notes) contained or incorporated by reference in the Signal SEC Documents: (i) complied as to form in all material respects with the published rules and regulations of the SEC applicable thereto; (ii) were prepared in accordance with GAAP (except as may be indicated in the notes to such financial statements or, in the case of unaudited financial statements, as permitted by Form 10-Q of the SEC, and except that the unaudited financial statements may not contain footnotes and are subject to normal and recurring year-end adjustments that are not reasonably expected to be material in amount) applied on a consistent basis unless otherwise noted therein throughout the periods indicated; and (iii) fairly present the consolidated financial position of Signal as of the respective dates thereof and the results of operations and cash flows of Signal for the periods covered thereby. Other than as expressly disclosed in the Signal SEC Documents filed prior to the date hereof, there has been no material change in Signal s accounting methods or principles that would be required to be disclosed in Signal s financial statements in accordance with GAAP. The books of account and other financial records of Signal are true and complete in all material respects.

(c) Signal s auditor has at all times since the date of enactment of the Sarbanes-Oxley Act been: (i) a registered public accounting firm (as defined in Section 2(a)(12) of the Sarbanes-Oxley Act); (ii) to the Knowledge of Signal,

independent with respect to Signal within the meaning of Regulation S-X under the

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Exchange Act; and (iii) to the Knowledge of Signal, in compliance with subsections (g) through (l) of Section 10A of the Exchange Act and the rules and regulations promulgated by the SEC and the Public Signal Accounting Oversight Board thereunder.

(d) Except as set forth in Section 3.5(d) of the Signal Disclosure Schedule, from June 17, 2014 through the date hereof, Signal has not received any comment letter from the SEC or the staff thereof or any correspondence from NASDAQ or the staff thereof relating to the delisting or maintenance of listing of the Signal Common Stock on The NASDAQ Capital Market. Signal has not disclosed any unresolved comments in its SEC Documents.

(e) Since January 1, 2011, there have been no formal internal investigations regarding financial reporting or accounting policies and practices discussed with, reviewed by or initiated at the direction of the chief executive officer or chief financial officer of Signal, the Signal Board of Directors or any committee thereof, other than ordinary course audits or reviews of accounting policies and practices or internal controls required by the Sarbanes-Oxley Act.

(f) Signal is in compliance in all material respects with the applicable provisions of the Sarbanes-Oxley Act and the applicable listing and governance rules and regulations of The NASDAQ Capital Market.

(g) Signal maintains a system of internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) of the Exchange Act) that is sufficient to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with GAAP, including policies and procedures sufficient to provide reasonable assurance (i) that Signal maintains records that in reasonable detail accurately and fairly reflect Signal s transactions and dispositions of assets, (ii) that transactions are recorded as necessary to permit preparation of financial statements in accordance with GAAP, (iii) that receipts and expenditures are made only in accordance with authorizations of management and the Signal Board of Directors, and (iv) regarding prevention or timely detection of the unauthorized acquisition, use or disposition of Signal s assets that could have a material effect on Signal s financial statements. Signal has evaluated the effectiveness of Signal s internal control over financial reporting and, to the extent required by applicable Legal Requirements, presented in any applicable Signal SEC Document that is a report on Form 10-K or Form 10-Q (or any amendment thereto) its conclusions about the effectiveness of the internal control over financial reporting as of the end of the period covered by such report or amendment based on such evaluation. Signal has disclosed to Signal s auditors and the Audit Committee of the Signal Board of Directors (and made available to Miragen a summary of the significant aspects of such disclosure) (A) all significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting that are reasonably likely to adversely affect Signal s ability to record, process, summarize and report financial information and (B) any fraud, whether or not material, that involves management or other employees who have a significant role in Signal s internal control over financial reporting. Except as disclosed in the Signal SEC Documents filed prior to the date hereof, Signal has not identified any material weaknesses in the design or operation of Signal s internal control over financial reporting. Since December 31, 2014, there have been no material changes in Signal s internal control over financial reporting.

(h) Signal s disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) of the Exchange Act) are reasonably designed to ensure that all information (both financial and non-financial) required to be disclosed by Signal in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the rules and forms of the SEC, and that all such information is accumulated and communicated to Signal s management as appropriate to allow timely decisions regarding required disclosure and to make the Certifications.

3.6 Absence of Changes. Except as set forth in Section 3.6 of the Signal Disclosure Schedule, between June 30, 2016 and the date of this Agreement Signal has conducted its business in the Ordinary Course of Business and there has not

been (a) any event that has had a Signal Material Adverse Effect or (b) or any action, event or occurrence that would have required consent of Miragen pursuant to Section 4.2(b) of this Agreement had such action, event or occurrence taken place after the execution and delivery of this Agreement.

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3.7 Title to Assets. Signal owns, and has good and valid title to, or, in the case of leased properties and assets, valid leasehold interests in, all tangible properties or assets and equipment used or held for use in its business or operations or purported to be owned by it, in each case, free and clear of any Encumbrances, except for: (i) any lien for current Taxes not yet due and payable or for Taxes that are being contested in good faith and for which adequate reserves have been made on the Signal Unaudited Interim Balance Sheet; (ii) minor liens that have arisen in the Ordinary Course of Business and that do not (in any case or in the aggregate) materially detract from the value of the assets subject thereto or materially impair the operations of Signal; and (iii) liens listed in Section 3.7 of the Signal Disclosure Schedule.

3.8 Real Property; Leaseholds. Signal does not currently own nor has it or any of its former Subsidiaries ever owned any real property or any interest in real property, except for the leaseholds created under the real property leases (including any amendments thereof) identified in Section 3.8 of the Signal Disclosure Schedule (the ***Signal Leases***), which are each in full force and effective, with no existing material default thereunder.

3.9 Intellectual Property.

(a) Signal owns, or has the right to use, and has the right to bring actions for the infringement of, all Signal IP Rights, except for any failure to own or have the right to use, or have the right to bring actions that would not constitute a Signal Material Adverse Effect.

(b) Section 3.9(b) of the Signal Disclosure Schedule is an accurate, true and complete listing of all Signal Registered IP.

(c) Section 3.9(c) of the Miragen Disclosure Schedule accurately identifies (i) all Signal IP Rights licensed to Signal (other than (A) any non-customized software that (1) is so licensed solely in executable or object code form pursuant to a non-exclusive, internal use software license and other Intellectual Property associated with such software and (2) is not incorporated into, or material to the development, manufacturing, or distribution of, any of Signal s products or services and (B) any Intellectual Property licensed ancillary to the purchase or use of equipment, reagents or other materials); (ii) the corresponding Signal Contracts pursuant to which such Signal IP Rights are licensed to Signal; (iii) whether the license or licenses granted to Signal are exclusive or non-exclusive; and (iv) whether any funding, facilities or personnel of any Governmental Body were used, directly or indirectly, to develop or create, in whole or in part, such Signal IP Rights.

(d) Section 3.9(d) of the Signal Disclosure Schedule accurately identifies each Signal Contract pursuant to which any Person (other than Signal) has been granted any license or option to obtain a license under, or otherwise has received or acquired any right (whether or not currently exercisable) or interest in, any Signal IP Rights. Signal is not bound by, and no Signal IP Rights are subject to, any Contract containing any covenant or other provision that in any way limits or restricts the ability of Signal to use, exploit, assert or enforce any Signal IP Rights anywhere in the world, in each case as would materially limit the business of Signal as currently conducted or planned to be conducted.

(e) Signal solely owns all right, title, and interest to and in Signal IP Rights (other than Signal IP Rights (i) exclusively or non-exclusively licensed to Signal, as identified in Section 3.9(c) of the Signal Disclosure Schedule, (ii) any non-customized software that (A) is so licensed solely in executable or object code form pursuant to a non-exclusive, internal use software license and other Intellectual Property associated with such software and (B) is not incorporated into, or material to the development, manufacturing, or distribution of, any of Signal s products or services, and (iii) any Intellectual Property licensed ancillary to the purchase or use of equipment, reagents or other materials) free and clear of any Encumbrances. Without limiting the generality of the foregoing and except as set forth in Section 3.9(e) of the Signal Disclosure Schedule:

(i) All documents and instruments necessary to register or apply for or renew registration of all Signal Registered IP have been validly executed, delivered and filed in a timely manner with the appropriate Governmental Body except for any such failure, individually or collectively, that would not have a Signal Material Adverse Effect.

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(ii) Each Person who is or was an employee or contractor of Signal and who is or was involved in the creation or development of any Signal IP Rights has signed a valid, enforceable agreement containing an assignment of such Intellectual Property to Signal and confidentiality provisions protecting trade secrets and confidential information of Signal. To the Knowledge of Signal, no current or former stockholder, officer, director, employee or contractor of Signal or any of its former Subsidiaries has any claim, right (whether or not currently exercisable), or interest to or in any Signal IP Rights. To the Knowledge of Signal, no employee or contractor of Signal is (a) bound by or otherwise subject to any Contract restricting him or her from performing his or her duties for Signal or (b) in breach of any Contract with any current or former employer or other Person concerning Signal IP Rights or confidentiality provisions protecting trade secrets and confidential information comprising Signal IP Rights.

(iii) No funding, facilities or personnel of any Governmental Body were used, directly or indirectly, to develop or create, in whole or in part, any Signal IP Rights in which Signal has an ownership interest.

(iv) Signal has taken reasonable steps to maintain the confidentiality of and otherwise protect and enforce its rights in all proprietary information that Signal holds, or purports to hold, as a trade secret.

(v) Signal has not assigned or otherwise transferred ownership of, or agreed to assign or otherwise transfer ownership of, any Signal IP Rights to any other Person, except for any such assignments or transfers made after the date of this Agreement pursuant to a definitive agreement for the sale of all of Signal s intellectual property assets related to the Lab Business.

(vi) To the Knowledge of Signal, the Signal IP Rights constitute all Intellectual Property necessary for Signal to conduct its business as currently conducted or planned to be conducted.

(f) Signal is not a party to any Contract that, as a result of the execution, delivery and performance of this Agreement and the consummation of the Contemplated Transactions will cause the grant of any license or other right to any Signal IP Rights or impair the right of Signal or the Surviving Corporation and its Subsidiaries to use, sell, license or enforce any Signal IP Rights or portion thereof, except for the occurrence of any such grant or impairment that would not reasonably be expected to result in a Signal Material Adverse Effect.

(g) The manufacture, marketing, license, sale or intended use of any product or service currently approved or sold or under preclinical or clinical development by Signal (i) does not violate or constitute a breach of any license or agreement between Signal and any third party, and, (ii) to the Knowledge of Signal, does not infringe or misappropriate any Intellectual Property right of any other party. Signal has disclosed in correspondence to Miragen the third-party patents and patent applications found during all freedom to operate searches that were conducted by Signal related to any product or technology currently approved or sold or under preclinical or clinical development by Signal. To the Knowledge of Signal, no third party is infringing upon or misappropriating, or violating any license or agreement with Signal relating to, any Signal IP Rights. There is no current or pending challenge, claim or Legal Proceeding (including opposition, interference or other proceeding in any patent or other government office) contesting the validity, enforceability, ownership or right to use, sell, license or dispose of any Signal IP Rights, nor has Signal received any written notice asserting that the manufacture, marketing, license, sale or intended use of any product or service currently approved or sold or under preclinical or clinical development by Signal conflicts with or infringes or misappropriates or will conflict with or infringe or misappropriate the rights of any other Person.

(h) Each item of Signal IP Rights that is Signal Registered IP is and at all times has been filed and maintained in compliance with all applicable Legal Requirements and all filings, payments and other actions required to be made or taken to maintain such item of Signal Registered IP in full force and effect have been made by the applicable deadline, except for any failure to perform any of the foregoing, individually or collectively, that would not have a Signal

Material Adverse Effect.

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(i) No trademark (whether registered or unregistered) or trade name owned, used, or applied for by Signal conflicts or interferes with any trademark (whether registered or unregistered) or trade name owned, used, or applied for by any other Person. None of the goodwill associated with or inherent in any trademark (whether registered or unregistered) in which Signal has or purports to have an ownership interest has been impaired as determined by Signal in accordance with GAAP.

(j) (i) Signal is not bound by any Contract to indemnify, defend, hold harmless, or reimburse any other Person with respect to any Intellectual Property infringement, misappropriation, or similar claim, and (ii) neither Signal nor any of its former Subsidiaries has ever assumed, or agreed to discharge or otherwise take responsibility for, any existing or potential liability of another Person for infringement, misappropriation, or violation of any Intellectual Property right, which assumption, agreement or responsibility remains in force as of the date of this Agreement.

3.10 Material Contracts. Section 3.10 of the Signal Disclosure Schedule lists the following Signal Contracts, effective as of the date of this Agreement (each, a ***Signal Material Contract*** and collectively, the ***Signal Material Contracts***):

(i) each Signal Contract relating to any material bonus, deferred compensation, severance, incentive compensation, pension, profit-sharing or retirement plans, or any other employee benefit plans or arrangements;

(ii) each Signal Contract relating to the employment of, or the performance of employment-related services by, any Person, including any employee, consultant or independent contractor, or entity providing employment related, consulting or independent contractor services, not terminable by Signal on 90 calendar days or less notice without liability, except to the extent general principles of wrongful termination law may limit Signal s ability to terminate employees at will;

(iii) each Signal Contract relating to any agreement or plan, including any stock option plan, stock appreciation right plan or stock purchase plan, any of the benefits of which will be increased, or the vesting of benefits of which will be accelerated, by the occurrence of any of the Contemplated Transactions (either alone or in conjunction with any other event, such as termination of employment) or the value of any of the benefits of which will be calculated on the basis of any of the Contemplated Transactions;

(iv) each Signal Contract relating to any agreement of indemnification or guaranty not entered into in the Ordinary Course of Business;

(v) each Signal Contract containing (A) any covenant limiting the freedom of Signal or the Surviving Corporation to engage in any line of business or compete with any Person, (B) any most-favored pricing arrangement, (C) any exclusivity provision, or (D) any non-solicitation provision;

(vi) each Signal Contract relating to capital expenditures and involving obligations after the date of this Agreement in excess of $25,000 and not cancelable without penalty;

(vii) each Signal Contract relating to the disposition or acquisition of material assets or any ownership interest in any Entity;

(viii) each Signal Contract relating to any mortgages, indentures, loans, notes or credit agreements, security agreements or other agreements or instruments relating to the borrowing of money or extension of credit in excess of $25,000 or creating any material Encumbrances with respect to any assets of Signal or any loans or debt obligations with officers or directors of Signal;

(ix) each Signal Contract relating to: (A) any distribution agreement (identifying any that contain exclusivity provisions); (B) any agreement involving provision of services or products with respect to any pre-

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clinical or clinical development activities of Signal; (C) any dealer, distributor, joint marketing, alliance, joint venture, cooperation, development or other agreement currently in force under which Signal has continuing obligations to develop or market any product, technology or service, or any agreement pursuant to which Signal has continuing obligations to develop any Intellectual Property that will not be owned, in whole or in part, by Signal; or (D) any Contract to license any third party to manufacture or produce any product, service or technology of Signal or any Contract to sell, distribute or commercialize any products or service of Signal, except agreements in the Ordinary Course of Business;

(x) each Signal Contract with any Person, including any financial advisor, broker, finder, investment banker or other Person, providing advisory services to Signal in connection with the Contemplated Transactions;

(xi) each Signal IP Right Agreement;

(xii) each Signal Lease; or

(xiii) any other Signal Contract that is not terminable at will (with no penalty or payment) by Signal and (i) which involves payment or receipt by Signal after the date of this Agreement under any such agreement, contract or commitment of more than $25,000 in the aggregate, or obligations after the date of this Agreement in excess of $25,000 in the aggregate, or (ii) that is material to the business or operations of Signal.

(b) Signal has delivered or made available to Miragen accurate and complete (except for applicable redactions thereto) copies of all Signal Material Contracts, including all amendments thereto. There are no Signal Material Contracts that are not in written form. Signal has not, nor to Signal s Knowledge, as of the date of this Agreement has any other party to a Signal Material Contract (as defined below) breached, violated or defaulted under, or received notice that it has breached, violated or defaulted under, any of the terms or conditions of any Signal Material Contract in such manner as would permit any other party to cancel or terminate any such Signal Material Contract, or would permit any other party to seek damages that constitutes a Signal Material Adverse Effect. As of the date of this Agreement, each Signal Material Contract is valid, binding, enforceable and in full force and effect, subject to: (i) laws of general application relating to bankruptcy, insolvency and the relief of debtors; and (ii) rules of law governing specific performance, injunctive relief and other equitable remedies.

3.11 Undisclosed Liabilities. As of the date of this Agreement, Signal has no Liability, except for: (a) Liabilities identified as such in the Signal Unaudited Interim Balance Sheet; (b) normal and recurring current Liabilities that have been incurred by Signal since the date of the Signal Unaudited Interim Balance Sheet in the Ordinary Course of Business and that are not in excess of $25,000 in the aggregate; (c) Liabilities for performance in the Ordinary Course of Business of obligations of Signal under Signal Contracts, including the reasonably expected performance of such Signal Contracts in accordance with their terms (which would not include, for example, any instances of breach or indemnification); (d) Liabilities described in Section 3.11 of the Signal Disclosure Schedule; and (e) Liabilities incurred in connection with the Contemplated Transactions.

3.12 Compliance; Permits; Restrictions.

(a) Signal is, and since January 1, 2011, each of Signal and its former Subsidiaries has been in compliance with all applicable Legal Requirements except for any non-compliance that would not constitute a Signal Material Adverse Effect. No investigation, claim, suit, proceeding, audit or other action by any Governmental Body or authority is pending or, to the Knowledge of Signal, threatened against Signal. There is no Contract, judgment, injunction, order or decree binding upon Signal which (i) has or would reasonably be expected to have the effect of prohibiting or materially impairing any business practice of Signal, any acquisition of material property by Signal or the conduct of

business by Signal as currently conducted, (ii) would reasonably be expected to have an adverse effect on Signal s ability to comply with or perform any covenant or obligation under this Agreement or (iii) would reasonably be expected to have the effect of preventing, delaying, making illegal or otherwise interfering with the Merger or any of the Contemplated Transactions.

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(b) Signal holds all Governmental Authorizations that are material to the operation of its business (collectively, the ***Signal Permits***) as currently conducted. Section 3.12(b) of the Signal Disclosure Schedule identifies each Signal Permit. As of the date of this Agreement, Signal is in material compliance with the terms of the Signal Permits. No action, proceeding, revocation proceeding, amendment procedure, writ, injunction or claim is pending or, to the Knowledge of Signal, threatened, which seeks to revoke, limit, suspend, or materially modify any Signal Permit. The rights and benefits of each material Signal Permit will be available to the Surviving Corporation immediately after the Effective Time on terms substantially identical to those enjoyed by Signal as of the date of this Agreement and immediately prior to the Effective Time.

(c) There are no proceedings pending or, to the Knowledge of Signal, threatened with respect to an alleged material violation by Signal of the Clinical Laboratory Improvement Amendments (***CLIA***), state CLIA regulations, or any other similar Legal Requirements promulgated by a Governmental Body.

(d) Signal holds all required Governmental Authorizations issuable by any Governmental Body necessary for the conduct of its business as currently conducted (the ***Signal Regulatory Permits***) and no such Signal Regulatory Permit has been (i) revoked, withdrawn, suspended, canceled or terminated or (ii) modified in any materially adverse manner. Signal has not received any written notice or other written communication from any Governmental Body regarding any revocation, withdrawal, suspension, cancelation, termination or material modification of any Signal Regulatory Permit. Signal has made available to Miragen all information in its possession or control relating to the following (to the extent there are any): (A) adverse event reports; clinical study reports and material study data; and inspection reports, notices of adverse findings, warning letters, filings and letters and other written correspondence to and from any Governmental Body; and meeting minutes with any Governmental Body; and (B) similar reports, material study data, notices, letters, filings, correspondence and meeting minutes with any other Governmental Body.

(e) All clinical, pre-clinical and other studies and tests conducted by or on behalf of, or sponsored by, Signal or in which Signal or its products or services have participated were conducted in all material respects in accordance with standard medical and scientific research procedures and in compliance with applicable Legal Requirements.

(f) To the Knowledge of Signal, no material debarment or exclusionary claims, actions, proceedings or investigations in respect of their business or products are pending or threatened against Signal or its officers, employees or agents.

3.13 Tax Matters.

(a) Each of Signal and its former Subsidiaries has timely filed all federal income Tax Returns and other material Tax Returns that they were required to file under applicable Legal Requirements. All such Tax Returns were correct and complete in all material respects and have been prepared in material compliance with all applicable Legal Requirements. Signal is not currently the beneficiary of any extension of time within which to file any Tax Return. No claim has ever been made by an authority in a jurisdiction where Signal or its former Subsidiaries do not file Tax Returns that such company is subject to taxation by that jurisdiction.

(b) All material Taxes due and owing by Signal or any of its former Subsidiaries on or before the date hereof (whether or not shown on any Tax Return) have been paid. The unpaid Taxes of Signal and its former Subsidiaries have been reserved for on the Signal Unaudited Interim Balance Sheet in accordance with GAAP. Since the date of the Signal Unaudited Interim Balance Sheet, Signal has not incurred any Liability for Taxes outside the Ordinary Course of Business or otherwise inconsistent with past custom and practice.

(c) Signal has withheld and paid all Taxes required to have been withheld and paid in connection with any amounts paid or owing to any employee, independent contractor, creditor, stockholder or other third party.

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(d) There are no Encumbrances for Taxes (other than Taxes not yet due and payable or Taxes that are being contested in good faith and for which adequate reserves have been made on Signal s Unaudited Interim Balance Sheet) upon any of the assets of Signal.

(e) No material deficiencies for Taxes with respect to Signal have been claimed, proposed or assessed by any Governmental Body in writing. There are no pending (or, based on written notice, threatened) audits, assessments or other actions for or relating to any liability in respect of Taxes of Signal. No issues relating to Taxes of Signal were raised by the relevant Tax authority in any completed audit or examination that would reasonably be expected to result in a material amount of Taxes in a later taxable period. Signal has delivered or made available to Miragen complete and accurate copies of all federal income Tax and all other material Tax Returns of Signal (and the predecessors of each) for all taxable years remaining open under the applicable statute of limitations, and complete and accurate copies of all examination reports and statements of deficiencies assessed against or agreed to by Signal with respect to federal income Tax and all other material Taxes. Signal has not waived any statute of limitations in respect of Taxes or agreed to any extension of time with respect to a Tax assessment or deficiency, nor has any request been made in writing for any such extension or waiver.

(f) All material elections with respect to Taxes affecting Signal as of the date hereof are set forth on Section 3.13 of the Signal Disclosure Schedule. Signal has not (i) consented at any time under former Section 341(f)(1) of the Code to have the provisions of former Section 341(f)(2) of the Code apply to any disposition of the assets of Signal; (ii) agreed, or is required, to make any adjustment under Section 481(a) of the Code by reason of a change in accounting method or otherwise; (iii) made an election, or is required, to treat any of its assets as owned by another Person for Tax purposes or as a tax-exempt bond financed property or tax-exempt use property within the meaning of Section 168 of the Code; (iv) acquired or owns any assets that directly or indirectly secure any debt the interest on which is tax exempt under Section 103(a) of the Code; (v) made or will make a consent dividend election under Section 565 of the Code; (vi) elected at any time to be treated as an S corporation within the meaning of Sections 1361 or 1362 of the Code; or (vii) made any of the foregoing elections or is required to apply any of the foregoing rules under any comparable provision of state, local or foreign law.

(g) Signal has not been a United States real property holding corporation within the meaning of Section 897(c)(2) of the Code during the applicable period specified in Section 897(c)(1)(A)(ii) of the Code.

(h) Signal is not a party to any Tax allocation, Tax sharing or similar agreement (including indemnity arrangements), other than commercial contracts entered into in the Ordinary Course of Business with vendors, customers and landlords.

(i) Neither Signal nor any of its former Subsidiaries has ever been a member of an affiliated group filing a consolidated, combined or unitary Tax Return (other than a group the common parent of which is Signal) for federal, state, local or foreign Tax purposes. Signal has no Liability for the Taxes of any Person (other than Signal) under Treasury Regulations Section 1.1502-6 (or any similar provision of state, local, or foreign law), as a transferee or successor, by Contract or otherwise.

(j) Signal has not distributed stock of another Person, or has had its stock distributed by another Person, in a transaction that was purported or intended to be governed in whole or in part by Section 355 of the Code or Section 361 of the Code.

(k) Signal is not a partner for Tax purposes with respect to any joint venture, partnership, or, to the Knowledge of Signal, other arrangement or contract which is treated as a partnership for Tax purposes.

(l) Signal will not be required to include any item of income in, or exclude any item of deduction from, taxable income for any period (or any portion thereof) ending after the Closing Date as a result of any (i) installment sale or other open transaction disposition made on or prior to the Closing Date, or (ii) agreement with any Tax authority (including any closing agreement described in Section 7121 of the Code or any similar provision of state, local or foreign law) made or entered into on or prior to the Closing Date.

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(m) Signal has not entered into any transaction identified as a listed transaction for purposes of Treasury Regulations Sections 1.6011-4(b)(2) or 301.6111-2(b)(2).

(n) Signal has not taken any action, or has any knowledge of any fact or circumstance, that would reasonably be expected to prevent the Contemplated Transactions from qualifying as a reorganization within the meaning of Section 368(a) of the Code.

3.14 Employee and Labor Matters; Benefit Plans.

(a) The employment of each of the Signal employees is terminable by Signal at will (or otherwise in accordance with general principles of wrongful termination law). Signal has made available to Miragen accurate and complete copies of all employee manuals and handbooks, disclosure materials, policy statements and other materials relating to the employment of Signal Associates to the extent currently effective and material.

(b) Signal is not, and neither Signal or any of its former Subsidiaries has been, a party to, bound by, or has, or had, a duty to bargain under, any collective bargaining agreement or other Contract with a labor organization, trade or labor union, employees association or similar organization representing any of its employees, and there are no labor organizations, trade or labor unions, employees associations or similar organizations representing, purporting to represent or, to the Knowledge of Signal, seeking to represent any employees of Signal.

(c) Section 3.14(c) of the Signal Disclosure Schedule lists, as of the date of this Agreement, all written and describes all non-written employee benefit plans (as defined in Section 3(3) of ERISA) and all bonus, equity-based, retention, incentive, deferred compensation, retirement or supplemental retirement, profit sharing, severance, golden parachute, disability, life or accident insurance, paid time off, vacation, cafeteria, dependent care, medical care, employee assistance program, education or tuition assistance programs, fringe or employee benefit, and all other compensation, plans, programs, agreements or arrangements, including but not limited to any employment, consulting, independent contractor, severance or executive compensation agreements or arrangements (other than regular salary or wages), written or otherwise, which are currently in effect relating to any present or former employee, independent contractor or director of Signal or any Signal Affiliate, or which is maintained by, administered or contributed to by, or required to be contributed to by, Signal, any of Signal s former Subsidiaries or any Signal Affiliate, or under which Signal, any of Signal s former Subsidiaries or any Signal Affiliate has incurred or may incur any liability (each, an ***Signal Employee Plan***).

(d) With respect to each Signal Employee Plan, Signal has made available to Miragen a true and complete copy of, to the extent applicable, (i) such Signal Employee Plan, (ii) the three most recent annual reports (Form 5500) as filed with the Internal Revenue Service, (iii) each currently effective trust agreement related to such Signal Employee Plan, (iv) the most recent summary plan description for each Signal Employee Plan for which such description is required, along with all summaries of material modifications, amendments, resolutions and all other material plan documentation related thereto in the possession of Signal, (v) the most recent Internal Revenue Service determination or opinion letter or analogous ruling under foreign law issued with respect to any Signal Employee Plan, (vi) all material notices, letters or other correspondence to or from any Governmental Body or agency thereof within the last three years; (vii) all non-discrimination tests for the most recent three plan years; (viii) all material written agreements and Contracts currently in effect, including (without limitation) administrative service agreements, group annuity contracts, and group insurance contracts; (ix) all material written employee communications within the past three years, and (x) all registration statements and prospectuses prepared in connection with each Signal Employee Plan.

(e) Each Signal Employee Plan that is intended to be qualified under Section 401(a) of the Code has received a favorable determination or may rely on a favorable opinion letter with respect to such qualified status from the

Internal Revenue Service. To the Knowledge of Signal, nothing has occurred that would reasonably be expected to adversely affect the qualified status of any such Signal Employee Plan or the exempt status of any related trust. Each Signal Employee Plan has been maintained in compliance in all material respects, with its terms and, both as to form and operations, with all applicable Legal Requirements, including the Code and

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ERISA. Except as set forth in Section 3.14(e)(i) of the Signal Disclosure Schedule, each Signal Employee Plan can be amended, terminated or otherwise discontinued in accordance with its terms, without material Liability to Signal, the Surviving Corporation, Miragen or any of their Affiliates (other than ordinary administrative expenses typically incurred in a termination event). Except as set forth in Section 3.14(e)(ii) of the Signal Disclosure Schedule, neither Signal nor any Signal Affiliate has announced its intention to modify or amend any Signal Employee Plan or adopt any arrangement or program which, once established, would come within the definition of a Signal Employee Plan, and to the Knowledge of Signal, each asset held under such Signal Employee Plan may be liquidated or terminated without the imposition of any material redemption fee, surrender charge or comparable Liability. Signal, each of its former Subsidiaries and each Signal Affiliate has performed all obligations required to be performed by it under, is not in default under or in violation of, and has no knowledge of any default or violation by any other party to, any of the Signal Employee Plans. Neither Signal, any of its former Subsidiaries, nor any Signal Affiliate is subject to any Liability or penalty under Sections 4976 through 4980 of the Code or Title I of ERISA with respect to any of the Signal Employee Plans. All contributions required to be made by Signal, any of its former Subsidiaries or any Signal Affiliate to any Signal Employee Plan have been made on or before their due dates (and no further contributions will be due or will have accrued thereunder as of the Closing Date, other than contributions accrued in the ordinary course of business consistent with past practice). No suit, administrative proceeding, action or other litigation has been initiated against, or to the Knowledge of Signal, is threatened, against or with respect to any Signal Employee Plan, including any audit or inquiry by the IRS, United States Department of Labor or other Governmental Body.

(f) Neither Signal, nor any of its former Subsidiaries or any Signal Affiliate has engaged in any transaction in violation of Sections 404 or 406 of ERISA or any prohibited transaction, as defined in Section 4975(c)(1) of the Code, for which no exemption exists under Section 408 of ERISA or Section 4975(c)(2) or (d) of the Code, or has otherwise violated the provisions of Part 4 of Title I, Subtitle B of ERISA. Neither Signal, nor any of its former Subsidiaries or any Signal Affiliate has knowingly participated in a violation of Part 4 of Title I, Subtitle B of ERISA by any plan fiduciary of any Signal Employee Plan subject to ERISA and neither Signal, nor any of its former Subsidiaries or any Signal Affiliate has been assessed any civil penalty under Section 502(l) of ERISA.

(g) No Signal Employee Plan is subject to Title IV or Section 302 of ERISA or Section 412 of the Code, and neither Signal, nor any of its former Subsidiaries or any Signal Affiliate has ever maintained, contributed to or partially or completely withdrawn from, or incurred any obligation or liability with respect to, any such plan. No Signal Employee Plan is a Multiemployer Plan, and neither Signal, nor any of its former Subsidiaries or any Signal Affiliate has ever contributed to or had an obligation to contribute, or incurred any liability in respect of a contribution, to any Multiemployer Plan. No Signal Employee Plan is a Multiple Employer Plan.

(h) No Signal Employee Plan provides for medical or death benefits beyond termination of service or retirement, other than (i) pursuant to COBRA or an analogous state law requirement or (ii) death or retirement benefits under a Signal Employee Plan qualified under Section 401(a) of the Code. Neither Signal nor any Signal Affiliate sponsors or maintains any self-funded employee benefit plan. No Signal Employee Plan is subject to any Legal Requirement of any foreign jurisdiction outside of the United States.

(i) To the Knowledge of Signal, no payment pursuant to any Signal Employee Plan or other arrangement to any service provider (as such term is defined in Section 409A of the Code and the United States Treasury Regulations and IRS guidance thereunder) from Signal or any of its former Subsidiaries, including the grant, vesting or exercise of any stock option, would subject any Person to tax pursuant to Section 409A(1) of the Code, whether pursuant to the Contemplated Transactions or otherwise.

(j) With respect to Signal Options granted pursuant to the 2014 Plan, (i) each Signal Option intended to qualify as an incentive stock option under Section 422 of the Code so qualifies, (ii) each grant of a Signal Option was duly

authorized no later than the date on which the grant of such Signal Option was by its terms to be

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effective by all necessary corporate action, including, as applicable, approval by the Signal Board of Directors (or a duly constituted and authorized committee thereof) and any required stockholder approval by the necessary number of votes or written consents, and the award agreement governing such grant (if any) was duly executed and delivered by each party thereto, (iii) each Signal Option grant was made in accordance with the terms of the 2014 Plan, the Exchange Act and all other applicable Legal Requirements, including the rules of NASDAQ and any other exchange on which Signal securities are traded, (iv) the per share exercise price of each Signal Option was not less than the fair market value of a share of Signal Common Stock on the applicable Grant Date and (v) each such Signal Option grant was properly accounted for in accordance with GAAP in the financial statements (including the related notes) of Signal and disclosed in Signal filings with the Securities and Exchange Commission in accordance with the Exchange Act and all other applicable Legal Requirements. Signal has not knowingly granted, and there is no and has been no policy or practice of Signal of granting, Signal Options prior to, or otherwise coordinate the grant of Signal Options with, the release or other public announcement of material information regarding Signal or its results of operations or prospects.

(k) No Signal Options, stock appreciation rights or other equity-based awards issued or granted by Signal are subject to the requirements of Code Section 409A. Each nonqualified deferred compensation plan (as such term is defined under Section 409A(d)(1) of the Code and the guidance thereunder) maintained by or under which Signal or any of its former Subsidiaries makes, is obligated to make or promises to make, payments (each, a ***Signal 409A Plan***) complies in all material respects, in both form and operation, with the requirements of Code Section 409A and the guidance thereunder. No payment to be made under any Signal 409A Plan is, or to the Knowledge of Signal will be, subject to the penalties of Code Section 409A(a)(1).

(l) Signal is in compliance with all of its bonus, commission and other compensation plans and has paid any and all amounts required to be paid under such plans, including any and all bonuses and commissions (or pro rata portion thereof) that may have accrued or been earned through the calendar quarter preceding the Effective Time, and is not liable for any payments, taxes or penalties for failure to comply with any of the terms or conditions of such plans or the laws governing such plans.

(m) Each of Signal and its former Subsidiaries has complied in all material respects with all state and federal laws applicable to employees, including but not limited to COBRA, FMLA, CFRA, HIPAA, the Women s Health and Cancer Rights Act of 1998, the Newborn s and Mothers Health Protection Act of 1996, and any similar provisions of state law applicable to its employees. To the extent required under HIPAA and the regulations issued thereunder, Signal and each of its former Subsidiaries has, prior to the Closing Date, performed all obligations under the medical privacy rules of HIPAA (45 C.F.R. Parts 160 and 164), the electronic data interchange requirements of HIPAA (45 C.F.R. Parts 160 and 162), and the security requirements of HIPAA (45 C.F.R. Part 142). Neither Signal nor any of its former Subsidiaries has any material unsatisfied obligations to any of its employees or qualified beneficiaries pursuant to COBRA, HIPAA or any state law governing health care coverage or extension. Signal and each Signal Affiliate is in compliance in all material respects with all applicable requirements of the ACA, including all requirements relating to eligibility waiting periods and the offer of or provision of minimum essential coverage that is compliant with Section 36B(c)(2)(C) of the Code and the regulations issued thereunder to full-time employees as defined in Section 4980H(c)(4) of the Code and the regulations issued thereunder. No excise tax or penalty under the ACA, including Sections 4980D and 4980H of the Code, is outstanding, has accrued, or has arisen with respect to any period prior to the Closing, with respect to any Signal Employee Plan. Neither Signal nor any Signal Affiliate has any unsatisfied obligations to any employees or qualified beneficiaries pursuant to the ACA, or any state or local Legal Requirement governing health care coverage or benefits that would reasonably be expected to result in any material liability to Signal. Each of Signal and its Signal Affiliates has maintained all records necessary to demonstrate its compliance with the ACA.

(n) Signal is, and its former Subsidiaries were in material compliance with all applicable foreign, federal, state and local laws, rules, regulations, orders, rulings, judgments, decrees or arbitration awards respecting employment, employment practices, terms and conditions of employment, worker classification, tax withholding, prohibited discrimination, equal employment, fair employment practices, meal and rest periods,

immigration status, employee safety and health, wages (including overtime wages), compensation, hours of work, labor relations, leave of absence requirements, occupational health and safety, privacy, harassment, retaliation, immigration and wrongful discharge and in each case, with respect to employees: (i) has withheld and reported all amounts required by law or by agreement to be withheld and reported with respect to wages, salaries and other payments to employees, (ii) is not liable for any arrears of wages, severance pay or any Taxes or any penalty of any material amount for failure to comply with any of the foregoing, and (iii) is not liable for any payment to any trust or other fund governed by or maintained by or on behalf of any Governmental Body, with respect to unemployment compensation benefits, social security or other benefits or obligations for employees (other than routine payments to be made in the normal course of business and consistent with past practice). There are no actions, suits, claims or administrative matters pending, or to the Knowledge of Signal, threatened or reasonably anticipated against Signal relating to any employee, employment agreement, independent contractor, independent contractor agreement or Signal Employee Plan. There are no pending or, to the Knowledge of Signal, threatened or reasonably anticipated claims or actions against Signal or any trustee of Signal under any worker s compensation policy or long-term disability policy. Signal is not a party to a conciliation agreement, consent decree or other agreement or order with any federal, state, or local agency or Governmental Body with respect to employment practices. Signal has good labor relations.

(o) No current or former independent contractor of Signal or any of its former Subsidiaries would reasonably be deemed to be a misclassified employee. Except as set forth on Section 3.14(o) of the Signal Disclosure Schedule, no independent contractor is eligible to participate in any Signal Employee Plan. Neither Signal nor any of its former Subsidiaries has material liability with respect to any misclassification of: (A) any Person as an independent contractor rather than as an employee, (B) any employee leased from another employer, or (C) any employee currently or formerly classified as exempt from overtime wages. Neither Signal nor any of its former Subsidiaries has taken any action which would constitute a plant closing or mass layoff within the meaning of the WARN Act or similar state or local law, issued any notification of a plant closing or mass layoff required by the WARN Act or similar state or local law, or incurred any liability or obligation under WARN or any similar state or local law that remains unsatisfied. No terminations of employees of Signal prior to the Closing would trigger any notice or other obligations under the WARN Act or similar state or local law.

(p) There has never been, nor has there been any threat of, any strike, slowdown, work stoppage, lockout, job action, union organizing activity, or any similar activity or dispute, affecting Signal or any of its former Subsidiaries. No event has occurred, and no condition or circumstance exists, that might directly or indirectly be likely to give rise to or provide a basis for the commencement of any such strike, slowdown, work stoppage, lockout, job action, union organizing activity, question concerning representation or any similar activity or dispute.

(q) Signal is not, and neither Signal nor any of its former Subsidiaries, has been, engaged in any unfair labor practice within the meaning of the National Labor Relations Act. There is no Legal Proceeding, claim, labor dispute or grievance pending or, to the Knowledge of Signal, threatened or reasonably anticipated relating to any employment contract, privacy right, labor dispute, wages and hours, leave of absence, plant closing notification, workers compensation policy, long-term disability policy, harassment, retaliation, immigration, employment statute or regulation, safety or discrimination matter involving any Signal Associate, including charges of unfair labor practices or discrimination complaints.

(r) There is no Contract or arrangement to which Signal or any Signal Affiliate is a party or by which it is bound to compensate any of its current or former employees, independent contractors or directors for additional income or excise taxes paid pursuant to Sections 409A or 4999 of the Code.

(s) Neither Signal nor any Signal Affiliate is a party to any Contract that has resulted or would reasonably be expected to result, separately or in the aggregate, in the payment of (i) any excess parachute payment within the meaning of

Section 280G of the Code and (ii) any amount the deduction for which would be disallowed under Section 162(m) of the Code.

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(t) Except as set forth in Section 3.14(t) of the Signal Disclosure Schedule, none of the execution and delivery of this Agreement, or the consummation of the Contemplated Transactions or any termination of employment or service or any other event in connection therewith or subsequent thereto will, individually or together or with the occurrence of some other event, (i) result in any payment (including severance, unemployment compensation, golden parachute, bonus or otherwise) becoming due to any employee, independent contractor or director of Signal, (ii) materially increase or otherwise enhance any benefits otherwise payable by Signal, (iii) result in the acceleration of the time of payment or vesting of any such benefits, except as required under Section 411(d)(3) of the Code, (iv) increase the amount of compensation due to any Person by Signal or (v) result in the forgiveness in whole or in part of any outstanding loans made by Signal to any Person.

3.15 Environmental Matters. Signal is in material compliance with all applicable Environmental Laws, which compliance includes the possession by Signal of all permits and other Governmental Authorizations required under applicable Environmental Laws and compliance with the terms and conditions thereof other than any failure to be in compliance or possess any such permits and authorized that is not a Signal Material Adverse Effect. Neither Signal nor any of its former Subsidiaries has received since January 1, 2011 any written notice or other communication (in writing or otherwise), whether from a Governmental Body, citizens group, employee or otherwise, that alleges that Signal is not in compliance with any Environmental Law, and, to the Knowledge of Signal, there are no circumstances that may prevent or interfere with Signal s compliance with any Environmental Law in the future. To the Knowledge of Signal: (i) no current or prior owner of any property leased or controlled by Signal or any of its former Subsidiaries has received since January 1, 2011, any written notice or other communication relating to property owned or leased at any time by Signal, whether from a Governmental Body, citizens group, employee or otherwise, that alleges that such current or prior owner or Signal or any of its former Subsidiaries is not in compliance with or has violated any Environmental Law relating to such property and (ii) neither Signal nor any of its former Subsidiaries has any material liability under any Environmental Law.

3.16 Insurance.

(a) Signal made available to Miragen accurate and complete copies of all material insurance policies and all material self-insurance programs and arrangements relating to the business, assets, liabilities and operations of Signal, as of the date of this Agreement. Each of such insurance policies is in full force and effect and Signal is in compliance with the terms thereof. As of the date of this Agreement, other than customary end of policy notifications from insurance carriers, since January 1, 2011, Signal has not received any notice or other communication regarding any actual or possible: (a) cancelation or invalidation of any insurance policy; (b) refusal or denial of any coverage, reservation of rights or rejection of any material claim under any insurance policy; or (c) material adjustment in the amount of the premiums payable with respect to any insurance policy. There is no pending workers compensation or other claim under or based upon any insurance policy of Signal. All information provided to insurance carriers (in applications and otherwise) on behalf of Signal is accurate and complete. Signal has provided timely written notice to the appropriate insurance carrier(s) of each Legal Proceeding pending or threatened in writing against Signal, and no such carrier has issued a denial of coverage or a reservation of rights with respect to any such Legal Proceeding, or informed Signal of its intent to do so.

(b) Signal has delivered to Miragen accurate and complete copies of the existing policies (primary and excess) of directors and officers liability insurance maintained by Signal and each Signal Subsidiary as of the date of this Agreement (the ***Existing Signal D&O Policies***). Section 3.16(b) of the Signal Disclosure Schedule accurately sets forth, as of the date of this Agreement, the most recent annual premiums paid by Signal and each Signal Subsidiary with respect to the Existing Signal D&O Policies. All premiums for the Existing Signal D&O Policies have been paid.

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3.17 Legal Proceedings; Orders.

(a) There is no pending Legal Proceeding, and, to the Knowledge of Signal, no Person has threatened in writing to commence any Legal Proceeding: (i) that involves Signal, or to the Knowledge of Signal, any director or officer of Signal (in his or her capacity as such) or any of the material assets owned or used by Signal; or (ii) that challenges, or that would reasonably be expected to have the effect of preventing, delaying, making illegal or otherwise interfering with, the Contemplated Transactions, in each case, except for any such Legal Proceedings that would not constitute a Signal Material Adverse Effect. To the Knowledge of Signal, no event has occurred, and no claim, dispute or other condition or circumstance exists, that will, or that would reasonably be expected to, give rise to or serve as a basis for the commencement of any such Legal Proceeding.

(b) There is no order, writ, injunction, judgment or decree to which Signal or any of the material assets owned or used by Signal, is subject. To the Knowledge of Signal, no officer of Signal is subject to any order, writ, injunction, judgment or decree that prohibits such officer from engaging in or continuing any conduct, activity or practice relating to the business of Signal or to any material assets owned or used by Signal.

3.18 Inapplicability of Anti-takeover Statutes. The Signal Board of Directors and the board of directors of Merger Sub have taken and will take all actions necessary to ensure that the restrictions applicable to business combinations contained in Section 203 of the DGCL are, and will be, inapplicable to the execution, delivery and performance of this Agreement and the Signal Stockholder Support Agreements and to the consummation of Contemplated Transactions. No other state takeover statute or similar Legal Requirement applies or purports to apply to the Merger, this Agreement, the Signal Stockholder Support Agreements or any of the other Contemplated Transactions.

3.19 No Financial Advisor. Except as set forth on Section 3.19 of the Signal Disclosure Schedule, no broker, finder or investment banker is entitled to any brokerage fee, finder s fee, opinion fee, success fee, transaction fee or other fee or commission in connection with the Contemplated Transactions based upon arrangements made by or on behalf of Signal or Merger Sub.

3.20 Disclosure. The information supplied by Signal for inclusion in the Proxy Statement / Prospectus / Information Statement will not, as of the date of the Proxy Statement / Prospectus / Information Statement or as of the date such information is first mailed to Signal Stockholders, (i) contain any untrue statement of any material fact or (ii) omit to state any material fact necessary in order to make such information, in the light of the circumstances under which such information is provided, not false or misleading.

3.21 Bank Accounts; Deposits.

(a) Section 3.21(a) of the Signal Disclosure Schedule provides accurate information with respect to each account maintained by or for the benefit of Signal at any bank or other financial institution, including the name of the bank or financial institution, the account number, the balance as of September 30, 2016 and the names of all individuals authorized to draw on or make withdrawals from such accounts.

(b) All existing accounts receivable of Signal (including those accounts receivable reflected on the Signal Unaudited Interim Balance Sheet that have not yet been collected and those accounts receivable that have arisen since the date of the Signal Unaudited Interim Balance Sheet and have not yet been collected) (i) represent valid obligations of customers of Signal arising from bona fide transactions entered into in the Ordinary Course of Business, and (ii) are current and collectible in full when due, without any counterclaim or set off, net of applicable reserves for bad debts on the Signal Unaudited Interim Balance Sheet. All deposits of Signal (including those set forth on the Signal Unaudited Interim Balance Sheet) which are individually more than $10,000 or more than $25,000 in the aggregate

are fully refundable to Signal.

3.22 Transactions with Affiliates. Except as set forth in the Signal SEC Documents filed prior to the date of this Agreement, since the date of Signal s last proxy statement filed in 2016 with the SEC, no event has

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occurred that would be required to be reported by Signal pursuant to Item 404 of Regulation S-K promulgated by the SEC. Section 3.22 of the Signal Disclosure Schedule identifies each Person who is (or who may be deemed to be) an Affiliate of Signal as of the date of this Agreement.

3.23 Valid Issuance. The Signal Common Stock to be issued in the Merger will, when issued in accordance with the provisions of this Agreement be validly issued, fully paid and nonassessable.

3.24 Code of Ethics. Signal has adopted a code of ethics, as defined by Item 406(b) of Regulation S-K of the SEC, for senior financial officers, applicable to its principal executive officer, principal financial officer, controller or principal accounting officer, or persons performing similar functions. Signal has promptly disclosed any change in or waiver of Signal s code of ethics with respect to any such persons, as required by Section 406(b) of the Sarbanes-Oxley Act. To the Knowledge of Signal, there have been no violations of provisions of Signal s code of ethics by any such persons.

3.25 Opinion of Financial Advisor. The Signal Board of Directors (in its capacity as such) has received an opinion of Cantor Fitzgerald & Co., financial advisor to Signal, to the effect that, as of the date of such opinion and based upon and subject to the various assumptions, qualifications and limitations set forth therein, the Exchange Ratio is fair to Signal from a financial point of view. Promptly following execution of this Agreement, Signal will furnish an accurate and complete copy of such opinion to Miragen.

3.26 Shell Company Status. Signal is not an issuer identified in Rule 144(i)(1) or of the Securities Act or a shell company as defined in Rule 12b-2 of the Exchange Act.

3.27 Exclusivity of Representations; Reliance.

(a) Except as expressly set forth in this Article 3, neither Signal, Merger Sub, nor any Person on behalf of Signal or Merger Sub has made, nor are any of them making, any representation or warranty, written or oral, express or implied, at law or in equity, including with respect to merchantability or fitness for any particular purpose, in respect of Signal or its business in connection with the transactions contemplated hereby, including any representations or warranties about the accuracy or completeness of any information or documents previously provided (including with respect to any financial or other projections therein), and any other such representations and warranties are hereby expressly disclaimed.

(b) Signal and Merger Sub acknowledge and agree that, except for the representations and warranties of Miragen set forth in Article 2, none of Signal, Merger Sub or any of their respective Representatives is relying on any other representation or warranty of Miragen or any other Person made outside of Article 2 of this Agreement, including regarding the accuracy or completeness of any such other representations or warranties or the omission of any material information, whether express or implied, in each case with respect to the Contemplated Transactions.

ARTICLE 4. CERTAIN COVENANTS OF THE PARTIES

4.1 Access and Investigation. Subject to the terms of the Confidentiality Agreement which the Parties agree will continue in full force following the date of this Agreement, during the period commencing on the date of this Agreement and continuing until the earlier of the termination of this Agreement in accordance with the terms hereto and the Effective Time (the ***Pre-Closing Period***), upon reasonable notice each Party shall, and shall use commercially reasonable efforts to cause such Party s Representatives to:

(a) provide the other Party and such other Party s Representatives with reasonable access during normal business hours to such Party s Representatives, personnel and assets and to all existing books, records, Tax Returns, work papers and

other documents and information relating to such Party and its Subsidiaries;

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(b) provide the other Party and such other Party s Representatives with such copies of the existing books, records, Tax Returns, work papers, product data, and other documents and information relating to such Party and its Subsidiaries, and with such additional financial, operating and other data and information regarding such Party and its Subsidiaries as the other Party may reasonably request; and

(c) permit the other Party s officers and other employees to meet, upon reasonable notice and during normal business hours, with the chief financial officer and other officers and managers of such Party responsible for such Party s financial statements and the internal controls of such Party to discuss such matters as the other Party may deem necessary or appropriate in order to enable the other Party to satisfy its obligations under the Sarbanes-Oxley Act and the rules and regulations relating thereto. Without limiting the generality of any of the foregoing, during the Pre-Closing Period, each Party shall promptly make available to the other Party copies of:

(i) the unaudited monthly consolidated balance sheets of such Party as of the end of each calendar month and the related unaudited monthly consolidated statements of operations, statements of stockholders equity and statements of cash flows for such calendar month, which shall be delivered within 30 calendar days after the end of such calendar month, or such longer periods as the Parties may agree to in writing;

(ii) all material operating and financial reports prepared by such Party for its senior management, including sales forecasts, marketing plans, development plans, discount reports, write-off reports, hiring reports and capital expenditure reports prepared for its management;

(iii) any written materials or communications sent by or on behalf of a Party to its stockholders;

(iv) any material notice, document or other communication sent by or on behalf of a Party to any party to any Signal Material Contract or Miragen Material Contract, as applicable, or sent to a Party by any party to any Signal Material Contract or Miragen Material Contract, as applicable (other than any communication that relates solely to routine commercial transactions between such Party and the other party to any such Signal Material Contract or Miragen Material Contract, as applicable, and that is of the type sent in the Ordinary Course of Business and consistent with past practices);

(v) any notice, report or other document filed with or otherwise furnished, submitted or sent to any Governmental Body on behalf of a Party in connection with the Merger or any of the Contemplated Transactions;

(vi) any non-privileged notice, document or other communication sent by or on behalf of, or sent to, a Party relating to any pending or threatened Legal Proceeding involving or affecting such Party; and

(vii) any material notice, report or other document received by a Party from any Governmental Body.

(b) Notwithstanding the foregoing, (i) any Party may restrict the foregoing access to the extent that any Legal Requirement applicable to such Party requires such Party to restrict or prohibit access to any of such Party s properties or information and (ii) neither Party nor its respective Representatives or Subsidiaries shall be required to provide access to or disclose information where such access or disclosure would jeopardize the protection of attorney-client privilege.

4.2 Operation of Signal s Business.

(a) Except as set forth on Section 4.2(a) of the Signal Disclosure Schedule, as expressly required or permitted by this Agreement, or as required by applicable Legal Requirements, during the Pre-Closing Period, Signal shall: (i) conduct

its business and operations in the Ordinary Course of Business; (ii) continue to pay outstanding accounts payable and other current Liabilities (including payroll) when due and payable; and (iii) conduct its business and operations in compliance with all applicable Legal Requirements and the requirements of all Signal Contracts that constitute Signal Material Contracts.

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(b) Without limiting the generality of the foregoing, during the Pre-Closing Period, except as set forth on Section 4.2(b) of the Signal Disclosure Schedule, as expressly required or permitted by this Agreement, or as required by applicable Legal Requirements, Signal shall not, without the prior written consent of Miragen (which consent shall not be unreasonably withheld or delayed):

(i) (A) declare, accrue, set aside or pay any dividend or made any other distribution in respect of any shares of Signal Capital Stock or (B) repurchase, redeem or otherwise reacquire any shares of its capital stock or other securities;

(ii) sell, issue or grant, or authorize the issuance of: (A) any capital stock or other security (except for shares of Signal Common Stock issued upon the settlement of Signal RSUs or upon the valid exercise of Signal Options or Signal Warrants outstanding as of the date of this Agreement), (B) any option, warrant or right to acquire any capital stock or any other security, (C) any equity-based award or instrument convertible into or exchangeable for any capital stock or other security, or (D) any debt securities or any rights to acquire any debt securities;

(iii) amend the certificate of incorporation, bylaws or other charter or organizational documents of Signal or Merger Sub, or effect or be a party to any merger, consolidation, share exchange, business combination, recapitalization, reclassification of shares, stock split, reverse stock split or similar transaction;

(iv) form any Subsidiary or acquire any equity interest or other interest in any other Entity;

(v) (A) lend money to any Person, (B) incur or guarantee any indebtedness for borrowed money, other than in the Ordinary Course of Business, (C) guarantee any debt securities of others, or (D) make any capital expenditure or commitment;

(vi) (A) adopt, establish or enter into any Signal Employee Plan, (B) cause or permit any Signal Employee Plan to be amended other than as required by law, including in order to make amendments for the purposes of Section 409A of the Code, subject to prior review and approval (with such approval not to be unreasonably withheld, conditioned or delayed) by Miragen, (C) hire any additional employees or independent contractors or enter into or amend the term of any employment or consulting agreement with any employee or independent contractor other than as reasonably necessary for the completion of the Contemplated Transactions, (D) enter into any Contract with a labor union or collective bargaining agreement, (E) except as provided in the Signal Disclosure Schedule, pay any bonus or make any profit-sharing or similar payment to (other than in the Ordinary Course of Business), or increase the amount of the wages, salary, commissions, fringe benefits or other compensation or remuneration payable to, any of its directors or employees, (F) except as provided in the Signal Disclosure Schedule, accelerate the vesting of or entitlement to any payment, award, compensation or benefit with respect to any Signal Associate, (G) except as provided in the Signal Disclosure Schedule, pay or increase the severance or change of control benefits offered to any Signal Associate, or (H) provide or make any Tax-related gross-up payment, *provided*, that Signal may pay those Terminated Signal Associate Payments set forth on Schedule 5.6(a)(ii) to the Terminated Signal Associates in connection with their termination of employment or service;

(vii) enter into any material transaction outside the Ordinary Course of Business;

(viii) acquire any material asset nor sell, lease, or otherwise irrevocably dispose of any of its assets or properties, or grant any Encumbrance with respect to such assets or properties, other than in the Ordinary Course of Business;

(ix) (A) make, change or revoke any material Tax election, (B) file any material amendment to any Tax Return, (C) adopt or change any accounting method in respect of Taxes, (D) change any annual Tax accounting period, (E) enter into any Tax allocation agreement, Tax sharing agreement or Tax indemnity

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agreement, other than commercial contracts entered into in the Ordinary Course of Business with vendors, customers or landlords, (F) enter into any closing agreement with respect to any Tax, (G) settle or compromise any claim, notice, audit report or assessment in respect of material Taxes, (H) apply for or enter into any ruling from any Tax authority with respect to Taxes, (I) surrender any right to claim a material Tax refund, or (J) consent to any extension or waiver of the statute of limitations period applicable to any material Tax claim or assessment;

(x) enter into, amend or terminate any Signal Contract that, if effective as of the date hereof, would constitute a Signal Material Contract;

(xi) initiate or settle any Legal Proceeding;

(xii) after the Net Cash Calculation is finalized pursuant to Section 1.6, incur any Liabilities or otherwise take any actions other than in the Ordinary Course of Business so as to cause the final Net Cash Calculation to differ materially from actual Net Cash as of the Closing; or

(xiii) agree, resolve or commit to do any of the foregoing.

4.3 Operation of Miragen s Business.

(a) Except as set forth on Section 4.3(a) of the Miragen Disclosure Schedule, as expressly required or permitted by this Agreement, or as required by applicable Legal Requirements, during the Pre-Closing Period, Miragen shall and shall cause its Subsidiaries to conduct its business and operations: (i) in the Ordinary Course of Business; and (ii) in compliance with all applicable Legal Requirements and the requirements of all Miragen Contracts that constitute Miragen Material Contracts.

(b) Without limiting the generality of the foregoing, during the Pre-Closing Period, except as set forth on Section 4.3(b) of the Miragen Disclosure Schedule, as expressly permitted by this Agreement, or as required by applicable Legal Requirements, Miragen shall not, nor shall it permit any of its Subsidiaries to, without the prior written consent of Signal (which consent shall not be unreasonably withheld or delayed):

(i) (A) declare, accrue, set aside or pay any dividend or made any other distribution in respect of any shares of Miragen Capital Stock or (B) repurchase, redeem or otherwise reacquire any shares of its capital stock or other securities except pursuant to Miragen Contracts existing as of the date of this Agreement;

(ii) sell, issue or grant, or authorize the issuance of: (A) any capital stock or other security (except in connection with the Miragen Pre-Closing Financing and for shares of Miragen Common Stock issued upon the valid exercise of Miragen Options or Miragen Warrants outstanding as of the date of this Agreement), (B) any option, warrant or right to acquire any capital stock or any other security (except for the grant of options to purchase up to an aggregate 379,524 shares of Miragen Common Stock and except for any warrants issued to Silicon Valley Bank pursuant to the terms of Miragen s existing credit facility), (C) any equity-based award or instrument convertible into or exchangeable for any capital stock or other security, or (D) any debt securities or any rights to acquire any debt securities;

(iii) amend the certificate of incorporation, bylaws or other charter or organizational documents of Miragen (other than in connection with the Miragen Pre-Closing Financing), or effect or be a party to any merger, consolidation, share exchange, business combination, recapitalization, reclassification of shares, stock split, reverse stock split or similar transaction;

(iv) form any Subsidiary or acquire any equity interest or other interest in any other Entity;

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(v) (A) lend money to any Person, (B) incur or guarantee any indebtedness for borrowed money, other than in the Ordinary Course of Business or under Miragen s existing credit facility with Silicon Valley Bank, (C) guarantee any debt securities of others, or (D) make any capital expenditure or commitment in excess of $250,000;

(vi) enter into any Contract with a labor union or collective bargaining agreement;

(vii) acquire any material asset nor sell, lease, or otherwise irrevocably dispose of any of its assets or properties, or grant any Encumbrance with respect to such assets or properties, in each case, other than in the Ordinary Course of Business;

(viii) (A) make, change or revoke any material Tax election, (B) file any material amendment to any Tax Return, (C) adopt or change any accounting method in respect of Taxes, (D) change any annual Tax accounting period, (E) enter into any Tax allocation agreement, Tax sharing agreement or Tax indemnity agreement, other than commercial contracts entered into in the Ordinary Course of Business with vendors, customers or landlords, (F) enter into any closing agreement with respect to any Tax, (G) settle or compromise any claim, notice, audit report or assessment in respect of material Taxes, (H) apply for or enter into any ruling from any Tax authority with respect to Taxes, (I) surrender any right to claim a material Tax refund, or (J) consent to any extension or waiver of the statute of limitations period applicable to any material Tax claim or assessment; or

(ix) agree, resolve or commit to do any of the foregoing.

4.4 Notification of Certain Matters.

(a) During the Pre-Closing Period, Signal shall:

(i) promptly notify Miragen of: (A) any notice or other communication from any Person alleging that the Consent of such Person is or may be required in connection with any of the Contemplated Transactions; (B) any Legal Proceeding against, relating to, involving or otherwise affecting Signal, or to the Knowledge of Signal, any director or officer of Signal, that is commenced or asserted against, or, to the Knowledge of Signal, threatened against, Signal or any director or officer of Signal; and (C) any notice or other communication from any Person alleging that any payment or other obligation is or will be owed to such Person at any time before or after the date of this Agreement, except for invoices or other communications related to agreements or dealings in the Ordinary Course of Business or payments or obligations identified in this Agreement, including the Signal Disclosure Schedule; and

(ii) promptly notify Miragen in writing of: (A) the discovery by Signal of any event, condition, fact or circumstance that occurred or existed on or prior to the date of this Agreement and that caused or constitutes an inaccuracy in any representation or warranty made by Signal in this Agreement in a manner that causes the condition set forth in Section 8.1 not to be satisfied; (B) any event, condition, fact or circumstance that occurs, arises or exists after the date of this Agreement and that would cause or constitute an inaccuracy in any representation or warranty made by Signal in this Agreement in a manner that causes the condition set forth in Section 8.1 not to be satisfied if: (1) such representation or warranty had been made as of the time of the occurrence, existence or discovery of such event, condition, fact or circumstance; or (2) such event, condition, fact or circumstance had occurred, arisen or existed on or prior to the date of this Agreement; (C) any breach of any covenant or obligation of Signal in a manner that causes the condition set forth in Section 8.2 not to be satisfied; and (D) any event, condition, fact or circumstance that would reasonably be expected to make the timely satisfaction of any of the conditions set forth in Article 6, Article 7, or Article 8 impossible or materially less likely. No notification given to Miragen pursuant to this Section 4.4(a) shall change, limit or otherwise affect any of the representations, warranties, covenants or obligations of Signal contained in this Agreement or the Signal Disclosure Schedule for purposes of Section 8.1.

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(b) During the Pre-Closing Period, Miragen shall:

(i) promptly notify Signal of: (A) any notice or other communication from any Person alleging that the Consent of such Person is or may be required in connection with any of the Contemplated Transactions; (B) any Legal Proceeding against, relating to, involving or otherwise affecting Miragen or any of its Subsidiaries, or to the Knowledge of Miragen, any director or officer of Miragen, that is commenced or asserted against, or, to the Knowledge of Miragen, threatened against, Miragen, any of its Subsidiaries, or any director or officer of Miragen; and (C) any notice or other communication from any Person alleging that any payment or other obligation is or will be owed to such Person at any time before or after the date of this Agreement, except for invoices or other communications related to agreements or dealings in the Ordinary Course of Business or payments or obligations identified in this Agreement; and

(ii) promptly notify Signal in writing, of: (i) the discovery by Miragen of any event, condition, fact or circumstance that occurred or existed on or prior to the date of this Agreement and that caused or constitutes an inaccuracy in any representation or warranty made by Miragen in this Agreement in a manner that causes the condition set forth in Section 7.1 not to be satisfied; (ii) any event, condition, fact or circumstance that occurs, arises or exists after the date of this Agreement and that would cause or constitute an inaccuracy in any representation or warranty made by Miragen in this Agreement in a manner that causes the condition set forth in Section 7.1 not to be satisfied if: (A) such representation or warranty had been made as of the time of the occurrence, existence or discovery of such event, condition, fact or circumstance; or (B) such event, condition, fact or circumstance had occurred, arisen or existed on or prior to the date of this Agreement; (iii) any breach of any covenant or obligation of Miragen in a manner that causes the condition set forth in Section 7.2 not to be satisfied; and (iv) any event, condition, fact or circumstance that would reasonably be expected to make the timely satisfaction of any of the conditions set forth in Article 6, Article 7, or Article 8 impossible or materially less likely. No notification given to Signal pursuant to this Section 4.4(b) shall change, limit or otherwise affect any of the representations, warranties, covenants or obligations of Miragen contained in this Agreement or the Miragen Disclosure Schedule for purposes of Section 7.1.

4.5 No Solicitation.

(a) Each Party agrees that neither it nor any of its Subsidiaries shall, nor shall it nor any of its Subsidiaries authorize or permit any of the Representatives retained by it or any of its Subsidiaries to directly or indirectly: (i) solicit, initiate, respond to or take any action to facilitate or encourage any inquiries or the communication, making, submission or announcement of any Acquisition Proposal or Acquisition Inquiry or take any action that could reasonably be expected to lead to an Acquisition Proposal or Acquisition Inquiry; (ii) enter into or participate in any discussions or negotiations with any Person with respect to any Acquisition Proposal or Acquisition Inquiry; (iii) furnish any information regarding such Party to any Person in connection with, in response to, relating to or for the purpose of assisting with or facilitating an Acquisition Proposal or Acquisition Inquiry; (iv) approve, endorse or recommend any Acquisition Proposal (subject to Sections 5.2 and 5.3); (v) execute or enter into any letter of intent or similar document or any Contract contemplating or otherwise relating to any Acquisition Transaction (an ***Acquisition Agreement***); or (vi) grant any waiver or release under any confidentiality, standstill or similar agreement (other than to the other Party).

(b) Notwithstanding anything contained in Section 4.5(a), prior to receipt of the Required Miragen Stockholder Vote, in the case of Miragen, or the Required Signal Stockholder Vote, in the case of Signal, (i) such Party may enter into discussions or negotiations with, any Person that has made (and not withdrawn) a bona fide, unsolicited, Acquisition Proposal, which such Party s Board of Directors determines in good faith, after consultation with its independent financial advisor, if any, and its outside legal counsel, constitutes, or would reasonably be expected to result in, a Superior Offer, and (ii) thereafter furnish to such Person non-public information regarding such Party pursuant to an

executed confidentiality agreement containing provisions (including nondisclosure provisions, use restrictions, non-solicitation provisions, no hire provisions and standstill provisions) at least as favorable to such Party as those contained in the Confidentiality Agreement,

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but in each case of the foregoing clauses (i) and (ii), only if: (A) neither such Party nor any Representative of such Party has breached this Section 4.5; (B) the Board of Directors of such Party determines in good faith based on the advice of outside legal counsel, that the failure to take such action would reasonably be expected to result in a breach of the fiduciary duties of the Board of Directors of such Party under applicable Legal Requirements; (C) at least five Business Days prior to furnishing any such non-public information to, or entering into discussions with, such Person, such Party gives the other Party written notice of the identity of such Person and of such Party s intention to furnish nonpublic information to, or enter into discussions with, such Person; and (D) at least five Business Days prior to furnishing any such non-public information to such Person, such Party furnishes such non-public information to Miragen or Signal, as applicable (to the extent such non-public information has not been previously furnished by such Party to Miragen or Signal, as applicable). Without limiting the generality of the foregoing, each Party acknowledges and agrees that, in the event any Representative of such Party (whether or not such Representative is purporting to act on behalf of such Party) takes any action that, if taken by such Party, would constitute a breach of this Section 4.5 by such Party, the taking of such action by such Representative shall be deemed to constitute a breach of this Section 4.5 by such Party for purposes of this Agreement.

(c) If any Party or any Representative of such Party receives an Acquisition Proposal or Acquisition Inquiry at any time during the Pre-Closing Period, then such Party shall promptly (and in no event later than 24 hours after such Party becomes aware of such Acquisition Proposal or Acquisition Inquiry) advise the other Party orally and in writing of such Acquisition Proposal or Acquisition Inquiry (including the identity of the Person making or submitting such Acquisition Proposal or Acquisition Inquiry, and the terms thereof). Such Party shall keep the other Party fully informed, on a current basis, in all material respects with respect to the status and terms of any such Acquisition Proposal or Acquisition Inquiry and any modification or proposed modification thereto. In addition to the foregoing, each Party shall provide the other Party with at least five Business Days written notice of a meeting of its board of directors (or any committee thereof) at which its board of directors (or any committee thereof) is reasonably expected to consider an Acquisition Proposal or Acquisition Inquiry it has received.

(d) Each Party shall and shall cause its respective Representatives to, cease immediately and cause to be terminated, and shall not authorize or knowingly permit any of its or their Representatives to continue, any and all existing activities, discussions or negotiations, if any, with any third party conducted prior to the date hereof with respect to any Acquisition Proposal and shall use its reasonable best efforts to cause any such third party (or its Representatives) in possession of non-public information in respect of such Party or its Subsidiaries that was furnished by or on behalf of such Party or its Subsidiaries to return or destroy (and confirm destruction of) all such information.

ARTICLE 5. ADDITIONAL AGREEMENTS OF THE PARTIES

5.1 Registration Statement; Proxy Statement / Prospectus / Information Statement.

(a) As promptly as practicable after the date of this Agreement, the Parties shall prepare and cause to be filed with the SEC the Proxy Statement / Prospectus / Information Statement and Signal shall prepare and cause to be filed with the SEC the Form S-4 Registration Statement, in which the Proxy Statement / Prospectus / Information Statement will be included as a prospectus.

(b) Signal covenants and agrees that the Proxy Statement / Prospectus / Information Statement, including any pro forma financial statements included therein (and the letter to stockholders, notice of meeting and form of proxy included therewith), will not, at the time that the Proxy Statement / Prospectus / Information Statement or any amendment or supplement thereto is filed with the SEC or is first mailed to the Signal Stockholders, at the time of the Signal Stockholders Meeting and at the Effective Time, contain any untrue statement of a material fact or omit to state any material fact required to be stated therein or necessary in order to make the statements made therein, in light of the

circumstances under which they were made, not misleading.

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Notwithstanding the foregoing, Signal makes no covenant, representation or warranty with respect to statements made in the Proxy Statement / Prospectus / Information Statement (and the letter to stockholders, notice of meeting and form of proxy included therewith), if any, based on information furnished in writing by Miragen specifically for inclusion therein. Each of the Parties shall use commercially reasonable efforts to cause the Form S-4 Registration Statement and the Proxy Statement / Prospectus / Information Statement to comply with the applicable rules and regulations promulgated by the SEC in all material respects.

(c) Signal shall notify Miragen promptly of the receipt of any comments from the SEC or the staff of the SEC and of any request by the SEC or the staff of the SEC for amendments or supplements to the Proxy Statement / Prospectus / Information Statement or the Form S-4 Registration Statement or for additional information and shall supply Miragen with copies of (i) all correspondence between Signal or any of its Representatives, on the one hand, and the SEC or the staff of the SEC, on the other hand, with respect to the Proxy Statement / Prospectus / Information Statement, the Form S-4 Registration Statement or the Contemplated Transactions and (ii) all orders of the SEC relating to the Form S-4 Registration Statement. Signal shall use its commercially reasonable efforts to respond as promptly as reasonably practicable to any comments of the SEC or the staff of the SEC with respect to the Proxy Statement / Prospectus / Information Statement and Form S-4 Registration Statement, and Miragen and its counsel a reasonable opportunity to participate in the formulation of any response to any such comments of the SEC or its staff. Prior to the Form S-4 Registration Statement being declared effective, (1) Miragen shall use its reasonable best efforts to execute and deliver to Cooley LLP (***Cooley***) and to Pillsbury Winthrop Shaw Pittman LLP (***Pillsbury***) the applicable Tax Representation Letter referenced in Section 5.11(c); and (2) Signal shall use its reasonable best efforts to execute and deliver to Pillsbury and to Cooley the applicable Tax Representation Letter referenced in Section 5.11(c). Following the delivery of the Tax Representation Letters pursuant to the preceding sentence, (A) Miragen shall use its commercially reasonable efforts to cause Cooley to deliver to it a tax opinion satisfying the requirements of Item 601 of Regulation S-K under the Securities Act; and (B) Signal shall use its commercially reasonable efforts to cause Pillsbury to deliver to it a tax opinion satisfying the requirements of Item 601 of Regulation S-K under the Securities Act. In rendering such opinions, each of such counsel shall be entitled to rely on the Tax Representation Letters referred to in this Section 5.1(c) and Section 5.11(c). Signal shall use its commercially reasonable efforts to have the Form S-4 Registration Statement declared effective by the SEC under the Securities Act as promptly as practicable after it is filed with the SEC. No filing of, or amendment or supplement to, the Form S-4 Registration Statement will be made by Signal, and no filing of, or amendment or supplement to, the Proxy Statement / Prospectus / Information Statement will be made by Signal, in each case, without providing Miragen a reasonable opportunity to review and comment thereon. Each Party shall promptly furnish to the other Party all information concerning such Party and such Party s Subsidiaries and such Party s stockholders that may be required or reasonably requested in connection with any action contemplated by this Section 5.1. If any event relating to Miragen occurs, or if Miragen becomes aware of any information, that should be disclosed in an amendment or supplement to the Form S-4 Registration Statement or the Proxy Statement / Prospectus / Information Statement, then Miragen shall promptly inform Signal thereof and shall cooperate fully with Signal in filing such amendment or supplement with the SEC and, if appropriate, in mailing such amendment or supplement to Signal s stockholders.

(d) Prior to the Effective Time, Signal shall use commercially reasonable efforts to obtain all regulatory approvals needed to ensure that the Signal Common Stock to be issued in the Merger shall be registered or qualified or exempt from registration or qualification under the securities law of every jurisdiction of the United States in which any registered holder of Miragen Capital Stock has an address of record on the record date for determining the stockholders entitled to notice of and to vote pursuant to the Miragen Stockholder Written Consent.

(e) Miragen shall reasonably cooperate with Signal and provide, and require its Representatives to provide, Signal and its Representatives with all true, correct and complete information regarding Miragen that is required by applicable Legal Requirements to be included in the Form S-4 Registration Statement or reasonably requested from Miragen to

be included in the Form S-4 Registration Statement.

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5.2 Miragen Stockholder Written Consent.

(a) Promptly after the S-4 Registration Statement has been declared effective by the SEC under the Securities Act, and in any event no later than five Business Days thereafter, Miragen shall obtain the Miragen Stockholder Written Consent for purposes of (i) adopting this Agreement, and approving the Merger, the Preferred Stock Conversion, the Miragen Pre-Closing Financing, and the other actions contemplated by this Agreement (the ***Miragen Stockholder Matters***); (ii) acknowledging that the approval given thereby is irrevocable and that such stockholder is aware of its rights to demand appraisal for its shares pursuant to Section 262 of the DGCL, a copy of which was attached thereto, and that such stockholder has received and read a copy of Section 262 of the DGCL; and (iii) acknowledging that by its approval of the Merger it is not entitled to appraisal rights with respect to its shares in connection with the Merger and thereby waives any rights to receive payment of the fair value of its capital stock under the DGCL.

(b) Miragen agrees that, subject to Section 5.2(c): (i) the Miragen Board of Directors shall recommend that Miragen Stockholders vote to approve the Miragen Stockholder Matters (the ***Miragen Board Recommendation***) and shall use commercially reasonable efforts to solicit such approval within the time set forth in Section 5.2(a); and (ii) (A) the Miragen Board Recommendation shall not be withdrawn or modified in a manner adverse to Signal, and no resolution by the Miragen Board of Directors or any committee thereof to withdraw or modify the Miragen Board Recommendation in a manner adverse to Signal shall be adopted or proposed and (B) the Miragen Board of Directors shall not recommend any Acquisition Transaction (collectively an ***Miragen Board Adverse Recommendation Change***).

(c) Notwithstanding the foregoing, at any time prior to the receipt of the Required Miragen Stockholder Vote, the Miragen Board of Directors may make an Miragen Board Adverse Recommendation Change, if: (i) the Miragen Board of Directors has received an Acquisition Proposal that the Miragen Board of Directors has determined in its reasonable, good faith judgment, after consultation with Miragen s outside legal counsel, constitutes a Superior Offer or (ii) as a result of a material development or change in circumstances (other than an Acquisition Proposal) that affects the business, assets or operations of Miragen that occurs or arises after the date of this Agreement that was neither known to Miragen or the Miragen Board of Directors nor reasonably foreseeable as of the date of this Agreement (an ***Miragen Intervening Event***), the Miragen Board of Directors determines in its reasonable, good faith judgment, after consultation with Miragen s outside legal counsel, that an Miragen Board Adverse Recommendation Change is required in order for the Miragen Board of Directors to comply with its fiduciary obligations to the Miragen Stockholders under applicable Legal Requirements; *provided, however*, that prior to Miragen taking any action permitted under this Section 5.2(c), (A) in the case of a Superior Offer, (1) Miragen must promptly notify Signal, in writing, at least five Business Days (the ***Notice Period***) before making an Miragen Board Adverse Recommendation Change, of its intention to take such action with respect to a Superior Offer, which notice shall state expressly that Miragen has received an Acquisition Proposal that the Miragen Board of Directors intends to declare a Superior Offer and that the Miragen Board of Directors intends to make an Miragen Board Adverse Recommendation Change, and (2) Miragen attaches to such notice the most current version of the proposed agreement (which version shall be updated on a prompt basis) and the identity of the third party making such Superior Offer; or (B) in the case of an Miragen Intervening Event, Miragen promptly notifies Signal, in writing, within the Notice Period before making an Miragen Board Adverse Recommendation Change, which notice shall state expressly the material facts and circumstances related to the applicable Miragen Intervening Event and that the Miragen Board of Directors intends to make an Miragen Adverse Recommendation Change.

(d) Unless the Miragen Board of Directors has effected an Miragen Board Adverse Recommendation Change in accordance with Section 5.2(c), Miragen s obligation to solicit the consent of its stockholders to sign the Miragen Stockholder Written Consent in accordance with Section 5.2(a) shall not be limited or otherwise affected by the commencement, disclosure, announcement or submission of any Superior Offer or other Acquisition Proposal, or by

any withdrawal or modification of the Miragen Board Recommendation.

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5.3 Signal Stockholders Meeting.

(a) Promptly after the Form S-4 Registration Statement has been declared effective by the SEC under the Securities Act, Signal shall (i) take all action necessary under applicable Legal Requirements to call, give notice of and hold a meeting of the holders of Signal Common Stock for the purpose of seeking approval of (A) the issuance of shares of Signal Common Stock to the Miragen Stockholders pursuant to the terms of this Agreement, (B) the change of control of Signal resulting from the Merger, (C) if requested by Miragen prior to the filing with the SEC of the Proxy Statement / Prospectus / Information Statement, the amendment of Signal s certificate of incorporation to effect the Miragen Reverse Split, (D) if requested by Miragen prior to the filing with the SEC of the Proxy Statement / Prospectus / Information Statement, the amendment of Signal s certificate of incorporation to increase the authorized shares of Signal Common Stock, (E) the conversion of the LeBow Note into shares of Signal s common stock immediately prior to the Closing, (F) the sale of all of Signal s intellectual property assets related to the Lab Business, (G) the amendment of Signal s certificate of incorporation to effect the name change of Signal, (H) the 2016 Equity Incentive Plan attached hereto as Exhibit F and the share reserve recommended by the Miragen Board of Directors or a committee thereof, (I) the 2016 Employee Stock Purchase Plan attached hereto as Exhibit G and the share reserve recommended by the Miragen Board of Directors or a committee thereof, (J) in accordance with Section 14A of the Exchange Act and the applicable SEC rules issued thereunder, seeking advisory approval of a proposal to the Signal Stockholders for a non-binding, advisory vote to approve certain compensation that may become payable to Signal s named executed officers in connection with the completion of the Merger, if applicable (the matters contemplated by the foregoing clauses (A) (J), collectively, the ***Signal Stockholder Matters***), and (K) the amendment of Signal s certificate of incorporation for the purpose of prohibiting the ability of Signal Stockholders to act by written consent (the matters contemplated by the foregoing clause (K), the ***Other Signal Stockholder Matters***); and (ii) mail to the Signal Stockholders as of the record date established for stockholders meeting of Signal, the Proxy Statement / Prospectus / Information Statement; *provided, however,* that in no event shall such meeting take place more than 60 calendar days after the date the S-4 Registration Statement is declared effective by the SEC (such meeting, the ***Signal Stockholders Meeting***).

(b) Signal agrees that, subject to Section 5.3(c): (i) the Signal Board of Directors shall recommend that the holders of Signal Common Stock vote to approve the Signal Stockholder Matters and the Other Signal Stockholder Matters; (ii) the Proxy Statement / Prospectus / Information Statement shall include a statement to the effect that the Signal Board of Directors recommends that Signal Stockholders vote to approve the Signal Stockholder Matters and the Other Signal Stockholder Matters (the ***Signal Board Recommendation***); (iii) the Signal Board of Directors shall use commercially reasonable efforts to solicit such approval within the timeframe set forth in Section 5.3(a) above; and (iv) (A) the Signal Board Recommendation shall not be withdrawn or modified in a manner adverse to Miragen, and no resolution by the Signal Board of Director or any committee thereof to withdraw or modify the Signal Board Recommendation in a manner adverse to Miragen shall be adopted or proposed and (B) the Signal Board of Directors shall not recommend any Acquisition Transaction (collectively a ***Signal Board Adverse Recommendation Change***).

(c) Notwithstanding the foregoing, at any time prior to the receipt of the Required Signal Stockholder Vote, the Signal Board of Directors may make a Signal Board Adverse Recommendation Change, if: (i) the Signal Board of Directors has received an Acquisition Proposal that the Signal Board of Directors has determined in its reasonable, good faith judgment, after consultation with Signal s outside legal counsel, constitutes a Superior Offer or (ii) as a result of a material development or change in circumstances (other than an Acquisition Proposal) that affects the business, assets or operations of Signal that occurs or arises after the date of this Agreement that was neither known to Signal or the Signal Board of Directors nor reasonably foreseeable as of the date of this Agreement (a ***Signal Intervening Event***), the Signal Board of Directors determines in its reasonable, good faith judgment, after consultation with Signal s outside legal counsel, that a Signal Board Adverse Recommendation Change is required in order for the Signal Board of Directors to comply with its fiduciary obligations to the Signal Stockholders under applicable Legal Requirements;

provided, however, that prior to Signal taking any action permitted under this Section 5.3(c), (A) in the case of a Superior Offer, (1)

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Signal must promptly notify Miragen, in writing, within the Notice Period before making a Signal Board Adverse Recommendation Change, of its intention to take such action with respect to a Superior Offer, which notice shall state expressly that Signal has received an Acquisition Proposal that the Signal Board of Directors intends to declare a Superior Offer and that the Signal Board of Directors intends to make a Signal Board Adverse Recommendation Change, and (2) Signal attaches to such notice the most current version of the proposed agreement (which version shall be updated on a prompt basis) and the identity of the third party making such Superior Offer; or (B) in the case of a Signal Intervening Event, Signal promptly notifies Miragen, in writing, within the Notice Period before making a Signal Board Adverse Recommendation Change, which notice shall state expressly the material facts and circumstances related to the applicable Signal Intervening Event and that the Signal Board of Directors intends to make a Signal Adverse Recommendation Change.

(d) Unless the Signal Board of Directors has effected a Signal Board Adverse Recommendation Change in accordance with Section 5.3(c), Signal s obligation to call, give notice of and hold the Signal Stockholders Meeting in accordance with Section 5.3(a) shall not be limited or otherwise affected by the commencement, disclosure, announcement or submission of any Superior Offer or Acquisition Proposal, or by any withdrawal or modification of the Signal Board Recommendation.

(e) Nothing contained in this Agreement shall prohibit Signal or its Board of Directors from (i) taking and disclosing to the Signal Stockholders a position as contemplated by Rule 14e-2(a) under the Exchange Act or complying with the provisions of Rule 14d-9 under the Exchange Act (other than Rule 14d-9(f) under the Exchange Act), (ii) making any disclosure to the Signal Stockholders if the Signal Board of Directors determines in good faith, after consultation with its outside legal counsel, that the failure to make such disclosure would be inconsistent with its fiduciary duties to the Signal Stockholders under applicable Legal Requirements, and (iii) making a stop, look and listen communication to the Signal Stockholders pursuant to Rule 14d-9(f) under the Exchange Act, *provided, however,* that (A) in the case of each of the foregoing clauses (i) and (ii), any such disclosure or public statement shall be deemed to be a Signal Board Adverse Recommendation Change subject to the terms and conditions of this Agreement unless the Signal Board of Directors reaffirms the Signal Board Recommendation in such disclosure or public statement or within five Business Days of such disclosure or public statement; (B) in the case of clause (iii), any such disclosure or public statement shall be deemed to be a Signal Board Adverse Recommendation Change subject to the terms and conditions of this Agreement unless the Signal Board of Directors reaffirms the Signal Board Recommendation in such disclosure or public statement or within 10 Business Days of such disclosure or public statement; and (C) Signal shall not affect a Signal Board Adverse Recommendation Change unless specifically permitted pursuant to the terms of Section 5.3(c).

5.4 Regulatory Approvals.

(a) Each Party shall use commercially reasonable efforts to take, or cause to be taken, all actions necessary to comply promptly with all Legal Requirements that may be imposed on such Party with respect to the Contemplated Transactions and, subject to the conditions set forth in Article 6 hereof, to consummate the Contemplated Transactions, as promptly as practicable. In furtherance and not in limitation of the foregoing, each Party hereto agrees to file or otherwise submit, as soon as practicable after the date of this Agreement, but in any event no later than 10 Business Days of the date hereof, all applications, notices, reports and other documents reasonably required to be filed by such Party with or otherwise submitted by such Party to any Governmental Body with respect to the Contemplated Transactions, and to submit promptly any additional information requested by any such Governmental Body. Without limiting the generality of the foregoing, the Parties shall prepare and file, if and as required, (a) the Notification and Report Forms pursuant to the HSR Act and (b) any notification or other document to be filed in connection with the Merger under any applicable foreign Legal Requirement relating to antitrust or competition matters. Miragen and Signal shall respond as promptly as is practicable to respond in compliance with: (i) any inquiries or requests received from the Federal Trade Commission or the Department of Justice for additional information or documentation; and (ii)

any inquiries or requests received from any state attorney general, foreign antitrust or competition authority or other Governmental Body in connection with antitrust or competition matters.

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(b) Each of the Parties shall use its commercially reasonable efforts to (i) cooperate in all respects with each other in connection with timely making all required filings and submissions and timely obtaining all related consents, permits, authorizations or approvals pursuant to Section 5.4(a); and (ii) keep Miragen or Signal, as applicable, informed in all material respects and on a reasonably timely basis of any communication received by such Party from, or given by such Party to, the Federal Trade Commission, the Department of Justice or any other Governmental Body relating to the Contemplated Transactions. Subject to applicable Legal Requirements relating to the exchange of information, each Party shall, to the extent practicable, give the other party reasonable advance notice of all material communications with any Governmental Body relating to the Contemplated Transactions and each Party shall have the right to attend or participate in material conferences, meetings and telephone or other communications between the other Parties and regulators concerning the Contemplated Transactions.

(c) Notwithstanding Sections 5.4(a) through 5.4(b) or any other provision of this Agreement to the contrary, in no event shall either Party be required to agree to (i) divest, license, hold separate or otherwise dispose of, encumber or allow a third party to utilize, any portion of its or their respective businesses, assets or contracts or (ii) take any other action that may be required or requested by any Governmental Body in connection with obtaining the consents, authorizations, orders or approvals contemplated by this Section 5.4 that, would have an adverse impact, in any material respect, on any of the Parties.

5.5 Miragen Options and Warrants.

(a) Subject to Section 5.5(c), at the Effective Time, each Miragen Option that is outstanding and unexercised immediately prior to the Effective Time under the 2008 Plan, whether or not vested, shall be assumed by Signal and converted into an option to purchase Signal Common Stock, and Signal shall assume the 2008 Plan and each such Miragen Option in accordance with the terms (as in effect as of the date of this Agreement) of the 2008 Plan and the terms of the stock option agreement by which such Miragen Option is evidenced. All rights with respect to Miragen Common Stock under Miragen Options assumed by Signal shall thereupon be converted into rights with respect to Signal Common Stock. Accordingly, from and after the Effective Time: (i) each Miragen Option assumed by Signal may be exercised solely for shares of Signal Common Stock; (ii) the number of shares of Signal Common Stock subject to each Miragen Option assumed by Signal shall be determined by multiplying (A) the number of shares of Miragen Common Stock that were subject to such Miragen Option, as in effect immediately prior to the Effective Time, by (B) the Exchange Ratio and rounding the resulting number down to the nearest whole number of shares of Signal Common Stock; (iii) the per share exercise price for the Signal Common Stock issuable upon exercise of each Miragen Option assumed by Signal shall be determined by dividing (A) the per share exercise price of Miragen Common Stock subject to such Miragen Option, as in effect immediately prior to the Effective Time, by (B) the Exchange Ratio and rounding the resulting exercise price up to the nearest whole cent; and (iv) any restriction on the exercise of any Miragen Option assumed by Signal shall continue in full force and effect and the term, exercisability, vesting schedule and other provisions of such Miragen Option shall otherwise remain unchanged; *provided, however*, that: (A) to the extent provided under the terms of an Miragen Option, such Miragen Option assumed by Signal in accordance with this Section 5.5(a) shall, in accordance with its terms, be subject to further adjustment as appropriate to reflect any stock split, division or subdivision of shares, stock dividend, reverse stock split, consolidation of shares, reclassification, recapitalization or other similar transaction with respect to Signal Common Stock subsequent to the Effective Time; and (B) the Signal Board of Directors or a committee thereof shall succeed to the authority and responsibility of the Miragen Board of Directors or any committee thereof with respect to each Miragen Option assumed by Signal. Notwithstanding anything to the contrary in this Section 5.5(a), the conversion of each Miragen Option (regardless of whether such option qualifies as an incentive stock option within the meaning of Section 422 of the Code) into an option to purchase shares of Signal Common Stock shall be made in a manner consistent with Treasury Regulation Section 1.424-1, such that the conversion of an Miragen Option shall not constitute a modification of such Miragen Option for purposes of Section 409A or Section 424 of the Code.

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(b) Signal shall file with the SEC, no later than 30 calendar days after the Effective Time, a registration statement on Form S-8, if available for use by Signal, relating to the shares of Signal Common Stock issuable with respect to Miragen Options assumed by Signal in accordance with Section 5.5(a).

(c) At the Effective Time, each Miragen Warrant that is outstanding and unexercised immediately prior to the Effective Time (for the avoidance of doubt, excluding Miragen Warrants that are deemed to have been automatically exercised pursuant to their terms as a result of the consummation of the Merger), if any, shall be converted into and become a warrant to purchase Signal Common Stock and Signal shall assume each such Miragen Warrant in accordance with its terms. All rights with respect to Miragen Common Stock or Miragen Preferred Stock under Miragen Warrants assumed by Signal shall thereupon be converted into rights with respect to Signal Common Stock. Accordingly, from and after the Effective Time: (i) each Miragen Warrant assumed by Signal may be exercised solely for shares of Signal Common Stock; (ii) the number of shares of Signal Common Stock subject to each Miragen Warrant assumed by Signal shall be determined by multiplying (A) the number of shares of Miragen Common Stock, or the number of shares of Miragen Common Stock issuable upon conversion of the shares of Miragen Preferred Stock issuable upon exercise of the Miragen Warrant, as applicable, that were subject to such Miragen Warrant immediately prior to the Effective Time by (B) the Exchange Ratio and rounding the resulting number down to the nearest whole number of shares of Signal Common Stock; (iii) the per share exercise price for the Signal Common Stock issuable upon exercise of each Miragen Warrant assumed by Signal shall be determined by dividing the per share exercise price of Miragen Common Stock or Miragen Preferred Stock subject to such Miragen Warrant, as in effect immediately prior to the Effective Time, by the Exchange Ratio and rounding the resulting exercise price up to the nearest whole cent; and (iv) any restriction on any Miragen Warrant assumed by Signal shall continue in full force and effect and the term and other provisions of such Miragen Warrant shall otherwise remain unchanged.

(d) Prior to the Effective Time, Miragen shall take all actions that may be necessary (under the Miragen Stock Option Plans, the Miragen Warrants and otherwise) to effectuate the provisions of this Section 5.5 and to ensure that, from and after the Effective Time, holders of Miragen Options and Miragen Warrants have no rights with respect thereto other than those specifically provided in this Section 5.5.

5.6 Signal Employee and Benefits Matters; Signal Options.

(a) Unless otherwise agreed in writing by Miragen pursuant to written notice provided to Signal no later than three calendar days prior to the Closing Date, effective no later than the Business Day immediately prior to the Closing Date, Signal shall, and shall cause any of its Subsidiaries to, terminate the employment and service of each Signal Associate (the ***Terminated Signal Associates***) such that neither Signal nor any Signal Subsidiary shall have any Signal Associate in its employ or service as of the Effective Time. As a condition to payment of any Terminated Signal Associate Payment to a Terminated Signal Associate and prior to the Closing Date, Signal will use commercially reasonable efforts to obtain from each Terminated Signal Associate an effective release of claims in a form approved by Miragen, which approval shall not be unreasonably withheld, conditioned or delayed. Prior to the Closing, Signal shall use commercially reasonable efforts to comply, in all material respects, with all of the requirements of the WARN Act and any applicable state Legal Requirement equivalent with respect to the Terminated Signal Associates. Schedule 5.6(a)(ii) sets forth, with respect to each Terminated Signal Associate, Signal s good faith estimate of the amount of all change of control payments, severance payments, termination or similar payments, retention payments, bonuses and other payments and benefits (including any COBRA costs), owed to or to be paid or provided to each Terminated Signal Associate, and the amount by which any of such Terminated Signal Associate s compensation or benefits may be accelerated or increased, in each case, whether under any Signal Employee Plan or otherwise, as a result of (i) the execution of this Agreement, (ii) the consummation of the Contemplated Transactions, or (iii) the termination of employment or service of such Terminated Signal Associate (together, the ***Terminated Signal Associate Payments***). Prior to the Closing, Signal shall cause all Terminated Signal Associate Payments to be

paid and satisfied in full such that Signal, the Surviving Corporation, Miragen and any of their Affiliates shall not have any Liability with respect to the Terminated Signal Associate on or following the Effective Time.

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(b) Each Signal Option that is outstanding and unexercised immediately prior to the Effective Time, whether under the 2014 Plan or otherwise, whether or not vested or exercisable, and each Signal RSU that is outstanding and has not been settled as of the Effective Time, whether under the 2014 Plan or otherwise, shall be canceled and extinguished at the Effective Time without the right to receive any consideration (the ***Terminated Signal Options and RSUs***). Prior to the Effective Time, the Signal Board of Directors will adopt appropriate resolutions (which draft resolutions shall be provided to Miragen for reasonable review and approval by Miragen prior to adoption by the Signal Board of Directors and no later than five calendar days prior to the Closing Date) and will have taken all other actions necessary and appropriate (under the 2014 Plan, the Signal Options, the Signal RSUs and otherwise) to effectuate the provisions of this Section 5.6(b) and to ensure that, from and after the Effective Time, holders of Signal Options and Signal RSUs have no rights with respect thereto.

(c) Effective no later than the day immediately preceding the Closing Date, Signal shall terminate (i) all Signal Employee Plans that are employee benefit plans within the meaning of ERISA, including but not limited to any Signal Employee Plans intended to include a Code Section 401(k) arrangement (each, a ***Signal 401(k) Plan***), and (ii) each other Signal Employee Plan set forth on Schedule 5.6(c) attached hereto unless written notice is provided by Miragen to Signal no later than three calendar days prior to the Closing Date, instructing Signal not to terminate any such Signal Employee Plan. Signal shall provide Miragen with evidence that such Signal Employee Plan(s) have been terminated (effective no later than the day immediately preceding the Closing Date) pursuant to resolutions of the Signal Board of Directors. The form and substance of such resolutions shall be subject to review and approval of Miragen. Signal also shall take such other actions in furtherance of terminating such Signal Employee Plan(s) as Miragen may reasonably require. In the event that termination of the Signal 401(k) Plans would reasonably be anticipated to trigger liquidation charges, surrender charges or other fees then Signal shall take such actions as are necessary to reasonably estimate the amount of such charges and/or fees and provide such estimate in writing to Miragen no later than 14 calendar days prior to the Closing Date.

(d) This Section 5.6 shall be binding upon and inure solely to the benefit of each of the parties to this Agreement. Nothing in this Section 5.6, express or implied, will (i) constitute or be treated as an amendment of any Signal Employee Plan or Miragen Employee Plan (or an undertaking to amend any such plan), (ii) prohibit Signal, any Signal Affiliate, Miragen, or any Miragen Affiliate from amending, modifying or terminating any Signal Employee Plan or Miragen Employee Plan pursuant to, and in accordance with, the terms thereof, or (iii) confer any rights or benefits on any Person other than Signal and Miragen.

5.7 Indemnification of Officers and Directors.

(a) From the Effective Time through the sixth anniversary of the date on which the Effective Time occurs, each of Signal and the Surviving Corporation shall, jointly and severally, indemnify and hold harmless each person who is now, or has been at any time prior to the date hereof, or who becomes prior to the Effective Time, a director or officer of Signal or Miragen (the ***D&O Indemnified Parties***), against all claims, losses, liabilities, damages, judgments, fines and reasonable fees, costs and expenses, including attorneys fees and disbursements (collectively, ***Costs***), incurred in connection with any claim, action, suit, proceeding or investigation, whether civil, criminal, administrative or investigative, arising out of or pertaining to the fact that the D&O Indemnified Party is or was a director or officer of Signal or Miragen, whether asserted or claimed prior to, at or after the Effective Time, to the fullest extent permitted under the DGCL for directors or officers of Delaware corporations. Each D&O Indemnified Party will be entitled to advancement of expenses incurred in the defense of any such claim, action, suit, proceeding or investigation from each of Signal and the Surviving Corporation, jointly and severally, upon receipt by Signal or the Surviving Corporation from the D&O Indemnified Party of a request therefor; *provided,* that any person to whom expenses are advanced provides an undertaking, as applicable, to repay such advances if it is ultimately determined that such person is not entitled to indemnification.

(b) The certificate of incorporation and bylaws of each of Signal and the Surviving Corporation shall contain, and Signal shall cause the certificate of incorporation and bylaws of the Surviving Corporation to so

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contain, provisions no less favorable with respect to indemnification, advancement of expenses and exculpation of present and former directors and officers of each of Signal and Miragen than are presently set forth in the certificate of incorporation and bylaws of Signal and Miragen, as applicable, which provisions shall not be amended, modified or repealed for a period of six years time from the Effective Time in a manner that would adversely affect the rights thereunder of individuals who, at or prior to the Effective Time, were officers or directors of Signal or Miragen.

(c) Signal shall purchase a tail insurance policy with an effective date as of the Closing Date, which shall remain effective for six years following the Closing Date, at least the same coverage and amounts and containing the same terms and conditions that are not less favorable to the D&O Indemnified Parties.

(d) Signal shall pay all reasonable expenses, including reasonable attorneys fees, that may be incurred by the persons referred to in this Section 5.7 in connection with their enforcement of their rights provided in this Section 5.7.

(e) The provisions of this Section 5.7 are intended to be in addition to the rights otherwise available to the D&O Indemnified Parties by law, charter, statute, bylaw or agreement. The obligations of Signal under this Section 5.7 shall survive the consummation of the Merger and shall not be terminated or modified in such a manner as to adversely affect any Indemnified Party to whom this Section 5.7 applies without the consent of such affected D&O Indemnified Party (it being expressly agreed that the D&O Indemnified Parties to whom this Section 5.7 applies, as well as their heirs and representatives, shall be third party beneficiaries of this Section 5.7, each of whom may enforce the provisions of this Section 5.7).

(f) In the event Signal or the Surviving Corporation or any of their respective successors or assigns (i) consolidates with or merges into any other person and shall not be the continuing or surviving corporation or entity of such consolidation or merger, or (ii) transfers all or substantially all of its properties and assets to any person, then, and in each such case, proper provision shall be made so that the successors and assigns of Signal or the Surviving Corporation, as the case may be, shall succeed to the obligations set forth in this Section 5.7. Signal shall cause the Surviving Corporation to perform all of the obligations of the Surviving Corporation under this Section 5.7.

5.8 Additional Agreements. The Parties shall (a) use commercially reasonable efforts to cause to be taken all actions necessary to consummate the Contemplated Transactions and (b) reasonably cooperate with the other Parties and provide the other Parties with such assistance as may be reasonably requested for the purpose of facilitating the performance by each Party of its respective obligations under this Agreement and to enable the Surviving Corporation to continue to meet its obligations under this Agreement following the Closing. Without limiting the generality of the foregoing, each Party to this Agreement: (i) shall make all filings and other submissions (if any) and give all notices (if any) required to be made and given by such Party in connection with the Contemplated Transactions; (ii) shall use commercially reasonable efforts to lift any injunction prohibiting, or any other legal bar to, the Contemplated Transactions; and (iii) shall use commercially reasonable efforts to satisfy the conditions precedent to the consummation of this Agreement.

5.9 Disclosure. Without limiting Miragen s or Signal s obligations under the Confidentiality Agreement, each Party shall not, and shall not permit any of its Subsidiaries or any Representative of such Party to, issue any press release or make any disclosure (to any customers or employees of such Party, to the public or otherwise) regarding the Contemplated Transactions unless: (a) the other Party has approved such press release or disclosure in writing; or (b) such Party has determined in good faith, upon the advice of outside legal counsel, that such disclosure is required by applicable Legal Requirements and, to the extent practicable, before such press release or disclosure is issued or made, such Party advises the other Party of, and consults with the other Party regarding, the text of such press release or disclosure.

5.10 Listing. Signal shall use its commercially reasonable efforts: (a) to maintain its existing listing on the NASDAQ Capital Market and to obtain approval of the listing of the combined company on the NASDAQ

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Capital Market; (b) to effect the NASDAQ Reverse Split, (c) without derogating from the generality of the requirements of clause (a) and to the extent required by the rules and regulations of NASDAQ, to (i) prepare and submit to NASDAQ a notification form for the listing of the shares of Signal Common Stock to be issued in the Merger and Miragen Reverse Split, and (ii) to cause such shares to be approved for listing (subject to notice of issuance); and (d) to the extent required by NASDAQ Marketplace Rule 5110, to file an initial listing for the Signal Common Stock on NASDAQ Capital Market (the ***NASDAQ Listing Application***) and to cause such NASDAQ Listing Application to be approved for listing (subject to official notice of issuance). Miragen will cooperate with Signal as reasonably requested by Signal with respect to the NASDAQ Listing Application and promptly furnish to Signal all information concerning Miragen and Miragen Stockholders that may be required or reasonably requested in connection with any action contemplated by this Section 5.10.

5.11 Tax Matters.

(a) Signal, Merger Sub and Miragen shall use their respective commercially reasonable efforts to cause the Merger to qualify, and agree not to, and not to permit or cause any affiliate or any Subsidiary to, take any actions or cause any action to be taken which would reasonably be expected to prevent the Merger from qualifying, as a reorganization under Section 368(a) of the Code.

(b) This Agreement is intended to constitute, and the Parties hereby adopt this Agreement as, a plan of reorganization within the meaning of Treasury Regulations Section 1.368-2(g). The Parties shall treat and shall not take any tax reporting position inconsistent with the treatment of the Merger as a reorganization within the meaning of Section 368(a) of the Code for U.S. federal, state and other relevant Tax purposes, unless otherwise required pursuant to a determination within the meaning of Section 1313(a) of the Code.

(c) Miragen shall use its reasonable best efforts to deliver to Cooley and Pillsbury a Tax Representation Letter, dated as of the date of the tax opinions referenced in Section 5.1(c) and signed by an officer of Miragen, containing representations of Miragen, and Signal shall use its reasonable best efforts to deliver to Cooley and Pillsbury a Tax Representation Letter, dated as of the date of the tax opinions referenced in Section 5.1(c) and signed by an officer of Signal, containing representations of Signal, in each case as shall be reasonably necessary or appropriate to enable Cooley and Pillsbury to render the applicable opinions described in Section 5.1(c) of this Agreement.

5.12 Legends. Signal shall be entitled to place appropriate legends on the book entries and/or certificates evidencing any shares of Signal Common Stock to be received in the Merger by equityholders of Miragen who may be considered affiliates of Signal for purposes of Rules 144 and 145 under the Securities Act reflecting the restrictions set forth in Rules 144 and 145 and to issue appropriate stop transfer instructions to the transfer agent for Signal Common Stock.

5.13 Directors and Officers. Prior to the Effective Time, but to be effective at the Effective Time, the Signal Board of Directors shall (i) set the size of the Signal Board of Directors at eight members and elect eight designees selected by Miragen (with such designees, in the aggregate, expected to satisfy the requisite independence requirements for the Signal Board of Directors, as well as the sophistication and independence requirements for the required committees of the Signal Board of Directors, pursuant to NASDAQ s listing standards), each to serve as a member of the Signal Board of Directors, (ii) take all necessary action to appoint each of the individuals set forth on Schedule 5.13 as officers of Signal to hold the offices set forth opposite his or her name, and (iii) appoint each of the directors set forth on Schedule 5.13 to the committees of the Signal Board of Directors set forth opposite his or her name (with such director, in the aggregate, expected to satisfy the sophistication and independence requirements for the required committees of the Signal Board of Directors pursuant to NASDAQ s listing standards).

5.14 Section 16 Matters. Prior to the Effective Time, Signal shall take all such steps as may be required to cause any acquisitions of Signal Common Stock and any options to purchase Signal Common Stock resulting

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from the Contemplated Transactions, by each individual who is reasonably expected to become subject to the reporting requirements of Section 16(a) of the Exchange Act with respect to Signal, to be exempt under Rule 16b-3 promulgated under the Exchange Act.

5.15 Takeover Statutes. If any control share acquisition , fair price , moratorium or other anti-takeover Legal Requirement becomes or is deemed to applicable to Signal, Miragen, Merger Sub, or the Contemplated Transactions, then each of Signal, Miragen, Merger Sub, and their respective board of directors shall grant such approvals and take such actions as are necessary so that the Contemplated Transactions may be consummated as promptly as practicable on the terms contemplated hereby and otherwise act to render such anti-takeover Legal Requirement inapplicable to the foregoing.

5.16 Preferred Stock. Miragen shall take all action necessary to effect the conversion of Miragen Preferred Stock into Miragen Common Stock immediately prior to the Effective Time.

5.17 Termination of Certain Agreements and Rights. Miragen shall use commercially reasonable efforts to terminate, at or prior to the Effective Time, those agreements set forth on Schedule 5.17 (collectively, the ***Investor Agreements***).

5.18 Net Cash. Signal shall use commercially reasonable efforts to ensure that Net Cash (as determined pursuant to Section 1.6) is greater than or equal to (a) zero ($0) if the Closing occurs on or before December 31, 2016, (b) negative Two Hundred Thousand Dollars (-$200,000) if the Closing occurs after December 31, 2016, and on or before January 31, 2017, and (c) negative Three Hundred Thousand Dollars (-$300,000) if the Closing occurs after January 31, 2017.

ARTICLE 6. CONDITIONS PRECEDENT TO OBLIGATIONS OF EACH PARTY

The obligations of each Party to effect the Merger and otherwise consummate the transactions to be consummated at the Closing are subject to the satisfaction or, to the extent permitted by applicable Legal Requirements, the written waiver by each of the Parties, at or prior to the Closing, of each of the following conditions:

6.1 Effectiveness of Registration Statement. The Form S-4 Registration Statement has been declared effective by the SEC under the Securities Act and no stop order suspending the effectiveness of the Form S-4 Registration Statement has been issued by the SEC and no proceedings for that purpose and no similar proceeding has been initiated or, to the Knowledge of Signal, threatened by the SEC.

6.2 No Restraints. (a) No temporary restraining order, preliminary or permanent injunction or other order preventing the consummation of the Merger has been issued by any court of competent jurisdiction or other Governmental Body of competent jurisdiction and remain in effect, and there shall not be any Legal Requirement which has the effect of making the consummation of the Merger illegal; and (b) there shall be no Legal Proceeding pending, or overtly threatened in writing, by an official of a Governmental Body in which such Governmental Body indicates that it intends to conduct any Legal Proceeding or take any other action challenging or seeking to restrain or prohibit the consummation of the Merger.

6.3 Stockholder Approval. (a) Miragen has obtained the Required Miragen Stockholder Vote, (b) Signal has obtained the Required Signal Stockholder Vote, and (c) Miragen has received evidence, in form and substance satisfactory to it, that Merger Sub has obtained the Required Merger Sub Stockholder Vote.

6.4 Regulatory Matters. Any waiting period applicable to the consummation of the Merger under the HSR Act or applicable to foreign Legal Requirements relating to antitrust or competition matters has expired or been terminated, and there shall not be in effect any voluntary agreement between Signal, Merger Sub and/or Miragen, on the one hand, and the Federal Trade Commission, the Department of Justice or any foreign Governmental

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Body, on the other hand, pursuant to which such Party has agreed not to consummate the Merger for any period of time; *provided*, that neither Miragen, on the one hand, nor Signal or Merger Sub, on the other hand, shall enter into any such voluntary agreement without the written consent of all Parties.

6.5 Listing. (a) The existing shares of Signal Common Stock have been continually listed on The NASDAQ Capital Market as of and from the date of this Agreement through the Closing Date, (b) the shares of Signal Common Stock to be issued in the Merger shall be approved for listing (subject to official notice of issuance) on The NASDAQ Capital Market as of the Effective Time, and (c) to the extent required by NASDAQ Marketplace Rule 5110, the NASDAQ Listing Application has been approved for listing (subject to official notice of issuance).

ARTICLE 7. ADDITIONAL CONDITIONS PRECEDENT TO OBLIGATIONS OF SIGNAL AND MERGER SUB

The obligations of Signal and Merger Sub to effect the Merger and otherwise consummate the transactions to be consummated at the Closing are subject to the satisfaction or the written waiver by Signal, at or prior to the Closing, of each of the following conditions:

7.1 Accuracy of Representations. (a) The representations and warranties of Miragen in Section 2.4(a), Section 2.4(b), and Section 2.4(c) (Capitalization), are true and correct in all but de minimis respects as of the date of this Agreement and are true and correct in all but de minimis respects on and as of the Closing Date with the same force and effect as if made on the Closing Date, except for those representations and warranties which address matters only as of a particular date (which representations were so true and correct as of such particular date); and (b) all other representations and warranties of Miragen in Article 2 of this Agreement are true and correct as of the date of this Agreement and are true and correct on and as of the Closing Date with the same force and effect as if made on the Closing Date except (i) in each case, or in the aggregate, where the failure to be true and correct would not have an Miragen Material Adverse Effect (provided that all Miragen Material Adverse Effect qualifications and other materiality qualifications limiting the scope of the representations and warranties of Miragen in Article 2 of this Agreement will be disregarded), or (ii) for those representations and warranties which address matters only as of a particular date (which representations were so true and correct, subject to the qualifications as set forth in the preceding clause (i), as of such particular date).

7.2 Performance of Covenants. Each of the covenants and obligations in this Agreement that Miragen is required to comply with or to perform at or prior to the Closing have been complied with and performed by Miragen in all material respects.

7.3 No Miragen Material Adverse Effect. Since the date of this Agreement, there has not occurred any Miragen Material Adverse Effect that is continuing.

7.4 Preferred Stock Conversion. Miragen has effected a conversion of all shares of Miragen Preferred Stock into shares of Miragen Common Stock immediately prior to the Effective Time (the ***Preferred Stock Conversion***).

7.5 Termination of Investor Agreements. The Investor Agreements shall have been terminated.

7.6 Documents. Signal has received the following documents, each of which shall be in full force and effect as of the Closing Date:

(a) a certificate executed by the Chief Executive Officer and Chief Financial Officer of Miragen confirming that the conditions set forth in Sections 7.1, 7.2, 7.3, 7.4 and 7.5 have been duly satisfied;

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(b) (i) certificates of good standing of Miragen in its jurisdiction of organization and the various foreign jurisdictions in which it is qualified to do business, (ii) certified copies of the certificate of incorporation and bylaws of Miragen, (iii) a certificate as to the incumbency of the Chief Executive Officer and Chief Financial Officer of Miragen, and (iv) the adoption of resolutions of the Miragen Board of Directors authorizing the execution of this Agreement and the consummation of the Contemplated Transactions to be performed by Miragen hereunder;

(c) a form of notice to the Internal Revenue Service in accordance with the requirements of Treasury Regulation Section 1.897-2(h) and in form and substance reasonably acceptable to Signal along with written authorization for Signal to deliver such notice form to the Internal Revenue Service on behalf of Miragen upon the Closing; and

(d) the Allocation Certificate.

ARTICLE 8. ADDITIONAL CONDITIONS PRECEDENT TO OBLIGATIONS OF Miragen

The obligations of Miragen to effect the Merger and otherwise consummate the transactions to be consummated at the Closing are subject to the satisfaction or the written wavier by Miragen, at or prior to the Closing, of each of the following conditions:

8.1 Accuracy of Representations. (a) The representations and warranties of Signal and Merger Sub in Section 3.4(a), Section 3.4(b), Section 3.4(c), Section 3.4(e) (Capitalization), are true and correct in all but de minimis respects as of the date of this Agreement and are true and correct in all but de minimis respects on and as of the Closing Date with the same force and effect as if made on the Closing Date, except for those representations and warranties which address matters only as of a particular date (which representations were so true and correct as of such particular date); and (b) all other representations and warranties of Signal and Merger Sub in Article 3 of this Agreement are true and correct as of the date of this Agreement and are true and correct on and as of the Closing Date with the same force and effect as if made on the Closing Date except (i) in each case, or in the aggregate, where the failure to be true and correct would not have a Signal Material Adverse Effect (provided that all Signal Material Adverse Effect qualifications and other materiality qualifications limiting the scope of the representations and warranties of Signal in Article 3 of this Agreement will be disregarded), or (ii) for those representations and warranties which address matters only as of a particular date (which representations were so true and correct, subject to the qualifications as set forth in the preceding clause (i), as of such particular date).

8.2 Performance of Covenants. (a) Signal and Merger Sub will have complied with the covenants and obligations set forth in Section 4.2(b)(ii), Section 4.2(b)(xii), and Section 5.6 in all respects and (b) all of the other covenants and obligations in this Agreement that either Signal or Merger Sub is required to comply with or to perform at or prior to the Closing have been complied with and performed in all material respects.

8.3 No Signal Material Adverse Effect. Since the date of this Agreement, there has not occurred any Signal Material Adverse Effect that is continuing.

8.4 Termination of Contracts. Miragen has received evidence, in form and substance satisfactory to it, that all Signal Contracts (other than the Signal Contracts listed on Schedule 8.4) have been (a) terminated, assigned, or fully performed by Signal and (b) all obligations of Signal thereunder have been fully satisfied, waived or otherwise discharged.

8.5 Board of Directors and Officers. Signal has caused the Signal Board of Directors and the officers of Signal, to be constituted as set forth in Section 5.13 of this Agreement effective as of the Effective Time.

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8.6 Sarbanes-Oxley Certifications. Neither the principal executive officer nor the principal financial officer of Signal has failed to provide, with respect to any Signal SEC Document filed (or required to be filed) with the SEC on or after the date of this Agreement, any necessary certification in the form required under Rule 13a-14 under the Exchange Act and 18 U.S.C. §1350.

8.7 Net Cash Threshold. Signal and Miragen have agreed in writing upon the Net Cash Calculation, or the Accounting Firm has delivered its determination with respect to the Net Cash Calculation, in each case pursuant to Section 1.6, and the Net Cash is greater than or equal to negative Three Hundred Thousand Dollars (-$300,000).

8.8 Lab Business. Signal has completed, in a manner satisfactory to Miragen, the sale, divestiture and/or winding down of its Lab Business such that there are no post-Closing obligations of Signal remaining related thereto.

8.9 Satisfaction of Liabilities. Signal has satisfied all of its Liabilities as of the Closing Date and Miragen has received payoff letters or other proof of payment evidencing the satisfaction of such Liabilities and release of any Encumbrances related to such Liabilities, in form and substance satisfactory, to Miragen.

8.10 Amendment to Certificate of Incorporation. (a) Signal has effected the NASDAQ Reverse Split and has provided a file-stamped copy of the amendment to Signal s certificate of incorporation effecting the NASDAQ Reverse Split; and (b) if requested by Miragen, Signal has effected the Miragen Reverse Split and has provided file-stamped copies of the amendments to Signal s certificate of incorporation effecting the Miragen Reverse Split and increase in the number of authorized shares of Signal Common Stock.

8.11 Note Conversion. Signal has effected a conversion of the LeBow Note into shares of Signal Common Stock immediately prior to the Effective Time in accordance with the terms of the LeBow Note.

8.12 Bylaws. The Signal Board of Directors shall have approved an amendment to the bylaws of Signal (i) prohibit the ability of Signal Stockholders to act by written consent and (ii) make such other changes as are mutually agreeable to Signal and Miragen.

8.13 Documents. Miragen has received the following documents, each of which shall be in full force and effect as of the Closing Date:

(a) a certificate executed by the Chief Executive Officer and Chief Financial Officer of Signal confirming that the conditions set forth in Sections 8.1, 8.2, 8.3, 8.5, 8.6, 8.7, 8.8, 8.9, and 8.11 have been duly satisfied;

(b) (i) certificates of good standing of each of Signal and Merger Sub in its jurisdiction of organization and the various foreign jurisdictions in which each is qualified to do business, (ii) certified copies of the certificate of incorporation and bylaws of Signal and Merger Sub, (iii) a certificate as to the incumbency of the officers of Signal and Merger Sub, and (iv) the adoption of resolutions of the Signal Board of Directors and the board of directors of Merger Sub authorizing the execution of this Agreement and the consummation of the Contemplated Transactions to be performed by Signal and Merger Sub hereunder;

(c) written resignations in forms satisfactory to Miragen, dated as of the Closing Date and effective as of the Closing executed by all officers and directors of Signal; and

(d) the Signal Outstanding Shares Certificate.

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ARTICLE 9. TERMINATION

9.1 Termination. This Agreement may be terminated prior to the Effective Time (whether before or after obtaining the Required Miragen Stockholder Vote or Required Signal Stockholder Vote, as applicable, unless otherwise specified below):

(a) by mutual written consent duly authorized by the Boards of Directors of Signal and Miragen;

(b) by either Signal or Miragen if the Merger shall not have been consummated by April 30, 2017 (the ***Outside Date***); *provided*, *however*, that the right to terminate this Agreement under this Section 9.1(b) shall not be available to Miragen, on the one hand, or to Signal, on the other hand, if such Party s (or, in the case of Signal, Merger Sub s) action or failure to act has been a principal cause of the failure of the Merger to occur on or before the Outside Date and such action or failure to act constitutes a breach of this Agreement; *provided*, *further*, that, in the event that the SEC has not declared effective under the Securities Act the Form S-4 Registration Statement by the date which is 60 calendar days prior to the Outside Date, then either Miragen or Signal shall be entitled to extend the date for termination of this Agreement pursuant to this Section 9.1(b) for an additional 60 calendar days from the Outside Date;

(c) by either Signal or Miragen if a court of competent jurisdiction or other Governmental Body has issued a final and nonappealable order, decree or ruling, or has taken any other action, having the effect of permanently restraining, enjoining or otherwise prohibiting the Merger;

(d) by Signal if the Required Miragen Stockholder Vote shall not have been obtained within five Business Days of the Form S-4 Registration Statement being declared effective by the SEC; *provided*, *however*, that once the Required Miragen Stockholder Vote has been obtained, Signal may not terminate this Agreement pursuant to this Section 9.1(d);

(e) by either Signal or Miragen if (i) the Signal Stockholders Meeting (including any adjournments and postponements thereof) has been held and completed and the Signal Stockholders have taken a final vote on the Signal Stockholder Matters and (ii) the Signal Stockholder Matters have not been approved at the Signal Stockholders Meeting (or any adjournment or postponement thereof) by the Required Signal Stockholder Vote; *provided*, *however*, that the right to terminate this Agreement under this Section 9.1(e) shall not be available to Signal where the failure to obtain the Required Signal Stockholder Vote has been caused by the action or failure to act of Signal or Merger Sub and such action or failure to act constitutes a material breach by Signal or Merger Sub of this Agreement;

(f) by Miragen (at any time prior to obtaining the Required Signal Stockholder Vote) if any of the following events have occurred: (i) Signal failed to include the Signal Board Recommendation in the Proxy Statement / Prospectus / Information Statement; (ii) the Signal Board of Directors have approved, endorsed or recommended any Acquisition Proposal; (iii) Signal has failed to hold the Signal Stockholders Meeting within 60 calendar days of the Form S-4 Registration Statement being declared effective by the SEC under the Securities Act (other than to the extent that the Form S-4 Registration Statement is subject to any stop order or proceeding (or threatened proceeding by the SEC) seeking a stop order with respect to the Form S-4 Registration Statement, in which case such 60-calendar day period shall be tolled for the earlier of 60 calendar days or so long as such stop order remains in effect or such proceeding or threatened proceeding remains pending); (iv) Signal has entered into any Acquisition Agreement (other than a confidentiality agreement permitted pursuant to Section 4.5); or (v) Signal or any of its Representatives has willfully and intentionally breached the provisions set forth in Section 4.5;

(g) by Signal (at any time prior to the approval of the Merger by the Required Miragen Stockholder Vote) if any of the following events have occurred: (i) the Miragen Board of Directors failed to include the Miragen Board

Recommendation in the Proxy Statement / Prospectus / Information Statement; (ii) the Miragen

Board of Directors have approved, endorsed or recommended any Acquisition Proposal; (iii) Miragen has entered into any Acquisition Agreement (other than a confidentiality agreement permitted pursuant to Section 4.5); or (iv) Miragen or any of its Representatives has willfully and intentionally breached the provisions set forth in Section 4.5 of the Agreement;

(h) by Miragen, upon a breach of any representation, warranty, covenant or agreement on the part of Signal or Merger Sub set forth in this Agreement, or if any representation or warranty of Signal or Merger Sub has become inaccurate, in either case such that the conditions set forth in Section 8.1 or Section 8.2 would not be satisfied; *provided, however*, that if such inaccuracy in Signal s or Merger Sub s representations and warranties or breach by Signal or Merger Sub is curable by Signal or Merger Sub, then this Agreement shall not terminate pursuant to this Section 9.1(h) as a result of such particular breach or inaccuracy unless such breach remains uncured 15 calendar days following the date of written notice from Miragen to Signal of such breach or inaccuracy and its intention to terminate pursuant to this Section 9.1(h); *provided further, however*, that no termination may be made pursuant to this Section 9.1(h) solely as a result of the failure to obtain the Required Signal Stockholder Vote (in which case, termination must be made pursuant to Section 9.1(e));

(i) by Signal, upon a breach of any representation, warranty, covenant or agreement on the part of Miragen set forth in this Agreement, or if any representation or warranty of Miragen has become inaccurate, in either case such that the conditions set forth in Section 7.1 or Section 7.2 would not be satisfied; *provided, however*, that if such inaccuracy in Miragen s representations and warranties or breach by Miragen is curable by Miragen, then this Agreement shall not terminate pursuant to this Section 9.1(i) as a result of such particular breach or inaccuracy unless such breach remains uncured 15 calendar days following the date of written notice from Signal to Miragen of such breach or inaccuracy and its intention to terminate pursuant to this Section 9.1(i); *provided further, however*, that no termination may be made pursuant to this Section 9.1(i) solely as a result of the failure to obtain the Required Miragen Stockholder Vote (in which case, termination must be made pursuant to Section 9.1(d));

(j) by Signal (prior to obtaining the Required Signal Stockholder Vote), if the Signal Board of Directors authorized Signal to enter into any Permitted Alternative Agreement; *provided, however*, that Signal shall not enter into any Permitted Alternative Agreement unless (i) Signal has complied with its obligations under Section 4.5; (ii) Signal has complied with its obligations under Section 5.3(c); (iii) Signal concurrently pays to Miragen amounts due pursuant to Section 9.3; and (iv) a copy of the execution version of such Permitted Alternative Agreement and all related agreements, exhibits, schedules, and other documents have been delivered to Miragen; or

(k) by Miragen (prior to obtaining the Required Miragen Stockholder Vote), if the Miragen Board of Directors authorized Miragen to enter into any Permitted Alternative Agreement; *provided, however*, that Miragen shall not enter into any Permitted Alternative Agreement unless (i) Miragen has complied with its obligations under Section 4.5; (ii) Miragen has complied with its obligations under Section 5.2(c); (iii) Miragen concurrently pays to Signal amounts due pursuant to Section 9.3; and (iv) a copy of the execution version of such Permitted Alternative Agreement and all related agreements, exhibits, schedules, and other documents have been delivered to Signal.

The Party desiring to terminate this Agreement pursuant to this Section 9.1 (other than pursuant to Section 9.1(a)) shall give a notice of such termination to the other Party specifying the provisions hereof pursuant to which such termination is made and the basis therefor described in reasonable detail.

9.2 Effect of Termination. In the event of the termination of this Agreement as provided in Section 9.1, this Agreement shall be of no further force or effect; *provided*, *however*, that (i) this Section 9.2, Section 9.3, and Article 10 shall survive the termination of this Agreement and shall remain in full force and effect, and (ii) the termination of this Agreement shall not relieve any Party for its fraud or from any liability for any willful and material breach of any

representation, warranty, covenant, obligation or other provision contained in this Agreement.

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9.3 Expenses; Termination Fees.

(a) Except as set forth in this Section 9.3, all fees and expenses incurred in connection with this Agreement and the Contemplated Transactions shall be paid by the Party incurring such expenses, whether or not the Merger is consummated; *provided*, *however*, that Signal and Miragen shall share equally all fees and expenses, other than attorneys and accountants fees and expenses, incurred in relation to the filings by the Parties under any filing requirement under the HSR Act and any foreign antitrust Legal Requirement applicable to this Agreement and the Contemplated Transactions; *provided*, *further,* that Signal and Miragen shall also share equally all fees and expenses incurred by engagement of the Exchange Agent and in relation to the printing (*e.g.*, paid to a financial printer) and filing with the SEC of the Form S-4 Registration Statement (including any financial statements and exhibits) and any amendments or supplements thereto.

(b) (i) If (A) this Agreement is terminated by Signal or Miragen pursuant to Section 9.1(e) or Section 9.1(f), (B) at any time before the Signal Stockholders Meeting an Acquisition Proposal with respect to Signal has been publicly announced, disclosed or otherwise communicated to the Signal Board of Directors and (C) in the event this Agreement is terminated pursuant Section 9.1(e), within 12 months after the date of such termination, Signal enters into a definitive agreement with respect to a Subsequent Transaction or consummates a Subsequent Transaction, then Signal shall pay to Miragen, within 10 Business Days after termination (or, if applicable, upon the earlier of such entry into a definitive agreement with respect to a Subsequent Transaction or consummation of a Subsequent Transaction), a nonrefundable fee in an amount equal to $300,000 (the ***Miragen Termination Fee***), in addition to any amount payable to Miragen pursuant to Section 9.3(c) or Section 9.3(e).

(ii) If (A) this Agreement is terminated by Signal pursuant to Section 9.1(d) or Section 9.1(g), (B) at any time before obtaining the Required Miragen Stockholder Vote an Acquisition Proposal with respect to Miragen has been publicly announced, disclosed or otherwise communicated to the Miragen Board of Directors, and (C) in the event this Agreement is terminated pursuant Section 9.1(d), within 12 months after the date of such termination, Miragen enters into a definitive agreement with respect to a Subsequent Transaction or consummates a Subsequent Transaction, then Miragen shall pay to Signal, within 10 Business Days after termination (or, if applicable, upon the earlier of such entry into a definitive agreement with respect to a Subsequent Transaction or consummation of a Subsequent Transaction), a nonrefundable fee in an amount equal to $300,000 (the ***Signal Termination Fee***), in addition to any amount payable to Signal pursuant to Section 9.3(d) or Section 9.3(e).

(iii) If this Agreement is terminated by Signal pursuant to Section 9.1(j), then Signal shall pay to Miragen, concurrent with such termination, the Miragen Termination Fee, in addition to any amount payable to Miragen pursuant to Section 9.3(c) or Section 9.3(e).

(iv) If this Agreement is terminated by Miragen pursuant to Section 9.1(k), then Miragen shall pay to Signal, concurrent with such termination, the Signal Termination Fee, in addition to any amount payable to Signal pursuant to Section 9.3(d) or Section 9.3(e).

(c) (i) If this Agreement is terminated by Miragen pursuant to Section 9.1(e), Section 9.1(f) or Section 9.1(h), or (ii) if this Agreement is terminated by Signal pursuant to Section 9.1(e) or Section 9.1(j), or (iii) in the event of a failure of Miragen to consummate the transactions to be consummated at the Closing solely as a result of a Signal Material Adverse Effect as set forth in Section 8.3 (*provided*, that at such time all of the other conditions precedent to Signal s obligation to close set forth in Article 6 and Article 7 of this Agreement have been satisfied by Miragen, are capable of being satisfied by Miragen or have been waived by Signal), then Signal shall reimburse Miragen for all reasonable fees and expenses incurred by Miragen in connection with this Agreement and the transactions contemplated hereby, including (A) all fees and expenses incurred in connection with the preparation, printing and filing, as applicable, of

the Form S-4 Registration Statement (including any preliminary materials related thereto and all amendments and supplements thereto, as well as any financial

statements and schedules thereto) and (B) all fees and expenses incurred in connection with the preparation and filing under any filing requirement of any Governmental Body applicable to this Agreement and the transactions contemplated hereby (such expenses, including (A) and (B) above, collectively, the ***Third-Party Expenses***), up to a maximum of $100,000, by wire transfer of same-day funds within 10 Business Days following the date on which Miragen submits to Signal true and correct copies of reasonable documentation supporting such Third-Party Expenses; *provided*, *however*, that such Third-Party Expenses shall not include any amounts for a financial advisor to Miragen except for reasonably documented out-of-pocket expenses otherwise reimbursable by Miragen to such financial advisor pursuant to the terms of Miragen s engagement letter or similar arrangement with financial advisor.

(d) (i) If this Agreement is terminated by Signal pursuant to Section 9.1(d), Section 9.1(g), or Section 9.1(i), or (ii) if this Agreement is terminated by Miragen pursuant to Section 9.1(k), or (iii) in the event of a failure of Signal to consummate the transactions to be consummated at the Closing solely as a result of an Miragen Material Adverse Effect as set forth in Section 7.3 (*provided*, that at such time all of the other conditions precedent to Miragen s obligation to close set forth in Article 6 and Article 8 of this Agreement have been satisfied by Signal, are capable of being satisfied by Signal or have been waived by Miragen), then Miragen shall reimburse Signal for all Third-Party Expenses incurred by Signal up to a maximum of $100,000, by wire transfer of same-day funds within 10 Business Days following the date on which Signal submits to Miragen true and correct copies of reasonable documentation supporting such Third-Party Expenses; *provided*, *however*, that such Third-Party Expenses shall not include any amounts for a financial advisor to Signal except for reasonably documented out-of-pocket expenses otherwise reimbursable by Signal to such financial advisor pursuant to the terms of Signal s engagement letter or similar arrangement with financial advisor.

(e) If either Party fails to pay when due any amount payable by such Party under Section 9.3(b), Section 9.3(c), or Section 9.3(d), then (i) such Party shall reimburse the other Party for reasonable costs and expenses (including reasonable fees and disbursements of counsel) incurred in connection with the collection of such overdue amount and the enforcement by the other Party of its rights under this Section 9.3, and (ii) such Party shall pay to the other Party interest on such overdue amount (for the period commencing as of the date such overdue amount was originally required to be paid and ending on the date such overdue amount is actually paid to the other Party in full) at a rate per annum equal to the prime rate (as announced by Bank of America or any successor thereto) in effect on the date such overdue amount was originally required to be paid.

The Parties agree that the payment of the fees and expenses set forth in this Section 9.3, subject to Section 9.2, shall be the sole and exclusive remedy of each Party following a termination of this Agreement under the circumstances described in this Section 9.3, it being understood that in no event shall either Signal or Miragen be required to pay fees or damages payable pursuant to this Section 9.3 on more than one occasion. Subject to Section 9.2, the payment of the fees and expenses set forth in this Section 9.3, and the provisions of Section 10.10, each of the Parties and their respective Affiliates will not have any liability, will not be entitled to bring or maintain any other claim, action or proceeding against the other, shall be precluded from any other remedy against the other, at law or in equity or otherwise, and shall not seek to obtain any recovery, judgment or damages of any kind against the other (or any partner, member, stockholder, director, officer, employee, Subsidiary, affiliate, agent or other representative of such Party) in connection with or arising out of the termination of this Agreement, any breach by any Party giving rise to such termination or the failure of the Contemplated Transactions to be consummated. Each of the Parties acknowledges that (i) the agreements contained in this Section 9.3, are an integral part of the Contemplated Transactions, (ii) without these agreements, the Parties would not enter into this Agreement and (iii) any amount payable pursuant to this Section 9.3, is not a penalty, but rather is liquidated damages in a reasonable amount that will compensate the Parties in the circumstances in which such amount is payable.

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ARTICLE 10. MISCELLANEOUS PROVISIONS

10.1 Non-Survival of Representations and Warranties. The representations and warranties of Miragen, Merger Sub and Signal contained in this Agreement or any certificate or instrument delivered pursuant to this Agreement shall terminate at the Effective Time, and only the covenants that by their terms survive the Effective Time and this Section 10.1 shall survive the Effective Time.

10.2 Amendment. This Agreement may be amended with the approval of the respective Boards of Directors of Miragen, Merger Sub and Signal at any time (whether before or after obtaining the Required Signal Stockholder Vote or the Required Miragen Stockholder Vote); *provided*, *however*, that after any such adoption and approval of this Agreement by a Party s stockholders, no amendment shall be made, which by applicable Legal Requirement requires further approval of the stockholders of such Party, without the further approval of such stockholders. This Agreement may not be amended except by an instrument in writing signed on behalf of each of Miragen, Merger Sub and Signal.

10.3 Waiver.

(a) No failure on the part of any Party to exercise any power, right, privilege or remedy under this Agreement, and no delay on the part of any Party in exercising any power, right, privilege or remedy under this Agreement, shall operate as a waiver of such power, right, privilege or remedy; and no single or partial exercise of any such power, right, privilege or remedy shall preclude any other or further exercise thereof or of any other power, right, privilege or remedy.

(b) No Party shall be deemed to have waived any claim arising out of this Agreement, or any power, right, privilege or remedy under this Agreement, unless the waiver of such claim, power, right, privilege or remedy is expressly set forth in a written instrument duly executed and delivered on behalf of such Party; and any such waiver shall not be applicable or have any effect except in the specific instance in which it is given.

10.4 Entire Agreement; Counterparts; Exchanges by Facsimile. This Agreement and the other agreements referred to in this Agreement constitute the entire agreement and supersede all prior agreements and understandings, both written and oral, among or between any of the Parties with respect to the subject matter hereof and thereof; *provided*, *however*, that the Confidentiality Agreement shall not be superseded and shall remain in full force and effect in accordance with its terms. This Agreement may be executed in several counterparts, each of which shall be deemed an original and all of which shall constitute one and the same instrument. The exchange of a fully executed Agreement (in counterparts or otherwise) by all Parties by facsimile or electronic transmission in .PDF format shall be sufficient to bind the Parties to the terms and conditions of this Agreement.

10.5 Applicable Law; Jurisdiction. This Agreement shall be governed by, and construed in accordance with, the laws of the State of Delaware, regardless of the laws that might otherwise govern under applicable principles of conflicts of laws. In any action or suit between any of the Parties arising out of or relating to this Agreement or any of the Contemplated Transactions: (a) each of the Parties irrevocably and unconditionally consents and submits to the exclusive jurisdiction and venue of the state and federal courts located in the State of Delaware; and (b) each of the Parties irrevocably waives the right to trial by jury.

10.6 Attorneys Fees. In any action at law or suit in equity to enforce this Agreement or the rights of any of the parties under this Agreement, the prevailing Party in such action or suit shall be entitled to receive a reasonable sum for its attorneys fees and all other reasonable costs and expenses incurred in such action or suit.

10.7 Assignability; No Third Party Beneficiaries. This Agreement shall be binding upon, and shall be enforceable by and inure solely to the benefit of, the Parties hereto and their respective successors and assigns; *provided*, *however*, that neither this Agreement nor any of a Party s rights or obligations hereunder may be

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assigned or delegated by such Party without the prior written consent of each other Party, and any attempted assignment or delegation of this Agreement or any of such rights or obligations by such Party without each other Party s prior written consent shall be void and of no effect. Nothing in this Agreement, express or implied, is intended to or shall confer upon any Person (other than the parties hereto and the D&O Indemnified Parties to the extent of their respective rights pursuant to Section 5.7) any right, benefit or remedy of any nature whatsoever under or by reason of this Agreement.

10.8 Notices. Any notice or other communication required or permitted to be delivered to any Party under this Agreement shall be in writing and shall be deemed properly delivered, given and received when delivered by hand, by registered mail, by courier or express delivery service, electronic mail, or by facsimile to the address, electronic mail address, or facsimile telephone number set forth beneath the name of such Party below (or to such other address, electronic mail address, or facsimile telephone number as such Party has specified in a written notice given to the other parties hereto):

if to Signal or Merger Sub:

Signal Genetics, Inc.

5740 Fleet Street

Carlsbad, California

Telephone No.: (760) 537-4100

Attention: Samuel D. Riccitelli, President & Chief Executive Officer

E-mail: sriccitelli@signalgenetics.com

with a copy to:

Pillsbury Winthrop Shaw Pittman LLP

12255 El Camino Real, Suite 300

San Diego, California 92130

Telephone: (858) 509-4000

Fax: (858) 509-4010

Attention: Mike Hird

E-mail: mike.hird@pillsburylaw.com

if to Miragen:

Miragen Therapeutics, Inc.

6200 Lookout Road, Suite 100

Boulder, Colorado

Telephone No.: (303) 531-5952

Facsimile No.: (303) 531-5094

Attention: William S. Marshall, President & Chief Executive Officer

E-mail: bmarshall@miragenrx.com

with a copy to:

Cooley LLP

380 Interlocken Crescent, Suite 900

Broomfield, Colorado 80021

Telephone No.: (720) 566-4000

Facsimile No.: (720) 455-4099

Attention: Brent Fassett

E-Mail: fassettbd@cooley.com

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10.9 Severability. Any term or provision of this Agreement that is invalid or unenforceable in any situation in any jurisdiction shall not affect the validity or enforceability of the remaining terms and provisions of this Agreement or the validity or enforceability of the offending term or provision in any other situation or in any other jurisdiction. If a final judgment of a court of competent jurisdiction declares that any term or provision of this Agreement is invalid or unenforceable, the Parties hereto agree that the court making such determination will have the power to limit such term or provision, to delete specific words or phrases or to replace such term or provision with a term or provision that is valid and enforceable and that comes closest to expressing the intention of the invalid or unenforceable term or provision, and this Agreement shall be valid and enforceable as so modified. In the event such court does not exercise the power granted to it in the prior sentence, the Parties hereto agree to replace such invalid or unenforceable term or provision with a valid and enforceable term or provision that will achieve, to the extent possible, the economic, business and other purposes of such invalid or unenforceable term or provision.

10.10 Other Remedies; Specific Performance. Except as otherwise provided herein, any and all remedies herein expressly conferred upon a Party will be deemed cumulative with and not exclusive of any other remedy conferred hereby, or by law or equity upon such Party, and the exercise by a Party of any one remedy will not preclude the exercise of any other remedy. The Parties hereto agree that irreparable damage would occur in the event that any of the provisions of this Agreement were not performed in accordance with their specific terms or were otherwise breached. It is accordingly agreed that the Parties shall be entitled to an injunction or injunctions to prevent breaches of this Agreement and to enforce specifically the terms and provisions hereof in any court of the United States or any state having jurisdiction, this being in addition to any other remedy to which they are entitled at law or in equity, and each of the Parties hereto waives any bond, surety or other security that might be required of any other Party with respect thereto.

10.11 Construction.

(a) For purposes of this Agreement, whenever the context requires: the singular number shall include the plural, and vice versa; the masculine gender shall include the feminine and neuter genders; the feminine gender shall include the masculine and neuter genders; and the neuter gender shall include masculine and feminine genders.

(b) The Parties hereto agree that any rule of construction to the effect that ambiguities are to be resolved against the drafting Party shall not be applied in the construction or interpretation of this Agreement.

(c) As used in this Agreement, the words include and including, and variations thereof, shall not be deemed to be terms of limitation, but rather shall be deemed to be followed by the words without limitation.

(d) Except as otherwise indicated, all references in this Agreement to Sections, Articles, Exhibits and Schedules are intended to refer to Sections or Articles of this Agreement and Exhibits and Schedules to this Agreement, respectively.

(e) The bold-faced headings contained in this Agreement are for convenience of reference only, shall not be deemed to be a part of this Agreement and shall not be referred to in connection with the construction or interpretation of this Agreement.

[*Remainder of page intentionally left blank*]

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IN WITNESS WHEREOF, the parties have caused this Agreement to be executed as of the date first above written.

SIGNAL GENETICS, INC.

By: /s/ Samuel D. Riccitelli
Name: Samuel D. Riccitelli
Title: Chief Executive Officer and President

SIGNAL MERGER SUB, INC.

By: /s/ Samuel D. Riccitelli
Name: Samuel D. Riccitelli
Title: Chief Executive Officer and President

MIRAGEN THERAPEUTICS, INC.

By: /s/ William S. Marshall, Ph.D.
Name: William S. Marshall, Ph.D.
Title: Chief Executive Officer and President

[Signature Page to Merger Agreement]

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EXHIBIT A

CERTAIN DEFINITIONS

For purposes of the Agreement (including this Exhibit A):

2008 Plan has the meaning set forth in Section 2.4(b).

2014 Plan has the meaning set forth in Section 3.4(b).

ACA has the meaning set forth in Section 2.14(o).

Accounting Firm has the meaning set forth in Section 1.6(e).

Acquisition Agreement has the meaning set forth in Section 4.5(a).

Acquisition Inquiry means, with respect to a Party, an inquiry, indication of interest or request for information (other than an inquiry, indication of interest or request for information made or submitted by Miragen, on the one hand, or Signal, on the other hand, to the other Party) that would reasonably be expected to lead to an Acquisition Proposal with such Party.

Acquisition Proposal means, with respect to a Party, any offer or proposal, whether written or oral (other than an offer or proposal made or submitted by or on behalf of Miragen or any of its Affiliates, on the one hand, or by or on behalf of Signal or any of its Affiliates, on the other hand, to the other Party) made by a third party contemplating or otherwise relating to any Acquisition Transaction with such Party.

Acquisition Transaction means any transaction or series of transactions involving: (a) any merger, consolidation, amalgamation, share exchange, business combination, issuance of securities, acquisition of securities, reorganization, recapitalization, tender offer, exchange offer or other similar transaction: (i) in which a Party is a constituent corporation; (ii) in which a Person or group (as defined in the Exchange Act and the rules promulgated thereunder) of Persons directly or indirectly acquires beneficial or record ownership of securities representing more than 20% of the outstanding securities of any class of voting securities of a Party or any of its Subsidiaries; or (iii) in which a Party or any of its Subsidiaries issues securities representing more than 20% of the outstanding securities of any class of voting securities of such Party or any of its Subsidiaries; *provided, however*, in the case of Miragen, the Miragen Pre-Closing Financing shall not be an Acquisition Transaction ; (b) any sale, lease, exchange, transfer, license, acquisition or disposition of any business or businesses or assets that constitute or account for 20% or more of the consolidated book value or the fair market value of the assets of a Party and its Subsidiaries, taken as a whole (other than (i) the sale, divestiture and/or winding down of the Lab Business by Signal in accordance with the terms and conditions of this Agreement and (ii) any lease, exchange, transfer, license, disposition, partnership, or collaboration involving less than substantially all of the assets of Miragen or any Miragen Subsidiary pursuant to a collaboration agreement, partnership agreement or similar arrangement); or (c) any tender offer or exchange offer, that if consummated would result in any Person beneficially owning 20% or more of the outstanding equity securities of a Party or any of its Subsidiaries.

Affiliates has the meaning for such term as used in Rule 145 under the Securities Act.

Agreement has the meaning set forth in the Preamble.

Allocation Certificate has the meaning set forth in Section 1.12(b).

Anticipated Closing Date has the meaning set forth in Section 1.6(a).

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Business Day means any day other than a day on which banks in the State of New York are authorized or obligated to be closed.

Certificate of Merger has the meaning set forth in Section 1.3.

Certifications has the meaning set forth in Section 3.5(a).

Closing has the meaning set forth in Section 1.3.

CLIA has the meaning set forth in Section 3.12(c).

Closing Date has the meaning set forth in Section 1.3.

COBRA means the Consolidated Omnibus Budget Reconciliation Act of 1985, as amended, as set forth in Section 4980B of the Code and Part 6 of Title I of ERISA.

Code means the Internal Revenue Code of 1986, as amended.

Confidentiality Agreement means the Amended and Restated Confidentiality Agreement, dated August 15, 2016, between Miragen and Signal.

Consent means any approval, consent, ratification, permission, waiver or authorization (including any Governmental Authorization).

Contemplated Transactions means the Merger, the Preferred Stock Conversion, the NASDAQ Reverse Split, the Miragen Reverse Split, the Miragen Pre-Closing Financing, and the other transactions and actions contemplated by the Agreement.

Contract shall, with respect to any Person, mean any written agreement, contract, subcontract, lease (whether real or personal property), mortgage, understanding, arrangement, instrument, note, option, warranty, purchase order, license, sublicense, insurance policy, benefit plan or legally binding commitment or undertaking of any nature to which such Person is a party or by which such Person or any of its assets are bound or affected under applicable law.

Cooley has the meaning set forth in Section 5.1(c).

Costs has the meaning set forth in Section 5.7(a).

D&O Indemnified Parties has the meaning set forth in Section 5.7(a).

Determination Date has the meaning set forth in Section 1.6(a).

DGCL means the General Corporation Law of the State of Delaware.

Dispute Notice has the meaning set forth in Section 1.6(b).

Dissenting Shares has the meaning set forth in Section 1.9(a).

Drug Regulatory Agency has the meaning set forth in Section 2.12(c).

Effect means any effect, change, event, circumstance, or development.

Effective Time has the meaning set forth in Section 1.3.

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Encumbrance means any lien, pledge, hypothecation, charge, mortgage, security interest, encumbrance, claim, infringement, interference, option, right of first refusal, preemptive right, community property interest or restriction of any nature (including any restriction on the voting of any security, any restriction on the transfer of any security or other asset, any restriction on the receipt of any income derived from any asset, any restriction on the use of any asset and any restriction on the possession, exercise or transfer of any other attribute of ownership of any asset).

Entity means any corporation (including any non-profit corporation), partnership (including any general partnership, limited partnership or limited liability partnership), joint venture, estate, trust, company (including any company limited by shares, limited liability company or joint stock company), firm, society or other enterprise, association, organization or entity, and each of its successors.

Environmental Law means any federal, state, local or foreign Legal Requirement relating to pollution or protection of human health or the environment (including ambient air, surface water, ground water, land surface or subsurface strata), including any law or regulation relating to emissions, discharges, releases or threatened releases of Hazardous Materials, or otherwise relating to the manufacture, processing, distribution, use, treatment, storage, disposal, transport or handling of Hazardous Materials.

ERISA means the Employee Retirement Income Security Act of 1974, as amended.

Exchange Act means the Securities Exchange Act of 1934, as amended.

Exchange Agent has the meaning set forth in Section 1.8(a).

Exchange Fund has the meaning set forth in Section 1.8(a).

Exchange Ratio means, subject to Section 1.5(f), the following ratio (with such ratio being calculated to the nearest 1/10,000 of a share): the quotient obtained by *dividing* (a) the Miragen Merger Shares *by* (b) the Miragen Outstanding Shares, in which

Miragen Allocation Percentage means 1.00 minus the Signal Allocation Percentage.

Miragen Merger Shares means the product determined by *multiplying* (a) the Post-Closing Signal Shares *by* (b) the Miragen Allocation Percentage.

Miragen Outstanding Shares means the total number of shares of Miragen Common Stock outstanding immediately prior to the Effective Time expressed on a fully-diluted and as-converted to Miragen Common Stock basis and assuming, without limitation or duplication, (a) the exercise of all Miragen Options and Miragen Warrants outstanding as of immediately prior to the Effective Time, (b) the effectiveness of the Preferred Stock Conversion, and (c) the issuance of shares of Miragen Common Stock in respect of all other options, warrants or rights to receive such shares that will be outstanding immediately after the Effective Time and are specifically listed in the calculation; *provided*, *however*, that notwithstanding the foregoing, all shares of Miragen Common Stock issued in the Miragen Pre-Closing Financing shall be excluded from such total (*i.e.*, the Miragen Allocation Percentage and Signal Allocation Percentage contemplated by the Exchange Ratio are intended to be determined in the absence of the Miragen Pre-Closing Financing).

Post-Closing Signal Shares mean the quotient determined by *dividing* (a) the Signal Outstanding Shares *by* (b) the Signal Allocation Percentage.

Signal Allocation Percentage means 0.06; *provided, however, solely* to the extent that the Net Cash determined pursuant to Section 1.6 is less than negative One Hundred Thousand Dollars (-$100,000), then 0.06 shall be reduced by 0.00000002 for each One Dollar ($1.00) that the Net Cash as so determined is less than negative One Hundred Thousand Dollars (-$100,000) (for example, the Signal Allocation Percentage would be 0.055 if the Net Cash determined pursuant to Section 1.6 is negative Three Hundred Fifty Thousand Dollars (-$350,000)).

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Signal Outstanding Shares means, subject to Section 1.5(f), the total number of shares of Signal Common Stock outstanding immediately prior to the Effective Time expressed on a fully-diluted and as-converted to Signal Common Stock basis, and assuming, without limitation or duplication, (a) the exercise of each Signal Option outstanding as of the Effective Time, solely to the extent such Signal Option will not be canceled pursuant to Section 5.6(b) at the Effective Time or exercised prior thereto, (b) the settlement in shares of Signal Common Stock of each Signal RSU outstanding as of the Effective Time, solely to the extent such Signal RSU will not be canceled pursuant to Section 5.6(b) at the Effective Time or settled prior thereto, (c) the exercise of all Signal Warrants outstanding as of immediately prior to the Effective Time, (d) the conversion of all of Signal s outstanding convertible indebtedness into shares of Signal Common Stock, including the conversion of the LeBow Note into shares of Signal Common Stock in accordance with the terms of the LeBow Note, and (e) the issuance of shares of Signal Common Stock in respect of all other options, warrants or rights to receive such shares that will be outstanding immediately after the Effective Time and are specifically listed in the calculation.

Existing Miragen D&O Policies has the meaning set forth in Section 2.16(b).

Existing Signal D&O Policies has the meaning set forth in Section 3.16(b).

FDA has the meaning set forth in Section 2.12(c).

FDCA has the meaning set forth in Section 2.12(c).

Form S-4 Registration Statement means the registration statement on Form S-4 to be filed with the SEC by Signal registering the public offering and sale of Signal Common Stock to all Miragen Stockholders in the Merger, including all shares of Signal Common Stock to be issued in exchange for all shares of Miragen Common Stock in the Merger, as said registration statement may be amended prior to the time it is declared effective by the SEC.

GAAP has the meaning set forth in Section 2.5(a).

Governmental Authorization means any: (a) permit, license, certificate, franchise, permission, variance, exceptions, orders, clearance, registration, qualification or authorization issued, granted, given or otherwise made available by or under the authority of any Governmental Body or pursuant to any Legal Requirement; or (b) right under any Contract with any Governmental Body.

Governmental Body means any: (a) nation, state, commonwealth, province, territory, county, municipality, district or other jurisdiction of any nature; (b) federal, state, local, municipal, foreign or other government; (c) governmental or quasi-governmental body of any nature (including any governmental division, department, agency, commission, instrumentality, official, ministry, fund, foundation, center, organization, unit, body or Entity and any court or other tribunal, and for the avoidance of doubt, any Tax authority); or (d) self-regulatory organization (including NASDAQ and the Financial Industry Regulatory Authority).

Grant Date has the meaning set forth in Section 2.14(f).

Hazardous Materials means any pollutant, chemical, substance and any toxic, infectious, carcinogenic, reactive, corrosive, ignitable or flammable chemical, or chemical compound, or hazardous substance, material or waste, whether solid, liquid or gas, that is subject to regulation, control or remediation under any Environmental Law, including crude oil or any fraction thereof, and petroleum products or by-products.

HSR Act means the Hart-Scott-Rodino Antitrust Improvements Act of 1976, as amended.

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Intellectual Property means (a) United States, foreign and international patents, patent applications, including provisional applications, statutory invention registrations, invention disclosures and inventions, (b) trademarks, service marks, trade names, domain names, URLs, trade dress, logos and other source identifiers, including registrations and applications for registration thereof, (c) copyrights, including registrations and applications for registration thereof, and (d) software, formulae, customer lists, trade secrets, know-how, confidential information and other proprietary rights and intellectual property, whether patentable or not.

Investor Agreements shall have the meaning set forth in Section 5.17.

IRS means the United States Internal Revenue Service.

Knowledge means, (a) with respect to Signal, the actual knowledge of Samuel D. Riccitelli and Tamara A. Seymour, after reasonable inquiry; and (b) with respect to Miragen, the actual knowledge of William S. Marshall, Jason A. Lervone, and Adam Levy, after reasonable inquiry.

Lab Business means the MyPRS® (Myeloma Prognostic Risk Signature) assay business of Signal.

LeBow Note means that certain Unsecured Demand Promissory Note, dated March 6, 2015, issued by Signal to the holder thereof in the original principal amount of $1,105,000, as amended by that certain Amendment to Unsecured Demand Promissory Note, dated October 31, 2016, between Signal and the holder thereof.

Legal Proceeding means any action, suit, litigation, arbitration, proceeding (including any civil, criminal, administrative, investigative or appellate proceeding), hearing, inquiry, audit, examination or investigation commenced, brought, conducted or heard by or before, or otherwise involving, any court or other Governmental Body or any arbitrator or arbitration panel.

Legal Requirement means any federal, state, foreign, material local or municipal or other law, statute, constitution, principle of common law, resolution, ordinance, code, edict, decree, rule, regulation, ruling or requirement issued, enacted, adopted, promulgated, implemented or otherwise put into effect by or under the authority of any Governmental Body.

Liability has the meaning set forth in Section 2.11.

Merger has the meaning set forth in the recitals.

Merger Consideration has the meaning set forth in Section 1.5(a)(ii).

Merger Sub has the meaning set forth in the Preamble.

Merger Sub Capital Stock has the meaning set forth in Section 3.4(e).

Miragen has the meaning set forth in the Preamble.

Miragen 409A Plan has the meaning set forth in Section 2.14(n).

Miragen Affiliate means any Person that is (or at any relevant time was) under common control with Miragen within the meaning of Sections 414(b), (c), (m) and (o) of the Code, and the regulations issued thereunder.

Miragen Associate means any current employee, independent contractor, officer or director of Miragen or any Miragen Affiliate.

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Miragen Board Adverse Recommendation Change has the meaning set forth in Section 5.2(b).

Miragen Board of Directors means the board of directors of Miragen.

Miragen Board Recommendation has the meaning set forth in Section 5.2(b).

Miragen Capital Stock means the Miragen Common Stock and the Miragen Preferred Stock.

Miragen Common Stock has the meaning set forth in Section 2.4(a).

Miragen Contract means any Contract: (a) to which Miragen or any of its Subsidiaries is a Party; or (b) by which Miragen or any Miragen Subsidiary or any Miragen IP Rights or any other asset of Miragen or its Subsidiaries is bound or under which Miragen or any Miragen Subsidiary has any obligation.

Miragen Disclosure Schedule has the meaning set forth in Article 2.

Miragen Employee Plan has the meaning set forth in Section 2.14(e).

Miragen Financials has the meaning set forth in Section 2.5(a).

Miragen IP Rights means all Intellectual Property owned, licensed or controlled by Miragen or any of its Subsidiaries that is necessary or used in the business of Miragen and its Subsidiaries as presently conducted or as presently proposed to be conducted.

Miragen IP Rights Agreement means any instrument or agreement governing, related or pertaining to any Miragen IP Rights.

Miragen Intervening Event has the meaning set forth in Section 5.2(c).

Miragen Leases has the meaning set forth in Section 2.8.

Miragen Material Adverse Effect means any Effect that, considered together with all other Effects that have occurred prior to the date of determination of the occurrence of the Miragen Material Adverse Effect, is or would reasonably be expected to be materially adverse to, or has or would reasonably be expected to have or result in a material adverse effect on: (a) the business, condition (financial or otherwise), capitalization, assets, operations or financial performance of Miragen and its Subsidiaries taken as a whole; or (b) the ability of Miragen to consummate the Contemplated Transactions or to perform any of its covenants or obligations under the Agreement in all material respects; *provided*, *however*, that Effects from the following shall not be deemed to constitute (nor shall Effects from any of the following be taken into account in determining whether there has occurred) an Miragen Material Adverse Effect: (i) any rejection by a Governmental Body of a registration or filing by Miragen relating to the Miragen IP Rights; (ii) any change in the cash position of Miragen which results from operations in the Ordinary Course of Business; (iii) conditions generally affecting the industries in which Miragen and its Subsidiaries participate or the United States or global economy or capital markets as a whole, to the extent that such conditions do not have a disproportionate impact on Miragen and its Subsidiaries taken as a whole; (iv) any failure by Miragen or any of its Subsidiaries to meet internal projections or forecasts on or after the date of this Agreement (it being understood, however, that any Effect causing or contributing to any such failure to meet projections or forecasts may constitute a Miragen Material Adverse Effect and may be taken into account in determining whether a Miragen Material Adverse Effect has occurred); (v) the execution, delivery, announcement or performance of the obligations under this

Agreement or the announcement, pendency or anticipated consummation of the Merger or the Miragen Pre-Closing Financing; (vi) the failure to close the Miragen Pre-Closing Financing; (vii) any natural disaster or any acts of terrorism, sabotage, military action or war or any escalation or worsening thereof; or (viii) any changes (after the date of this Agreement) in GAAP or applicable Legal Requirements.

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Miragen Material Contract has the meaning set forth in Section 2.10(a).

Miragen Options means options to purchase shares of Miragen Common Stock issued or granted by Miragen.

Miragen Permits has the meaning set forth in Section 2.12(b).

Miragen Pre-Closing Financing means an acquisition of Miragen Capital Stock to be consummated prior to the Closing pursuant to the Subscription Agreement.

Miragen Preferred Stock has the meaning set forth in Section 2.4(a).

Miragen Product Candidates has the meaning set forth in Section 2.12(d).

Miragen Registered IP means all Miragen IP Rights that are registered, filed or issued under the authority of, with or by any Governmental Body, including all patents, registered copyrights and registered trademarks and all applications for any of the foregoing.

Miragen Regulatory Permits has the meaning set forth in Section 2.12(d).

Miragen Reverse Split means a reverse stock split of all outstanding shares of Signal Common Stock at a reverse stock split ratio in the range mutually agreed to by Signal and Miragen that is effected by Signal upon the request of Miragen. For the avoidance of doubt, Miragen Reverse Split as used in this Agreement shall not mean any reverse split of Signal Common Stock undertaken by Signal to maintain compliance with NASDAQ listing standards.

Miragen Stock Certificate has the meaning set forth in Section 1.7.

Miragen Stockholder means each holder of Miragen Capital Stock, and ***Miragen Stockholders*** means all Miragen Stockholders.

Miragen Stockholder Matters has the meaning set forth in Section 5.2(a).

Miragen Stockholder Support Agreements has the meaning set forth in the Recitals.

Miragen Stockholder Written Consent has the meaning set forth in Section 2.2(b).

Miragen Subsidiary has the meaning set forth in Section 2.1(a).

Miragen Termination Fee has the meaning set forth in Section 9.3(b).

Miragen Unaudited Interim Balance Sheet means the unaudited consolidated balance sheet of Miragen as of June 30, 2016.

Miragen Warrants means the outstanding warrants to purchase Miragen Capital Stock set forth in Section 2.4(a) of the Miragen Disclosure Schedule.

Multiemployer Plan means (a) a multiemployer plan, as defined in Section 3(37) or 4001(a)(3) of ERISA, or (b) a plan which if maintained or administered in or otherwise subject to the laws of the United States would be described in paragraph (a).

Multiple Employer Plan means (a) a multiple employer plan within the meaning of Section 413(c) of the Code or Section 3(40) of ERISA, or (b) a plan which if maintained or administered in or otherwise subject to the laws of the United States would be described in paragraph (a).

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NASDAQ means The NASDAQ Stock Market.

NASDAQ Listing Application has the meaning set forth in Section 5.10.

NASDAQ Reverse Split means a reverse stock split of all outstanding shares of Signal Common Stock at a reverse stock split ratio in the range previously approved by the holders of Signal Common Stock and otherwise mutually agreed to by Signal and Miragen that is effected by Signal for the purpose of maintaining compliance with NASDAQ listing standards.

Net Cash means (a) the sum of Signal s cash and cash equivalents, marketable securities, accounts, interest and other receivables (to the extent determined to be collectible), and deposits (to the extent refundable to Signal), in each case as of the Anticipated Closing Date, determined in a manner consistent with the manner in which such items were historically determined and in accordance with the Signal Audited Financial Statements and the Signal Unaudited Interim Balance Sheet, *minus* (b) the sum of Signal s accounts payable and accrued expenses (without duplication of any expenses accounted for below), in each case as of such date and determined in a manner consistent with the manner in which such items were historically determined and in accordance with the Signal Audited Financial Statements and the Signal Unaudited Interim Balance Sheet, *minus* (c) the cash cost of any unpaid change of control payments or severance, termination or similar payments that are or become due to any current or former employee, director or independent contractor of Signal, or any other third party *minus* (d) the cash cost of any accrued and unpaid retention payments or other bonuses due to any current or former employee, director or independent contractor of Signal as of the Closing Date, *minus* (e) the cash cost of any other Terminated Signal Associate Payment not set forth in clauses (c) or (d), *minus* (f) all payroll, employment or other withholding Taxes incurred by Signal and any Signal Associate (to the extent paid or to be paid by Signal on the behalf of such Signal Associate) in connection with any payment amounts set forth in clauses (c), (d) or (e) and the exercise of any Signal Option or settlement of any Signal RSU on or prior to the Effective Time, *minus* (g) any remaining unpaid fees and expenses (including any attorney s, accountant s, financial advisor s or finder s fees) as of such date for which Signal is liable incurred by Signal in connection with this Agreement and the Contemplated Transactions or otherwise, *minus* (h) any bona fide current liabilities payable in cash, in each case to the extent not canceled at or prior to the Anticipated Closing Date, *minus* (i) any fees and expenses payable by Signal pursuant to Section 1.6(e), *minus* (j) any unpaid amounts payable by Signal in satisfaction of its obligations under Section 5.7 for the period after the Closing (including any expenses incurred in connection with the tail policy), *minus* (k) the cash cost of any unpaid retention payment amounts due under any insurance policy with respect to any Legal Proceeding against Signal or Merger Sub, *minus* (l) the cash cost of repurchasing any shares of Signal Common Stock to the extent Signal has agreed to purchase such shares and the purchase price for such shares has not been fully paid by Signal as of the Determination Date, *plus* or *minus* (as applicable) (m) the net amount of any transaction expense reimbursement owed to, or transaction expense payment owed by, Signal pursuant to Section 9.3(a), *plus* (n) the amount of any payments due to Signal within 30 calendar days of the Closing Date pursuant to the sale or other disposition of all or a portion of the Lab Business, *plus* (o) any amounts paid or payable by Signal for activities requested by Miragen in respect of the audit of Signal s financial statements at and for the year ended December 31, 2016, as well as for the preparation of Signal s Annual Report on Form 10-K for 2016.

Net Cash Calculation has the meaning set forth in Section 1.6(a).

Net Cash Schedule has the meaning set forth in Section 1.6(a).

Notice Period has the meaning set forth in Section 5.2(c).

Ordinary Course of Business means, in the case of each of Miragen and Signal and for all periods, such actions taken in the ordinary course of its normal operations and consistent with its past practices, and for periods following the date of this Agreement consistent with its operating plans delivered to the other Party pursuant to Section 4.1(ii); *provided, however,* that during the Pre-Closing Period, (a) the Ordinary Course of Business of

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each Party shall also include any actions expressly required or permitted by this Agreement, including the Contemplated Transactions, (b) the Ordinary Course of Business for Miragen shall also include (i) actions undertaken in connection with preparing to become a SEC reporting company listed on the NASDAQ Capital Market and (ii) actions required to engage with one or more third parties regarding a lease, exchange, transfer, license, disposition, partnership, or collaboration involving less than substantially all of the assets of Miragen or any Miragen Subsidiary pursuant to a collaboration agreement, partnership agreement or similar arrangement, and (c) the Ordinary Course of Business of Signal shall also include actions required to effect the sale, divestiture and/or winding down of the Lab Business.

Other Signal Stockholder Matters has the meaning set forth in Section 5.3(a).

Outside Date has the meaning set forth in Section 9.1(b).

Party or ***Parties*** means Miragen, Merger Sub and Signal.

Permitted Alternative Agreement means an Acquisition Agreement that constitutes a Superior Offer.

Person means any individual, Entity or Governmental Body.

Pillsbury has the meaning set forth in Section 5.1(c).

Pre-Closing Period has the meaning set forth in Section 4.1.

Preferred Stock Conversion has the meaning set forth in Section 7.4.

Proxy Statement / Prospectus / Information Statement means the proxy statement/prospectus/information statement to be sent to Miragen s stockholders in connection with the approval of this Agreement and the Merger (by signing the Miragen Stockholder Written Consent) and to Signal s stockholders in connection with the Signal Stockholders Meeting.

Representatives means directors, officers, other employees, agents, attorneys, accountants, investment bankers, advisors and representatives.

Required Merger Sub Stockholder Vote has the meaning set forth in Section 3.2(b).

Required Miragen Stockholder Vote has the meaning set forth in Section 2.2(b).

Required Signal Stockholder Vote has the meaning set forth in Section 3.2(b).

Response Date has the meaning set forth in Section 1.6(b).

Sarbanes-Oxley Act means the Sarbanes-Oxley Act of 2002, as it may be amended from time to time.

SEC means the United States Securities and Exchange Commission.

Securities Act means the Securities Act of 1933, as amended.

Subscription Agreement has the meaning set forth in the Recitals.

Signal 401(k) Plan has the meaning set forth in Section 5.6(c).

Signal 409A Plan has the meaning set forth in Section 3.14(k).

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Signal has the meaning set forth in the Preamble.

Signal Affiliate means any Person that is (or at any relevant time was) under common control with Signal within the meaning of Sections 414(b), (c), (m) and (o) of the Code, and the regulations issued thereunder.

Signal Associate means any current or former employee, independent contractor, officer or director of Signal, any of its former Subsidiaries or any Signal Affiliate.

Signal Audited Financial Statements means the audited consolidated financial statements included in Signal s Report on Form 10-K filed with the SEC for the period ended December 31, 2015.

Signal Board Adverse Recommendation Change has the meaning set forth in Section 5.3(b).

Signal Board of Directors means the board of directors of Signal.

Signal Board Recommendation has the meaning set forth in Section 5.3(b).

Signal Capital Stock means Signal Common Stock and Signal preferred stock.

Signal Common Stock has the meaning set forth in Section 3.4(a).

Signal Contract means any Contract: (a) to which Signal is a Party; or (b) by which Signal or any Signal IP Rights or any other asset of Signal is bound or under which Signal has any obligation.

Signal Disclosure Schedule has the meaning set forth in Article 3.

Signal Employee Plan has the meaning set forth in Section 3.14(c).

Signal IP Rights means all Intellectual Property owned, licensed or controlled by Signal that is necessary or used in the business of Signal as presently conducted or as presently proposed to be conducted).

Signal IP Rights Agreement means any instrument or agreement governing, related or pertaining to any Signal IP Rights.

Signal Intervening Event has the meaning set forth in Section 5.3(c).

Sidney Leases has the meaning set forth in Section 3.8.

Signal Material Adverse Effect means any Effect that, considered together with all other Effects that have occurred prior to the date of determination of the occurrence of the Signal Material Adverse Effect, is or would reasonably be expected to be or to become materially adverse to, or has or would reasonably be expected to have or result in a material adverse effect on: (a) the business, condition (financial or otherwise), capitalization, assets, operations or financial performance of Signal; or (b) the ability of Signal to consummate the Contemplated Transactions or to perform any of its covenants or obligations under the Agreement in all material respects; *provided*, *however*, that Effects from the following shall not be deemed to constitute (nor shall Effects from any of the following be taken into account in determining whether there has occurred) a Signal Material Adverse Effect: (i) any rejection by a Governmental Body of a registration or filing by Signal relating to the Signal IP Rights; (ii) any change in the cash position of Signal which results from operations in the Ordinary Course of Business; (iii) conditions generally

affecting the industries in which Signal participates or the United States or global economy or capital markets as a whole, to the extent that such conditions do not have a disproportionate impact on Signal; (iv) any failure of Signal to meet internal projections or forecast or third-party revenue or earnings predictions for any period ending (or for which revenues or earnings are released) on or after the date of

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this Agreement or any change in the price or trading volume of Signal Common Stock (it being understood, however, that any Effect causing or contributing to any such failure to meet projections or predictions or any change in stock price or trading volume may constitute a Signal Material Adverse Effect and may be taken into account in determining whether a Signal Material Adverse Effect has occurred); (v) the sale and/or winding down of the Lab Business and Signal s operations; (vi) the conversion of the LeBow Note; (vii) the execution, delivery, announcement or performance of the obligations under this Agreement or the announcement, pendency or anticipated consummation of the Merger or the Miragen Pre-Closing Financing; (viii) any natural disaster or any acts of terrorism, sabotage, military action or war or any escalation or worsening thereof; or (ix) any changes (after the date of this Agreement) in GAAP or applicable Legal Requirements.

Signal Material Contract has the meaning set forth in Section 3.10.

Signal Options means options to purchase shares of Signal Common Stock issued or granted by Signal.

Signal Outstanding Shares Certificate has the meaning set forth in Section 1.12(a).

Signal Permits has the meaning set forth in Section 3.12(b).

Signal Registered IP means all Signal IP Rights that are registered, filed or issued under the authority of, with or by any Governmental Body, including all patents, registered copyrights and registered trademarks and all applications for any of the foregoing.

Signal Regulatory Permits has the meaning set forth in Section 3.12(d).

Signal RSUs means a restricted stock unit covering shares of Signal Common Stock issued or granted by Signal.

Signal Stockholder means each holder of Signal Capital Stock, and ***Signal Stockholders*** means all Signal Stockholders.

Signal Stockholder Matters has the meaning set forth in Section 5.3(a).

Signal Stockholders Meeting has the meaning set forth in Section 5.3(a).

Signal Stockholder Support Agreements has the meaning set forth in the Recitals.

Signal Termination Fee has the meaning set forth in Section 9.3(b).

Signal Unaudited Interim Balance Sheet means the unaudited consolidated balance sheet of Signal included in Signal s Report on Form 10-Q filed with the SEC for the period ended June 30, 2016.

Signal Warrants means the outstanding warrants to purchase Signal Capital Stock set forth in Section 3.4(a) of the Signal Disclosure Schedule.

Subsequent Transaction means any Acquisition Transaction (with all references to 20% in the definition of Acquisition Proposal being treated as references to 50% for these purposes).

Subsidiary means an Entity of which another Person directly or indirectly owns or purports to own, beneficially or of record, (a) an amount of voting securities of other interests in such Entity that is sufficient to enable such Person to

elect at least a majority of the members of such Entity s board of directors or other governing body, or (b) at least 50% of the outstanding equity, voting, beneficial or financial interests in such Entity.

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Superior Offer means an unsolicited, bona fide Acquisition Proposal (with all references to 20% in the definition of Acquisition Proposal being treated as references to 50% for these purposes) made by a third party that (a) was not obtained or made as a direct or indirect result of a breach of (or in violation of) this Agreement; and (b) is on terms and conditions that the Signal Board of Directors or the Miragen Board of Directors, as applicable, determines, in its reasonable, good faith judgment, after obtaining and taking into account such matters that its Board of Directors deems relevant following consultation with its outside legal counsel and financial advisor, if any (i) is more favorable, from a financial point of view, to the Signal Stockholders or the Miragen Stockholders, as applicable, than the terms of the Merger; and (ii) is reasonably capable of being consummated; *provided*, *however*, that any such offer shall not be deemed to be a Superior Offer if (A) any financing required to consummate the transaction contemplated by such offer is not committed and is not reasonably capable of being obtained by such third party or (B) if the consummation of such transaction is contingent on any such financing being obtained.

Surviving Corporation has the meaning set forth in Section 1.1.

Tax means any federal, state, local, foreign or other tax, including any income tax, franchise tax, capital gains tax, gross receipts tax, value-added tax, surtax, estimated tax, unemployment tax, national health insurance tax, excise tax, ad valorem tax, transfer tax, stamp tax, sales tax, use tax, property tax, business tax, withholding tax, payroll tax, customs duty, alternative or add-on minimum or other tax of any kind whatsoever, and including any fine, penalty, addition to tax or interest, whether disputed or not.

Tax Return means any return (including any information return), report, statement, declaration, estimate, schedule, notice, notification, form, election, certificate or other document or information, and any amendment or supplement to any of the foregoing, filed with or submitted to, or required to be filed with or submitted to, any Governmental Body in connection with the determination, assessment, collection or payment of any Tax or in connection with the administration, implementation or enforcement of or compliance with any Legal Requirement relating to any Tax.

Terminated Signal Associate Payments has the meaning set forth in Section 5.6(a).

Terminated Signal Options and RSUs has the meaning set forth in Section 5.6(b).

Treasury Regulations means the United States Treasury regulations promulgated under the Code.

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Annex B

Signal 2016 Equity Incentive Plan

ADOPTED BY THE BOARD OF DIRECTORS: NOVEMBER 30, 2016

APPROVED BY THE STOCKHOLDERS: ,

1. GENERAL.

(a) Successor to and Continuation of Prior Plan. The Plan is intended as the successor to and continuation of the Miragen Therapeutics, Inc. 2008 Equity Incentive Plan, as amended (the ***Prior Plan***). On and following the Effective Date, no additional stock awards will be granted under the Prior Plan. All Awards granted on or after the Effective Date will be granted under this Plan. All stock awards granted under the Prior Plan prior to the Effective Date will remain subject to the terms of the Prior Plan and the applicable award agreement. All Awards granted on or after the Effective Date will be subject to the terms of the Plan and the applicable award agreement.

(i) Any shares that would otherwise remain available for future grants under the Prior Plan as of the Effective Date will cease to be available under the Prior Plan at such time.

(ii) From and after the Effective Date, any shares subject to stock awards granted under the Prior Plan and outstanding as of the Effective Date that (i) expire or terminate for any reason prior to exercise or settlement; (ii) are forfeited because of the failure to meet a contingency or condition required to vest such shares or otherwise return to the Company; or (iii) are reacquired, withheld (or not issued) to satisfy a tax withholding obligation in connection with an award or to satisfy the purchase price or exercise price of a stock award (such shares the ***Returning Shares***) will immediately be added to the Share Reserve (as further described in Section 3(a) below) as and when such shares become Returning Shares, up to the maximum number set forth in Section 3(a) below.

(b) Eligible Award Recipients. Employees, Directors and Consultants are eligible to receive Awards.

(c) Available Awards. The Plan provides for the grant of the following types of Awards: (i) Incentive Stock Options; (ii) Nonstatutory Stock Options; (iii) Stock Appreciation Rights; (iv) Restricted Stock Awards; (v) Restricted Stock Unit Awards; (vi) Performance Stock Awards; (vii) Performance Cash Awards; and (viii) Other Stock Awards.

(d) Purpose. The Plan, through the granting of Awards, is intended to help the Company secure and retain the services of eligible award recipients, provide incentives for such persons to exert maximum efforts for the success of the Company and any Affiliate and provide a means by which the eligible recipients may benefit from increases in value of the Common Stock.

2. ADMINISTRATION.

(a) Administration by Board. The Board will administer the Plan. The Board may delegate administration of the Plan to a Committee or Committees, as provided in Section 2(c).

(b) Powers of Board. The Board will have the power, subject to, and within the limitations of, the express provisions of the Plan:

(i) To determine: (A) who will be granted Awards; (B) when and how each Award will be granted; (C) what type of Award will be granted; (D) the provisions of each Award (which need not be identical), including when a Participant will be permitted to exercise or otherwise receive cash or Common Stock under the Award; (E) the number of shares of Common Stock subject to, or the cash value of, an Award; and (F) the Fair Market Value applicable to a Stock Award.

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(ii) To construe and interpret the Plan and Awards granted under it, and to establish, amend and revoke rules and regulations for administration of the Plan and Awards. The Board, in the exercise of these powers, may correct any defect, omission or inconsistency in the Plan or in any Award Agreement or in the written terms of a Performance Cash Award, in a manner and to the extent it will deem necessary or expedient to make the Plan or Award fully effective.

(iii) To settle all controversies regarding the Plan and Awards granted under it.

(iv) To accelerate, in whole or in part, the time at which an Award may be exercised or vest (or at which cash or shares of Common Stock may be issued).

(v) To suspend or terminate the Plan at any time. Except as otherwise provided in the Plan (including Section 2(b)(viii)) or an Award Agreement, suspension or termination of the Plan will not materially impair a Participant s rights under an outstanding Award without his or her written consent.

(vi) To amend the Plan in any respect the Board deems necessary or advisable, including, without limitation, by adopting amendments relating to Incentive Stock Options and certain nonqualified deferred compensation under Section 409A of the Code and/or to make the Plan or Awards granted under the Plan compliant with the requirements for Incentive Stock Options or exempt from or compliant with the requirements for nonqualified deferred compensation under Section 409A of the Code, subject to the limitations, if any, of applicable law. If required by applicable law or listing requirements, and except as provided in Section 9(a) relating to Capitalization Adjustments, the Company will seek stockholder approval of any amendment of the Plan that (A) materially increases the number of shares of Common Stock available for issuance under the Plan, (B) materially expands the class of individuals eligible to receive Awards under the Plan, (C) materially increases the benefits accruing to Participants under the Plan, (D) materially reduces the price at which shares of Common Stock may be issued or purchased under the Plan, (E) materially extends the term of the Plan, or (F) materially expands the types of Awards available for issuance under the Plan. Except as otherwise provided in the Plan (including Section 2(b)(viii)) or an Award Agreement, no amendment of the Plan will materially impair a Participant s rights under an outstanding Award without his or her written consent.

(vii) To submit any amendment to the Plan for stockholder approval, including, but not limited to, amendments to the Plan intended to satisfy the requirements of (A) Section 162(m) of the Code regarding the exclusion of performance-based compensation from the limit on corporate deductibility of compensation paid to Covered Employees, (B) Section 422 of the Code regarding incentive stock options or (C) Rule 16b-3.

(viii) To approve forms of Award Agreements for use under the Plan and to amend the terms of any one or more outstanding Awards, including, but not limited to, amendments to provide terms more favorable to the Participant than previously provided in the Award Agreement, subject to any specified limits in the Plan that are not subject to Board discretion; *provided, however,* that except as otherwise provided in the Plan (including this Section 2(b)(viii)) or an Award Agreement, the Board may not amend the terms of an outstanding Award if the Board, in its sole discretion, determines that the amendment, taken as a whole, will materially impair the Participant s rights under such Award without his or her written consent.

Notwithstanding the foregoing or anything in the Plan to the contrary, unless prohibited by applicable law, the Board may amend the terms of any outstanding Award or the Plan, or may suspend or terminate the Plan, without the affected Participant s consent, (A) to maintain the qualified status of the Award as an Incentive Stock Option under Section 422 of the Code, (B) to change the terms of an Incentive Stock Option, if such change results in impairment of the Award solely because it impairs the qualified status of the Award as an Incentive Stock Option under Section 422

of the Code, (C) to clarify the manner of exemption from, or to bring the Award or the Plan into compliance with, Section 409A of the Code, or (D) to comply with other applicable laws or listing requirements.

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(ix) Generally, to exercise such powers and to perform such acts as the Board deems necessary or expedient to promote the best interests of the Company and that are not in conflict with the provisions of the Plan or Awards.

(x) To adopt such procedures and sub-plans as are necessary or appropriate to permit participation in the Plan by Employees, Directors or Consultants who are foreign nationals or employed outside the United States (provided that Board approval will not be necessary for immaterial modifications to the Plan or any Award Agreement that are required for compliance with the laws of the relevant foreign jurisdiction).

(c) Delegation to Committee.

(i) General. The Board may delegate some or all of the administration of the Plan to a Committee or Committees. If administration of the Plan is delegated to a Committee, the Committee will have, in connection with the administration of the Plan, the powers theretofore possessed by the Board that have been delegated to the Committee, including the power to delegate to a subcommittee of the Committee any of the administrative powers the Committee is authorized to exercise (and references in this Plan to the Board will thereafter be to the Committee or subcommittee, as applicable). Any delegation of administrative powers will be reflected in resolutions, not inconsistent with the provisions of the Plan, adopted from time to time by the Board or Committee (as applicable). The Committee may, at any time, abolish the subcommittee and/or revest in the Committee any powers delegated to the subcommittee. The Board may retain the authority to concurrently administer the Plan with the Committee and may, at any time, revest in the Board some or all of the powers previously delegated.

(ii) Section 162(m) and Rule 16b-3 Compliance. The Committee may consist solely of two (2) or more Outside Directors, in accordance with Section 162(m) of the Code, or solely of two (2) or more Non-Employee Directors, in accordance with Rule 16b-3.

(d) Delegation to an Officer. The Board may delegate to one (1) or more Officers the authority to do one or both of the following: (i) designate Employees who are not Officers to be recipients of Options and SARs (and, to the extent permitted by applicable law, other Stock Awards) and, to the extent permitted by applicable law, the terms of such Awards; and (ii) determine the number of shares of Common Stock to be subject to such Stock Awards granted to such Employees; *provided, however*, that the Board resolutions regarding such delegation will specify the total number of shares of Common Stock that may be subject to the Stock Awards granted by such Officer and that such Officer may not grant a Stock Award to himself or herself. Any such Stock Awards will be granted on the form of Award Agreement most recently approved for use by the Committee or the Board, unless otherwise provided in the resolutions approving the delegation of authority. The Board may not delegate authority to an Officer who is acting solely in the capacity of an Officer (and not also as a Director) to determine the Fair Market Value pursuant to Section 13(y)(iii).

(e) Effect of Board s Decision. All determinations, interpretations and constructions made by the Board in good faith will not be subject to review by any person and will be final, binding and conclusive on all persons.

(f) Cancellation and Re-Grant of Stock Awards. Neither the Board nor any Committee will have the authority to (i) reduce the exercise or strike price of any outstanding Option or SAR under the Plan or (ii) cancel any outstanding Option or SAR that has an exercise or strike price greater than the then-current Fair Market Value of the Common Stock in exchange for cash or other Stock Awards under the Plan, unless the stockholders of the Company have approved such an action within twelve (12) months prior to such an event.

3. Shares Subject to the Plan.

(a) Share Reserve.

(i) Subject to Section 9(a) relating to Capitalization Adjustments, the aggregate number of shares of Common Stock that may be issued pursuant to Stock Awards from and after the Effective Date will not exceed 4,182,404 shares (the ***Share Reserve***), which is the sum of (A) 1,681,294 shares, *plus* (ii) 2,501,110 shares that are Returning Shares as such shares become available from time to time.

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(ii) In addition, the Share Reserve will automatically increase on January 1st of each year, for a period of not more than ten years, commencing on January 1st of the year following the year in which the Effective Date occurs and ending on (and including) January 1, 2026, in an amount equal to 4% of the total number of shares of Capital Stock outstanding on December 31st of the preceding calendar year. Notwithstanding the foregoing, the Board may act prior to January 1st of a given year to provide that there will be no January 1st increase in the Share Reserve for such year or that the increase in the Share Reserve for such year will be a lesser number of shares of Common Stock than would otherwise occur pursuant to the preceding sentence

(iii) For clarity, the Share Reserve in this Section 3(a) is a limitation on the number of shares of Common Stock that may be issued pursuant to the Plan. Accordingly, this Section 3(a) does not limit the granting of Stock Awards except as provided in Section 7(a). Shares may be issued in connection with a merger or acquisition as permitted by NASDAQ Listing Rule 5635(c) or, if applicable, NYSE Listed Company Manual Section 303A.08, AMEX Company Guide Section 711 or other applicable rule, and such issuance will not reduce the number of shares available for issuance under the Plan.

(b) Reversion of Shares to the Share Reserve. If a Stock Award or any portion thereof (i) expires or otherwise terminates without all of the shares covered by such Stock Award having been issued or (ii) is settled in cash (i.e., the Participant receives cash rather than stock), such expiration, termination or settlement will not reduce (or otherwise offset) the number of shares of Common Stock that may be available for issuance under the Plan. If any shares of Common Stock issued pursuant to a Stock Award are forfeited back to or repurchased by the Company because of the failure to meet a contingency or condition required to vest such shares in the Participant, then the shares that are forfeited or repurchased will revert to and again become available for issuance under the Plan. Any shares reacquired by the Company in satisfaction of tax withholding obligations on a Stock Award or as consideration for the exercise or purchase price of a Stock Award will again become available for issuance under the Plan.

(c) Incentive Stock Option Limit. Subject to the Share Reserve and Section 9(a) relating to Capitalization Adjustments, the aggregate maximum number of shares of Common Stock that may be issued pursuant to the exercise of Incentive Stock Options will be 20,912,020 shares of Common Stock.

(d) Section 162(m) Limitations. Subject to the Share Reserve and Section 9(a) relating to Capitalization Adjustments, at such time as the Company may be subject to the applicable provisions of Section 162(m) of the Code, the following limitations will apply; *provided, however,* that if any additional Awards are granted to any Participant during any calendar year in excess of the limits below, compensation attributable to such additional Awards will not satisfy the requirements to be considered qualified performance-based compensation under Section 162(m) of the Code unless such additional Award is approved by the Company s stockholders.

(i) A maximum of One Million Five Hundred Thousand (1,500,000) shares of Common Stock subject to Options and SARs whose value is determined by reference to an increase over an exercise or strike price of at least one hundred percent (100%) of the Fair Market Value on the date any such Option or SAR is granted may be granted to any one Participant during any one calendar year.

(ii) A maximum of One Million Five Hundred Thousand (1,500,000) shares of Common Stock subject to Performance Stock Awards may be granted to any one Participant during any one calendar year (whether the grant, vesting or exercise is contingent upon the attainment during the Performance Period of the Performance Goals).

(iii) A maximum of Three Million Dollars ($3,000,000) subject to Performance Cash Awards may be granted to any one Participant during any one calendar year.

For purposes of this Section 3(d): (1) if a Performance Stock Award is in the form of an Option or SAR, it will count only against the Performance Stock Award limit set forth in Section 3(d)(ii); (2) if a Performance

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Stock Award may be paid in the form of cash, it will count only against the Performance Stock Award limit set forth in Section 3(d)(ii); and (3) if a Performance Cash Award may be paid in the form of Common Stock, it will count only against the Performance Cash Award limit set forth in Section 3(d)(iii).

(e) Limits on Grants to Non-Employee Directors. The maximum number of shares of Common Stock subject to Stock Awards granted under the Plan or otherwise during any one calendar year to any Non-Employee Director, taken together with any cash fees paid by the Company to such Non-Employee Director during such calendar year for service on the Board, will not exceed Five Hundred Thousand Dollars ($500,000) in total value (calculating the value of any such Stock Awards based on the grant date fair value of such Stock Awards for financial reporting purposes), or, with respect to the calendar year in which a Non-Employee Director is first appointed or elected to the Board, One Million Dollars ($1,000,000). The Board may make exceptions to the applicable limit in this Section 3(e) for individual Non-Employee Directors in extraordinary circumstances, as the Board may determine in its discretion, provided that the Non-Employee Director receiving such additional compensation may not participate in the decision to award such compensation.

(f) Source of Shares. The stock issuable under the Plan will be shares of authorized but unissued or reacquired Common Stock, including shares repurchased by the Company on the open market or otherwise.

4. ELIGIBILITY.

(a) Eligibility for Specific Stock Awards. Incentive Stock Options may be granted only to employees of the Company or a parent corporation or subsidiary corporation thereof (as such terms are defined in Sections 424(e) and 424(f) of the Code). Stock Awards other than Incentive Stock Options may be granted to Employees, Directors and Consultants; *provided, however*, that Stock Awards may not be granted to Employees, Directors and Consultants who are providing Continuous Service only to any parent of the Company, as such term is defined in Rule 405, unless (i) the stock underlying such Stock Awards is treated as service recipient stock under Section 409A of the Code (for example, because the Stock Awards are granted pursuant to a corporate transaction such as a spin off transaction) or (ii) the Company, in consultation with its legal counsel, has determined that such Stock Awards are otherwise exempt from or alternatively comply with Section 409A of the Code.

(b) Ten Percent Stockholders. A Ten Percent Stockholder will not be granted an Incentive Stock Option unless the exercise price of such Option is at least one hundred ten percent (110%) of the Fair Market Value on the date of grant and the Option is not exercisable after the expiration of five (5) years from the date of grant.

5. PROVISIONS RELATING TO OPTIONS AND STOCK APPRECIATION RIGHTS.

Each Option or SAR Agreement will be in such form and will contain such terms and conditions as the Board deems appropriate. All Options will be separately designated Incentive Stock Options or Nonstatutory Stock Options at the time of grant, and, if certificates are issued, a separate certificate or certificates will be issued for shares of Common Stock purchased on exercise of each type of Option. If an Option is not specifically designated as an Incentive Stock Option, or if an Option is designated as an Incentive Stock Option but some portion or all of the Option fails to qualify as an Incentive Stock Option under the applicable rules, then the Option (or portion thereof) will be a Nonstatutory Stock Option. The terms and conditions of separate Option or SAR Agreements need not be identical; *provided, however*, that each Award Agreement will conform to (through incorporation of the provisions hereof by reference in the applicable Award Agreement or otherwise) the substance of each of the following provisions:

(a) Term. Subject to the provisions of Section 4(b) regarding Ten Percent Stockholders, no Option or SAR will be exercisable after the expiration of ten (10) years from the date of its grant or such shorter period specified in the Award Agreement.

(b) Exercise Price. Subject to the provisions of Section 4(b) regarding Ten Percent Stockholders, the exercise or strike price of each Option or SAR will be not less than one hundred percent (100%) of the Fair

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Market Value of the Common Stock subject to the Option or SAR on the date the Award is granted. Notwithstanding the foregoing, an Option or SAR may be granted with an exercise or strike price lower than one hundred percent (100%) of the Fair Market Value of the Common Stock subject to the Award if such Award is granted pursuant to an assumption of or substitution for another option or stock appreciation right pursuant to a Corporate Transaction and in a manner consistent with the provisions of Section 409A of the Code and, if applicable, Section 424(a) of the Code. Each SAR will be denominated in shares of Common Stock equivalents.

(c) Purchase Price for Options. The purchase price of Common Stock acquired pursuant to the exercise of an Option may be paid, to the extent permitted by applicable law and as determined by the Board in its sole discretion, by any combination of the methods of payment set forth below. The Board will have the authority to grant Options that do not permit all of the following methods of payment (or that otherwise restrict the ability to use certain methods) and to grant Options that require the consent of the Company to use a particular method of payment. The permitted methods of payment are as follows:

(i) by cash (including electronic funds transfers), check, bank draft or money order payable to the Company;

(ii) pursuant to a program developed under Regulation T as promulgated by the Federal Reserve Board that, prior to the issuance of the stock subject to the Option, results in either the receipt of cash (or check) by the Company or the receipt of irrevocable instructions to pay the aggregate exercise price to the Company from the sales proceeds;

(iii) by delivery to the Company (either by actual delivery or attestation) of shares of Common Stock;

(iv) if an Option is a Nonstatutory Stock Option, by a net exercise arrangement pursuant to which the Company will reduce the number of shares of Common Stock issuable upon exercise by the largest whole number of shares with a Fair Market Value that does not exceed the aggregate exercise price; *provided, however*, that the Company will accept a cash or other payment from the Participant to the extent of any remaining balance of the aggregate exercise price not satisfied by such reduction in the number of whole shares to be issued. Shares of Common Stock will no longer be subject to an Option and will not be exercisable thereafter to the extent that (A) shares issuable upon exercise are used to pay the exercise price pursuant to the net exercise, (B) shares are delivered to the Participant as a result of such exercise, and (C) shares are withheld to satisfy tax withholding obligations; or

(v) in any other form of legal consideration that may be acceptable to the Board and specified in the applicable Award Agreement.

(d) Exercise and Payment of a SAR. To exercise any outstanding SAR, the Participant must provide written notice of exercise to the Company in compliance with the provisions of the Award Agreement evidencing such SAR. The appreciation distribution payable on the exercise of a SAR will be not greater than an amount equal to the excess of (A) the aggregate Fair Market Value (on the date of the exercise of the SAR) of a number of shares of Common Stock equal to the number of Common Stock equivalents in which the Participant is vested under such SAR, and with respect to which the Participant is exercising the SAR on such date, over (B) the aggregate strike price of the number of Common Stock equivalents with respect to which the Participant is exercising the SAR on such date. The appreciation distribution may be paid in Common Stock, in cash, in any combination of the two or in any other form of consideration, as determined by the Board and contained in the Award Agreement evidencing such SAR.

(e) Transferability of Options and SARs. The Board may, in its sole discretion, impose such limitations on the transferability of Options and SARs as the Board will determine. In the absence of such a determination by the Board to the contrary, the following restrictions on the transferability of Options and SARs will apply:

(i) Restrictions on Transfer. An Option or SAR will not be transferable, except by will or by the laws of descent and distribution (or pursuant to Sections 5(e)(ii) and 5(e)(iii)), and will be exercisable during the

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lifetime of the Participant only by the Participant. The Board may permit transfer of the Option or SAR in a manner that is not prohibited by applicable tax and securities laws. Except as explicitly provided in the Plan, neither an Option nor a SAR may be transferred for consideration.

(ii) Domestic Relations Orders. Subject to the approval of the Board or a duly authorized Officer, an Option or SAR may be transferred pursuant to the terms of a domestic relations order, official marital settlement agreement or other divorce or separation instrument as permitted by Treasury Regulations Section 1.421-1(b)(2). If an Option is an Incentive Stock Option, such Option may be deemed to be a Nonstatutory Stock Option as a result of such transfer.

(iii) Beneficiary Designation. Subject to the approval of the Board or a duly authorized Officer, a Participant may, by delivering written notice to the Company, in a form approved by the Company (or the designated broker), designate a third party who, upon the death of the Participant, will thereafter be entitled to exercise the Option or SAR and receive the Common Stock or other consideration resulting from such exercise. In the absence of such a designation, upon the death of the Participant, the executor or administrator of the Participant s estate will be entitled to exercise the Option or SAR and receive the Common Stock or other consideration resulting from such exercise. However, the Company may prohibit designation of a beneficiary at any time, including due to any conclusion by the Company that such designation would be inconsistent with the provisions of applicable laws.

(f) Vesting Generally. The total number of shares of Common Stock subject to an Option or SAR may vest and become exercisable in periodic installments that may or may not be equal. The Option or SAR may be subject to such other terms and conditions on the time or times when it may or may not be exercised (which may be based on the satisfaction of Performance Goals or other criteria) as the Board may deem appropriate. The vesting provisions of individual Options or SARs may vary. The provisions of this Section 5(f) are subject to any Option or SAR provisions governing the minimum number of shares of Common Stock as to which an Option or SAR may be exercised.

(g) Termination of Continuous Service. Except as otherwise provided in the applicable Award Agreement or other written agreement between a Participant and the Company or an Affiliate, if a Participant s Continuous Service terminates (other than for Cause and other than upon the Participant s death or Disability), the Participant may exercise his or her Option or SAR (to the extent that the Participant was entitled to exercise such Option or SAR as of the date of termination of Continuous Service), but only within such period of time ending on the earlier of (i) the date that is three (3) months following such termination of Continuous Service (or such longer or shorter period specified in the Award Agreement), and (ii) the expiration of the term of the Option or SAR as set forth in the Award Agreement. Except as otherwise provided in the applicable Award Agreement, if, after such termination of Continuous Service, the Participant does not exercise his or her Option or SAR (as applicable) within the applicable time frame, the Option or SAR (as applicable) will terminate.

(h) Extension of Termination Date. Except as otherwise provided in the applicable Award Agreement or other written agreement between a Participant and the Company or an Affiliate, if the exercise of an Option or SAR following the termination of a Participant s Continuous Service (other than for Cause and other than upon the Participant s death or Disability) would be prohibited at any time solely because the issuance of shares of Common Stock would violate the registration requirements under the Securities Act, then the Option or SAR will terminate on the earlier of (i) the expiration of a total period of time (that need not be consecutive) equal to the applicable post-termination exercise period after the termination of the Participant s Continuous Service during which the exercise of the Option or SAR would not be in violation of such registration requirements, or (ii) the expiration of the term of the Option or SAR as set forth in the applicable Award Agreement. In addition, except as otherwise provided in the applicable Award Agreement or other written agreement between a Participant and the Company or an Affiliate, if the sale of any Common Stock received upon exercise of an Option or SAR following the termination of a Participant s Continuous Service (other than for Cause) would violate the Company s insider trading policy, then the

Option or SAR will terminate on the earlier of (i) the expiration of a

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total period of time (that need not be consecutive) equal to the applicable post-termination exercise period after the termination of the Participant s Continuous Service during which the sale of the Common Stock received upon exercise of the Option or SAR would not be in violation of the Company s insider trading policy, or (ii) the expiration of the term of the Option or SAR as set forth in the applicable Award Agreement.

(i) Disability of Participant. Except as otherwise provided in the applicable Award Agreement or other written agreement between a Participant and the Company or an Affiliate, if a Participant s Continuous Service terminates as a result of the Participant s Disability, the Participant may exercise his or her Option or SAR (to the extent that the Participant was entitled to exercise such Option or SAR as of the date of termination of Continuous Service), but only within such period of time ending on the earlier of (i) the date that is twelve (12) months following such termination of Continuous Service (or such longer or shorter period specified in the Award Agreement), and (ii) the expiration of the term of the Option or SAR as set forth in the Award Agreement. If, after such termination of Continuous Service, the Participant does not exercise his or her Option or SAR (as applicable) within the applicable time frame, the Option or SAR (as applicable) will terminate.

(j) Death of Participant. Except as otherwise provided in the applicable Award Agreement or other written agreement between a Participant and the Company or an Affiliate, if (i) a Participant s Continuous Service terminates as a result of the Participant s death, or (ii) a Participant dies within the period (if any) specified in the Award Agreement for exercisability after the termination of the Participant s Continuous Service (for a reason other than death), then the Participant s Option or SAR may be exercised (to the extent that the Participant was entitled to exercise such Option or SAR as of the date of death) by the Participant s estate, by a person who acquired the right to exercise the Option or SAR by bequest or inheritance, or by a person designated to exercise the Option or SAR upon the Participant s death, but only within such period of time ending on the earlier of (i) the date that is eighteen (18) months following the date of death (or such longer or shorter period specified in the Award Agreement), and (ii) the expiration of the term of the Option or SAR as set forth in the Award Agreement. If, after the Participant s death, the Option or SAR (as applicable) is not exercised within the applicable time frame, the Option or SAR (as applicable) will terminate.

(k) Termination for Cause. Except as explicitly provided otherwise in the applicable Award Agreement or other individual written agreement between a Participant and the Company or an Affiliate, if a Participant s Continuous Service is terminated for Cause, the Participant s Option or SAR will terminate immediately upon such termination of Continuous Service, and the Participant will be prohibited from exercising his or her Option or SAR from and after the time of such termination of Continuous Service.

(l) Non-Exempt Employees. If an Option or SAR is granted to an Employee who is a non-exempt employee for purposes of the Fair Labor Standards Act of 1938, as amended, the Option or SAR will not be first exercisable for any shares of Common Stock until at least six (6) months following the date of grant of the Option or SAR (although the Award may vest prior to such date). Consistent with the provisions of the Worker Economic Opportunity Act, (i) if such non-exempt employee dies or suffers a Disability, (ii) upon a Corporate Transaction in which such Option or SAR is not assumed, continued or substituted, (iii) upon a Change in Control, or (iv) upon the Participant s retirement (as such term may be defined in the Participant s Award Agreement, in another written agreement between the Participant and the Company or an Affiliate, or, if no such definition, in accordance with the Company s then current employment policies and guidelines), the vested portion of any Options and SARs may be exercised earlier than six (6) months following the date of grant. The foregoing provision is intended to operate so that any income derived by a non-exempt employee in connection with the exercise or vesting of an Option or SAR will be exempt from his or her regular rate of pay. To the extent permitted and/or required for compliance with the Worker Economic Opportunity Act to ensure that any income derived by a non-exempt employee in connection with the exercise, vesting or issuance of any shares under any other Stock Award will be exempt from the employee s regular rate of pay,

the provisions of this Section 5(l) will apply to all Stock Awards and are hereby incorporated by reference into such Stock Award Agreements.

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6. Provisions of Stock Awards Other than Options and SARs.

(a) Restricted Stock Awards. Each Restricted Stock Award Agreement will be in such form and will contain such terms and conditions as the Board deems appropriate. To the extent consistent with the Company s bylaws, at the Board s election, shares of Common Stock underlying a Restricted Stock Award may be (i) held in book entry form subject to the Company s instructions until any restrictions relating to the Restricted Stock Award lapse, or (ii) evidenced by a certificate, which certificate will be held in such form and manner as determined by the Board. The terms and conditions of separate Restricted Stock Award Agreements need not be identical; *provided, however*, that each Restricted Stock Award Agreement will conform to (through incorporation of the provisions hereof by reference in the applicable Award Agreement or otherwise) the substance of each of the following provisions:

(i) Consideration. A Restricted Stock Award may be awarded in consideration for (A) cash (including electronic funds transfers), check, bank draft or money order payable to the Company, (B) past services to the Company or an Affiliate, or (C) any other form of legal consideration (including future services) that may be acceptable to the Board, in its sole discretion, and permissible under applicable law.

(ii) Vesting. Shares of Common Stock awarded under a Restricted Stock Award Agreement may be subject to forfeiture to or repurchase by the Company in accordance with a vesting schedule to be determined by the Board.

(iii) Termination of Continuous Service. If a Participant s Continuous Service terminates, the Company may receive through a forfeiture condition or a repurchase right any or all of the shares of Common Stock held by the Participant that have not vested as of the date of such termination under the terms of the Participant s Restricted Stock Award Agreement.

(iv) Transferability. Rights to acquire shares of Common Stock under a Restricted Stock Award Agreement will be transferable by the Participant only upon such terms and conditions as are set forth in the Restricted Stock Award Agreement, as the Board will determine in its sole discretion, so long as Common Stock awarded under the Restricted Stock Award Agreement remains subject to the terms of the Restricted Stock Award Agreement.

(v) Dividends. A Restricted Stock Award Agreement may provide that any dividends paid on Restricted Stock will be subject to the same vesting and forfeiture restrictions as apply to the shares subject to the Restricted Stock Award to which they relate.

(b) Restricted Stock Unit Awards. Each Restricted Stock Unit Award Agreement will be in such form and will contain such terms and conditions as the Board deems appropriate. The terms and conditions of separate Restricted Stock Unit Award Agreements need not be identical; *provided, however*, that each Restricted Stock Unit Award Agreement will conform to (through incorporation of the provisions hereof by reference in the applicable Award Agreement or otherwise) the substance of each of the following provisions:

(i) Consideration. At the time of grant of a Restricted Stock Unit Award, the Board will determine the consideration, if any, to be paid by the Participant upon delivery of each share of Common Stock subject to the Restricted Stock Unit Award. The consideration to be paid (if any) by the Participant for each share of Common Stock subject to a Restricted Stock Unit Award may be paid in any form of legal consideration that may be acceptable to the Board, in its sole discretion, and permissible under applicable law.

(ii) Vesting. At the time of the grant of a Restricted Stock Unit Award, the Board may impose such restrictions on or conditions to the vesting of the Restricted Stock Unit Award as it, in its sole discretion, deems appropriate.

(iii) Payment. A Restricted Stock Unit Award may be settled by the delivery of shares of Common Stock, their cash equivalent, any combination thereof or in any other form of consideration, as determined by the Board and contained in the Restricted Stock Unit Award Agreement.

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(iv) Additional Restrictions. At the time of the grant of a Restricted Stock Unit Award, the Board, as it deems appropriate, may impose such restrictions or conditions that delay the delivery of the shares of Common Stock (or their cash equivalent) subject to the Restricted Stock Unit Award to a time after the vesting of the Restricted Stock Unit Award.

(v) Dividend Equivalents. Dividend equivalents may be credited in respect of shares of Common Stock covered by a Restricted Stock Unit Award, as determined by the Board and contained in the Restricted Stock Unit Award Agreement. At the sole discretion of the Board, such dividend equivalents may be converted into additional shares of Common Stock covered by the Restricted Stock Unit Award in such manner as determined by the Board. Any additional shares covered by the Restricted Stock Unit Award credited by reason of such dividend equivalents will be subject to all of the same terms and conditions of the underlying Restricted Stock Unit Award Agreement to which they relate.

(vi) Termination of Continuous Service. Except as otherwise provided in the applicable Restricted Stock Unit Award Agreement or other written agreement between a Participant and the Company or an Affiliate, if a Participant s Continuous Service terminates, any portion of the Participant s Restricted Stock Unit Award that has not vested as of the date of such termination will be forfeited upon such termination.

(c) Performance Awards.

(i) Performance Stock Awards. A Performance Stock Award is a Stock Award (covering a number of shares not in excess of that set forth in Section 3(d)(ii)) that is payable (including that may be granted, vest or be exercised) contingent upon the attainment during a Performance Period of specified Performance Goals. A Performance Stock Award may, but need not, require the Participant s completion of a specified period of Continuous Service. The length of any Performance Period, the Performance Goals to be achieved during the Performance Period, and the measure of whether and to what degree such Performance Goals have been attained will be conclusively determined by the Committee (or, to the extent that an Award is not intended to qualify as performance-based compensation under Section 162(m) of the Code, the Board or the Committee), in its sole discretion. In addition, to the extent permitted by applicable law and the applicable Award Agreement, the Board or the Committee may determine that cash may be used in payment of Performance Stock Awards.

(ii) Performance Cash Awards. A Performance Cash Award is a cash award (for a dollar value not in excess of that set forth in Section 3(d)(iii)) that is payable contingent upon the attainment during a Performance Period of specified Performance Goals. A Performance Cash Award may, but need not, require the Participant s completion of a specified period of Continuous Service. The length of any Performance Period, the Performance Goals to be achieved during the Performance Period, and the measure of whether and to what degree such Performance Goals have been attained will be conclusively determined by the Committee (or, to the extent that an Award is not intended to qualify as performance-based compensation under Section 162(m) of the Code, the Board or the Committee), in its sole discretion. The Board or the Committee may specify the form of payment of Performance Cash Awards, which may be cash or other property, or may provide for a Participant to have the option for his or her Performance Cash Award, or such portion thereof as the Board or the Committee may specify, to be paid in whole or in part in cash or other property.

(iii) Committee and Board Discretion. With respect to any Performance Stock Award or Performance Cash Award, the Committee (or, to the extent that an Award is not intended to qualify as performance-based compensation under Section 162(m) of the Code, the Board or the Committee) retains the discretion to (A) reduce or eliminate the compensation or economic benefit due upon attainment of the Performance Goals on the basis of any considerations as the Committee or Board (as applicable), in its sole discretion, may determine and (B) define the manner of

calculating the Performance Criteria it selects to use for a Performance Period.

(iv) Section 162(m) Compliance. With respect to any Award intended to qualify as performance-based compensation under Section 162(m) of the Code, unless otherwise permitted under Section 162(m) of the

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Code, the Committee will establish the Performance Goals applicable to, and the formula for calculating the amount payable under, the Award no later than the earlier of (A) the date ninety (90) days after the commencement of the applicable Performance Period, and (B) the date on which twenty-five percent (25%) of the Performance Period has elapsed, and in any event at a time when the achievement of the applicable Performance Goals remains substantially uncertain. Prior to the payment of any compensation under an Award intended to qualify as performance-based compensation under Section 162(m) of the Code, the Committee will certify the extent to which any Performance Goals and any other material terms under such Award have been satisfied (other than in cases where such Performance Goals or terms relate solely to the increase in the value of the Common Stock).

(d) Other Stock Awards. Other forms of Stock Awards valued in whole or in part by reference to, or otherwise based on, Common Stock, including the appreciation in value thereof (*e.g.*, options or stock appreciation rights with an exercise price or strike price less than one hundred percent (100%) of the Fair Market Value of the Common Stock at the time of grant) may be granted either alone or in addition to Stock Awards granted under Section 5 and this Section 6. Subject to the provisions of the Plan, the Board will have sole and complete authority to determine the persons to whom and the time or times at which such Other Stock Awards will be granted, the number of shares of Common Stock (or the cash equivalent thereof) to be granted pursuant to such Other Stock Awards and all other terms and conditions of such Other Stock Awards.

7. COVENANTS OF THE COMPANY.

(a) Availability of Shares. The Company will keep available at all times the number of shares of Common Stock reasonably required to satisfy then-outstanding Stock Awards.

(b) Securities Law Compliance. The Company will seek to obtain from each regulatory commission or agency having jurisdiction over the Plan the authority required to grant Stock Awards and to issue and sell shares of Common Stock upon exercise of the Stock Awards; *provided, however*, that this undertaking will not require the Company to register under the Securities Act the Plan, any Stock Award or any Common Stock issued or issuable pursuant to any such Stock Award. If, after reasonable efforts and at a reasonable cost, the Company is unable to obtain from any such regulatory commission or agency the authority that counsel for the Company deems necessary for the lawful issuance and sale of Common Stock under the Plan, the Company will be relieved from any liability for failure to issue and sell Common Stock upon exercise of such Stock Awards unless and until such authority is obtained. A Participant will not be eligible for the grant of an Award or the subsequent issuance of cash or Common Stock pursuant to the Award if such grant or issuance would be in violation of any applicable securities law.

(c) No Obligation to Notify or Minimize Taxes. The Company will have no duty or obligation to any Participant to advise such holder as to the time or manner of exercising a Stock Award. Furthermore, the Company will have no duty or obligation to warn or otherwise advise such holder of a pending termination or expiration of an Award or a possible period in which the Award may not be exercised. The Company has no duty or obligation to minimize the tax consequences of an Award to the holder of such Award.

8. MISCELLANEOUS.

(a) Use of Proceeds from Sales of Common Stock. Proceeds from the sale of shares of Common Stock issued pursuant to Stock Awards will constitute general funds of the Company.

(b) Corporate Action Constituting Grant of Awards. Corporate action constituting a grant by the Company of an Award to any Participant will be deemed completed as of the date of such corporate action, unless otherwise determined by the Board, regardless of when the instrument, certificate or letter evidencing the Award is communicated to, or actually received or accepted by, the Participant. In the event that the corporate records (*e.g.*, Board consents, resolutions or minutes) documenting the corporate action constituting the grant

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contain terms (*e.g.*, exercise price, vesting schedule or number of shares) that are inconsistent with those in the Award Agreement or related grant documents as a result of a clerical error in the papering of the Award Agreement or related grant documents, the corporate records will control and the Participant will have no legally binding right to the incorrect term in the Award Agreement or related grant documents.

(c) Stockholder Rights. No Participant will be deemed to be the holder of, or to have any of the rights of a holder with respect to, any shares of Common Stock subject to an Award unless and until (i) such Participant has satisfied all requirements for exercise of, or the issuance of shares of Common Stock under, the Award pursuant to its terms, and (ii) the issuance of the Common Stock subject to such Award has been entered into the books and records of the Company.

(d) No Employment or Other Service Rights. Nothing in the Plan, any Award Agreement or any other instrument executed thereunder or in connection with any Award granted pursuant thereto will confer upon any Participant any right to continue to serve the Company or an Affiliate in the capacity in effect at the time the Award was granted or will affect the right of the Company or an Affiliate to terminate (i) the employment of an Employee with or without notice and with or without cause, (ii) the service of a Consultant pursuant to the terms of such Consultant s agreement with the Company or an Affiliate, or (iii) the service of a Director pursuant to the bylaws of the Company or an Affiliate, and any applicable provisions of the corporate law of the state in which the Company or the Affiliate is incorporated, as the case may be.

(e) Change in Time Commitment. In the event a Participant s regular level of time commitment in the performance of his or her services for the Company or any Affiliate is reduced (for example, and without limitation, if the Participant is an Employee of the Company and the Employee has a change in status from a full-time Employee to a part-time Employee or takes an extended leave of absence) after the date of grant of any Award to the Participant, the Board has the right in its sole discretion to (i) make a corresponding reduction in the number of shares or cash amount subject to any portion of such Award that is scheduled to vest or become payable after the date of such change in time commitment, and (ii) in lieu of or in combination with such a reduction, extend the vesting or payment schedule applicable to such Award. In the event of any such reduction, the Participant will have no right with respect to any portion of the Award that is so reduced or extended.

(f) Incentive Stock Option Limitations. To the extent that the aggregate Fair Market Value (determined at the time of grant) of Common Stock with respect to which Incentive Stock Options are exercisable for the first time by any Participant during any calendar year (under all plans of the Company and any Affiliates) exceeds one hundred thousand dollars ($100,000) (or such other limit established in the Code) or otherwise does not comply with the rules governing Incentive Stock Options, the Options or portions thereof that exceed such limit (according to the order in which they were granted) or otherwise do not comply with such rules will be treated as Nonstatutory Stock Options, notwithstanding any contrary provision of the applicable Option Agreement(s).

(g) Investment Assurances. The Company may require a Participant, as a condition of exercising or acquiring Common Stock under any Award, (i) to give written assurances satisfactory to the Company as to the Participant s knowledge and experience in financial and business matters and/or to employ a purchaser representative reasonably satisfactory to the Company who is knowledgeable and experienced in financial and business matters and that he or she is capable of evaluating, alone or together with the purchaser representative, the merits and risks of exercising the Award, and (ii) to give written assurances satisfactory to the Company stating that the Participant is acquiring Common Stock subject to the Award for the Participant s own account and not with any present intention of selling or otherwise distributing the Common Stock. The foregoing requirements, and any assurances given pursuant to such requirements, will be inoperative if (A) the issuance of the shares upon the exercise or acquisition of Common Stock under the Stock Award has been registered under a then currently effective registration statement under the Securities

Act, or (B) as to any particular requirement, a determination is made by counsel for the Company that such requirement need not be met in the circumstances under the then applicable securities laws. The Company may, upon advice of counsel to the Company, place legends on stock certificates issued under the Plan as such counsel deems necessary or appropriate in order to comply with applicable securities laws, including, but not limited to, legends restricting the transfer of the Common Stock.

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(h) Withholding Obligations. Unless prohibited by the terms of an Award Agreement, the Company may, in its sole discretion, satisfy any federal, state or local tax withholding obligation relating to an Award by any of the following means or by a combination of such means: (i) causing the Participant to tender a cash payment; (ii) withholding shares of Common Stock from the shares of Common Stock issued or otherwise issuable to the Participant in connection with the Stock Award; *provided, however,* that no shares of Common Stock are withheld with a value exceeding the minimum amount of tax required to be withheld by law (or such lesser amount as may be necessary to avoid classification of the Stock Award as a liability for financial accounting purposes); (iii) withholding cash from an Award settled in cash; (iv) withholding payment from any amounts otherwise payable to the Participant; or (v) by such other method as may be set forth in the Award Agreement.

(i) Electronic Delivery. Any reference herein to a written agreement or document will include any agreement or document delivered electronically, filed publicly at www.sec.gov (or any successor website thereto) or posted on the Company s intranet (or other shared electronic medium controlled by the Company to which the Participant has access).

(j) Deferrals. To the extent permitted by applicable law, the Board, in its sole discretion, may determine that the delivery of Common Stock or the payment of cash, upon the exercise, vesting or settlement of all or a portion of any Award may be deferred and may establish programs and procedures for deferral elections to be made by Participants. Deferrals by Participants will be made in accordance with Section 409A of the Code. Consistent with Section 409A of the Code, the Board may provide for distributions while a Participant is still an employee or otherwise providing services to the Company. The Board is authorized to make deferrals of Awards and determine when, and in what annual percentages, Participants may receive payments, including lump sum payments, following the Participant s termination of Continuous Service, and implement such other terms and conditions consistent with the provisions of the Plan and in accordance with applicable law.

(k) Section 409A Compliance. Unless otherwise expressly provided for in an Award Agreement, the Plan and Award Agreements will be interpreted to the greatest extent possible in a manner that makes the Plan and the Awards granted hereunder exempt from Section 409A of the Code, and, to the extent not so exempt, in compliance with Section 409A of the Code. If the Board determines that any Award granted hereunder is not exempt from and is therefore subject to Section 409A of the Code, the Award Agreement evidencing such Award will incorporate the terms and conditions necessary to avoid the consequences specified in Section 409A(a)(1) of the Code and to the extent an Award Agreement is silent on terms necessary for compliance, such terms are hereby incorporated by reference into the Award Agreement. Notwithstanding anything to the contrary in this Plan (and unless the Award Agreement specifically provides otherwise), if the shares of Common Stock are publicly traded, and if a Participant holding an Award that constitutes deferred compensation under Section 409A of the Code is a specified employee for purposes of Section 409A of the Code, no distribution or payment of any amount that is due because of a separation from service (as defined in Section 409A of the Code without regard to alternative definitions thereunder) will be issued or paid before the date that is six (6) months following the date of the Participant s separation from service or, if earlier, the date of the Participant s death, unless such distribution or payment may be made in a manner that complies with Section 409A of the Code, and any amounts so deferred will be paid in a lump sum on the day after such six (6) month period elapses, with the balance paid thereafter on the original schedule.

(l) Clawback/Recovery. All Awards granted under the Plan will be subject to recoupment in accordance with any clawback policy that the Company is required to adopt pursuant to the listing standards of any national securities exchange or association on which the Company s securities are listed or as is otherwise required by the Dodd-Frank Wall Street Reform and Consumer Protection Act or other applicable law. In addition, the Board may impose such other clawback, recovery or recoupment provisions in an Award Agreement as the Board determines necessary or appropriate, including, but not limited to, a reacquisition right in respect of previously acquired shares of Common

Stock or other cash or property upon the occurrence of Cause. No recovery of compensation under such a clawback policy will be an event giving rise to a right to resign for good reason or constructive termination (or similar term) under any agreement with the Company.

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9. Adjustments upon Changes in Common Stock; Other Corporate Events.

(a) Capitalization Adjustments. In the event of a Capitalization Adjustment, the Board will appropriately and proportionately adjust: (i) the class(es) and maximum number of securities subject to the Plan pursuant to Section 3(a); (ii) the class(es) and maximum number of securities that may be issued pursuant to the exercise of Incentive Stock Options pursuant to Section 3(c); (iii) the class(es) and maximum number of securities that may be awarded to any Participant pursuant to Section 3(d); (iv) the class(es) and maximum number of securities that may be awarded to any Non-Employee Director pursuant to Section 3(e); and (v) the class(es) and number of securities and price per share of stock subject to outstanding Stock Awards. The Board will make such adjustments, and its determination will be final, binding and conclusive.

(b) Dissolution or Liquidation. Except as otherwise provided in the applicable Stock Award Agreement or other written agreement between a Participant and the Company or an Affiliate, in the event of a dissolution or liquidation of the Company, all outstanding Stock Awards (other than Stock Awards consisting of vested and outstanding shares of Common Stock not subject to a forfeiture condition or the Company s right of repurchase) will terminate immediately prior to the completion of such dissolution or liquidation, and the shares of Common Stock subject to a forfeiture condition or the Company s right of repurchase may be reacquired or repurchased by the Company notwithstanding the fact that the holder of such Stock Award is providing Continuous Service; *provided, however*, that the Board may, in its sole discretion, cause some or all Stock Awards to become fully vested, exercisable and/or no longer subject to forfeiture or repurchase (to the extent such Stock Awards have not previously expired or terminated) before the dissolution or liquidation is completed but contingent on its completion.

(c) Corporate Transactions. In the event of a Corporate Transaction, notwithstanding any other provision of the Plan, the Board may take one or more of the following actions with respect to Stock Awards, contingent upon the closing or consummation of the Corporate Transaction, unless otherwise provided in the instrument evidencing the Stock Award, in any other written agreement between the Company or any Affiliate and the Participant or in any director compensation policy of the Company, or unless otherwise expressly provided by the Board at the time of grant of the Stock Award:

(i) arrange for the surviving corporation or acquiring corporation (or the surviving or acquiring corporation s parent company) to assume or continue the Stock Award or to substitute a similar stock award for the Stock Award (including, but not limited to, an award to acquire the same consideration paid to the stockholders of the Company pursuant to the Corporate Transaction);

(ii) arrange for the assignment of any reacquisition or repurchase rights held by the Company in respect of Common Stock issued pursuant to the Stock Award to the surviving corporation or acquiring corporation (or the surviving or acquiring corporation s parent company);

(iii) accelerate the vesting, in whole or in part, of the Stock Award (and, if applicable, the time at which the Stock Award may be exercised) to a date prior to the effective time of such Corporate Transaction as the Board determines (or, if the Board does not determine such a date, to the date that is five (5) days prior to the effective date of the Corporate Transaction), with such Stock Award terminating if not exercised (if applicable) at or prior to the effective time of the Corporate Transaction; *provided, however*, that the Board may require Participants to complete and deliver to the Company a notice of exercise before the effective date of a Corporate Transaction, which exercise is contingent upon the effectiveness of such Corporate Transaction;

(iv) arrange for the lapse, in whole or in part, of any reacquisition or repurchase rights held by the Company with respect to the Stock Award;

(v) cancel or arrange for the cancellation of the Stock Award, to the extent not vested or not exercised prior to the effective time of the Corporate Transaction, and pay such cash consideration (including no consideration) as the Board, in its sole discretion, may consider appropriate; and

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(vi) cancel or arrange for the cancellation of the Stock Award, to the extent not vested or not exercised prior to the effective time of the Corporate Transaction, in exchange for a payment, in such form as may be determined by the Board equal to the excess, if any, of (A) the per share amount payable to holders of Common Stock in connection with the Corporate Transaction, over (B) the per share exercise price under the applicable Award. For clarity, this payment may be zero ($0) if the value of the property is equal to or less than the exercise price. In addition, any escrow, holdback, earnout or similar provisions in the definitive agreement for the Corporate Transaction may apply to such payment to the same extent and in the same manner as such provisions apply to the holders of Common Stock.

The Board need not take the same action or actions with respect to all Stock Awards or portions thereof or with respect to all Participants. The Board may take different actions with respect to the vested and unvested portions of a Stock Award.

In the event of a Corporate Transaction, unless otherwise provided in the instrument evidencing a Performance Cash Award or any other written agreement between the Company or any Affiliate and the Participant, or unless otherwise expressly provided by the Board, all Performance Cash Awards outstanding under the Plan will terminate prior to the effective time of such Corporate Transaction.

(d) Change in Control. A Stock Award may be subject to additional acceleration of vesting and exercisability upon or after a Change in Control as may be provided in the Stock Award Agreement for such Stock Award, in any other written agreement between the Company or any Affiliate and the Participant or in any director compensation policy of the Company, but in the absence of such provision, no such acceleration will occur.

10. Termination or Suspension of the Plan.

(a) The Board may suspend or terminate the Plan at any time. No Incentive Stock Option may be granted after the tenth (10th) anniversary of the earlier of (i) the Adoption Date or (ii) the date the Plan is approved by the stockholders of the Company. No Awards may be granted under the Plan while the Plan is suspended or after it is terminated.

(b) No Impairment of Rights. Suspension or termination of the Plan will not materially impair rights and obligations under any Award granted while the Plan is in effect except with the written consent of the affected Participant or as otherwise permitted in the Plan (including Section 2(b)(viii)) or an Award Agreement.

11. Effective Date of Plan.

This Plan will become effective on the Effective Date.

12. Choice of Law.

The laws of the State of Delaware will govern all questions concerning the construction, validity and interpretation of this Plan, without regard to that state s conflict of laws rules.

13. Definitions. As used in the Plan, the following definitions will apply to the capitalized terms indicated below:

(a) ***Adoption Date*** means November 30, 2016, which is the date the Plan was adopted by the Board.

(b) ***Affiliate*** means, at the time of determination, any parent or subsidiary of the Company as such terms are defined in Rule 405. The Board will have the authority to determine the time or times at which parent or subsidiary status is determined within the foregoing definition.

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(c) ***Award*** means a Stock Award or a Performance Cash Award.

(d) ***Award Agreement*** means a written agreement between the Company and a Participant evidencing the terms and conditions of an Award.

(e) ***Board*** means the Board of Directors of the Company.

(f) ***Capital Stock*** means each and every class of common stock of the Company, regardless of the number of votes per share.

(g) ***Capitalization Adjustment*** means any change that is made in, or other events that occur with respect to, the Common Stock subject to the Plan or subject to any Stock Award after the Adoption Date without the receipt of consideration by the Company through merger, consolidation, reorganization, recapitalization, reincorporation, stock dividend, dividend in property other than cash, large nonrecurring cash dividend, stock split, reverse stock split, liquidating dividend, combination of shares, exchange of shares, change in corporate structure or any similar equity restructuring transaction, as that term is used in Statement of Financial Accounting Standards Board Accounting Standards Codification Topic 718 (or any successor thereto). Notwithstanding the foregoing, the conversion of any convertible securities of the Company will not be treated as a Capitalization Adjustment.

(h) ***Cause*** will have the meaning ascribed to such term in any written agreement between a Participant and the Company or an Affiliate defining such term and, in the absence of such agreement, such term means, with respect to a Participant, the occurrence of any of the following events: (i) such Participant s commission of any felony or any crime involving fraud, dishonesty or moral turpitude under the laws of the United States or any state thereof; (ii) such Participant s attempted commission of, or participation in, a fraud or act of dishonesty against the Company; (iii) such Participant s intentional, material violation of any contract or agreement between such Participant and the Company or any statutory duty the Participant owes to the Company; (iv) such Participant s unauthorized use or disclosure of the Company s confidential information or trade secrets; or (v) such Participant s gross misconduct; *provided, however*, that the action or conduct described in clauses (iii) and (v) above will constitute Cause only if such action or conduct continues after the Company has provided such Participant with written notice thereof and thirty (30) days to cure the same. The determination that a termination of the Participant s Continuous Service is either for Cause or without Cause will be made by the Company, in its sole discretion. Any determination by the Company that the Continuous Service of a Participant was terminated with or without Cause for the purposes of outstanding Awards held by such Participant will have no effect upon any determination of the rights or obligations of the Company or such Participant for any other purpose.

(i) ***Change in Control*** means the occurrence, in a single transaction or in a series of related transactions, of any one or more of the following events:

(i) any Exchange Act Person becomes the Owner, directly or indirectly, of securities of the Company representing more than fifty percent (50%) of the combined voting power of the Company s then outstanding securities other than by virtue of a merger, consolidation or similar transaction. Notwithstanding the foregoing, a Change in Control will not be deemed to occur (A) on account of the acquisition of securities of the Company directly from the Company, (B) on account of the acquisition of securities of the Company by an investor, any affiliate thereof or any other Exchange Act Person that acquires the Company s securities in a transaction or series of related transactions the primary purpose of which is to obtain financing for the Company through the issuance of equity securities, or (C) solely because the level of Ownership held by any Exchange Act Person (the ***Subject Person***) exceeds the designated percentage threshold of the outstanding voting securities as a result of a repurchase or other acquisition of voting securities by the Company reducing the number of shares outstanding, provided that if a Change in Control would occur (but for the

operation of this sentence) as a result of the acquisition of voting securities by the Company, and after such share acquisition, the Subject Person becomes the Owner of any additional voting securities that, assuming the repurchase or other acquisition had not occurred, increases the percentage of the then outstanding voting securities Owned by the Subject Person over the designated percentage threshold, then a Change in Control will be deemed to occur;

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(ii) there is consummated a merger, consolidation or similar transaction involving (directly or indirectly) the Company and, immediately after the consummation of such merger, consolidation or similar transaction, the stockholders of the Company immediately prior thereto do not Own, directly or indirectly, either (A) outstanding voting securities representing more than fifty percent (50%) of the combined outstanding voting power of the surviving Entity in such merger, consolidation or similar transaction or (B) more than fifty percent (50%) of the combined outstanding voting power of the parent of the surviving Entity in such merger, consolidation or similar transaction, in each case in substantially the same proportions as their Ownership of the outstanding voting securities of the Company immediately prior to such transaction;

(iii) there is consummated a sale, lease, exclusive license or other disposition of all or substantially all of the consolidated assets of the Company and its Subsidiaries, other than a sale, lease, license or other disposition of all or substantially all of the consolidated assets of the Company and its Subsidiaries to an Entity, more than fifty percent (50%) of the combined voting power of the voting securities of which are Owned by stockholders of the Company in substantially the same proportions as their Ownership of the outstanding voting securities of the Company immediately prior to such sale, lease, license or other disposition; or

(iv) individuals who, on the Effective Date immediately following the closing of the Merger, are members of the Board (the ***Incumbent Board***) cease for any reason to constitute at least a majority of the members of the Board; *provided, however*, that if the appointment or election (or nomination for election) of any new Board member was approved or recommended by a majority vote of the members of the Incumbent Board then still in office, such new member will, for purposes of this Plan, be considered as a member of the Incumbent Board.

Notwithstanding the foregoing definition or any other provision of this Plan, (A) the term Change in Control will not include a sale of assets, merger or other transaction effected exclusively for the purpose of changing the domicile of the Company, and (B) the definition of Change in Control (or any analogous term) in an individual written agreement between a Participant and the Company or an Affiliate will supersede the foregoing definition with respect to Awards subject to such agreement; *provided, however*, that (1) if no definition of Change in Control (or any analogous term) is set forth in such an individual written agreement, the foregoing definition will apply; and (2) no Change in Control (or any analogous term) will be deemed to occur with respect to Awards subject to such an individual written agreement without a requirement that the Change in Control (or any analogous term) actually occur. If required for compliance with Section 409A of the Code, in no event will an event be deemed a Change in Control if such event is not also a change in the ownership of the Company, a change in the effective control of the Company, or a change in the ownership of a substantial portion of the assets of the Company, each as determined under Treasury Regulations Section 1.409A-3(i)(5) (without regard to any alternative definition thereunder). The Board may, in its sole discretion and without a Participant s consent, amend the definition of Change in Control to conform to the definition of a change in control event under Section 409A of the Code and the regulations thereunder.

(j) ***Code*** means the Internal Revenue Code of 1986, as amended, including any applicable regulations and guidance thereunder.

(k) ***Committee*** means a committee of one (1) or more Directors to whom authority has been delegated by the Board in accordance with Section 2(c).

(l) ***Common Stock*** means the common stock of the Company.

(m) ***Company*** means Signal Genetics, Inc., a Delaware corporation.

(n) ***Consultant*** means any person, including an advisor, who is (i) engaged by the Company or an Affiliate to render consulting or advisory services and is compensated for such services, or (ii) serving as a member of the board of directors of an Affiliate and is compensated for such services. However, service solely as

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a Director, or payment of a fee for such service, will not cause a Director to be considered a Consultant for purposes of the Plan. Notwithstanding the foregoing, a person is treated as a Consultant under this Plan only if a Form S-8 Registration Statement under the Securities Act is available to register either the offer or the sale of the Company s securities to such person.

(o) ***Continuous Service*** means that the Participant s service with the Company or an Affiliate, whether as an Employee, Director or Consultant, is not interrupted or terminated. A change in the capacity in which the Participant renders service to the Company or an Affiliate as an Employee, Director or Consultant or a change in the Entity for which the Participant renders such service, provided that there is no interruption or termination of the Participant s service with the Company or an Affiliate, will not terminate a Participant s Continuous Service; *provided, however,* that if the Entity for which a Participant is rendering services ceases to qualify as an Affiliate, as determined by the Board, in its sole discretion, such Participant s Continuous Service will be considered to have terminated on the date such Entity ceases to qualify as an Affiliate. For example, a change in status from an Employee of the Company to a Consultant of an Affiliate or to a Director will not constitute an interruption of Continuous Service. To the extent permitted by law, the Board or the chief executive officer of the Company, in that party s sole discretion, may determine whether Continuous Service will be considered interrupted in the case of (i) any leave of absence approved by the Board or chief executive officer, including sick leave, military leave or any other personal leave, or (ii) transfers between the Company, an Affiliate, or their successors. Notwithstanding the foregoing, a leave of absence will be treated as Continuous Service for purposes of vesting in an Award only to such extent as may be provided in the Company s leave of absence policy, in the written terms of any leave of absence agreement or policy applicable to the Participant, or as otherwise required by law.

(p) ***Corporate Transaction*** means the consummation, in a single transaction or in a series of related transactions, of any one or more of the following events:

(i) a sale or other disposition of all or substantially all, as determined by the Board, in its sole discretion, of the consolidated assets of the Company and its Subsidiaries;

(ii) a sale or other disposition of more than fifty percent (50%) of the outstanding securities of the Company;

(iii) a merger, consolidation or similar transaction following which the Company is not the surviving corporation; or

(iv) a merger, consolidation or similar transaction following which the Company is the surviving corporation but the shares of Common Stock outstanding immediately preceding the merger, consolidation or similar transaction are converted or exchanged by virtue of the merger, consolidation or similar transaction into other property, whether in the form of securities, cash or otherwise.

If required for compliance with Section 409A of the Code, in no event will an event be deemed a Corporate Transaction if such event is not also a change in the ownership of the Company, a change in the effective control of the Company, or a change in the ownership of a substantial portion of the assets of the Company, each as determined under Treasury Regulations Section 1.409A-3(i)(5) (without regard to any alternative definition thereunder). The Board may, in its sole discretion and without a Participant s consent, amend the definition of Corporate Transaction to conform to the definition of a change in control event under Section 409A of the Code and the regulations thereunder.

(q) ***Covered Employee*** will have the meaning provided in Section 162(m)(3) of the Code.

(r) ***Director*** means a member of the Board.

(s) ***Disability*** means, with respect to a Participant, the inability of such Participant to engage in any substantial gainful activity by reason of any medically determinable physical or mental impairment that can be

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expected to result in death or that has lasted or can be expected to last for a continuous period of not less than twelve (12) months, as provided in Sections 22(e)(3) and 409A(a)(2)(c)(i) of the Code, and will be determined by the Board on the basis of such medical evidence as the Board deems warranted under the circumstances.

(t) ***Effective Date*** means the effective date of this Plan document, which is the date of the closing of the transactions contemplated by the Agreement and Plan of Merger and Reorganization among the Company, Signal Merger Sub, Inc., and Miragen Therapeutics, Inc. dated as of October 31, 2016, provided that this Plan is approved by the Company s stockholders on or prior to such date.

(u) ***Employee*** means any person employed by the Company or an Affiliate. However, service solely as a Director, or payment of a fee for such services, will not cause a Director to be considered an Employee for purposes of the Plan.

(v) ***Entity*** means a corporation, partnership, limited liability company or other entity.

(w) ***Exchange Act*** means the Securities Exchange Act of 1934, as amended, and the rules and regulations promulgated thereunder.

(x) ***Exchange Act Person*** means any natural person, Entity or group (within the meaning of Section 13(d) or 14(d) of the Exchange Act), except that Exchange Act Person will not include (i) the Company or any Subsidiary of the Company, (ii) any employee benefit plan of the Company or any Subsidiary of the Company or any trustee or other fiduciary holding securities under an employee benefit plan of the Company or any Subsidiary of the Company, (iii) an underwriter temporarily holding securities pursuant to an offering of such securities, (iv) an Entity Owned, directly or indirectly, by the stockholders of the Company in substantially the same proportions as their Ownership of stock of the Company, or (v) any natural person, Entity or group (within the meaning of Section 13(d) or 14(d) of the Exchange Act) that, as of the Effective Date, is the Owner, directly or indirectly, of securities of the Company representing more than fifty percent (50%) of the combined voting power of the Company s then outstanding securities.

(y) ***Fair Market Value*** means, as of any date, the value of the Common Stock determined as follows:

(i) If the Common Stock is listed on any established stock exchange or traded on any established market, the Fair Market Value of a share of Common Stock will be, unless otherwise determined by the Board, the closing sales price for such stock as quoted on such exchange or market (or the exchange or market with the greatest volume of trading in the Common Stock) on the date of determination, as reported in a source the Board deems reliable.

(ii) Unless otherwise provided by the Board, if there is no closing sales price for the Common Stock on the date of determination, then the Fair Market Value will be the closing sales price on the last preceding date for which such quotation exists.

(iii) In the absence of such markets for the Common Stock, the Fair Market Value will be determined by the Board in good faith and in a manner that complies with Sections 409A and 422 of the Code.

(z) ***Incentive Stock Option*** means an option granted pursuant to Section 5 that is intended to be, and that qualifies as, an incentive stock option within the meaning of Section 422 of the Code.

(aa) ***Non-Employee Director*** means a Director who either (i) is not a current employee or officer of the Company or an Affiliate, does not receive compensation, either directly or indirectly, from the Company or an Affiliate for services rendered as a consultant or in any capacity other than as a Director (except for an amount as to which disclosure

would not be required under Item 404(a) of Regulation S-K promulgated pursuant to the Securities Act (***Regulation S-K***)), does not possess an interest in any other transaction for which disclosure

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would be required under Item 404(a) of Regulation S-K, and is not engaged in a business relationship for which disclosure would be required pursuant to Item 404(b) of Regulation S-K, or (ii) is otherwise considered a non-employee director for purposes of Rule 16b-3.

(bb) ***Nonstatutory Stock Option*** means an option granted pursuant to Section 5 that does not qualify as an Incentive Stock Option.

(cc) ***Officer*** means a person who is an officer of the Company within the meaning of Section 16 of the Exchange Act.

(dd) ***Option*** means an Incentive Stock Option or a Nonstatutory Stock Option to purchase shares of Common Stock granted pursuant to the Plan.

(ee) ***Option Agreement*** means a written agreement between the Company and a holder of an Option evidencing the terms and conditions of an Option grant. Each Option Agreement will be subject to the terms and conditions of the Plan.

(ff) ***Other Stock Award*** means an award based in whole or in part by reference to the Common Stock which is granted pursuant to the terms and conditions of Section 6(d).

(gg) ***Other Stock Award Agreement*** means a written agreement between the Company and a holder of an Other Stock Award evidencing the terms and conditions of an Other Stock Award grant. Each Other Stock Award Agreement will be subject to the terms and conditions of the Plan.

(hh) ***Outside Director*** means a Director who either (i) is not a current employee of the Company or an affiliated corporation (within the meaning of Treasury Regulations promulgated under Section 162(m) of the Code), is not a former employee of the Company or an affiliated corporation who receives compensation for prior services (other than benefits under a tax-qualified retirement plan) during the taxable year, has not been an officer of the Company or an affiliated corporation, and does not receive remuneration from the Company or an affiliated corporation, either directly or indirectly, in any capacity other than as a Director, or (ii) is otherwise considered an outside director for purposes of Section 162(m) of the Code.

(ii) ***Own, Owned, Owner, Ownership*** means a person or Entity will be deemed to Own, to have Owned, to be Owner of, or to have acquired Ownership of securities if such person or Entity, directly or indirectly, through any contract, arrangement, understanding, relationship or otherwise, has or shares voting power, which includes the power to vote or to direct the voting, with respect to such securities.

(jj) ***Participant*** means a person to whom an Award is granted pursuant to the Plan or, if applicable, such other person who holds an outstanding Award.

(kk) ***Performance Cash Award*** means an award of cash granted pursuant to the terms and conditions of Section 6(c)(ii).

(ll) ***Performance Criteria*** means the one or more criteria that the Board will select for purposes of establishing the Performance Goals for a Performance Period. The Performance Criteria that will be used to establish such Performance Goals may be based on any one of, or combination of, the following as determined by the Board: (i) earnings (including earnings per share and net earnings); (ii) earnings before interest, taxes and depreciation; (iii) earnings before interest, taxes, depreciation and amortization; (iv) earnings before interest, taxes, depreciation, amortization and legal settlements; (v) earnings before interest, taxes, depreciation, amortization, legal settlements and

other income (expense); (vi) earnings before interest, taxes, depreciation, amortization, legal settlements, other income (expense) and stock-based compensation; (vii) earnings before interest, taxes, depreciation, amortization, legal settlements, other income (expense), stock-based compensation

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and changes in deferred revenue; (viii) earnings before interest, taxes, depreciation, amortization, legal settlements, other income (expense), stock-based compensation, other non-cash expenses and changes in deferred revenue; (ix) total stockholder return; (x) return on equity or average stockholder s equity; (xi) return on assets, investment, or capital employed; (xii) stock price; (xiii) margin (including gross margin); (xiv) income (before or after taxes); (xv) operating income; (xvi) operating income after taxes; (xvii) pre-tax profit; (xviii) operating cash flow; (xix) sales or revenue targets; (xx) increases in revenue or product revenue; (xxi) expenses and cost reduction goals; (xxii) improvement in or attainment of working capital levels; (xxiii) economic value added (or an equivalent metric); (xxiv) market share; (xxv) cash flow; (xxvi) cash flow per share; (xxvii) cash balance; (xxviii) cash burn; (xxix) cash collections; (xxx) share price performance; (xxxi) debt reduction; (xxxii) implementation or completion of projects or processes (including, without limitation, clinical trial initiation, clinical trial enrollment and dates, clinical trial results, regulatory filing submissions, regulatory filing acceptances, regulatory or advisory committee interactions, regulatory approvals, new and supplemental indications for existing products, and product supply); (xxxiii) stockholders equity; (xxxiv) capital expenditures; (xxxv) debt levels; (xxxvi) operating profit or net operating profit; (xxxvii) workforce diversity; (xxxviii) growth of net income or operating income; (xxxix) billings; (xl) bookings; (xli) employee retention; (xlii) initiation of phases of clinical trials and/or studies by specific dates; (xliii) acquisition of new customers, including institutional accounts; (xliv) customer retention and/or repeat order rate; (xlv) number of institutional customer accounts (xlvi) budget management; (xlvii) improvements in sample and test processing times; (xlviii) regulatory milestones; (xlix) progress of internal research or clinical programs; (l) progress of partnered programs; (li) partner satisfaction; (lii) milestones related to samples received and/or tests run; (liii) expansion of sales in additional geographies or markets; (liv) research progress, including the development of programs; (lv) submission to, or approval by, a regulatory body (including, but not limited to the U.S. Food and Drug Administration) of an applicable filing or a product; (lvi) timely completion of clinical trials; (lvii) milestones related to samples received and/or tests or panels run; (lviii) expansion of sales in additional geographies or markets; (lix) research progress, including the development of programs; (lx) patient samples processed and billed; (lxi) sample processing operating metrics (including, without limitation, failure rate maximums and reduction of repeat rates); (lxii) strategic partnerships or transactions (including in-licensing and out-licensing of intellectual property); (lxiii) pre-clinical development related to compound goals; (lxiv) customer satisfaction; and (lxv) and to the extent that an Award is not intended to comply with Section 162(m) of the Code, other measures of performance selected by the Board.

(mm) ***Performance Goals*** means, for a Performance Period, the one or more goals established by the Board for the Performance Period based upon the Performance Criteria. Performance Goals may be based on a Company-wide basis, with respect to one or more business units, divisions, Affiliates, or business segments, and in either absolute terms or relative to the performance of one or more comparable companies or the performance of one or more relevant indices. Unless specified otherwise by the Board (i) in the Award Agreement at the time the Award is granted or (ii) in such other document setting forth the Performance Goals at the time the Performance Goals are established, the Board will appropriately make adjustments in the method of calculating the attainment of Performance Goals for a Performance Period as follows: (1) to exclude restructuring and/or other nonrecurring charges; (2) to exclude exchange rate effects; (3) to exclude the effects of changes to generally accepted accounting principles; (4) to exclude the effects of any statutory adjustments to corporate tax rates; (5) to exclude the effects of items that are unusual in nature or occur infrequently as determined under generally accepted accounting principles; (6) to exclude the dilutive effects of acquisitions or joint ventures; (7) to assume that any business divested by the Company achieved performance objectives at targeted levels during the balance of a Performance Period following such divestiture; (8) to exclude the effect of any change in the outstanding shares of common stock of the Company by reason of any stock dividend or split, stock repurchase, reorganization, recapitalization, merger, consolidation, spin-off, combination or exchange of shares or other similar corporate change, or any distributions to common stockholders other than regular cash dividends; (9) to exclude the effects of stock based compensation and the award of bonuses under the Company s bonus plans; (10) to exclude costs incurred in connection with potential acquisitions or divestitures that are required to be expensed under generally accepted accounting principles; and (11) to exclude the goodwill and intangible asset

impairment charges that are required to be recorded under generally accepted accounting principles. In addition,

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the Board retains the discretion to reduce or eliminate the compensation or economic benefit due upon attainment of Performance Goals and to define the manner of calculating the Performance Criteria it selects to use for such Performance Period. Partial achievement of the specified criteria may result in the payment or vesting corresponding to the degree of achievement as specified in the Stock Award Agreement or the written terms of a Performance Cash Award.

(nn) ***Performance Period*** means the period of time selected by the Committee (or, to the extent that an Award is not intended to qualify as performance-based compensation under Section 162(m) of the Code, the Board or the Committee) over which the attainment of one or more Performance Goals will be measured for the purpose of determining a Participant s right to and the payment of a Performance Stock Award or a Performance Cash Award. Performance Periods may be of varying and overlapping duration, at the sole discretion of the Committee (or Board, if applicable).

(oo) ***Performance Stock Award*** means a Stock Award granted under the terms and conditions of Section 6(c)(i).

(pp) ***Plan*** means this Signal Genetics, Inc. 2016 Equity Incentive Plan.

(qq) ***Restricted Stock Award*** means an award of shares of Common Stock which is granted pursuant to the terms and conditions of Section 6(a).

(rr) ***Restricted Stock Award Agreement*** means a written agreement between the Company and a holder of a Restricted Stock Award evidencing the terms and conditions of a Restricted Stock Award grant. Each Restricted Stock Award Agreement will be subject to the terms and conditions of the Plan.

(ss) ***Restricted Stock Unit Award*** means a right to receive shares of Common Stock which is granted pursuant to the terms and conditions of Section 6(b).

(tt) ***Restricted Stock Unit Award Agreement*** means a written agreement between the Company and a holder of a Restricted Stock Unit Award evidencing the terms and conditions of a Restricted Stock Unit Award grant. Each Restricted Stock Unit Award Agreement will be subject to the terms and conditions of the Plan.

(uu) ***Rule 16b-3*** means Rule 16b-3 promulgated under the Exchange Act or any successor to Rule 16b-3, as in effect from time to time.

(vv) ***Rule 405*** means Rule 405 promulgated under the Securities Act.

(ww) ***Securities Act*** means the Securities Act of 1933, as amended.

(xx) ***Stock Appreciation Right*** or ***SAR*** means a right to receive the appreciation on Common Stock that is granted pursuant to the terms and conditions of Section 5.

(yy) ***Stock Appreciation Right Agreement*** or ***SAR Agreement*** means a written agreement between the Company and a holder of a Stock Appreciation Right evidencing the terms and conditions of a Stock Appreciation Right grant. Each Stock Appreciation Right Agreement will be subject to the terms and conditions of the Plan.

(zz) ***Stock Award*** means any right to receive Common Stock granted under the Plan, including an Incentive Stock Option, a Nonstatutory Stock Option, a Stock Appreciation Right, a Restricted Stock Award, a Restricted Stock Unit Award, a Performance Stock Award or any Other Stock Award.

(aaa) ***Stock Award Agreement*** means a written agreement between the Company and a Participant evidencing the terms and conditions of a Stock Award grant. Each Stock Award Agreement will be subject to the terms and conditions of the Plan.

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(bbb) ***Subsidiary*** means, with respect to the Company, (i) any corporation of which more than fifty percent (50%) of the outstanding capital stock having ordinary voting power to elect a majority of the board of directors of such corporation (irrespective of whether, at the time, stock of any other class or classes of such corporation will have or might have voting power by reason of the happening of any contingency) is at the time, directly or indirectly, Owned by the Company, and (ii) any partnership, limited liability company or other entity in which the Company has a direct or indirect interest (whether in the form of voting or participation in profits or capital contribution) of more than fifty percent (50%).

(ccc) ***Ten Percent Stockholder*** means a person who Owns (or is deemed to Own pursuant to Section 424(d) of the Code) stock possessing more than ten percent (10%) of the total combined voting power of all classes of stock of the Company or any Affiliate.

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Annex C

2016 Signal Employee Stock Purchase Plan

ADOPTED BY THE BOARD OF DIRECTORS: NOVEMBER 30, 2016

APPROVED BY THE STOCKHOLDERS: ,

1. GENERAL; PURPOSE.

(a) The Plan provides a means by which Eligible Employees of the Company and certain designated Related Corporations may be given an opportunity to purchase shares of Common Stock. The Plan permits the Company to grant a series of Purchase Rights to Eligible Employees under an Employee Stock Purchase Plan.

(b) The Company, by means of the Plan, seeks to retain the services of such Employees, to secure and retain the services of new Employees and to provide incentives for such persons to exert maximum efforts for the success of the Company and its Related Corporations.

2. ADMINISTRATION.

(a) The Board will administer the Plan. The Board may delegate administration of the Plan to a Committee or Committees, as provided in Section 2(c).

(b) The Board will have the power, subject to, and within the limitations of, the express provisions of the Plan:

(i) To determine when and how Purchase Rights will be granted and the provisions of each Offering (which need not be identical).

(ii) To designate from time to time which Related Corporations will be eligible to participate in the Plan.

(iii) To construe and interpret the Plan and Purchase Rights, and to establish, amend and revoke rules and regulations for the administration of the Plan. The Board, in the exercise of this power, may correct any defect, omission or inconsistency in the Plan, in a manner and to the extent it deems necessary or expedient to make the Plan fully effective.

(iv) To settle all controversies regarding the Plan and Purchase Rights.

(v) To amend the Plan at any time as provided in Section 12.

(vi) To suspend or terminate the Plan at any time as provided in Section 12.

(vii) Generally, to exercise such powers and to perform such acts as it deems necessary or expedient to promote the best interests of the Company and its Related Corporations and to carry out the intent that the Plan be treated as an Employee Stock Purchase Plan.

(viii) To adopt such procedures and sub-plans as are necessary or appropriate to permit participation in the Plan by Employees who are foreign nationals or employed outside the United States.

(c) The Board may delegate some or all of the administration of the Plan to a Committee or Committees. If administration is delegated to a Committee, the Committee will have, in connection with the administration of the Plan, the powers theretofore possessed by the Board that have been delegated to the Committee, including the power to delegate to a subcommittee any of the administrative powers the Committee is authorized to exercise (and references to the Board in this Plan and in any applicable Offering Document will thereafter be to the Committee or subcommittee), subject, however, to such resolutions, not inconsistent with the provisions of the Plan, as may be adopted from time to time by the Board. The Board may retain the authority to concurrently

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administer the Plan with the Committee and may, at any time, revest in the Board some or all of the powers previously delegated. Whether or not the Board has delegated administration of the Plan to a Committee, the Board will have the final power to determine all questions of policy and expediency that may arise in the administration of the Plan.

(d) All determinations, interpretations and constructions made by the Board in good faith will not be subject to review by any person and will be final, binding and conclusive on all persons.

3. Shares of Common Stock Subject to the Plan.

(a) Subject to Section 11(a) relating to Capitalization Adjustments, the aggregate number of shares of Common Stock that may be issued under the Plan will not exceed 210,162 shares of Common Stock, plus the number of shares of Common Stock that are automatically added on January 1st of each year for a period of up to ten years, commencing on the first January 1st following the Effective Date and ending on (and including) January 1, 2026, in an amount equal to the lesser of (i) 1% of the total number of shares of Capital Stock outstanding on December 31st of the preceding calendar year, and (ii) 367,784 shares of Common Stock. Notwithstanding the foregoing, the Board may act prior to the first day of any calendar year to provide that there will be no January 1st increase in the share reserve for such calendar year or that the increase in the share reserve for such calendar year will be a lesser number of shares of Common Stock than would otherwise occur pursuant to the preceding sentence.

(b) If any Purchase Right terminates without having been exercised in full, the shares of Common Stock not purchased under such Purchase Right will again become available for issuance under the Plan.

(c) The stock issuable under the Plan will be shares of authorized but unissued or reacquired Common Stock, including shares repurchased by the Company on the open market.

4. Grant of Purchase Rights; Offering.

(a) The Board may from time to time grant or provide for the grant of Purchase Rights to Eligible Employees under an Offering (consisting of one or more Purchase Periods) on an Offering Date or Offering Dates selected by the Board. Each Offering will be in such form and will contain such terms and conditions as the Board will deem appropriate and will comply with the requirement of Section 423(b)(5) of the Code that all Employees granted Purchase Rights will have the same rights and privileges. The terms and conditions of an Offering will be incorporated by reference into the Plan and treated as part of the Plan. The provisions of separate Offerings need not be identical, but each Offering will include (through incorporation of the provisions of this Plan by reference in the document comprising the Offering or otherwise) the period during which the Offering will be effective, which period will not exceed twenty-seven (27) months beginning with the Offering Date, and the substance of the provisions contained in Sections 5 through 8, inclusive.

(b) If a Participant has more than one Purchase Right outstanding under the Plan, unless he or she otherwise indicates in forms delivered to the Company: (i) each form will apply to all of his or her Purchase Rights under the Plan, and (ii) a Purchase Right with a lower exercise price (or an earlier-granted Purchase Right, if different Purchase Rights have identical exercise prices) will be exercised to the fullest possible extent before a Purchase Right with a higher exercise price (or a later-granted Purchase Right if different Purchase Rights have identical exercise prices) will be exercised.

(c) The Board will have the discretion to structure an Offering so that if the Fair Market Value of a share of Common Stock on any Purchase Date during an Offering is less than or equal to the Fair Market Value of a share of Common Stock on the Offering Date for that Offering, then (i) that Offering will terminate immediately following the purchase of shares of Common Stock on such Purchase Date, and (ii) the Participants in such terminated Offering will be automatically enrolled in a new Offering that begins immediately after such Purchase Date.

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5. ELIGIBILITY.

(a) Purchase Rights may be granted only to Employees of the Company or, as the Board may designate in accordance with Section 2(b), to Employees of a Related Corporation. Except as provided in Section 5(b), an Employee will not be eligible to be granted Purchase Rights unless, on the Offering Date, the Employee has been in the employ of the Company or the Related Corporation, as the case may be, for such continuous period preceding such Offering Date as the Board may require, but in no event will the required period of continuous employment be equal to or greater than two (2) years. In addition, the Board may provide that no Employee will be eligible to be granted Purchase Rights unless, on the Offering Date, such Employee s customary employment with the Company or the Related Corporation is more than twenty (20) hours per week and more than five (5) months per calendar year or such other criteria as the Board may determine consistent with Section 423 of the Code.

(b) The Board may provide that each person who, during the course of an Offering, first becomes an Eligible Employee will, on a date or dates specified in the Offering which coincides with the day on which such person becomes an Eligible Employee or which occurs thereafter, receive a Purchase Right under that Offering, which Purchase Right will thereafter be deemed to be a part of that Offering. Such Purchase Right will have the same characteristics as any Purchase Rights originally granted under that Offering, as described herein, except that:

(i) the date on which such Purchase Right is granted will be the Offering Date of such Purchase Right for all purposes, including determination of the exercise price of such Purchase Right;

(ii) the period of the Offering with respect to such Purchase Right will begin on its Offering Date and end coincident with the end of such Offering; and

(iii) the Board may provide that if such person first becomes an Eligible Employee within a specified period of time before the end of the Offering, he or she will not receive any Purchase Right under that Offering.

(c) No Employee will be eligible for the grant of any Purchase Rights if, immediately after any such Purchase Rights are granted, such Employee owns stock possessing five percent (5%) or more of the total combined voting power or value of all classes of stock of the Company or of any Related Corporation. For purposes of this Section 5(c), the rules of Section 424(d) of the Code will apply in determining the stock ownership of any Employee, and stock which such Employee may purchase under all outstanding Purchase Rights and options will be treated as stock owned by such Employee.

(d) As specified by Section 423(b)(8) of the Code, an Eligible Employee may be granted Purchase Rights only if such Purchase Rights, together with any other rights granted under all Employee Stock Purchase Plans of the Company and any Related Corporations, do not permit such Eligible Employee s rights to purchase stock of the Company or any Related Corporation to accrue at a rate which exceeds twenty-five thousand dollars ($25,000) of Fair Market Value of such stock (determined at the time such rights are granted, and which, with respect to the Plan, will be determined as of their respective Offering Dates) for each calendar year in which such rights are outstanding at any time.

(e) Officers of the Company and any designated Related Corporation, if they are otherwise Eligible Employees, will be eligible to participate in Offerings under the Plan. Notwithstanding the foregoing, the Board may provide in an Offering that Employees who are highly compensated Employees within the meaning of Section 423(b)(4)(D) of the Code will not be eligible to participate.

6. PURCHASE RIGHTS; PURCHASE PRICE.

(a) On each Offering Date, each Eligible Employee, pursuant to an Offering made under the Plan, will be granted a Purchase Right to purchase up to that number of shares of Common Stock purchasable either with a

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percentage or with a maximum dollar amount, as designated by the Board, but in either case not exceeding fifteen percent (15%) of such Employee s earnings (as defined by the Board in each Offering) during the period that begins on the Offering Date (or such later date as the Board determines for a particular Offering) and ends on the date stated in the Offering, which date will be no later than the end of the Offering.

(b) The Board will establish one (1) or more Purchase Dates during an Offering on which Purchase Rights granted pursuant to that Offering will be exercised and shares of Common Stock will be purchased in accordance with such Offering.

(c) In connection with each Offering made under the Plan, the Board may specify (i) a maximum number of shares of Common Stock that may be purchased by any Participant pursuant to such Offering, (ii) a maximum number of shares of Common Stock that may be purchased by any Participant on any Purchase Date pursuant to such Offering, (iii) a maximum aggregate number of shares of Common Stock that may be purchased by all Participants pursuant to such Offering, and/or (iv) a maximum aggregate number of shares of Common Stock that may be purchased by all Participants on any Purchase Date pursuant to such Offering. If the aggregate purchase of shares of Common Stock issuable upon exercise of Purchase Rights granted under such Offering would exceed any such maximum aggregate number, then, in the absence of any Board action otherwise, a pro rata (based on each Participant s accumulated Contributions) allocation of the shares of Common Stock available will be made in as nearly a uniform manner as will be practicable and equitable.

(d) The purchase price of shares of Common Stock acquired pursuant to Purchase Rights will not be less than the lower of:

(i) an amount equal to eighty-five percent (85%) of the Fair Market Value of the shares of Common Stock on the Offering Date; or

(ii) an amount equal to eighty-five percent (85%) of the Fair Market Value of the shares of Common Stock on the applicable Purchase Date.

7. PARTICIPATION; WITHDRAWAL; TERMINATION.

(a) An Eligible Employee may elect to authorize payroll deductions as the means of making Contributions by completing and delivering to the Company, within the time specified in the Offering, an enrollment form provided by the Company. The enrollment form will specify the amount of Contributions not to exceed the maximum amount specified by the Board. Each Participant s Contributions will be credited to a bookkeeping account for such Participant under the Plan and will be deposited with the general funds of the Company except where applicable law requires that Contributions be deposited with a third party. To the extent provided in the Offering, a Participant may begin such Contributions on or after the Offering Date. To the extent provided in the Offering, a Participant may thereafter decrease (including to zero) or increase his or her Contributions. To the extent specifically provided in the Offering, in addition to or instead of making Contributions by payroll deductions, a Participant may make Contributions through payment by cash or check prior to a Purchase Date.

(b) During an Offering, a Participant may cease making Contributions and withdraw from the Offering by delivering to the Company a withdrawal form provided by the Company. The Company may impose a deadline before a Purchase Date for withdrawing. Upon such withdrawal, such Participant s Purchase Right in that Offering will immediately terminate and the Company will distribute to such Participant all of his or her accumulated but unused Contributions without interest. A Participant s withdrawal from an Offering will have no effect upon his or her

eligibility to participate in any other Offerings under the Plan, but such Participant will be required to deliver a new enrollment form to participate in subsequent Offerings.

(c) Purchase Rights granted pursuant to any Offering under the Plan will terminate immediately if the Participant either (i) is no longer an Employee for any reason or for no reason (subject to any post-employment participation period required by law) or (ii) is otherwise no longer eligible to participate. The Company will distribute to such individual all of his or her accumulated but unused Contributions without interest.

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(d) Purchase Rights will not be transferable by a Participant except by will, by the laws of descent and distribution, or, if permitted by the Company, by a beneficiary designation as described in Section 10. During a Participant s lifetime, Purchase Rights will be exercisable only by such Participant.

(e) Unless otherwise specified in an Offering, the Company will have no obligation to pay interest on Contributions.

8. Exercise of Purchase Rights.

(a) On each Purchase Date, each Participant s accumulated Contributions will be applied to the purchase of shares of Common Stock, up to the maximum number of shares of Common Stock permitted by the Plan and the applicable Offering, at the purchase price specified in the Offering. No fractional shares will be issued upon the exercise of Purchase Rights unless specifically provided for in the Offering.

(b) If any amount of accumulated Contributions remains in a Participant s account after the purchase of shares of Common Stock and such remaining amount is less than the amount required to purchase one (1) whole share of Common Stock on the final Purchase Date of an Offering, then such remaining amount will be held in such Participant s account for the purchase of shares of Common Stock under the next Offering under the Plan, unless such Participant withdraws from or is not eligible to participate in such next Offering, in which case such amount will be distributed to such Participant after the final Purchase Date without interest. If the amount of Contributions remaining in a Participant s account after the purchase of shares of Common Stock is at least equal to the amount required to purchase one (1) whole share of Common Stock on the final Purchase Date of an Offering, then such remaining amount will be distributed in full to such Participant after the final Purchase Date of such Offering without interest.

(c) No Purchase Rights may be exercised to any extent unless the shares of Common Stock to be issued upon such exercise under the Plan are covered by an effective registration statement pursuant to the Securities Act and the Plan is in material compliance with all applicable federal, state, foreign and other securities and other laws applicable to the Plan. If, on a Purchase Date, the shares of Common Stock are not so registered or the Plan is not in such compliance, no Purchase Rights will be exercised on such Purchase Date, and the Purchase Date will be delayed until the shares of Common Stock are subject to such an effective registration statement and the Plan is in such compliance, except that the Purchase Date will not be delayed more than twelve (12) months and the Purchase Date will in no event be more than twenty-seven (27) months from the Offering Date. If, on the Purchase Date, as delayed to the maximum extent permissible, the shares of Common Stock are not so registered or the Plan is not in such compliance, no Purchase Rights will be exercised and all accumulated but unused Contributions will be distributed to the Participants without interest.

9. Covenants of the Company.

The Company will seek to obtain from each federal, state, foreign or other regulatory commission or agency having jurisdiction over the Plan such authority as may be required to grant Purchase Rights and issue and sell shares of Common Stock thereunder. If, after commercially reasonable efforts, the Company is unable to obtain the authority that counsel for the Company deems necessary for the grant of Purchase Rights or the lawful issuance and sale of Common Stock under the Plan, and at a commercially reasonable cost, the Company will be relieved from any liability for failure to grant Purchase Rights and/or to issue and sell Common Stock upon exercise of such Purchase Rights.

10. Designation of Beneficiary.

(a) The Company may, but is not obligated to, permit a Participant to submit a form designating a beneficiary who will receive any shares of Common Stock and/or Contributions from the Participant s account under the Plan if the Participant dies before such shares and/or Contributions are delivered to the Participant. The Company may, but is not obligated to, permit the Participant to change such designation of beneficiary. Any such designation and/or change must be on a form approved by the Company.

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(b) If a Participant dies, and in the absence of a valid beneficiary designation, the Company will deliver any shares of Common Stock and/or Contributions to the executor or administrator of the estate of the Participant. If no executor or administrator has been appointed (to the knowledge of the Company), the Company, in its sole discretion, may deliver such shares of Common Stock and/or Contributions to the Participant s spouse, dependents or relatives, or if no spouse, dependent or relative is known to the Company, then to such other person as the Company may designate.

11. Adjustments upon Changes in Common Stock; Corporate Transactions.

(a) In the event of a Capitalization Adjustment, the Board will appropriately and proportionately adjust: (i) the class(es) and maximum number of securities subject to the Plan pursuant to Section 3(a); (ii) the class(es) and maximum number of securities by which the share reserve is to increase automatically each year pursuant to Section 3(a); (iii) the class(es) and number of securities subject to, and the purchase price applicable to, outstanding Offerings and Purchase Rights; and (iv) the class(es) and number of securities that are the subject of the purchase limits under each ongoing Offering. The Board will make these adjustments, and its determination will be final, binding and conclusive.

(b) In the event of a Corporate Transaction, (i) any surviving or acquiring corporation (or its parent company) may assume or continue outstanding Purchase Rights or may substitute similar rights (including a right to acquire the same consideration paid to the stockholders in the Corporate Transaction) for outstanding Purchase Rights, or (ii) if any surviving or acquiring corporation (or its parent company) does not assume or continue outstanding Purchase Rights or does not substitute similar rights for outstanding Purchase Rights, then the Participants accumulated Contributions will be used to purchase shares of Common Stock within ten (10) business days prior to the Corporate Transaction under such Purchase Rights, and such Purchase Rights will terminate immediately after such purchase.

12. Amendment, Suspension or Termination of the Plan.

(a) The Board may amend the Plan at any time in any respect the Board deems necessary or advisable. However, except as provided in Section 11(a) relating to Capitalization Adjustments, stockholder approval will be required for any amendment of the Plan for which stockholder approval is required by applicable law or listing requirements, including any amendment that either (i) materially increases the number of shares of Common Stock available for issuance under the Plan, (ii) materially expands the class of individuals eligible to become Participants and receive Purchase Rights, (iii) materially increases the benefits accruing to Participants under the Plan or materially reduces the price at which shares of Common Stock may be purchased under the Plan, (iv) materially extends the term of the Plan, or (v) expands the types of awards available for issuance under the Plan, but in each of (i) through (v) above only to the extent stockholder approval is required by applicable law or listing requirements.

(b) The Board may suspend or terminate the Plan at any time. No Purchase Rights may be granted under the Plan while the Plan is suspended or after it is terminated.

(c) Any benefits, privileges, entitlements and obligations under any outstanding Purchase Rights granted before an amendment, suspension or termination of the Plan will not be materially impaired by any such amendment, suspension or termination except (i) with the consent of the person to whom such Purchase Rights were granted, (ii) as necessary to comply with any laws, listing requirements, or governmental regulations (including, without limitation, the provisions of Section 423 of the Code and the regulations and other interpretive guidance issued thereunder relating to Employee Stock Purchase Plans) including, without limitation, any such regulations or other guidance that may be issued or amended after the Adoption Date, or (iii) as necessary to obtain or maintain favorable tax, listing, or

regulatory treatment. To be clear, the Board may amend outstanding Purchase Rights without a Participant s consent if such amendment is necessary to ensure that the Purchase Right and/or the Plan complies with the requirements of Section 423 of the Code.

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Notwithstanding anything in the Plan or any Offering Document to the contrary, the Board will be entitled to: (i) establish the exchange ratio applicable to amounts withheld in a currency other than U.S. dollars; (ii) permit Contributions in excess of the amount designated by a Participant in order to adjust for mistakes in the Company s processing of properly completed Contribution elections; (iii) establish reasonable waiting and adjustment periods and/or accounting and crediting procedures to ensure that amounts applied toward the purchase of Common Stock for each Participant properly correspond with amounts withheld from the Participant s Contributions; (iv) amend any outstanding Purchase Rights or clarify any ambiguities regarding the terms of any Offering to enable the Purchase Rights to qualify under and/or comply with Section 423 of the Code; and (v) establish other limitations or procedures as the Board determines in its sole discretion advisable that are consistent with the Plan. The actions of the Board pursuant to this paragraph will not be considered to alter or impair any Purchase Rights granted under an Offering as they are part of the initial terms of each Offering and the Purchase Rights granted under each Offering.

13. Effective Date of Plan.

The Plan will become effective on the Effective Date. No Purchase Rights will be exercised unless and until the Plan has been approved by the stockholders of the Company, which approval must be within 12 months before or after the Adoption Date (or if required under Section 12(a), the date of any material amendment of the Plan).

14. Miscellaneous Provisions.

(a) Proceeds from the sale of shares of Common Stock pursuant to Purchase Rights will constitute general funds of the Company.

(b) A Participant will not be deemed to be the holder of, or to have any of the rights of a holder with respect to, shares of Common Stock subject to Purchase Rights unless and until the Participant s shares of Common Stock acquired upon exercise of Purchase Rights are recorded in the books of the Company (or its transfer agent).

(c) The Plan and Offering do not constitute an employment contract. Nothing in the Plan or in the Offering will in any way alter the at will nature of a Participant s employment or be deemed to create in any way whatsoever any obligation on the part of any Participant to continue in the employ of the Company or a Related Corporation, or on the part of the Company or a Related Corporation to continue the employment of a Participant.

(d) The provisions of the Plan will be governed by the laws of the State of Delaware without resort to that state s conflicts of laws rules.

15. Definitions.

As used in the Plan, the following definitions will apply to the capitalized terms indicated below:

(a) ***Adoption Date*** means November 30, 2016, which is the date the Plan was adopted by the Board.

(b) ***Board*** means the Board of Directors of the Company.

(c) ***Capitalization Adjustment*** means any change that is made in, or other events that occur with respect to, the Common Stock subject to the Plan or subject to any Purchase Right after the Adoption Date without the receipt of

consideration by the Company through merger, consolidation, reorganization, recapitalization, reincorporation, stock dividend, dividend in property other than cash, large nonrecurring cash dividend, stock split, reverse stock split, liquidating dividend, combination of shares, exchange of shares, change in corporate structure or other similar equity restructuring transaction, as that term is used in Statement of Financial

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Accounting Standards Board Accounting Standards Codification Topic 718 (or any successor thereto). Notwithstanding the foregoing, the conversion of any convertible securities of the Company will not be treated as a Capitalization Adjustment.

(d) ***Capital Stock*** means each and every class of common stock of the Company, regardless of the number of votes per share.

(e) ***Code*** means the Internal Revenue Code of 1986, as amended, including any applicable regulations and guidance thereunder.

(f) ***Committee*** means a committee of one (1) or more members of the Board to whom authority has been delegated by the Board in accordance with Section 2(c).

(g) ***Common Stock*** means the common stock of the Company.

(h) ***Company*** means Signal Genetics, Inc., a Delaware corporation.

(i) ***Contributions*** means the payroll deductions and other additional payments specifically provided for in the Offering that a Participant contributes to fund the exercise of a Purchase Right. A Participant may make additional payments into his or her account if specifically provided for in the Offering, and then only if the Participant has not already had the maximum permitted amount withheld during the Offering through payroll deductions.

(j) ***Corporate Transaction*** means the consummation, in a single transaction or in a series of related transactions, of any one or more of the following events:

(i) a sale or other disposition of all or substantially all, as determined by the Board in its sole discretion, of the consolidated assets of the Company and its Subsidiaries;

(ii) a sale or other disposition of at least fifty percent (50%) of the outstanding securities of the Company;

(iii) a merger, consolidation or similar transaction following which the Company is not the surviving corporation; or

(iv) a merger, consolidation or similar transaction following which the Company is the surviving corporation but the shares of Common Stock outstanding immediately preceding the merger, consolidation or similar transaction are converted or exchanged by virtue of the merger, consolidation or similar transaction into other property, whether in the form of securities, cash or otherwise.

(k) ***Director*** means a member of the Board.

(l) ***Effective Date*** means the effective date of this Plan document, which is the date of the closing of the transactions contemplated by the Agreement and Plan of Merger and Reorganization among the Company, Signal Merger Sub, Inc., and Miragen Therapeutics, Inc., dated as of October 31, 2016, provided that this Plan is approved by the Company s stockholders on or prior to such date.

(m) ***Eligible Employee*** means an Employee who meets the requirements set forth in the document(s) governing the Offering for eligibility to participate in the Offering, provided that such Employee also meets the requirements for eligibility to participate set forth in the Plan.

(n) ***Employee*** means any person, including an Officer or Director, who is employed for purposes of Section 423(b)(4) of the Code by the Company or a Related Corporation. However, service solely as a Director, or payment of a fee for such services, will not cause a Director to be considered an Employee for purposes of the Plan.

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(o) ***Employee Stock Purchase Plan*** means a plan that grants Purchase Rights intended to be options issued under an employee stock purchase plan, as that term is defined in Section 423(b) of the Code.

(p) ***Exchange Act*** means the Securities Exchange Act of 1934, as amended, and the rules and regulations promulgated thereunder.

(q) ***Fair Market Value*** means, as of any date, the value of the Common Stock determined as follows:

(i) If the Common Stock is listed on any established stock exchange or traded on any established market, the Fair Market Value of a share of Common Stock will be, unless otherwise determined by the Board, the closing sales price for such stock as quoted on such exchange or market (or the exchange or market with the greatest volume of trading in the Common Stock) on the date of determination, as reported in a source the Board deems reliable.

(ii) Unless otherwise provided by the Board, if there is no closing sales price for the Common Stock on the date of determination, the Fair Market Value of a share of Common Stock will be the closing sales price for such stock on the last preceding date for which such quotation exists.

(iii) In the absence of such markets for the Common Stock, the Fair Market Value of a share of Common Stock will be determined by the Board in good faith in compliance with applicable laws and in a manner that complies with Section 409A of the Code.

(r) ***Offering*** means the grant to Eligible Employees of Purchase Rights, with the exercise of those Purchase Rights automatically occurring at the end of one or more Purchase Periods. The terms and conditions of an Offering will generally be set forth in the ***Offering Document*** approved by the Board for that Offering.

(s) ***Offering Date*** means a date selected by the Board for an Offering to commence.

(t) ***Officer*** means a person who is an officer of the Company or a Related Corporation within the meaning of Section 16 of the Exchange Act.

(u) ***Participant*** means an Eligible Employee who holds an outstanding Purchase Right.

(v) ***Plan*** means this Signal Genetics, Inc. 2016 Employee Stock Purchase Plan.

(w) ***Purchase Date*** means one or more dates during an Offering selected by the Board on which Purchase Rights will be exercised and on which purchases of shares of Common Stock will be carried out in accordance with such Offering.

(x) ***Purchase Period*** means a period of time specified within an Offering, generally beginning on the Offering Date or on the first Trading Day following a Purchase Date and ending on a Purchase Date. An Offering may consist of one or more Purchase Periods.

(y) ***Purchase Right*** means an option to purchase shares of Common Stock granted pursuant to the Plan.

(z) ***Related Corporation*** means any parent corporation or subsidiary corporation of the Company whether now or subsequently established, as those terms are defined in Sections 424(e) and (f), respectively, of the Code.

(aa) ***Securities Act*** means the Securities Act of 1933, as amended.

(bb) ***Subsidiary*** means, with respect to the Company, (i) any corporation of which more than fifty percent (50%) of the outstanding capital stock having ordinary voting power to elect a majority of the board of

directors of such corporation (irrespective of whether, at the time, stock of any other class or classes of such corporation will have or might have voting power by reason of the happening of any contingency) is at the time, directly or indirectly, Owned by the Company, and (ii) any partnership, limited liability company or other entity in which the Company has a direct or indirect interest (whether in the form of voting or participation in profits or capital contribution) of more than fifty percent (50%). For purposes of the foregoing clause (i), the Company will be deemed to Own or have Owned such securities if the Company, directly or indirectly, through any contract, arrangement, understanding, relationship or otherwise, has or shares voting power, which includes the power to vote or to direct the voting, with respect to such securities.

(cc) ***Trading Day*** means any day on which the exchange(s) or market(s) on which shares of Common Stock are listed (including, but not limited to, the NYSE, the Nasdaq Global Select Market, the Nasdaq Global Market, the Nasdaq Capital Market or any successors thereto) is open for trading.

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Annex D

Amendment to Certificate of Incorporation Name Change

CERTIFICATE OF AMENDMENT

OF

CERTIFICATE OF INCORPORATION

OF

SIGNAL GENETICS, INC.

SIGNAL GENETICS, INC., a corporation organized and existing under and by virtue of the General Corporation Law of the State of Delaware (the DGCL), does hereby certify:

FIRST: The name of the corporation is Signal Genetics, Inc. (the Corporation).

SECOND: The date of filing of its original Certificate of Incorporation with the Secretary of State of the State of Delaware was June 17, 2014 under the name Signal Genetics, Inc.

THIRD: The Board of Directors (the Board) of the Corporation, acting in accordance with the provisions of Sections 141 and 242 of the DGCL, adopted resolutions amending its Certificate of Incorporation as follows:

1. Article I of the Certificate of Incorporation, as presently in effect, of the Corporation is hereby amended and restated in its entirety as follows:

ARTICLE I: The name of this Corporation is Miragen Therapeutics, Inc. (the Corporation).

FOURTH: Thereafter, pursuant to a resolution by the Board, this Certificate of Amendment was submitted to the stockholders of the Corporation for their approval in accordance with the provisions of Section 211 and 242 of the DGCL. Accordingly, said proposed amendment has been adopted in accordance with Section 242 of the DGCL.

IN WITNESS WHEREOF, **SIGNAL GENETICS, INC.** has caused this Certificate of Amendment to be signed by its duly authorized officer this day of , 2017.

SIGNAL GENETICS, INC.

By: _____

_____

Name: _____

_____

Title: _____

_____

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Annex E

Amendment to Certificate of Incorporation Reverse Stock Split

CERTIFICATE OF AMENDMENT

OF

CERTIFICATE OF INCORPORATION

OF

SIGNAL GENETICS, INC.

SIGNAL GENETICS, INC., a corporation organized and existing under and by virtue of the General Corporation Law of the State of Delaware (the DGCL), does hereby certify:

FIRST: The name of the corporation is Signal Genetics, Inc. (the Corporation).

SECOND: The date of filing of its original Certificate of Incorporation with the Secretary of State of the State of Delaware was June 17, 2014 under the name Signal Genetics, Inc.

THIRD: The Board of Directors (the Board) of the Corporation, acting in accordance with the provisions of Sections 141 and 242 of the DGCL, adopted resolutions amending its Certificate of Incorporation as follows:

1. Article IV of the Certificate of Incorporation, as presently in effect, of the Corporation is hereby amended to amend and restate the final two paragraphs of Article IV in their entirety as follows:

D. Effective at 5:00 p.m. Eastern time, on the date of filing of this Certificate of Amendment to the Certificate of Incorporation with the Secretary of State of the State of Delaware (the Effective Time), the shares of the Corporation s Common Stock, par value $0.01 per share, issued and outstanding immediately prior to the Effective Time and the shares of Common Stock issued and held in the treasury of the Corporation immediately prior to the Effective Time shall be combined into a smaller number of shares such that each [one to 15, as determined by the Board] shares of issued and outstanding Common Stock immediately prior to the Effective Time are combined into one validly issued, fully paid and nonassessable share of Common Stock, par value $0.01 per share. Notwithstanding the immediately preceding sentence, no fractional shares shall be issued and, in lieu thereof, upon surrender after the Effective Time of a certificate which formerly represented shares of Common Stock that were issued and outstanding immediately prior to the Effective Time, any person who would otherwise be entitled to a fractional share of Common Stock as a result of the combination, following the Effective Time (after taking into account all fractional shares of Common Stock otherwise issuable to such holder), shall be entitled to receive a cash payment equal to the fraction to which such holder would otherwise be entitled multiplied by the fair value of the Common Stock on the date of the Effective Time, as determined by the Board of Directors.

Each stock certificate that, immediately prior to the Effective Time, represented shares of Common Stock that were issued and outstanding immediately prior to the Effective Time shall, from and after the Effective Time, automatically and without the necessity of presenting the same for exchange, represent that number of whole shares of Common Stock after the Effective Time into which the shares of Common Stock formerly represented by such certificate shall have been combined (as well as the right to receive cash in lieu of fractional shares of Common Stock after the

Effective Time), provided however, that each person of record holding a certificate that represented shares of Common Stock that were issued and outstanding immediately prior to the Effective Time shall receive, upon surrender of such certificate, a new certificate evidencing and representing the number of whole shares of Common stock after the Effective Time into which the shares of Common Stock formerly represented by such certificate shall have been combined.

FOURTH: Thereafter, pursuant to a resolution by the Board, this Certificate of Amendment was submitted to the stockholders of the Corporation for their approval in accordance with the provisions of Section 211 and 242 of the DGCL. Accordingly, said proposed amendment has been adopted in accordance with Section 242 of the DGCL.

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IN WITNESS WHEREOF, **SIGNAL GENETICS, INC.** has caused this Certificate of Amendment to be signed by its duly authorized officer this day of , 2017.

SIGNAL GENETICS, INC.

By: _____

Name: _____

Title: _____

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Annex F

Amendment to Certificate of Incorporation Authorized Shares

CERTIFICATE OF AMENDMENT

OF

CERTIFICATE OF INCORPORATION

OF

SIGNAL GENETICS, INC.

SIGNAL GENETICS, INC., a corporation organized and existing under and by virtue of the General Corporation Law of the State of Delaware (the DGCL), does hereby certify:

FIRST: The name of the corporation is Signal Genetics, Inc. (the Corporation).

SECOND: The date of filing of its original Certificate of Incorporation with the Secretary of State of the State of Delaware was June 17, 2014 under the name Signal Genetics, Inc.

THIRD: The Board of Directors (the Board) of the Corporation, acting in accordance with the provisions of Sections 141 and 242 of the DGCL, adopted resolutions amending its Certificate of Incorporation as follows:

1. Section A of Article IV of the Certificate of Incorporation, as presently in effect, of the Corporation is hereby amended and restated in its entirety as follows:

A. The total number of shares of all classes of stock which the Corporation shall have the authority to issue is 105,000,000 shares consisting of:

1. 100,000,000 shares of common stock, with a par value of $0.01 per share (the Common Stock); and

2. 5,000,000 shares of preferred stock, with a par value of $0.01 per share (the Preferred Stock).

FOURTH: Thereafter, pursuant to a resolution by the Board, this Certificate of Amendment was submitted to the stockholders of the Corporation for their approval in accordance with the provisions of Section 211 and 242 of the DGCL. Accordingly, said proposed amendment has been adopted in accordance with Section 242 of the DGCL.

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IN WITNESS WHEREOF, **SIGNAL GENETICS, INC.** has caused this Certificate of Amendment to be signed by its duly authorized officer this day of , 2017.

SIGNAL GENETICS, INC.

By: _____

Name: _____

Title: _____

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Annex G

FINAL VERSION

INTELLECTUAL PROPERTY PURCHASE AGREEMENT

THIS INTELLECTUAL PROPERTY PURCHASE AGREEMENT (this "Agreement"), effective as of November 29, 2016 (the "Effective Date"), is entered into by and between Signal Genetics, Inc., a Delaware corporation ("Seller"), and Quest Diagnostics Investments LLC, a Delaware limited liability company ("Buyer").

WHEREAS, Seller has rights to that certain MyPRS assay (the "Test") and certain Intellectual Property assets relating thereto (collectively, the "MyPRS Assay"), with "Intellectual Property" meaning intellectual property rights in any jurisdiction throughout the world, which includes, without limitation, (i) registered and applied for patents (including issuances, divisions, continuations, continuations-in-part, reissues, extensions, reexaminations, and renewals), trademarks, copyrights, and other intellectual property applied for and registered before a governmental authority; (ii) domain names, web addresses, web pages, websites, and related content; and (iii) all other intellectual property or proprietary rights including, without limitation, inventions, works of authorship, trademarks, trade dress, service marks, trade secrets, know-how, confidential information, formulas, designs, technology, research and development, methods, processes, compositions, mask works, moral rights, and all similar intellectual property rights of every type that may exist now or in the future in any jurisdiction, whether registered or not, including, without limitation, all goodwill associated with the foregoing and all rights to recover for past, present, and future infringement associated therewith, with descriptions of certain Intellectual Property assets held by Seller and relating to the MyPRS Assay set forth on Exhibit A; and

WHEREAS, Seller desires to sell, transfer, assign and convey to Buyer, and Buyer desires to purchase and receive all of Seller's rights, title and interests in and to the MyPRS Assay; and

WHEREAS, Seller agrees to sell, transfer, assign and set over to Buyer, and Buyer agrees to purchase, the Purchased Assets (as defined below) upon the terms and conditions set forth in this Agreement; and

WHEREAS, Seller has entered into that certain merger agreement dated October 31, 2016 by and among Seller, Signal Merger Sub, Inc., a wholly-owned subsidiary of Seller ("Merger Sub") and Miragen Therapeutics, Inc. ("miRagen") (the "Merger Agreement"), pursuant to which Merger Sub will merge with and into MiRagen with miRagen continuing as the surviving corporation and becoming a wholly-owned subsidiary of Seller (the "Merger"), immediately prior to the consummation of the transactions contemplated hereby.

NOW, THEREFORE, in consideration of the Seller's and Buyer's respective covenants and promises contained in this Agreement and other good and valuable consideration, the receipt and adequacy of which are hereby acknowledged, the parties hereto intending to be legally bound hereby expressly agree as follows:

1. Purchase and Sale of MyPRS Assay.

1.1 Sale and Purchase. Subject to the terms and conditions set forth herein, at the Closing (as defined in Section 1.4 below), Seller shall sell, transfer, convey, assign, set over and deliver to Buyer, and Buyer shall purchase, acquire and accept from Seller, free and clear of all Encumbrances (as defined below), all of Seller's rights, title and interests of every type and nature and wherever situated (whether personal, tangible, intangible, accrued, contingent or otherwise), in and to the following assets, properties and rights (collectively, the "Purchased Assets"):

(a) the MyPRS Assay, including all of Seller s rights, title and interests to Intellectual Property therein or related thereto;

(b) all of the Seller s rights, interests and obligations under any licenses, contracts and agreements, whether written or oral, granting, assigning, or transferring any rights in or to the MyPRS Assay listed on

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Annex 1.1(b) (Assigned Contracts), including all of Seller s rights, interests and obligations under that certain License Agreement effective as of April 1, 2010, made by and between the Board of Trustees of the University of Arkansas acting for and on behalf of the University of Arkansas for Medical Sciences (UAMS), a public institution of higher education, and Myeloma Health LLC, a Delaware limited liability company, as amended to date (the UAMS License Agreement);

(c) all income, royalties, damages, rights to sue, rights to enforce and any and all payments now or hereafter due or payable with respect to the MyPRS Assay, other than any accounts receivable of Seller as of the Closing or prior thereto;

(d) the benefit of any attorney client privilege or attorney work product privilege pertaining to the MyPRS Assay;

(e) the information technology, software and firmware, including algorithms, and data files (including, without limitation patient data, case study data, expression level data and risk outcomes), source code, object code, application programming interfaces, architecture, files, records, schematics, databases, and other related specifications, documentation and technology related to or required for the use of the MyPRS Assay, and media on which any of the foregoing is recorded, including without limitation all Technology Assets set forth on Annex 1.1(e) (the Technology Assets); provided, however, that the Technology Assets do not include any rights to the following (the Excluded Technology Assets): (i) Telerik DevCraft Complete (including, without limitation, the User Interface and Graphics library used in report generation), (ii) products from Microsoft related to coding and software (available from Microsoft on the open market) and (iii) the Affymetrix GeneChip system including without limitation related kits and software used therein (available from Affymetrix on the open market);

(f) all of the Seller s customer, supplier and contractor lists, pricing and cost information, customer files and records, sales data and customer and contractor relationships;

(g) all records pertaining to all of the foregoing Purchased Assets; and

(h) all of Seller s claims, causes of action, choses in action, rights of recovery and rights of set-off of any kind against third parties relating to all of the foregoing Purchased Assets, other than any accounts receivable of Seller as of the Closing or prior thereto.

Encumbrance means, except as expressly set forth in any Assigned Contract, any lien, pledge, mortgage, deed of trust, security interest, charge, claim, easement, encroachment, restriction, other similar encumbrance, or adverse claim of any kind or character.

1.2 Purchase Price. The purchase price to be paid by Buyer for the Purchased Assets shall be the amount (Purchase Price) equal to the sum of (a) $825,000.00 plus (b) $100,000 if Seller s lab continues to operate beyond December 31, 2016 (but no later than January 14, 2017) due to Buyer s request (as contemplated by Section 4.2) for continued Seller processing of specimens for Buyer s validation needs. At the Closing, the Purchase Price will be delivered by Buyer by wire transfer to Seller of immediately available funds to an account designated by Seller not less than three (3) business days prior to the Closing.

1.3 No Assumption of Liabilities. Buyer shall not assume or be obligated to pay any liabilities or obligations of Seller other than those liabilities of Seller arising after the Closing under the Assigned Contracts (other than liabilities arising after the Closing out of a breach by Seller of the Assigned Contracts that occurred prior to the Closing) (collectively, Assumed Liabilities). Seller shall be responsible for and shall pay when due all of its obligations and liabilities, including all obligations and liabilities arising out of, related to or in connection with any circumstances, causes of

action, breach, violation, default or failure to perform with respect to the Purchased Assets prior to the Closing (collectively, the Retained Liabilities). Nothing contained in this Agreement shall

be construed as an agreement by Buyer to assume any liability or to perform any obligation of Seller, whether known or unknown, fixed or contingent, asserted or unasserted, accrued or unaccrued, matured or unmatured, liquidated or unliquidated (including those arising out of any contract or tort, whether based on negligence, strict liability or otherwise) other than the Assumed Liabilities.

1.4 Closing Date and Deliveries. Subject to the terms and conditions of this Agreement, the consummation of the transactions contemplated by this Agreement (the Closing) shall take place at the offices of Buyer, 3 Giralda Farms, Madison, NJ 07940, by electronic mail or other electronic transmission, United States mail or overnight courier, simultaneously with the closing of the Merger assuming that all of the conditions to Closing set forth in Section 5 are either satisfied or waived by the party entitled to the benefit thereof (other than conditions which, by their nature, are to be satisfied on the Closing Date), or at such other time, date or place as Seller and Buyer may mutually agree upon in writing. The date on which the Closing is to occur is herein referred to as the Closing Date and the Closing shall for all business, tax and accounting purposes be deemed to have occurred immediately prior to the effective time of the Merger on the Closing Date. On the Closing Date:

(a) Buyer shall deliver to Seller the Purchase Price.

(b) Buyer shall deliver to Seller a bill of sale, assignment and assumption agreement in the form attached hereto as Exhibit B (the Bill of Sale/Assignment), executed by a duly appointed officer of Buyer.

(c) Buyer shall deliver to Seller an assignment of intellectual property in the form attached hereto as Exhibit C (the IP Assignment), executed by a duly appointed officer of Buyer.

(d) Buyer shall deliver to Seller the Buyer Closing Certificate and the certificate required by Section 5.3(e).

(e) Buyer shall deliver to Seller an assignment and assumption of the UAMS License Agreement in the form attached hereto as Exhibit D (the Assignment), executed by a duly appointed officer of Buyer.

(f) Buyer shall reimburse Seller for half of the amount paid by Seller to UT for the fourth quarter of 2016 and all amounts paid to UT for 2017 under that certain Sponsored Clinical Study Agreement, dated September 12, 2015, between the University of Texas M.D. Anderson Cancer Center (UT) and Seller.

(g) Seller shall deliver to Buyer the Bill of Sale/Assignment, executed by a duly appointed officer of Seller.

(h) Seller shall deliver to Buyer the IP Assignment, executed by a duly appointed officer of Seller.

(i) Seller shall deliver to Buyer the Assignment, executed by a duly appointed officer of Seller.

(j) Seller shall deliver to Buyer copies of all Required Approvals (as defined in Section 3.3).

(k) Seller shall deliver to Buyer the Seller Closing Certificate and certificate required by Sections 5.2(e) and (f).

(l) Seller shall deliver to Buyer a certificate of good standing of Seller issued by the State of Delaware and dated no earlier than ten days prior to the Closing Date.

(m) Seller shall deliver to Buyer a IRS Form W-9 Request for Taxpayer Identification Number and Certification , California Form 590 Withholding Exemption Certificate , and such other tax form, as reasonably requested by Buyer which is necessary or helpful, in its good faith judgment, to establish the tax residency of Seller and/or the

qualification of Seller from exemption from any otherwise applicable withholding tax, each such form validly completed and executed by Seller.

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1.5 Sublicense. Subject to the terms of that certain UAMS License Agreement, (i) Seller hereby grants Buyer a sublicense to all of Seller s rights under such UAMS License Agreement, (ii) Buyer hereby agrees to perform and be bound by the terms of such UAMS License Agreement as a sublicensee, and (iii) this sublicense shall terminate upon the earlier of the Closing or the termination of this Agreement.

2. Buyer s Representations and Warranties. Buyer represents and warrants to Seller that: (a) it is a limited liability company duly organized, validly existing and in good standing under the laws of the State of Delaware; (b) it has all necessary limited liability company power and authority to execute and deliver this Agreement, the Bill of Sale/Assignment, the IP Assignment, the Assignment and the other agreements contemplated hereby and thereby to which it is a party (collectively, the Buyer Transaction Documents), to carry out its obligations hereunder and thereunder and to consummate the transactions contemplated hereby and thereby; (c) no authorization or approval from any third party is required in connection with Buyer s execution, delivery or performance of this Agreement or the other Buyer Transaction Documents to which it is a party; and (d) this Agreement constitutes its legal, valid and binding obligation, enforceable against it in accordance with its terms, except as such enforceability may be limited by applicable bankruptcy, insolvency, reorganization, moratorium or similar laws affecting creditors rights generally and by general principles of equity (regardless of whether enforcement is sought in a proceeding at law or in equity). Buyer further represents and warrants to Seller that the execution, delivery and performance by it of this Agreement and the other Buyer Transaction Documents to which it is a party, and the consummation by it of the transactions contemplated hereby and thereby, does not and will not (i) violate any provision of its certificate of formation or limited liability company agreement, (ii) conflict with, result in a breach of or constitute a default under any agreement or other instrument to which it is a party or by which it is bound, or (iii) violate, result in a breach of or constitute a default under any judgment, order, injunction, decree, law, rule, regulation or other restriction of any court or governmental authority to which it is subject, except in each case, where the violation, conflict, breach or default, would not have a material adverse effect on Buyer s ability to consummate the transactions contemplated hereby.

3. Seller s Representations and Warranties. Seller represents and warrants to Buyer that:

3.1 Corporate Organization. Seller is a corporation duly organized, validly existing and in good standing under the laws of the State of Delaware with full power and authority to own and operate its properties and assets and carry on its business as currently conducted.

3.2 Authorization. Seller has all necessary corporate power and authority to enter into this Agreement, the Bill of Sale/Assignment, the IP Assignment, the Assignment and the other agreements contemplated hereby and thereby to which it is a party (collectively, the Seller Transaction Documents), to carry out its obligations hereunder and thereunder and to consummate the transactions contemplated hereby and thereby. Except for Stockholder Approval (as defined in Section 5.1(b) below), the execution and delivery of this Agreement and the other Seller Transaction Documents, the performance by Seller of its obligations hereunder and thereunder and the consummation of the transactions contemplated hereby and thereby have been duly authorized by all necessary corporate actions on the part of Seller. This Agreement has been duly executed and delivered by Seller, and constitutes a legal, valid and binding obligation of Seller, enforceable in accordance with its terms, except as such enforceability may be limited by applicable bankruptcy, insolvency, reorganization, moratorium or similar laws affecting creditors rights generally and by general principles of equity (regardless of whether enforcement is sought in a proceeding at law or in equity). When each other Seller Transaction Document has been duly executed and delivered by Seller, each such Seller Transaction Document will constitute a legal, valid and binding obligation of Seller enforceable against it in accordance with its terms, except as such enforceability may be limited by applicable bankruptcy, insolvency, reorganization, moratorium or similar laws affecting creditors rights generally and by general principles of equity (regardless of whether enforcement is sought in a proceeding at law or in equity).

3.3 No Conflicts; Consents. Except as set forth on Schedule 3.3, neither the execution and delivery of this Agreement and the other Seller Transaction Documents, nor the assignment of the Purchased Assets or

consummation of the other transactions contemplated hereby and thereby will (a) violate, or be in conflict with, any provision of any organizational document of Seller or of any applicable law binding upon or applicable to Seller, or any of the Purchased Assets; (b) violate, conflict with, or give rise to any right of termination, cancellation, increase in obligations, imposition of fees or penalties under, any debt, note, bond, indenture, mortgage, lien, lease, license, instrument, contract, commitment or other agreement, or order, arbitration award, judgment or decree, to which Seller is a party or by which it is bound or to which the Purchased Assets is subject; (c) result in the creation or imposition of any Encumbrance or third party right upon any of the Purchased Assets; or (d) result in the loss of, or otherwise adversely affect or impair, any ownership rights of Seller or Buyer in any of the Purchased Assets. Except as set forth on Schedule 3.3, no consent, approval, order or authorization of, or registration, declaration or filing with, any governmental or regulatory authority or third party is required in connection with the execution or delivery of this Agreement and the other Seller Transaction Documents or the consummation of the transactions contemplated hereby and thereby, except for recordation of the IP Assignment and other suitable patent and trademark assignment documents in the U.S. Patent & Trademark Office (the USPTO) and any comparable foreign patent offices (such recordation together with the consent of any parties identified on Schedule 3.3, other than counterparties with respect to items identified on Annex 1.1(b) other than item 1 and item 2, the Required Approvals). Except as expressly set forth in the Assigned Contracts, neither this Agreement, the other Seller Transaction Documents nor the consummation of the transactions contemplated hereby and thereby, including the assignment to Buyer of any Assigned Contracts, will result in (i) Buyer granting to any third party any right to or with respect to any Intellectual Property in the MyPRS Assay; (ii) Buyer being bound by, or subject to, any non-compete or other restriction on the operation or scope of its business; or (iii) Buyer being obligated to pay any royalties or other amounts to any person in excess of those payable by Seller prior to the Closing Date.

3.4 Ownership of Purchased Assets. To the knowledge of Seller: (i) the Purchased Assets and Seller s rights in the Purchased Assets are valid, subsisting, and enforceable; (ii) except for the Excluded Technology Assets, the Purchased Assets include all of the Intellectual Property necessary for the use or exploitation of the MyPRS Assay consistent with the scope of Seller s use or exploitation of the MyPRS Assay to date; and (iii) except with respect to the Assigned Contacts or as set forth on Schedule 3.4, Seller has good, exclusive and marketable title to the Purchased Assets and is the sole and exclusive owner of the Purchased Assets, free and clear of all Encumbrances. Except as set forth in the Assigned Contracts or on Schedule 3.4, Seller is not obligated or under any liability whatsoever to make any payments by way of royalties, fees or otherwise to any owner or licensee of, or other claimant with respect to the use of the Test or in connection with the licensing of the Test to or by third parties. To the knowledge of Seller, the Purchased Assets do not infringe, misappropriate, dilute, violate, impair, interfere or conflict with (Infringe), and has not Infringed, in any manner with any common law, statutory or other right of any third party, including any patent, trade secret, trademark, service mark, copyright, domain name or other intellectual property or proprietary right of any other person. To the knowledge of Seller, no third party has or is Infringing in any manner the Purchased Assets. Seller has not put a third party on notice of infringement of the Purchased Assets.

3.5 Proceedings; Compliance with Laws. There is no opposition, cancellation, action, arbitration, audit, hearing, investigation, litigation, suit, claim, or proceeding (collectively, Proceedings) pending, asserted or threatened by or, to the knowledge of Seller, against the Seller, and Seller has not received any communication related to any such Proceedings (including a cease and desist letter or invitation to take a license), related to the Purchased Assets, including any Proceedings concerning the ownership, validity, registrability, enforceability, infringement, misappropriation, violation or use of, or licensed right to use any Purchased Assets. To the knowledge of Seller, no valid basis exists for any such Proceeding. Seller s use or exploitation of the Purchased Assets to date complies, and at all times has complied, with all applicable laws, rules and regulations in all material respects.

3.6 Existing and Rights to Purchased Assets. Except as set forth in the Assigned Contracts or on Schedule 3.6, no past, current or future rights or licenses, including, without limitation, any implied licenses granted or retained by Seller,

have been expressly or implicitly granted or retained by Seller or, to the knowledge

of Seller, any other party under or in connection with the Purchased Assets, including without limitation through any implied or express rights or licenses granted or retained by Seller, any prior owners, the inventors or any other third parties. Except as set forth on Schedule 3.3, the consummation of the transactions contemplated by this Agreement will not result in the loss of, or otherwise adversely affect, any ownership rights of the Buyer in any Purchased Assets. To the knowledge of Seller and except as set forth in the Assigned Contracts, Buyer and its successors and assigns will not be subject to any covenant not to sue for infringement or similar restrictions or immunities with regard to, or exhaustion of rights under, the Purchased Assets, or any representations or commitments on its enforcement, control or enjoyment of the Purchased Assets after the transactions contemplated in this Agreement, or as a result of any prior transaction made by Seller related to the Purchased Assets.

3.7 Maintenance. To the knowledge of Seller, sufficient actions have been taken to protect, preserve and maintain the Purchased Assets and to perfect the chain of title (where applicable) recorded with the applicable governmental authority. To the knowledge of Seller, all annuity and maintenance fees that are necessary in order to keep the Purchased Assets in force have been paid, and no payment of annuities or fees, or fillings, are required to be made by Seller within the forty-five (45) day period after the Closing Date (except filing of the IP Assignment with the USPTO or comparable foreign patent and trademark offices). To the knowledge of Seller, no inequitable conduct has been committed in the application for registration, prosecution, or maintenance of the Purchased Assets, and no material information was withheld from any entity requiring disclosure of such information during prosecution of the Purchased Assets.

3.8 Confidentiality of Purchased Assets. Seller has taken sufficient actions to maintain and protect the confidentiality, secrecy and value of the confidential information and trade secrets related to the Purchased Assets and neither have been used by or disclosed to any person by Seller or Seller s representative except pursuant to valid non-disclosure agreements with commercially reasonable protections of such confidential information and trade secrets made available to such persons. To the knowledge of Seller, there has not been any breach by any third party of any of the confidentiality obligations contained in such non-disclosure agreements.

3.9 Employees/Contractors. The Seller has not granted to any person or authorized any person to retain any rights in any Seller owned Purchased Assets. All persons who have contributed to the Purchased Assets which are owned or purported to be owned by Seller (i) have executed a valid and enforceable agreement assigning all of such person s rights in and to such Seller owned Purchased Assets to the Seller; and (ii) have executed and are legally bound by valid and enforceable nondisclosure agreement applicable to the Seller s confidential information and trade secrets to which the Seller is the beneficiary either directly or indirectly.

3.10 Contracts.

(a) Except for the Assigned Contracts and as set forth on Schedule 3.10(a), Seller is not a party to any contract (i) relating to the borrowing of money by Seller that required or resulted in the mortgaging, pledging or otherwise placing an Encumbrance on the MyPRS Assay; (ii) licensing the MyPRS Assay or providing in whole or in part for the use of or limiting the use of the MyPRS Assay; or (iii) providing for the purchase or other acquisition or the sale or other disposition of any of the Purchased Assets or for the grant to any third party, entity or person of any preferential rights to purchase any of the Purchased Assets.

(b) Each Assigned Contract is legal, valid and binding, in full force and effect, and enforceable against Seller and, to the knowledge of Seller, the other parties thereto, in accordance with its terms, subject to laws of general application relating to the rights of creditors generally and the availability of equitable remedies, and neither Seller nor, to the knowledge of Seller, any other party thereto is in breach or default thereunder (with or without notice or lapse of time, or both). Neither Seller nor any other party to any Assigned Contract has exercised any termination rights with respect

thereto. No event has occurred or circumstance exists, including the transaction contemplated under this Agreement, that (with or without notice or lapse of time, or both) would result in a material breach of, or give Seller or any other person the right to declare a material default or exercise

any material remedy under, or accelerate the maturity or performance of or payment under, or cancel, terminate or modify, any Assigned Contract. Seller has made available to Buyer executed originals or true, complete and correct copies of all Assigned Contracts, together with all amendments or modifications thereto.

(c) The UAMS License Agreement is in full force and effect in accordance with its terms, and Seller is in compliance with all terms of the UAMS License Agreement. Any failure on the part the Seller to meet its obligations under the UAMS License Agreement, including but not limited to its obligations with respect to the development or commercialization of tests, products and or services, has not and does not constitute a material breach of or material default under the UAMS License Agreement. The Seller has not received any notice or claim (or threat of claims) related to the Seller s breach of or default under the UAMS License Agreement or any failure to meet its obligations under the UAMS License Agreement, and no facts or circumstances exist that would constitute a reasonable basis for such claim.

3.11 Technology Assets. The Technology Assets operate and perform in all material respects (i) in accordance with their documentation and functional specifications; and (ii) as necessary for the performance, use and exploitation of the MyPRS Assay. To the knowledge of Seller, the Technology Assets that are under the control of the Seller have not materially malfunctioned or failed within the past 12 months (or, if developed within that period, since completion of development) and do not contain any viruses, worms, Trojan horses, bugs, faults, or other devices, errors or contaminants that (i) significantly disrupt or adversely affect the functionality of any Technology Assets or other software or systems, or (ii) enable or assist any person to access without authorization any Technology Assets. Except as set forth on Schedule 3.11, no open source code, public source code, freeware or shareware is included in, integrated or bundled with, or otherwise necessary for the use of any Technology Assets. Seller has established and maintained safeguards within the past 12 months against the material destruction, loss or alteration of any data included within the Technology Assets. All such data has been collected and used in accordance with applicable law in all material respects and Seller s privacy policies and contractual commitments and the transaction contemplated hereunder will not require the consent of or notice to any third party with respect to the transfer of such data to or use of the data by Buyer.

3.12 Taxes. All taxes due and payable by Seller with respect to the Purchased Assets have been paid, and Seller shall not be liable for any additional taxes in respect of any taxable period ending on or before the Closing Date, and payments by Buyer hereunder to Seller shall not be subject to withholding taxes imposed by the United States of America or any state or local political subdivision thereof.

3.13 Value of the Purchased Assets. Seller has carefully reviewed and considered the value of the Purchased Assets and has discussed the sale of the Purchased Assets with (i) its financial advisors and (ii) other potential purchasers. Based on such review, consideration and discussions, Seller acknowledges and agrees that the total consideration being paid by the Buyer for the Purchased Assets represents a reasonably equivalent value for the Purchased Assets. Seller is not relying on the Buyer or any of its affiliates or any of the Buyer s or its respective affiliates valuations or appraisals in assessing the value of the Purchased Assets.

3.14 Insolvency. Seller is not now insolvent, and will not be rendered insolvent by any of the transactions contemplated hereby. In addition, immediately after giving effect to the consummation of the transactions contemplated hereby, (a) Seller will be able to pay its debts as they become due, (b) Seller will not have unreasonably small capital with which to conduct its present or proposed business, (c) Seller will have assets (calculated at fair market value) that exceed its liabilities, (d) taking into account all pending and threatened litigation, final judgments against Seller in actions for money damages are not reasonably anticipated to be rendered at a time when, or in amounts such that, Seller will be unable to satisfy any such judgments promptly in accordance with their terms (taking into account the maximum probable amount of such judgments in any such actions and the earliest reasonable time at

which such judgments might be rendered) as well as all other obligations of Seller and (e) the cash available to Seller, after taking into account all other anticipated uses of the cash, will be sufficient to pay all such debts and judgments promptly in accordance with their terms.

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3.15 No Brokers. Except as set forth on Schedule 3.15, Seller has not made any agreement with any person or entity which would entitle such person or entity to any fee, commission or reimbursement of expenses from Seller or Buyer or any of their affiliates in connection with the execution and delivery of this Agreement, the other Seller Transaction Documents or the other Buyer Transaction Documents, or the consummation of the transactions contemplated hereby or thereby.

4. Pre-Closing Covenants.

4.1 Notification. From the Effective Date until the Closing, Buyer or Seller, as the case may be (any such party, the Disclosing Party), shall promptly notify the other party in writing if the Disclosing Party becomes aware of (i) any fact or condition that causes or constitutes a breach of any of the representations and warranties of the Disclosing Party made as of the date of this Agreement, or (ii) the occurrence after the date of this Agreement of any fact or condition that would or be reasonably likely to cause or constitute a breach of any such representation or warranty had that representation or warranty been made as of the time of the occurrence of, or the Disclosing Party s discovery of, such fact or condition. If any such fact or condition requires any change to the schedules prepared by a Disclosing Party, such Disclosing Party shall promptly deliver to the other party a supplement to such schedules specifying such change. In addition, between the date of this Agreement and the Closing, Buyer or Seller, as the case may be, shall promptly notify the other party of the occurrence of any breach of any covenant by such party in this Section 4 or of the occurrence of any event that may make the satisfaction of any conditions in Section 5 impossible or unlikely. No disclosure pursuant to this Section 4.1 will prevent or cure any breach of any representation or warranty or covenant set forth herein or affect any remedies available to the non-Disclosing Party.

4.2 Conduct of Business; Request for Continued Lab Operations. From the Effective Date until the Closing, except as otherwise provided in this Agreement or consented to in writing by Buyer, Seller shall (i) preserve intact the Purchased Assets and (ii) not take any action (except in the ordinary course of business, consistent with past practice or in compliance with applicable law) that would, or could reasonably be expected to, result in any representation or warranty of Seller set forth herein to become untrue. Notwithstanding the foregoing or the other provisions of this Agreement, Buyer acknowledges that (i) prior to the Closing Seller will be winding down Seller s business represented by the use and exploitation of the Test, (ii) Seller s lab will not continue to operate beyond December 31, 2016 unless Buyer submits a written request to Seller no later than December 9, 2016 for continued Seller processing of specimens for Buyer s validation needs, (iii) in no event will Seller s lab continue to operate beyond January 14, 2017, and (iv) promptly following the Effective Date Seller will be terminating that certain Sponsored Research Agreement, dated August 10, 2015, by and between H. Lee Moffitt Cancer Center and Research Institute and the Seller.

4.3 No Solicitation. From the Effective Date until Closing or such time as this Agreement is terminated pursuant to Section 8, Seller shall not, and Seller shall cause its directors, employees and other representatives, not to, directly or indirectly, solicit, initiate, encourage, accept or entertain any inquiries, offers or proposals from, discuss or negotiate with, provide any non-public information to, or consider the merits of any inquiries, offers or proposals from, any person or entity (other than Buyer) relating to any asset sale or similar transaction involving the Purchased Assets (excluding the sale of inventory or Seller s use or exploitation of the Test in the ordinary course of business). Seller shall notify Buyer of any such inquiry or proposal that it may receive and the terms thereof within 24 hours of receipt or awareness.

4.4 Meeting of Stockholders. Following the Effective Date, Seller will take all action necessary in accordance with applicable law and its organizational documents to convene a meeting of its stockholders as promptly as practicable to consider and vote upon the approval of Seller s sale of the Purchased Assets to Buyer. Seller will provide Buyer a reasonable opportunity to review and comment on any filings with the Securities and Exchange Commission to the extent relating to this Agreement, the other Seller Transaction Documents or the transactions contemplated hereby and

thereby. Seller will not make any statement in respect of Buyer in any such

filing which is untrue or misleading. Seller shall include all information reasonably requested by Buyer to be included therein. Neither the board of directors of Seller nor any committee thereof shall withdraw or modify, or propose to withdraw or modify, in a manner adverse to Buyer, the approval or recommendation by the board of directors of Seller or any such committee of this Agreement, the other Seller Transaction Documents or the transactions contemplated hereby and thereby.

4.5 Closing Conditions. From the Effective Date until the Closing, each party hereto shall use its commercially reasonable efforts to take such actions as are necessary to expeditiously satisfy the closing conditions set forth in Section 5 hereof to the extent that such party s action or inaction can control or influence the satisfaction of such conditions. Seller shall use reasonable efforts to obtain all Required Approvals.

4.6 Bulk Sales Laws. The parties hereby waive compliance with the provisions of any bulk sales, bulk transfer or similar laws of any jurisdiction that may otherwise be applicable with respect to the sale of any or all of the Purchased Assets to Buyer.

4.7 Access and Investigation. Without limiting the last sentence of Section 4.2, between the Effective Date and the Closing, and upon reasonable advance notice received from Buyer, Seller shall (a) afford Buyer and its agents and representatives (collectively, the Buyer Group), reasonable access, during regular business hours, to Seller s properties, personnel, facilities, contracts, books and records, and other documents and data, such rights of access to be exercised in a manner that does not unreasonably interfere with the operations of Seller, (b) furnish to the Buyer Group copies of all such contracts, books and records, and other existing documents and data that the Buyer Group may reasonably request, (c) furnish the Buyer Group with such additional financial, operating, and other relevant data and information as the Buyer Group may reasonably request, and (d) otherwise cooperate and assist, to the extent reasonably requested by Buyer Group, with Buyer Group s investigation of the Purchased Assets. In addition, between the Effective Date and the Closing Date, Buyer will be provided access to Seller s employees with expertise relative to the Test, and Seller will exercise reasonable efforts to provide Buyer with access to suppliers, customers and other persons having business relations with Seller with respect to the Test, at such times and in the manner mutually agreed to by Buyer and Seller (it being understood that Seller will permit Buyer to have reasonable access to such persons to the extent within the control of Seller).

4.8 Delivery of Purchased Assets; Transition Support. Between the Effective Date and the Closing Date Seller shall use its commercially reasonable efforts to provide transition support reasonably requested by Buyer to relocate the Purchased Assets to Buyer s laboratory at 33608 Ortega Highway, San Juan Capistrano, California. Unless requested in writing otherwise, Seller shall deliver the Technology Assets to Quest Diagnostics Nichols Institute at its laboratory located at 33608 Ortega Highway, San Juan Capistrano, California solely through electronic means via download via the internet. On the Effective Date Seller shall release Sudipto Sur, PhD from the provisions of any restrictive covenants and/or other agreements so as to enable Buyer to engage him as a consultant and permit him to disclose and use Seller s confidential information included in the Purchased Assets in such capacity.

4.9 USPTO. Prior to the Closing Date Seller shall record documentary evidence of its conversion to a corporation with the USPTO to reflect Seller s proper name and ownership for any registered Intellectual Property.

4.10 Notice to UAMS. Within three (3) days following the Effective Date Seller shall provide written notice to UAMS, in accordance with the terms of the UAMS License Agreement, of its agreement to assign the UAMS License Agreement to Buyer on the Closing Date.

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5. Closing Conditions.

5.1 Conditions to Obligations of Both Parties. The obligations of Buyer and Seller to consummate the transactions contemplated by this Agreement shall be subject to the fulfillment, at or prior to the Closing, of each of the following conditions (any of which may be waived in writing, in whole or in part by the party entitled to enforce such condition):

(a) No governmental authority shall have enacted, issued, promulgated, enforced or entered any order which is in effect and has the effect of making the transactions contemplated by this Agreement illegal, otherwise restraining, prohibiting or delaying consummation of such transactions or causing any of the transactions contemplated hereunder to be rescinded following completion thereof, and no proceedings or investigations by or before, or otherwise involving, any governmental authority shall be threatened or pending against Seller or Buyer which seek to enjoin or prevent the consummation of the transactions contemplated under this Agreement or which seek material damages in connection with the transactions contemplated hereby.

(b) Seller s sale of the Purchased Assets to Buyer shall have been approved by the requisite vote of the stockholders of Seller (Stockholder Approval) in accordance with its organizational documents and the Delaware General Corporation Law (the DGCL).

(c) Seller shall have obtained the approval of the Merger Agreement and the Merger by the requisite vote of the stockholders of Seller in accordance with its organizational documents and the DGCL.

(d) The closing of the Merger shall occur simultaneously with the Closing.

5.2 Conditions to Obligations of Buyer. The obligations of Buyer to consummate the transactions contemplated by this Agreement shall be subject to the fulfillment or Buyer s written waiver, at or prior to the Closing, of each of the following conditions:

(a) (i) (A) The representations and warranties of Seller contained in this Agreement that does not contain an express materiality qualification (other than the representations and warranties set forth in Section 5.2(a)(ii)) must have been true and correct in all material respects as of the date of this Agreement, and shall be true and correct in all material respects as of the Closing as if made on the Closing Date, and (B) each of the representations and warranties of Seller contained in this Agreement that contains an express materiality qualification (other than the representations and warranties set forth in Section 5.2(a)(ii)) must have been true and correct in all respects as of the date of this Agreement, and must be true and correct in all respects as of the Closing as if made on the Closing Date.

(ii) The representations and warranties of Seller contained in Section 3.1 (Corporate Organization), Section 3.2 (Authorization), Section 3.14 (Insolvency) and Section 3.15 (No Brokers) must be true and correct in all respects as of the Closing Date with the same effect as if made on and as of the Closing Date.

(b) Seller shall have duly performed and complied in all material respects with all agreements, covenants and conditions required by this Agreement and each of the other Seller Transaction Documents to be performed or complied with by it prior to or on the Closing Date.

(c) Seller shall have delivered to Buyer duly executed counterparts to the Seller Transaction Documents (other than this Agreement) and such other documents and deliveries set forth in Section 1.4 to be delivered by Seller (including all Required Approvals).

(d) Buyer shall have received a certificate, dated the Closing Date and signed by a duly authorized officer of Seller, that each of the conditions set forth in Section 5.2(a) and Section 5.2(b) have been satisfied (the Seller Closing Certificate).

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(e) Buyer shall have received a certificate of the Secretary (or equivalent officer) of Seller certifying that attached thereto are true and complete copies of all resolutions adopted by the stockholders and board of directors of Seller authorizing the execution, delivery and performance of this Agreement and the other Seller Transaction Documents and the consummation of the transactions contemplated hereby and thereby, and that all such resolutions are in full force and effect and are all the resolutions adopted in connection with the transactions contemplated hereby and thereby.

(f) Buyer shall have received a certificate of the Secretary (or equivalent officer) of Seller certifying the names and signatures of the officers of Seller authorized to sign this Agreement, the Seller Transaction Documents and the other documents to be delivered hereunder and thereunder.

(g) Neither the consummation nor the performance of the transactions contemplated hereby will, directly or indirectly (with or without notice or lapse of time), contravene, or conflict with, or result in a violation of, or cause Buyer to suffer any adverse consequence under, (i) any applicable law or order or (ii) any law or order that has been published, introduced, or otherwise proposed by or before any governmental authority.

(h) Seller shall not (i) be in receivership or dissolution, (ii) have made any assignment for the benefit of creditors, (iii) have admitted in writing its inability to pay its debts as they mature, (iv) have been adjudicated a bankrupt, or (v) have filed a petition in voluntary bankruptcy, a petition or answer seeking reorganization, or an arrangement with creditors under the federal bankruptcy law or any other similar law or statute of the United States or any state, nor shall any such petition have been filed against Seller.

5.3 Conditions to Obligations of Seller. The obligation of Seller to consummate the transactions contemplated by this Agreement shall be subject to the fulfillment or Seller s written waiver, at or prior to the Closing, of each of the following conditions:

(a) (i) Each of the representations and warranties of Buyer contained in this Agreement that does not contain an express materiality qualification must have been true and correct in all material respects as of the date of this Agreement, and must be accurate in all material respects as of the Closing as if made on the Closing Date, and (ii) each of the representations and warranties of Buyer contained in this Agreement that contains an express materiality qualification must have been true and correct in all respects as of the date of this Agreement, and must be accurate in all respects as of the Closing as if made on the Closing Date.

(b) Buyer shall have duly performed and complied in all material respects with all agreements, covenants and conditions required by this Agreement and each of the other Buyer Transaction Documents to be performed or complied with by it prior to or on the Closing Date.

(c) Buyer shall have delivered to Seller duly executed counterparts to the Buyer Transaction Documents (other than this Agreement) and such other documents and deliveries set forth in Section 1.4 to be delivered by Buyer.

(d) Seller shall have received a certificate, dated the Closing Date and signed by a duly authorized officer of Buyer, that each of the conditions set forth in Section 5.3(a) and Section 5.3(b) have been satisfied (the Buyer Closing Certificate).

(e) Seller shall have received a certificate of the Secretary (or equivalent officer) of Buyer certifying the names and signatures of the officers of Buyer authorized to sign this Agreement, the Buyer Transaction Documents and the other documents to be delivered hereunder and thereunder.

(f) Neither the consummation nor the performance of the transactions contemplated hereby will, directly or indirectly (with or without notice or lapse of time), contravene, or conflict with, or result in a violation of, or cause Seller to suffer any adverse consequence under, (i) any applicable law or order or (ii) any law or order that has been published, introduced, or otherwise proposed by or before any governmental authority.

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6. Additional Covenants.

6.1 Confidentiality. Buyer acknowledges and agrees that the Non-Disclosure Agreement between Buyer and Seller, dated August 6, 2016 (the NDA) remains in full force and effect and, in addition, covenants and agrees to keep confidential, in accordance with the provisions of the NDA, information provided to Buyer pursuant to this Agreement. If this Agreement is, for any reason, terminated prior to the Closing, the NDA and the provisions of this Section 6.1 shall nonetheless continue in full force and effect. Notwithstanding anything contained herein to the contrary, effective as of the Closing, all Confidential Information of Seller included in the Purchased Assets will be deemed to be Confidential Information of Buyer and will be subject to the protections set forth herein and in the NDA for the benefit of Buyer. Seller agrees, for itself and its representatives and affiliates (and all such parties respective successors, assigns and representatives) that they shall not use, publish or disclose, and shall not authorize or permit any representative or affiliate to use, publish or disclose, the MyPRS Assay or any trade secrets or confidential information related thereto.

6.2 Public Announcements. Unless otherwise required by applicable law or rules of a stock exchange or stock listing entity (based upon the reasonable advice of counsel), or as shall be necessary for Seller to solicit Stockholder Approval, no party to this Agreement shall make any public announcements in respect of this Agreement or the transactions contemplated hereby or otherwise communicate with any news media without the prior written consent of the other party (which consent shall not be unreasonably withheld, conditioned or delayed), and the parties shall cooperate as to the timing and contents of any such announcement.

6.3 Files. Prior to the Closing Date, Buyer shall specify to Seller those attorneys and patent agents Buyer desires to have handle the Purchased Assets. As soon after receipt of notice from Buyer of the names of such attorneys and patent agents as is reasonably practical, Seller shall direct the attorneys and patent agents currently responsible for the handling of the Purchased Assets to cooperate in good faith with those attorneys and patent agents. Prior to the Closing Date, Seller shall, and shall cause its patent counsel to deliver to Buyer (or to Buyer s counsel as may be directed by Buyer) copies of all patents and patent applications, and correspondence with the USPTO and foreign patent offices in Seller s or Seller s counsel s possession related to the MyPRS Assay and the following documents (electronic or otherwise) in Seller s custody or control relating to the MyPRS Assay, to the extent available and existing : (a) all original letters patent for the MyPRS Assay, (b) all original assignments for the MyPRS Assay, (c) all original documents, files and materials evidencing dates of invention and reduction to practice of inventions set forth in the MyPRS Assay, (d) all original files reflecting the prosecution history for all issued, pending and abandoned Purchased Assets, (e) all original files regarding the issued Purchased Assets, and (f) all original files regarding any action, suit, investigation, communication, claim or proceeding (in each case, whether before an administrative, arbitral or judicial body), whether or not outstanding, adjudicated to final resolution or settled, concerning the Purchased Assets. Seller further agrees that upon the Closing Date all rights and privileges (including with respect to any attorney client privileges, attorney work product or any other professional privileges or rights) held by Seller, that arise from or relate to the Purchased Assets transferred under this Agreement, shall be transferred from Seller to Buyer. If this Agreement is terminated prior to the Closing, Buyer shall return any such materials that have been delivered by Seller or its patent counsel.

6.4 Allocation of Purchase Price. The Purchase Price will be allocated for tax purposes in the manner proposed by Buyer as soon as practicable prior to the Closing, and reasonably agreed to by Seller. After the Closing, the parties shall make consistent use of such Purchase Price allocation for all tax purposes and in any tax returns filed with the Internal Revenue Service, or with any state or local taxing agency, in respect thereof, including IRS Form 8594.

6.5 Expenses. Except as otherwise provided in this Agreement, Seller is responsible for any fees and expenses (including legal and broker fees and expenses) incurred by Seller and Buyer is responsible for any fees and expenses

(including legal and broker fees and expense) incurred by Buyer in connection with the negotiation and execution of this Agreement and the consummation of transactions contemplated hereby.

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7. Indemnification.

7.1 Seller Indemnity. Subject to the provisions of Section 7.5, Seller agrees to defend, indemnify and hold Buyer, its affiliates and their respective officers, directors, stockholders, managers, members, partners, employees, assigns and successors (individually a Buyer Indemnified Party and collectively, the Buyer Indemnified Parties) harmless from, against and in respect of any and all losses, liabilities, damages, claims or expenses (including, without limitation, attorneys fees) suffered or incurred, directly or indirectly by the Buyer Indemnified Parties by reason of, or resulting from (a) the breach of any representation or warranty contained in Section 3 of this Agreement, (b) the breach of or failure to perform any covenant made by it in this Agreement or any other Seller Transaction Document, (c) any Retained Liability, (d) any claim challenging the Merger, any claim challenging the consideration payable hereunder or any claim pertaining to Seller s involvement or role in this Agreement or the transactions contemplated hereby, or (e) any taxes of Seller, except for taxes which are the responsibility of Buyer under Section 9.3.

7.2 Indemnification Process. Whenever any claim arises for indemnification under this Agreement or an event which may result in a claim for such indemnification has occurred for which the Buyer Indemnified Parties are entitled to indemnification hereunder, the Buyer Indemnified Party will promptly notify Seller of the claim and, when known, the facts constituting the basis for such claim. Seller shall have the obligation to dispute and defend all such third party claims and thereafter so defend and pay any adverse final judgment or award or settlement amount in regard thereto. Such defense shall be controlled by Seller, and the cost of such defense shall be borne by Seller, provided that the Buyer Indemnified Parties shall have the right to participate in such defense at their own expense, unless the Buyer Indemnified Parties require their own attorney due to a conflict of interests, in which case, the expense thereof will be borne by Seller. The Buyer Indemnified Parties shall cooperate in all reasonable respects in the investigation, trial and defense of any such claim at the cost of Seller. If Seller fails to take action within thirty (30) days of notice, then the Buyer Indemnified Parties shall have the right to pay, compromise or defend any third party claim, such costs to be borne by Seller. The Buyer Indemnified Parties shall also have the right and upon delivery of ten (10) days advance written notice to such effect to Seller, exercisable in good faith, to take such action as may be reasonably necessary to avoid a default prior to the assumption of the defense of the third party claim by Seller, and any expenses incurred by the Buyer Indemnified Parties so acting shall be paid by Seller. Seller will not settle or compromise any third party claim pursuant to this Section 7.2 without the prior written consent of the Buyer Indemnified Parties (which consent shall not be unreasonably withheld, conditioned or delayed provided that such settlement is without injunctive or other non-monetary relief affecting the Buyer Indemnified Parties or leading to liability or the creation of a financial or other obligation on the part of the Buyer Indemnified Parties and provides, in customary form, for the unconditional release of each Buyer Indemnified Party from all liabilities and obligations in connection with such claim).

7.3 Buyer Indemnity. Buyer agrees to defend, indemnify and hold harmless Seller, its affiliates and their respective officers, directors, stockholders, managers, members, partners, employees, assigns and successors (individually, a Seller Indemnified Party and collectively, the Seller Indemnified Parties) from, against and in respect of any and all losses, liabilities, damages, claims or expenses (including, without limitation, attorneys fees) suffered or incurred, directly or indirectly by the Seller Indemnified Parties by reason of, or resulting from (a) the breach of any representation or warranty contained in Section 2 of this Agreement, (b) any Assumed Liability, (c) the breach of or failure to perform any covenant made by it in this Agreement or any other Buyer Transaction Document or (d) taxes which are the responsibility of Buyer under Section 9.3.

7.4 Indemnification Process. Whenever any claim arises for indemnification under this Agreement or an event which may result in a claim for such indemnification has occurred for which the Seller Indemnified Parties are entitled to indemnification hereunder, the Seller Indemnified Party will promptly notify Buyer of the claim and, when known, the facts constituting the basis for such claim. Buyer shall have the obligation to dispute and defend all such third party claims and thereafter so defend and pay any adverse final judgment or award or settlement amount in regard thereto.

Such defense shall be controlled by Buyer, and the cost of such defense shall

be borne by Buyer, provided that the Seller Indemnified Parties shall have the right to participate in such defense at their own expense, unless the Seller Indemnified Parties require their own attorney due to a conflict of interests, in which case, the expense thereof will be borne by Buyer. The Seller Indemnified Parties shall cooperate in all reasonable respects in the investigation, trial and defense of any such claim at the cost of Buyer. If Buyer fails to take action within thirty (30) days of notice, then the Seller Indemnified Parties shall have the right to pay, compromise or defend any third party claim, such costs to be borne by Buyer. The Seller Indemnified Parties shall also have the right and upon delivery of ten (10) days advance written notice to such effect to Buyer, exercisable in good faith, to take such action as may be reasonably necessary to avoid a default prior to the assumption of the defense of the third party claim by Buyer, and any expenses incurred by the Seller Indemnified Parties so acting shall be paid by Buyer. Buyer shall not settle or compromise any third party claim pursuant to this Section 7.4 without the prior written consent of the Seller Indemnified Parties (which consent shall not be unreasonably withheld, conditioned or delayed provided that such settlement is without injunctive or other non-monetary relief affecting the Seller Indemnified Parties or leading to liability or the creation of a financial or other obligation on the part of the Seller Indemnified Parties and provides, in customary form, for the unconditional release of each Seller Indemnified Party from all liabilities and obligations in connection with such claim)

7.5 Survival; Limitations. Subject to the limitations and other provisions of this Agreement, the representations and warranties contained herein shall survive the Closing and shall remain in full force and effect until the date that is 12 months from the Closing Date, provided that the representations and warranties of Seller set forth in Section 3.1 (Corporate Organization), Section 3.2 (Authorization), Section 3.4 (Ownership of Purchased Assets), Section 3.11 (Taxes), Section 3.14 (Insolvency) and Section 3.15 (No Brokers) (the foregoing collectively the Fundamental Representations) shall survive the Closing and shall remain in full force and effect until the date that is 18 months from the Closing Date, and nothing contained herein shall limit or restrict any Buyer Indemnified Party s or Seller Indemnified Party s right to maintain or recover any amounts in connection with any action or claim based upon fraud. All covenants or other agreements contained in this Agreement to be performed or complied with prior to the Closing shall terminate upon the Closing. All other covenants or other agreements contained in this Agreement shall survive the Closing without limitation. Notwithstanding the foregoing or any provision herein to the contrary, (a) any claims asserted by proper notice hereunder by a Buyer Indemnified Party or Seller Indemnified Party prior to the expiration date of the applicable survival period shall not thereafter be barred by the expiration of such survival period and such claims shall survive until finally resolved, (b) Seller shall not be required to indemnify or hold harmless any Buyer Indemnified Party against, or reimburse any Buyer Indemnified Party for, any losses, liabilities, damages, claims or expenses under Section 7.1(a) for any breaches of the representations or warranties contained in Section 3 other than Fundamental Representations until the aggregate amount exceeds $41,250, after which Seller shall be obligated for the full amount of the losses, liabilities, damages, claims or expenses, (c) the cumulative indemnification obligations of Seller under Section 7.1(a) shall in no event exceed, in aggregate, $825,000, and (d) the cumulative indemnification obligations of Seller under Section 7.1(a) for any breaches of the representations or warranties contained in Section 3 other than Fundamental Representations shall in no event exceed, in aggregate, $206,250.

7.6 Exclusive Remedy. Buyer and Seller acknowledge and agree that the indemnification provisions of this Section 7 shall be the sole and exclusive post-Closing remedy of the Buyer Indemnified Parties and Seller Indemnified Parties for any losses, liabilities, damages, claims or expenses that any of the Buyer Indemnified Parties or Seller Indemnified Parties may suffer or incur, or become subject to, as a result of, or in connection with, the sale of the Purchased Assets or the other transactions contemplated by this Agreement, including any breach of any representation or warranty of Seller or Buyer in this Agreement or any failure by Seller or Buyer to perform or comply with any covenant or agreement that, by its terms, was to have been performed, or complied with, under this Agreement; provided, that nothing in this Section 7.6 shall limit (a) any right to recovery in respect of a claim of fraud or (b) any Buyer Indemnified Party s or Seller Indemnified Party s rights hereunder or otherwise to injunctive or other equitable relief to enforce its rights under this Agreement or otherwise in connection with the transactions contemplated hereby.

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8. Termination.

8.1 Termination Rights. This Agreement may be terminated at any time prior to the Closing:

(a) by the mutual written consent of Seller and Buyer;

(b) by Buyer by written notice to Seller if:

(i) there has been a material breach, inaccuracy in or failure to perform any representation, warranty, covenant or agreement made by Seller pursuant to this Agreement that has not been waived in writing by Buyer; or

(ii) the satisfaction of any of the conditions set forth in Section 5.1 or Section 5.2 shall become impossible, unless such failure shall be due to the failure of Buyer to perform or comply with any of the covenants, agreements or conditions hereof to be performed or complied with by it prior to the Closing, and Buyer has not waived such condition in writing.

(c) by Seller by written notice to Buyer if:

(i) there has been a material breach, inaccuracy in or failure to perform any representation, warranty, covenant or agreement made by Buyer pursuant to this Agreement that has not been waived in writing by Seller; or

(ii) the satisfaction of any of the conditions set forth in Section 5.1 or Section 5.3 shall become impossible, unless such failure shall be due to the failure of Seller to perform or comply with any of the covenants, agreements or conditions hereof to be performed or complied with by it prior to the Closing and Seller has not waived such condition in writing.

(d) by Buyer or Seller in the event that:

(i) there shall be any law that makes consummation of the transactions contemplated by this Agreement illegal or otherwise prohibited;

(ii) any governmental authority of competent jurisdiction shall have issued an order permanently restraining or enjoining the consummation of the transactions contemplated by this Agreement, and such order shall have become final and non-appealable;

(iii) the Closing has not occurred on or before April 30, 2017 or such later date as Buyer and Seller may agree upon in writing, unless the terminating party is in material breach of this Agreement;

(iv) the Merger Agreement has been terminated; or

(v) any proceedings or investigations by or before, or otherwise involving, any governmental authority shall be threatened or pending against Seller or Buyer which seek to enjoin or prevent the Merger or the consummation of the transactions contemplated under this Agreement or which seek material damages in connection with the Merger or the transactions contemplated hereby.

8.2 Effect of Termination. Each party s right of termination under Section 8.1 is in addition to any other rights it may have under this Agreement or otherwise, and the exercise of such right of termination will not be an election of remedies. In the event of the termination of this Agreement in accordance with this Section 8, this Agreement shall

forthwith become void and there shall be no liability on the part of any party hereto except:

(a) Section 6.1, Section 6.2, Section 6.5, Section 8 and Section 9 hereof shall survive the termination; and

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(b) that termination of this Agreement will not preclude a party from bringing an indemnification claim against any other party to this Agreement for a breach arising prior to such termination pursuant to the terms and conditions set forth herein and nothing herein shall relieve any party hereto from liability for any intentional breach of any provision hereof.

9. Miscellaneous

9.1 Consents to Assignment. Notwithstanding any other provision of this Agreement to the contrary, this Agreement shall not constitute an agreement to assign any contract, lease, permit or other claim or right, or any benefit arising thereunder or resulting therefrom (each, an Assignable Right), if an attempted assignment thereof, without the consent of a third party, would constitute a breach or default thereof or thereunder or increase the obligations or adversely affect the rights of Seller or Buyer thereunder. Except with respect to items identified on Annex 1.1(b) other than item 1 and item 2: (i) if such consent is not obtained prior to the Closing, Seller and Buyer shall use their respective commercially reasonable efforts, and cooperate with each other, to obtain such consent as quickly as practicable thereafter; and (ii) prior to the obtaining of any such consent, Seller and Buyer shall cooperate with each other in any reasonable and lawful arrangements designed to provide to Buyer the benefits of use of the Assignable Right for its term, and to the extent that Buyer receives such benefits, it will assume the obligations of Seller thereunder to the extent that Buyer would have been responsible therefor if such consent had been obtained. Once a consent is obtained, Seller shall promptly assign such Assignable Right to Buyer, and Buyer shall assume the obligations thereunder. Except with respect to items identified on Annex 1.1(b) other than item 1 and item 2, nothing contained in this Section 9.1 or elsewhere in this Agreement shall be deemed to constitute an agreement to exclude from the Purchased Assets the economic benefits under any Assigned Contract as to which a consent may be necessary.

9.2 Further Assurances. Except with respect to items identified on Annex 1.1(b) other than item 1 and item 2, at any time and from time to time after the Closing Date, at the request of any other party hereto and without further consideration, each party hereto will use reasonable efforts to execute and deliver such other instruments of sale, transfer, conveyance, assignment, and delivery and confirmation and take such action as the requesting party may reasonably deem necessary or desirable, at the requesting party s expense, in order to more effectively carry out the purposes of this Agreement and to transfer, convey and assign to Buyer and to place Buyer in possession and control of, and to confirm Buyer s title to, the Purchased Assets and to assist Buyer in exercising all rights and enjoying all benefits with respect thereto. In case at any time after the Closing Date any further action is necessary to carry out the purposes of this Agreement, the proper officers and directors of each party hereto shall take all such necessary action reasonably requested to be taken by such party.

9.3 Filings and Taxes. Each party shall be responsible for making all filings and paying all federal, state and local sales, documentary and other transfer taxes, if any, due as a result of the purchase, sale or transfer of the Purchased Assets in accordance herewith, as imposed by law on such party. Seller shall not collect any sales and use taxes from Buyer on the portion of the Purchase Price, if any, allocable to the Technology Assets based on the delivery of the Technology Assets to Quest Diagnostics Nichols Institute, an affiliate of Buyer, at its laboratory located at 33608 Ortega Highway, San Juan Capistrano, CA 92675 by electronic means via download from the Internet, but, in the event any sales and use taxes do apply to the portion of the Purchase Price, if any, allocable to the Technology Assets, Buyer shall be solely responsible for such sales and use taxes and shall pay such sales and use taxes (if any) when due.

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9.4 Notices. All notices, requests, consents, or other communications provided for in or to be given under this Agreement shall be in writing, may be delivered in person, by facsimile transmission (fax) (to the extent a facsimile number is provided), by overnight air courier or by mail, and shall be deemed to have been duly given and to have become effective (i) upon receipt if delivered in person or by fax, (ii) one day after having been delivered to an overnight air courier, or (iii) three days after having been deposited in the mails as certified or registered matter, all fees prepaid, directed to the parties or their assignees at the addresses noted below (or to such other address as either party may designate by notice in accordance with the provisions of this Section):

If to Seller:

Signal Genetics, Inc.

5740 Fleet Street

Carlsbad, CA 92008

Attn: Samuel D. Riccitelli

Fax: 760-537-4101

with a copy to (which shall not constitute notice):

Pillsbury Winthrop Shaw Pittman LLP

12255 El Camino Real

San Diego, CA 92130-4088

Attn: Mike Hird

Fax: 858-509-4010

If to Buyer:

c/o Quest Diagnostics Investments LLC

3 Giralda Farms

Madison, NJ 07940

Attn: SVP, Strategy, M&A and Ventures

Fax: (973) 520-2136

With copies (which shall not constitute notice) to:

c/o Quest Diagnostics Investments LLC

3 Giralda Farms

Madison, NJ 07940

Attn: General Counsel

Fax: (973) 520-2026

and

Bass, Berry & Sims PLC

150 Third Avenue South

Suite 2800

Nashville, TN 37201

Attn: J. Allen Overby

Fax: (615) 742-2711

9.5 Disclaimer of UN Convention on the Sale of Goods. PURSUANT TO ARTICLE 6 OF THE UNITED NATIONS CONVENTION ON CONTRACTS FOR THE INTERNATIONAL SALE OF GOODS (UN CONVENTION), SELLER AND BUYER AGREE THAT THE UN CONVENTION SHALL NOT APPLY TO THIS AGREEMENT.

9.6 Severability. If any provision of this Agreement is deemed void or unenforceable by any court of competent jurisdiction, that provision shall be stricken from this Agreement without affecting the remaining provisions.

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9.7 Independent Contractors. The provisions of this Agreement are not intended to create any relationship between the parties other than that of independent contractors. Neither party shall act or represent itself directly or by implication as an agent of the other party, or assume or create any obligation on behalf of or in the name of the other party.

9.8 No Third-Party Beneficiaries. Except as set forth herein, this Agreement is for the sole benefit of the parties hereto and their respective successors and permitted assigns and nothing herein, express or implied, is intended to or shall confer upon any other person any legal or equitable right, benefit or remedy of any nature whatsoever under or by reason of this Agreement.

9.9 Governing Law. The Agreement will be construed, interpreted, and applied in accordance with the laws of the State of Delaware (excluding its body of law concerning conflicts of laws).

9.10 Assignability; Parties in Interest. Neither party shall assign any rights or delegate any obligations hereunder without the consent of the other party, and any attempt to do so shall be void; provided, that Buyer and Seller shall have the right to assign its rights and delegate its obligations hereunder to (i) any third party or entity controlling, under the control of, or under common control with it, or (ii) in connection with the sale of all or substantially all of the assets of or any business combination transaction involving such party; provided that no such assignment or delegation will relieve Buyer or Seller from any of its obligations hereunder. All the terms and provisions of this Agreement shall be binding upon, shall inure to the benefit of and shall be enforceable by the respective successors and permitted assigns of the parties hereto.

9.11 Remedies. Each of the parties hereby acknowledges that any breach by it of its obligations under this Agreement would cause substantial and irreparable damage to the other party, and that money damages and the indemnity protections provided herein would be inadequate remedies therefor, and accordingly, acknowledges and agrees that the other party shall be entitled to seek an injunction or specific performance to prevent or remedy the breach of such obligations (in addition to the other rights and remedies provided for herein).

9.12 Entire Agreement; Amendments. This Agreement constitutes the sole and entire agreement and understanding of the parties with respect to the entire subject matter hereof. The Agreement is made and entered into in good faith and supersedes any and all prior representations, statements or written agreements relating thereto. Any amendment or modification of the terms and conditions set forth herein must be agreed to in a writing signed by the parties hereto.

9.13 Counterparts. This Agreement may be executed in any number of counterparts, each of which shall be deemed an original but all of which together shall constitute one and the same instrument. Delivery of a counterpart hereof via facsimile or electronic mail transmission shall be as effective as delivery of a manually executed counterpart hereof.

9.14 Headings. The headings in this Agreement are for convenience only and do not alter or affect any provision of this Agreement.

9.15 Waivers. The rights and remedies of the parties to this Agreement are cumulative. No failure or delay by any party in exercising any right, power or privilege under this Agreement shall operate as a waiver of or shall preclude that party s right to exercise that right, power or privilege.

9.16 **EACH PARTY ACKNOWLEDGES AND AGREES THAT ANY CONTROVERSY WHICH MAY ARISE UNDER THIS AGREEMENT OR THE OTHER TRANSACTION DOCUMENTS IS LIKELY TO INVOLVE COMPLICATED AND DIFFICULT ISSUES AND, THEREFORE, EACH SUCH PARTY IRREVOCABLY AND UNCONDITIONALLY WAIVES ANY RIGHT IT MAY HAVE TO A TRIAL BY JURY IN RESPECT OF ANY LEGAL ACTION ARISING OUT OF OR RELATING TO THIS**

AGREEMENT, THE OTHER TRANSACTION DOCUMENTS OR THE TRANSACTIONS

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CONTEMPLATED HEREBY OR THEREBY. EACH PARTY TO THIS AGREEMENT CERTIFIES AND ACKNOWLEDGES THAT (A) NO REPRESENTATIVE OF ANY OTHER PARTY HAS REPRESENTED, EXPRESSLY OR OTHERWISE, THAT SUCH OTHER PARTY WOULD NOT SEEK TO ENFORCE THE FOREGOING WAIVER IN THE EVENT OF A LEGAL ACTION, (B) SUCH PARTY HAS CONSIDERED THE IMPLICATIONS OF THIS WAIVER, (C) SUCH PARTY MAKES THIS WAIVER VOLUNTARILY, AND (D) SUCH PARTY HAS BEEN INDUCED TO ENTER INTO THIS AGREEMENT BY, AMONG OTHER THINGS, THE MUTUAL WAIVERS AND CERTIFICATIONS IN THIS SECTION 9.16.

[Signature Page(s) Follow this Page]

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IN WITNESS WHEREOF, the parties, by their duly authorized representatives, have caused this Agreement to be executed as of the Effective Date.

SELLER:

Signal Genetics, Inc.

By: /s/ Samuel D. Riccitelli
Name: Samuel D. Riccitelli
Title: President and Chief Executive Officer

BUYER:

Quest Diagnostics Investments LLC

By: /s/ Christopher C. Fikry
Name: Christopher C. Fikry
Title: GM, Cancer Diagnostics

[Signature Page to Purchase Agreement]

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Annexes:

Annex 1.1(b)	Transferred Contracts
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Exhibits

Exhibit A	Intellectual Property
Exhibit B	Bill of Sale, Assignment and Assumption Agreement
Exhibit C	Assignment of Intellectual Property Agreement
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Annex H

Amendment to Certificate of Incorporation Stockholder Written Consent

CERTIFICATE OF AMENDMENT

OF

CERTIFICATE OF INCORPORATION

OF

SIGNAL GENETICS, INC.

SIGNAL GENETICS, INC., a corporation organized and existing under and by virtue of the General Corporation Law of the State of Delaware (the DGCL), does hereby certify:

FIRST: The name of the corporation is Signal Genetics, Inc. (the Corporation).

SECOND: The date of filing of its original Certificate of Incorporation with the Secretary of State of the State of Delaware was June 17, 2014 under the name Signal Genetics, Inc.

THIRD: The Board of Directors (the Board) of the Corporation, acting in accordance with the provisions of Sections 141 and 242 of the DGCL, adopted resolutions amending its Certificate of Incorporation as follows:

1. Article X of the Certificate of Incorporation, as presently in effect, of the Corporation is hereby amended and restated in its entirety as follows:

ARTICLE X: A. Meetings of the stockholders of the Corporation may be held within or without the State of Delaware, as the Bylaws of the Corporation may provide. The books of the Corporation may be kept (subject to any provision contained in the DGCL) outside of the State of Delaware at such place or places as may be designated from time to time by the board of directors of the Corporation or in the Bylaws of the Corporation.

B. No action shall be taken by the stockholders of the Company except at an annual or special meeting of stockholders called in accordance with the Bylaws of the Corporation and no action shall be taken by the stockholders by written consent or electronic transmission.

FOURTH: Thereafter, pursuant to a resolution by the Board, this Certificate of Amendment was submitted to the stockholders of the Corporation for their approval in accordance with the provisions of Section 211 and 242 of the DGCL. Accordingly, said proposed amendment has been adopted in accordance with Section 242 of the DGCL.

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IN WITNESS WHEREOF, **SIGNAL GENETICS, INC.** has caused this Certificate of Amendment to be signed by its duly authorized officer this day of , 2017.

SIGNAL GENETICS, INC.

By: _____

Name: _____

Title: _____

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Annex I

Opinion of Financial Advisor

Cantor Fitzgerald & CO.

110 East 59th Street

New York, New York 10022

Tel 212.0000.2000

www.cantorfitzgerald.com

October 31, 2016

Board of Directors

Signal Genetics, Inc.

5740 Fleet Street

Carlsbad, CA 92008

Members of the Board:

We understand that Signal Genetics, Inc. (Sydney), Sydney Merger Sub, Inc., a wholly-owned subsidiary of Sydney (Merger Sub), and miRagen Therapeutics, Inc. (miRagen) intend to enter into an Agreement and Plan of Merger and Reorganization (the Merger Agreement), pursuant to which, among other things, Merger Sub will be merged with and into miRagen with miRagen continuing as the surviving corporation and becoming a wholly-owned subsidiary of Sydney (the Merger).

Pursuant to the Merger Agreement, and as more fully set forth in the Merger Agreement, each share of common stock, par value $0.001 per share (miRagen Common Stock), of miRagen outstanding immediately prior to the effective time of the Merger, excluding shares held in treasury or held by miRagen, any subsidiary of miRagen, Sydney, Merger Sub and any shares as to which dissenter s rights have been perfected, will be converted into the right to receive a number of shares of common stock, par value $0.001 per share (Sydney Common Stock), of Sydney equal to the quotient of (a) the product of (i) the number of shares of Sydney Common Stock to be outstanding immediately following the consummation Merger *multiplied* by (ii) 0.94 (which number will be increased by 0.00000002 for each one dollar that the Net Cash (as defined in the Merger Agreement) of Sydney as determined pursuant to the terms of the Merger Agreement is less than ($100,000) (the miRagen Allocation Percentage)) divided by (b) the total number of shares of miRagen Common Stock outstanding immediately prior to the consummation of the Merger on a fully-diluted and as-converted basis, excluding the shares of miRagen Common Stock issued in the MT Pre-Closing Financing (the Exchange Ratio). We understand that in connection with the Merger (i) certain current holders of miRagen Common Stock will prior to consummation of the Merger purchase an additional 9,045,126 shares of miRagen Common Stock for aggregate consideration of $40,703,067.00 (the MT Pre-Closing Financing) pursuant to a Subscription Agreement to be entered into among miRagen and certain holders of miRagen Common Stock (the Subscription Agreement) and

(ii) as a condition to the consummation of the Merger, Sydney will sell its MyPRS® (Myeloma Prognostic Risk Signature) assay business (the Lab Business Sale) which Sydney management has informed us will result in cash consideration in an amount equal to $825,000 payable to Sydney. We further understand that the holders of shares of Sydney Common Stock immediately prior to the consummation Merger will hold approximately 4.4% (which includes the conversion of a convertible note into Sydney Common Stock) of the outstanding shares of Sydney Common Stock immediately following completion of the Merger (after giving effect to the MT Pre-Closing Financing). The terms and conditions of the Merger are set forth in more detail in the Merger Agreement.

You have asked us to render our opinion as to whether the Exchange Ratio is fair, from a financial point of view, to Sydney.

In the course of performing our reviews and analyses for rendering this opinion, we have:

reviewed a draft of the Merger Agreement, dated October 30, 2016 (the Draft Merger Agreement);

reviewed a draft of the Subscription Agreement, dated October 30, 2016 (the Draft Subscription Agreement);

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Board of Directors

Signal Genetics, Inc.

October 31, 2016

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reviewed certain publicly available business and financial information relating to Sydney and miRagen;

reviewed certain operating and financial information relating to Sydney s and miRagen s respective businesses and Sydney s prospects, as provided to us by Sydney s and miRagen s management, including projections for Sydney for the five years ended December 31, 2020, and monthly cash projections for October, November, and December 2016, as prepared and provided to us by Sydney s management;

had conference calls with certain members of Sydney s senior management and the Board of Directors of Sydney to discuss Sydney s and miRagen s respective businesses, operations, historical and projected financial results and future prospects;

had conference calls with certain members of miRagen s senior management to discuss miRagen s business and operations;

reviewed certain publicly available information with respect to other companies in the biopharmaceutical industry that we deemed to be relevant;

reviewed the financial terms, to the extent publicly available, of selected recent business combinations and initial public offerings involving companies in the biopharmaceutical industry that we deemed to be relevant; and

conducted such other studies, analyses, inquiries and investigations as we deemed appropriate.

In rendering this opinion, we have relied upon and assumed, without independent verification, the accuracy and completeness of the financial and other information provided to or discussed with us by Sydney and miRagen or obtained by us from public sources, including, without limitation, the projections referred to above. With respect to the projections, we have relied on representations that they have been reasonably prepared on bases reflecting the best currently available estimates and judgments of the senior management of Sydney, as to the expected future performance of and liquidation value of Sydney. We have not assumed any responsibility for the independent verification of any such information, including, without limitation, the projections; we express no view or opinion as to such projections and the assumptions upon which they are based; and we have further relied upon the assurances of the senior management of Sydney that they are unaware of any facts that would make the information and projections incomplete or misleading. We have relied upon, without independent verifications, the assessment of Sydney management and miRagen management as to the viability of, and risks associated with, the current and future

products and services of miRagen (including without limitation, the development, testing and marketing of such products and services, the receipt of all necessary governmental and other regulatory approvals for the development, testing and marketing thereof, and the life and enforceability of all relevant patents and other intellectual and other property rights associated with such products and services). We have assumed that the executed Merger Agreement and Subscription Agreement will not differ in any material respect from the Draft Merger Agreement and the Draft Subscription Agreement, respectively, and that the Merger and the MT Pre-Closing Financing will be consummated in accordance with the terms of the Merger Agreement and the Subscription Agreement, respectively, without waiver, modification or amendment and in compliance with all applicable laws, documents and other requirements. We have also assumed that in the course of obtaining the necessary regulatory or third-party approvals, consents and releases for the Merger, no delay, limitation, restriction or condition will be imposed that would have an adverse effect on Sydney or miRagen or the contemplated benefits of the Merger. We have also assumed that the representations and warranties contained in the Merger Agreement made by the parties thereto are true and correct in all respects material to our analysis. We have assumed, at the direction of Sydney management, that the miRagen Allocation Percentage is no greater than 0.94

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In arriving at our opinion, we have not performed or obtained any independent evaluation or appraisal of the assets or liabilities (contingent or otherwise) of Sydney and miRagen, nor did we conduct a physical inspection of any of the properties or facilities of Sydney or miRagen, nor have we been furnished with any such evaluations, appraisals or inspections, nor do we assume any responsibility to obtain any such evaluations, appraisals or inspections. During the course of our engagement, we were directed by the Board of Directors of Sydney to solicit indications of interest from various third parties regarding a transaction with Sydney, and we have considered the results of such solicitation in rendering our opinion. We are not legal, regulatory, tax or accounting experts and have relied on the assessments made by Sydney and its advisors with respect to such issues. Our opinion does not address any legal, tax, regulatory or accounting matters.

We do not express any opinion as to the price or range of prices at which the shares of Sydney Common Stock may trade subsequent to the announcement or consummation of the Merger or at any time.

We have acted as a financial advisor to Sydney in connection with the Merger and will receive a customary fee for such services pursuant to an engagement letter with Sydney, a substantial portion of which is contingent on successful consummation of the Merger. A portion of our compensation is payable upon delivery of this letter and may be credited against the fee payable upon consummation of the Merger. In addition, Sydney has agreed to reimburse us for certain expenses and to indemnify us against certain liabilities arising out of our engagement.

CF&CO has previously been engaged during the two years preceding the date of this opinion by Sydney to provide certain investment banking and other services on matters unrelated to the Merger, for which we have received customary fees. CF&CO may seek to provide Sydney and its affiliates with certain investment banking and other services unrelated to the Transaction in the future.

Consistent with applicable legal and regulatory requirements, CF&CO has adopted certain policies and procedures to establish and maintain the independence of CF&CO s research departments and personnel. As a result, CF&CO s research analysts may hold views, make statements or investment recommendations and/or publish research reports with respect to Sydney, the Merger and other participants in the Merger that differ from the views of CF&CO s investment banking personnel.

In the ordinary course of business, CF&CO and its affiliates may actively trade (for their own accounts and for the accounts of their customers) certain equity and debt securities, bank debt and/or other financial instruments issued by Sydney and affiliates, as well as derivatives thereof, and, accordingly, may at any time hold long or short positions in such securities, bank debt, financial instruments and derivatives.

It is understood that this letter is intended solely for the benefit and use of the Board of Directors of Sydney (in its capacity as such) in connection with its consideration of the Merger. This letter and our opinion are not to be used for any other purpose, or be reproduced, disseminated, quoted from or referred to at any time, in whole or in part, without

our prior written consent; provided, however, that this letter may be included in its entirety in any proxy statement that may be distributed to the holders of Sydney Common Stock in connection with the Merger. This letter and our opinion does not constitute a recommendation to the Board of Directors of Sydney in connection with the Merger, nor does this letter and our opinion constitute a recommendation to any holders of Sydney Common Stock or miRagen Common Stock as to how to vote or act in connection with the Merger. Our opinion addresses only the fairness of the Exchange Ratio from a financial point of view to Sydney. Our opinion does not address Sydney s underlying business decision to pursue the Merger, the relative merits of the Merger as compared to any alternative business or financial strategies that might exist for Sydney or the effects of any other transaction in which Sydney might engage. In addition, this opinion does not constitute a solvency opinion

or a fair value opinion, and we have not evaluated the solvency or fair value of Sydney under any federal or state laws relating to bankruptcy, insolvency or similar matters. Furthermore, we do not express any view or opinion as to the fairness, financial or otherwise, of the amount or nature of any compensation payable to or to be received by any of Sydney s officers, directors or employees, or any class of such persons, in connection with the Merger relative to the Exchange Ratio. We express no view as to any other aspect or implication of the Merger or any other agreement, arrangement or understanding entered into in connection with the Merger or otherwise, and we express no opinion as to the terms of the MT Pre-Closing Financing or the Lab Business Sale.

Our opinion has been authorized for issuance by the Fairness Opinion and Valuation Committee of CF&CO. Our opinion is subject to the assumptions, limitations, qualifications and other conditions contained herein and is necessarily based on economic, market and other conditions, and the information made available to us, as of the date hereof. We assume no responsibility for updating or revising our opinion based on circumstances or events of which we become aware after the date hereof.

Based on and subject to the foregoing, including the various assumptions, qualifications and limitations set forth herein, it is our opinion that, as of the date hereof, the Exchange Ratio is fair, from a financial point of view, to Sydney.

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Board of Directors

Signal Genetics, Inc.

October 31, 2016

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Very truly yours,

CANTOR FITZGERALD & CO.

By: /s/ Sage Kelly
Sage Kelly

Senior Managing Director, Head of

Investment Banking

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Annex J

Section 262 of the Delaware General Corporation Law

§262 Appraisal rights.

(a) Any stockholder of a corporation of this State who holds shares of stock on the date of the making of a demand pursuant to subsection (d) of this section with respect to such shares, who continuously holds such shares through the effective date of the merger or consolidation, who has otherwise complied with subsection (d) of this section and who has neither voted in favor of the merger or consolidation nor consented thereto in writing pursuant to § 228 of this title shall be entitled to an appraisal by the Court of Chancery of the fair value of the stockholder s shares of stock under the circumstances described in subsections (b) and (c) of this section. As used in this section, the word stockholder means a holder of record of stock in a corporation; the words stock and share mean and include what is ordinarily meant by those words; and the words depository receipt mean a receipt or other instrument issued by a depository representing an interest in 1 or more shares, or fractions thereof, solely of stock of a corporation, which stock is deposited with the depository.

(b) Appraisal rights shall be available for the shares of any class or series of stock of a constituent corporation in a merger or consolidation to be effected pursuant to § 251 (other than a merger effected pursuant to § 251(g) of this title and, subject to paragraph (b)(3) of this section, § 251(h) of this title), § 252, § 254, § 255, § 256, § 257, § 258, § 263 or § 264 of this title:

(1) Provided, however, that, except as expressly provided in § 363(b) of this title, no appraisal rights under this section shall be available for the shares of any class or series of stock, which stock, or depository receipts in respect thereof, at the record date fixed to determine the stockholders entitled to receive notice of the meeting of stockholders to act upon the agreement of merger or consolidation, were either: (i) listed on a national securities exchange or (ii) held of record by more than 2,000 holders; and further provided that no appraisal rights shall be available for any shares of stock of the constituent corporation surviving a merger if the merger did not require for its approval the vote of the stockholders of the surviving corporation as provided in § 251(f) of this title.

(2) Notwithstanding paragraph (b)(1) of this section, appraisal rights under this section shall be available for the shares of any class or series of stock of a constituent corporation if the holders thereof are required by the terms of an agreement of merger or consolidation pursuant to §§ 251, 252, 254, 255, 256, 257, 258, 263 and 264 of this title to accept for such stock anything except:

a. Shares of stock of the corporation surviving or resulting from such merger or consolidation, or depository receipts in respect thereof;

b. Shares of stock of any other corporation, or depository receipts in respect thereof, which shares of stock (or depository receipts in respect thereof) or depository receipts at the effective date of the merger or consolidation will be either listed on a national securities exchange or held of record by more than 2,000 holders;

c. Cash in lieu of fractional shares or fractional depository receipts described in the foregoing paragraphs (b)(2)a. and b. of this section; or

d. Any combination of the shares of stock, depository receipts and cash in lieu of fractional shares or fractional depository receipts described in the foregoing paragraphs (b)(2)a., b. and c. of this section.

(3) In the event all of the stock of a subsidiary Delaware corporation party to a merger effected under § 251(h), § 253 or § 267 of this title is not owned by the parent immediately prior to the merger, appraisal rights shall be available for the shares of the subsidiary Delaware corporation.

(4) In the event of an amendment to a corporation s certificate of incorporation contemplated by § 363(a) of this title, appraisal rights shall be available as contemplated by § 363(b) of this title, and the procedures of this

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section, including those set forth in subsections (d) and (e) of this section, shall apply as nearly as practicable, with the word amendment substituted for the words merger or consolidation, and the word corporation substituted for the words constituent corporation and/or surviving or resulting corporation.

(c) Any corporation may provide in its certificate of incorporation that appraisal rights under this section shall be available for the shares of any class or series of its stock as a result of an amendment to its certificate of incorporation, any merger or consolidation in which the corporation is a constituent corporation or the sale of all or substantially all of the assets of the corporation. If the certificate of incorporation contains such a provision, the provisions of this section, including those set forth in subsections (d), (e), and (g) of this section, shall apply as nearly as is practicable.

(d) Appraisal rights shall be perfected as follows:

(1) If a proposed merger or consolidation for which appraisal rights are provided under this section is to be submitted for approval at a meeting of stockholders, the corporation, not less than 20 days prior to the meeting, shall notify each of its stockholders who was such on the record date for notice of such meeting (or such members who received notice in accordance with § 255(c) of this title) with respect to shares for which appraisal rights are available pursuant to subsection (b) or (c) of this section that appraisal rights are available for any or all of the shares of the constituent corporations, and shall include in such notice a copy of this section and, if 1 of the constituent corporations is a nonstock corporation, a copy of § 114 of this title. Each stockholder electing to demand the appraisal of such stockholder s shares shall deliver to the corporation, before the taking of the vote on the merger or consolidation, a written demand for appraisal of such stockholder s shares. Such demand will be sufficient if it reasonably informs the corporation of the identity of the stockholder and that the stockholder intends thereby to demand the appraisal of such stockholder s shares. A proxy or vote against the merger or consolidation shall not constitute such a demand. A stockholder electing to take such action must do so by a separate written demand as herein provided. Within 10 days after the effective date of such merger or consolidation, the surviving or resulting corporation shall notify each stockholder of each constituent corporation who has complied with this subsection and has not voted in favor of or consented to the merger or consolidation of the date that the merger or consolidation has become effective; or

(2) If the merger or consolidation was approved pursuant to § 228, § 251(h), § 253, or § 267 of this title, then either a constituent corporation before the effective date of the merger or consolidation or the surviving or resulting corporation within 10 days thereafter shall notify each of the holders of any class or series of stock of such constituent corporation who are entitled to appraisal rights of the approval of the merger or consolidation and that appraisal rights are available for any or all shares of such class or series of stock of such constituent corporation, and shall include in such notice a copy of this section and, if 1 of the constituent corporations is a nonstock corporation, a copy of § 114 of this title. Such notice may, and, if given on or after the effective date of the merger or consolidation, shall, also notify such stockholders of the effective date of the merger or consolidation. Any stockholder entitled to appraisal rights may, within 20 days after the date of mailing of such notice or, in the case of a merger approved pursuant to § 251(h) of this title, within the later of the consummation of the offer contemplated by § 251(h) of this title and 20 days after the date of mailing of such notice, demand in writing from the surviving or resulting corporation the appraisal of such holder s shares. Such demand will be sufficient if it reasonably informs the corporation of the identity of the stockholder and that the stockholder intends thereby to demand the appraisal of such holder s shares. If such notice did not notify stockholders of the effective date of the merger or consolidation, either (i) each such constituent corporation shall send a second notice before the effective date of the merger or consolidation notifying each of the holders of any class or series of stock of such constituent corporation that are entitled to appraisal rights of the effective date of the merger or consolidation or (ii) the surviving or resulting corporation shall send such a second notice to all such holders on or within 10 days after such effective date; provided, however, that if such second notice is sent more than 20 days following the sending of the first notice or, in the case of a merger approved pursuant to § 251(h) of this title, later than the later of the consummation of the offer contemplated by § 251(h) of this title and 20 days following the

sending of the first notice, such second notice need only be sent to each stockholder who is entitled

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to appraisal rights and who has demanded appraisal of such holder s shares in accordance with this subsection. An affidavit of the secretary or assistant secretary or of the transfer agent of the corporation that is required to give either notice that such notice has been given shall, in the absence of fraud, be prima facie evidence of the facts stated therein. For purposes of determining the stockholders entitled to receive either notice, each constituent corporation may fix, in advance, a record date that shall be not more than 10 days prior to the date the notice is given, provided, that if the notice is given on or after the effective date of the merger or consolidation, the record date shall be such effective date. If no record date is fixed and the notice is given prior to the effective date, the record date shall be the close of business on the day next preceding the day on which the notice is given.

(e) Within 120 days after the effective date of the merger or consolidation, the surviving or resulting corporation or any stockholder who has complied with subsections (a) and (d) of this section hereof and who is otherwise entitled to appraisal rights, may commence an appraisal proceeding by filing a petition in the Court of Chancery demanding a determination of the value of the stock of all such stockholders. Notwithstanding the foregoing, at any time within 60 days after the effective date of the merger or consolidation, any stockholder who has not commenced an appraisal proceeding or joined that proceeding as a named party shall have the right to withdraw such stockholder s demand for appraisal and to accept the terms offered upon the merger or consolidation. Within 120 days after the effective date of the merger or consolidation, any stockholder who has complied with the requirements of subsections (a) and (d) of this section hereof, upon written request, shall be entitled to receive from the corporation surviving the merger or resulting from the consolidation a statement setting forth the aggregate number of shares not voted in favor of the merger or consolidation and with respect to which demands for appraisal have been received and the aggregate number of holders of such shares. Such written statement shall be mailed to the stockholder within 10 days after such stockholder s written request for such a statement is received by the surviving or resulting corporation or within 10 days after expiration of the period for delivery of demands for appraisal under subsection (d) of this section hereof, whichever is later. Notwithstanding subsection (a) of this section, a person who is the beneficial owner of shares of such stock held either in a voting trust or by a nominee on behalf of such person may, in such person s own name, file a petition or request from the corporation the statement described in this subsection.

(f) Upon the filing of any such petition by a stockholder, service of a copy thereof shall be made upon the surviving or resulting corporation, which shall within 20 days after such service file in the office of the Register in Chancery in which the petition was filed a duly verified list containing the names and addresses of all stockholders who have demanded payment for their shares and with whom agreements as to the value of their shares have not been reached by the surviving or resulting corporation. If the petition shall be filed by the surviving or resulting corporation, the petition shall be accompanied by such a duly verified list. The Register in Chancery, if so ordered by the Court, shall give notice of the time and place fixed for the hearing of such petition by registered or certified mail to the surviving or resulting corporation and to the stockholders shown on the list at the addresses therein stated. Such notice shall also be given by 1 or more publications at least 1 week before the day of the hearing, in a newspaper of general circulation published in the City of Wilmington, Delaware or such publication as the Court deems advisable. The forms of the notices by mail and by publication shall be approved by the Court, and the costs thereof shall be borne by the surviving or resulting corporation.

(g) At the hearing on such petition, the Court shall determine the stockholders who have complied with this section and who have become entitled to appraisal rights. The Court may require the stockholders who have demanded an appraisal for their shares and who hold stock represented by certificates to submit their certificates of stock to the Register in Chancery for notation thereon of the pendency of the appraisal proceedings; and if any stockholder fails to comply with such direction, the Court may dismiss the proceedings as to such stockholder. If immediately before the merger or consolidation the shares of the class or series of stock of the constituent corporation as to which appraisal rights are available were listed on a national securities exchange, the Court shall dismiss the proceedings as to all holders of such shares who are otherwise entitled to appraisal rights unless (1) the total number of shares entitled to

appraisal exceeds 1% of the outstanding shares of the class or series eligible for appraisal, (2) the value of the consideration provided in the merger or consolidation for such total number of shares exceeds $1 million, or (3) the merger was approved pursuant to § 253 or § 267 of this title.

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(h) After the Court determines the stockholders entitled to an appraisal, the appraisal proceeding shall be conducted in accordance with the rules of the Court of Chancery, including any rules specifically governing appraisal proceedings. Through such proceeding the Court shall determine the fair value of the shares exclusive of any element of value arising from the accomplishment or expectation of the merger or consolidation, together with interest, if any, to be paid upon the amount determined to be the fair value. In determining such fair value, the Court shall take into account all relevant factors. Unless the Court in its discretion determines otherwise for good cause shown, and except as provided in this subsection, interest from the effective date of the merger through the date of payment of the judgment shall be compounded quarterly and shall accrue at 5% over the Federal Reserve discount rate (including any surcharge) as established from time to time during the period between the effective date of the merger and the date of payment of the judgment. At any time before the entry of judgment in the proceedings, the surviving corporation may pay to each stockholder entitled to appraisal an amount in cash, in which case interest shall accrue thereafter as provided herein only upon the sum of (1) the difference, if any, between the amount so paid and the fair value of the shares as determined by the Court, and (2) interest theretofore accrued, unless paid at that time. Upon application by the surviving or resulting corporation or by any stockholder entitled to participate in the appraisal proceeding, the Court may, in its discretion, proceed to trial upon the appraisal prior to the final determination of the stockholders entitled to an appraisal. Any stockholder whose name appears on the list filed by the surviving or resulting corporation pursuant to subsection (f) of this section and who has submitted such stockholder s certificates of stock to the Register in Chancery, if such is required, may participate fully in all proceedings until it is finally determined that such stockholder is not entitled to appraisal rights under this section.

(i) The Court shall direct the payment of the fair value of the shares, together with interest, if any, by the surviving or resulting corporation to the stockholders entitled thereto. Payment shall be so made to each such stockholder, in the case of holders of uncertificated stock forthwith, and the case of holders of shares represented by certificates upon the surrender to the corporation of the certificates representing such stock. The Court s decree may be enforced as other decrees in the Court of Chancery may be enforced, whether such surviving or resulting corporation be a corporation of this State or of any state.

(j) The costs of the proceeding may be determined by the Court and taxed upon the parties as the Court deems equitable in the circumstances. Upon application of a stockholder, the Court may order all or a portion of the expenses incurred by any stockholder in connection with the appraisal proceeding, including, without limitation, reasonable attorney s fees and the fees and expenses of experts, to be charged pro rata against the value of all the shares entitled to an appraisal.

(k) From and after the effective date of the merger or consolidation, no stockholder who has demanded appraisal rights as provided in subsection (d) of this section shall be entitled to vote such stock for any purpose or to receive payment of dividends or other distributions on the stock (except dividends or other distributions payable to stockholders of record at a date which is prior to the effective date of the merger or consolidation); provided, however, that if no petition for an appraisal shall be filed within the time provided in subsection (e) of this section, or if such stockholder shall deliver to the surviving or resulting corporation a written withdrawal of such stockholder s demand for an appraisal and an acceptance of the merger or consolidation, either within 60 days after the effective date of the merger or consolidation as provided in subsection (e) of this section or thereafter with the written approval of the corporation, then the right of such stockholder to an appraisal shall cease. Notwithstanding the foregoing, no appraisal proceeding in the Court of Chancery shall be dismissed as to any stockholder without the approval of the Court, and such approval may be conditioned upon such terms as the Court deems just; provided, however that this provision shall not affect the right of any stockholder who has not commenced an appraisal proceeding or joined that proceeding as a named party to withdraw such stockholder s demand for appraisal and to accept the terms offered upon the merger or consolidation within 60 days after the effective date of the merger or consolidation, as set forth in subsection (e) of this section.

(l) The shares of the surviving or resulting corporation to which the shares of such objecting stockholders would have been converted had they assented to the merger or consolidation shall have the status of authorized and unissued shares of the surviving or resulting corporation.