Dicerna Pharmaceuticals Inc
Form S-3
May 17, 2018
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As filed with the Securities and Exchange Commission on May 16, 2018

Registration No. 333-

UNITED STATES

SECURITIES AND EXCHANGE COMMISSION

WASHINGTON, DC 20549

FORM S-3

REGISTRATION STATEMENT

UNDER

THE SECURITIES ACT OF 1933

DICERNA PHARMACEUTICALS, INC.

(Exact name of registrant as specified in its charter)

Delaware	**20-5993609**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification Number)**

87 Cambridgepark Drive

Cambridge, MA 02140

(617) 621-8097

(Address, including zip code, and telephone number, including area code, of registrant s principal executive offices)

Douglas M. Fambrough, III, Ph.D.

President, Chief Executive Officer and Director

Dicerna Pharmaceuticals, Inc.

87 Cambridgepark Drive

Cambridge, MA 02140

(617) 621-8097

(Name, address, including zip code, and telephone number, including area code, of agent for service)

Copy to:

Sam Zucker, Esq.

Istvan A. Hajdu, Esq.

Sidley Austin LLP

1001 Page Mill Road

Building 1

Palo Alto, CA 94304

(650) 565-7000

Approximate date of commencement of proposed sale to the public: From time to time or at one time as determined by the Registrant after the effective date of this registration statement.

If the only securities being registered on this Form are being offered pursuant to dividend or interest reinvestment plans, please check the following box.

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, other than securities offered only in connection with dividend or interest reinvestment plans, check the following box.

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, please check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

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If this Form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

If this Form is a registration statement pursuant to General Instruction I.D. or a post-effective amendment thereto that shall become effective upon filing with the Commission pursuant to Rule 462(e) under the Securities Act, check the following box.

If this Form is a post-effective amendment to a registration statement filed pursuant to General Instruction I.D. filed to register additional securities or additional classes of securities pursuant to Rule 413(b) under the Securities Act, check the following box.

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, smaller reporting company, or an emerging growth company. See the definitions of large accelerated filer, accelerated filer, smaller reporting company, and emerging growth company in Rule 12b-2 of the Exchange Act.

Large accelerated filer		Accelerated filer
Non-accelerated filer	(Do not check if smaller reporting company)	Smaller reporting company
		Emerging growth company

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 7(a)(2)(B) of the Securities Act.

CALCULATION OF REGISTRATION FEE

Title of each class of securities to be registered	**Proposed maximum aggregate offering price[1][2]**	**Amount of registration fee[3]**
Common Stock, par value $0.0001 per share		
Preferred Stock, par value $0.0001 per share		
Debt Securities		
Warrants[4]		
Other Rights or Units[5]		
Total Registration Fee	$250,000,000	$31,125

(1) This registration statement covers such indeterminate number or principal amount of each identified class of securities, with a maximum aggregate offering price of $250,000,000, exclusive of accrued interest and

dividends, if any.

(2) As permitted pursuant to Note 2 of Notes to the Calculation of Registration Fee Table of Form S-3, this information is omitted because the registration fee is calculated pursuant to Rule 457(o) under the Securities Act of 1933, as amended (the Securities Act).

(3) Calculated pursuant to Rule 457(o) under the Securities Act.

(4) Warrants may be sold separately or together with any of the securities registered hereby and may be exercisable for shares of common stock or preferred stock registered hereby. Because the warrants will provide a right only to purchase such securities offered hereunder, no additional registration fee is required.

(5) Rights will represent rights to purchase shares of common stock or shares of preferred stock registered hereby. Because the rights will provide a right only to purchase such securities offered hereunder, no additional registration fee is required. Each unit will represent an interest in two or more securities registered pursuant to this registration statement, which may or may not be separable. Because the units will provide a right only to purchase such securities offered hereunder, no additional registration fee is required.

The Registrant hereby amends this Registration Statement on such date or dates as may be necessary to delay its effective date until the Registrant shall file a further amendment which specifically states that this Registration Statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933 or until the Registration Statement shall become effective on such date as the Commission, acting pursuant to said Section 8(a), may determine.

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EXPLANATORY NOTE

This registration statement contains two prospectuses:

- a base prospectus which covers the offering, issuance and sale by the Registrant of up to a maximum aggregate offering price of $250,000,000 of the Registrant s common stock, preferred stock, debt securities, warrants or units; and

- a sales agreement prospectus covering the offering, issuance and sale by the Registrant of up to a maximum aggregate offering price of $100,000,000 of our common stock that may be issued and sold under a sales agreement with Cowen and Company, LLC.

The base prospectus immediately follows this explanatory note. The prospectus relating to the sales agreement immediately follows the base prospectus. The common stock that may be offered, issued and sold by the Registrant under the sales agreement prospectus is included in the $250,000,000 of securities that may be offered, issued and sold by the Registrant under the base prospectus.

Upon termination of the sales agreement with Cowen and Company, LLC, any portion of the $100,000,000 included in the sales agreement prospectus that is not sold pursuant to the sales agreement will be available for sale in other offerings pursuant to the base prospectus and a corresponding prospectus supplement, and if no shares are sold under the sales agreement, the full $100,000,000 of securities may be sold in other offerings pursuant to the base prospectus.

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The information in this prospectus is not complete and may be changed. We may not sell these securities until the registration statement filed with the U.S. Securities and Exchange Commission is effective. This prospectus is not an offer to sell these securities and it is not soliciting any offer to buy these securities in any jurisdiction where the offer or sale is not permitted.

SUBJECT TO COMPLETION, DATED MAY 16, 2018

PROSPECTUS

$250,000,000

Common Stock

Preferred Stock

Debt Securities

Warrants

Other Rights

Units

From time to time, we may sell up to an aggregate total offering price of $250,000,000 of our shares of Common Stock, Preferred Stock, Debt Securities, Warrants, other Rights or Units, in each case in one or more issuances and at prices and on terms that we will determine at the time of the offering.

This prospectus describes the general manner in which any of these securities may be offered using this prospectus. We will specify in an accompanying prospectus supplement the terms of the securities offered and other details regarding the offering thereof.

Our common stock is listed on The NASDAQ Global Select Market under the symbol DRNA.

We are an emerging growth company as defined by the Jumpstart Our Business Startups Act of 2012 and, as such, we are subject to reduced public company reporting requirements. Investing in our securities involves a

high degree of risk. You should review carefully the risks and uncertainties described under the heading Risk Factors on page 10 of this prospectus and under any similar heading in the documents that are incorporated by reference into this prospectus, as well as Special Note Regarding Forward-Looking Statements on page 3 of this prospectus. You should read the entire prospectus carefully before you make your investment decision.

The securities covered by this prospectus may be sold directly by us to investors, through agents designated by us from time to time or through underwriters or dealers at prices and on terms to be determined at the time of offering. We will include in an applicable prospectus supplement the names of any underwriters or agents and any applicable commissions or discounts. Additional information on the methods of sale appears under Plan of Distribution in this prospectus. We will also describe in an applicable prospectus supplement the way(s) in which we expect to use the net proceeds we receive from any sale.

Neither the U.S. Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or determined if this prospectus or any accompanying prospectus supplement is truthful or complete. Any representation to the contrary is a criminal offense.

This prospectus may not be used to offer or sell any securities unless accompanied by a prospectus supplement.

The date of this prospectus is , 2018.

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You should rely only on the information contained or incorporated by reference in this prospectus and in an applicable prospectus supplement to this prospectus. We have not authorized any other person to provide you with different or additional information. If anyone provides you with different, additional or inconsistent information, you should not rely on it. We do not take responsibility for, and can provide no assurance as to the reliability of, any other information that others may give you. We are not making an offer to sell these securities or soliciting any offer to buy these securities in any jurisdiction where the offer or sale is not permitted. You should assume that the information appearing in this prospectus, any applicable prospectus supplement or any free writing prospectus we authorize to be delivered to you is accurate only as of the date of that document or any other date set forth in that document. Additionally, any information we have incorporated by reference in this prospectus or in any applicable prospectus supplement is accurate only as of the date of the document incorporated by reference or other date set forth in that document, regardless of the time of delivery of this prospectus, any applicable prospectus supplement or any sale of securities. Our business, financial condition, results of operations, cash flow and prospects may have changed since that date.

This prospectus, any applicable prospectus supplement and the information incorporated herein or therein by reference contains market data, industry statistics and other data that have been obtained or compiled from information made available by independent third parties. We have not independently verified the accuracy and completeness of such data. This prospectus, any applicable prospectus supplement and the information incorporated herein or therein by reference include trademarks, service marks and trade names owned by us or other companies. Solely for convenience, we may refer to our trademarks included or incorporated by reference in this prospectus, any applicable prospectus supplement or any free writing prospectus without the ™ or ® symbols, but any such references are not intended to indicate that we will not assert, to the fullest extent permitted under applicable law, our rights to our trademarks or other intellectual property. All trademarks, service marks and trade names included or incorporated by reference in this prospectus, any applicable prospectus supplement or any related free writing prospectus are the property of their respective owners.

When used in this prospectus, the terms Dicerna, we, our and us refer to Dicerna Pharmaceuticals, Inc., a Delaware corporation, and its subsidiaries, unless otherwise specified or the context otherwise requires.

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ABOUT THIS PROSPECTUS

This prospectus forms a part of a registration statement that we have filed with the U.S. Securities and Exchange Commission (SEC) using a shelf registration process.

By using a shelf registration statement, we may, from time to time, offer and sell the securities described in this prospectus with an aggregate total offering price not exceeding $250,000,000 million in one or more offerings.

This prospectus describes the general manner in which we may offer the securities described in this prospectus. Each time we sell securities pursuant to the registration statement we will provide a prospectus supplement (which term includes, as applicable, the at-the-market sales agreement prospectus filed with the registration statement of which this prospectus forms a part) that will contain specific information about the offering and the securities offered, and may also add, update or change information contained in this prospectus. If there is any inconsistency between information in this prospectus and any accompanying prospectus supplement, you should rely on the information in the most recent applicable prospectus supplement and documents incorporated by reference herein and therein. This prospectus may not be used to offer to sell, solicit an offer to buy or consummate a sale of our securities unless it is accompanied by a prospectus supplement.

This prospectus, together with any accompanying prospectus supplement, contains important information you should know before investing in our securities, including important information about us and the securities being offered. You should carefully read both documents, as well as the additional information contained in the documents described under Where You Can Find More Information and Incorporation of Certain Information by Reference in both this prospectus and the applicable prospectus supplement, and in particular the annual quarterly and current reports and other documents we file with the SEC. Neither this prospectus nor any accompanying prospectus supplement is an offer to sell these securities or is soliciting an offer to buy these securities in any jurisdiction where the offer or sale is not permitted.

WHERE YOU CAN FIND MORE INFORMATION

We have filed with the SEC a registration statement on Form S-3 under the Securities Act of 1933, as amended (the Securities Act), with respect to the securities offered by this prospectus and the applicable prospectus supplement. This prospectus and the applicable prospectus supplement do not contain all of the information set forth in the registration statement and its exhibits and schedules in accordance with SEC rules and regulations. For further information with respect to us and the securities being offered by this prospectus and the applicable prospectus supplement, you should read the registration statement, including its exhibits and schedules. Statements contained in this prospectus and the applicable prospectus supplement, including documents that we have incorporated by reference, as to the contents of any contract or other document referred to are not necessarily complete, and, with respect to any contract or other document filed as an exhibit to the registration statement or any other such document, each such statement is qualified in all respects by reference to the corresponding exhibit. You should review the complete contract or other document to evaluate these statements. You may obtain copies of the registration statement and its exhibits via the SEC s EDGAR database or our website, or at the offices of the SEC, where they may be examined without charge at the Public Reference Room, at the address listed below, or obtained upon payment of the prescribed fees.

We file annual, quarterly and current reports, proxy statements and other documents with the SEC under the U.S. Securities Exchange Act of 1934, as amended (the Exchange Act). The SEC maintains a website that contains reports, proxy and information statements and other information regarding issuers, including us, that file electronically with the SEC. You may obtain documents that we file with the SEC at *sec.gov* and read and copy them at the SEC s

Public Reference Room at 100 F Street N.E., Washington, DC 20549 (information on operation of the Public Reference Room is available by calling the SEC at 1-800-SEC-0330).

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We also make these documents available on our website at *dicerna.com*. Our website and the information contained or connected to our website is not incorporated by reference in this prospectus or any prospectus supplement, and you should not consider it part of this prospectus or any prospectus supplement.

INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

SEC rules permit us to incorporate information by reference in this prospectus and the applicable prospectus supplement. This means that we can disclose important information to you by referring you to another document filed separately with the SEC. The information incorporated by reference is considered to be part of this prospectus and the applicable prospectus supplement, except for information superseded by information contained in this prospectus or the applicable prospectus supplement itself or in any subsequently filed incorporated document. This prospectus and the applicable prospectus supplement incorporate by reference the documents set forth below that we have previously filed with the SEC (Commission File No. 001-36281), other than information in such documents that is deemed to be furnished and not filed. These documents contain important information about us and our business and financial condition.

Annual Report on Form 10-K for the year ended December 31, 2017, filed with the SEC on March 8, 2018, as amended;

Quarterly Report on Form 10-Q for the period ended March 31, 2018, filed with the SEC on May 14, 2018;

Current Reports on Form 8-K, filed with the SEC on April 23, 2018 and April 26, 2018 (Items 1.01 and 3.02 only);

Definitive Proxy Statement on Schedule 14A, filed with the SEC on April 26, 2018; and

the description of our Common Stock contained in our Registration Statement on Form 8/A, dated January 28, 2014, including any amendments or reports filed for the purpose of updating such description.

All documents that we file (but not those that we furnish) pursuant to Section 13(a), 13(c), 14 or 15(d) of the Exchange Act, after the date of the initial registration statement of which this prospectus is a part and prior to the effectiveness of the registration statement shall be deemed to be incorporated by reference into this prospectus and will automatically update and supersede the information in this prospectus, and any previously filed documents. All documents that we file (but not those that we furnish) pursuant to Section 13(a), 13(c), 14 or 15(d) of the Exchange Act on or after the date of this prospectus and prior to the termination of the offering of any of the securities covered under this prospectus shall be deemed to be incorporated by reference into this prospectus and will automatically update and supersede the information in this prospectus, the applicable prospectus supplement and any previously filed documents.

Any statement contained herein or in a document incorporated or deemed to be incorporated by reference in this prospectus or the applicable prospectus supplement shall be deemed to be modified or superseded for purposes of this prospectus and such applicable prospectus supplement to the extent that a statement contained in this prospectus or such applicable prospectus supplement, or in any other subsequently filed document which also is or is deemed to be

incorporated by reference in this prospectus and such applicable prospectus supplement, modifies or supersedes such earlier statement. Any statement so modified or superseded shall not be deemed, except as so modified or superseded, to constitute a part of this prospectus or such applicable prospectus supplement.

Documents incorporated by reference are available from us without charge, excluding all exhibits unless specifically incorporated by reference as an exhibit to this prospectus and the applicable prospectus supplement.

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Prospective investors may obtain documents incorporated by reference in this prospectus and the applicable prospectus supplement by requesting them in writing or by telephone from us at our executive offices at:

Dicerna Pharmaceuticals, Inc.

87 Cambridgepark Drive

Cambridge, MA 02140

(617) 621-8097

Attention: Investor Relations and Corporate Communications

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus, together with any accompanying prospectus supplement, includes and incorporates by reference forward-looking statements within the meaning of the U.S. Private Securities Litigation Reform Act of 1995 and releases issued by the SEC and within the meaning of Section 27A of the Securities Act, and Section 21E of the Exchange Act. All statements other than statements of historical fact are forward-looking statements for purposes of this prospectus. In some cases, you can identify forward-looking statements by terminology such as may, could, will, would, should, expect, plan, anticipate, believe, estimate, intend, predict, seek, contemplate, potential, ongoing, goal, or the negative of these terms or other comparable terminology. These forward-looking statements include, but are not limited to, statements about:

- how long we expect to maintain liquidity to fund our planned level of operations and our ability to obtain additional funds for our operations;
- the initiation, timing, progress and results of our research and development programs, preclinical studies, any clinical trials and IND, CTA, New Drug Application (NDA) and other regulatory submissions;
- our ability to identify and develop product candidates for treatment of additional disease indications;
- our or a collaborator s ability to obtain and maintain regulatory approval of any of our product candidates;
- the rate and degree of market acceptance of any approved product candidates;
- the commercialization of any approved product candidates;
- our ability to establish and maintain additional collaborations and retain commercial rights for our product candidates in the collaborations;

the implementation of our business model and strategic plans for our business, technologies and product candidates;

our estimates of our expenses, ongoing losses, future revenue and capital requirements;

our ability to obtain and maintain intellectual property protection for our technologies and product candidates and our ability to operate our business without infringing the intellectual property rights of others;

our reliance on third parties to conduct our preclinical studies or any clinical trials;

our reliance on third party suppliers and manufacturers to supply the materials and components for, and manufacture, our research and development, preclinical and clinical trial drug supplies;

our ability to attract and retain qualified key management and technical personnel;

our dependence on our existing collaborator, BI, for developing, obtaining regulatory approval for and commercializing product candidates in the collaboration;

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our receipt and timing of any milestone payments or royalties under our research collaboration and license agreement with BI or any future arrangements with any other collaborators;

our expectations regarding the time during which we will be an emerging growth company under the Jumpstart Our Business Startups Act;

our financial performance; and

developments relating to our competitors or our industry.

These statements relate to future events or to our future financial performance and involve known and unknown risks, uncertainties and other factors that may cause our actual results, performance or achievements to be materially different from any future results, performance or achievements expressed or implied by these forward-looking statements. In evaluating such forward-looking statements, you should specifically consider various factors that may cause actual results to differ materially from current expectations, including the risks outlined under the heading Risk Factors contained in this prospectus and any related free writing prospectus, and in any other documents incorporated herein or therein (including in our most recent annual report on Form 10-K, subsequent quarterly reports on Form 10-Q and other filings we make with the SEC pursuant to Section 13(a), 13(c), 14 or 15(d) of the Exchange Act). Any forward-looking statement in this prospectus reflects our current view with respect to future events and is subject to these and other risks, uncertainties and assumptions relating to our operations, results of operations, industry and future growth. Given these uncertainties, you should not place undue reliance on these forward-looking statements. Except as required by law, we assume no obligation to update or revise these forward-looking statements for any reason, even if new information becomes available in the future.

This prospectus, together with any accompanying prospectus supplement, also contains estimates, projections and other information concerning our industry, our business and the markets for certain drugs, including data regarding the estimated size of those markets, their projected growth rates and the incidence of certain medical conditions. Information that is based on estimates, forecasts, projections or similar methodologies is inherently subject to uncertainties and actual events or circumstances may differ materially from events and circumstances reflected in this information. Unless otherwise expressly stated, we obtained these industry, business, market and other data from reports, research surveys, studies and similar data prepared by third parties, industry, medical and general publications, government data and similar sources. In some cases, we do not expressly refer to the sources from which these data are derived.

Trademarks

This prospectus includes trademarks, service marks and trade names owned by us or by other companies. All trademarks, service marks and trade names included in this prospectus are the property of their respective owners.

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ABOUT THE COMPANY

The following highlights information about the Registrant and our business contained elsewhere or incorporated by reference in this prospectus. It is not complete and does not contain all of the information that you should consider before investing in any of our securities. You should carefully read this prospectus together with the more detailed information incorporated by reference in this prospectus.

Overview

Dicerna is a biopharmaceutical company focused on the discovery and development of innovative subcutaneously delivered ribonucleic acid (RNA) interference (RNAi)-based pharmaceuticals using our GalXC™ RNAi platform for the treatment of diseases involving the liver, including rare diseases, viral infectious diseases, chronic liver diseases and cardiovascular diseases. Within these therapeutic areas, we believe our GalXC RNAi platform will allow us to build a broad pipeline of therapeutics with commercially attractive pharmaceutical properties, including a subcutaneous route of administration, infrequent dosing (e.g., dosing that is monthly or quarterly, and potentially even less frequent), high therapeutic index, and specificity to a single target gene.

All of our GalXC drug discovery and development efforts are based on the therapeutic modality of RNAi, a highly potent and specific mechanism for silencing the activity of a targeted gene. In this naturally occurring biological process, double-stranded RNA molecules induce the enzymatic destruction of the messenger ribonucleic acid (mRNA) of a target gene that contains sequences that are complementary to one strand of the therapeutic double-stranded RNA molecule. The Company s approach is to design proprietary double-stranded RNA molecules that have the potential to engage the enzyme Dicer and initiate an RNAi process to silence a specific target gene. Our GalXC RNAi platform utilizes a particular structure of double-stranded RNA molecules configured for subcutaneous delivery to the liver. Due to the enzymatic nature of RNAi, a single GalXC molecule incorporated into the RNAi machinery can destroy hundreds or thousands of mRNAs from the targeted gene.

The GalXC RNAi platform supports Dicerna s long-term strategy to retain, subject to the evaluation of potential licensing opportunities as they may arise, a full or substantial ownership stake and to invest internally in diseases with focused patient populations, such as certain rare diseases. We see such diseases as representing opportunities that carry a relatively higher probability of success, with genetically and molecularly defined disease markers, high unmet need, a limited number of Centers of Excellence to facilitate reaching these patients, and the potential for more rapid clinical development programs. For more complex diseases with multiple gene dysfunctions and larger patient populations, we plan to pursue collaborations that can provide the enhanced scale, resources and commercial infrastructure required to maximize these prospects, such as the BI Agreement, as defined and discussed below.

Development Programs

In choosing which development programs to advance, we apply scientific, clinical, and commercial criteria that we believe allow us to best leverage our GalXC RNAi platform and maximize value. The Company is focusing its efforts on three priority therapeutic programs that currently have a Clinical Trial Application (CTA) filed, Investigational New Drug application (IND) filed or are in enabling studies in preparation to file additional regulatory clearances to initiate clinical trials. The Company is also focusing its efforts on a series of programs in the clinical candidate selection stage that may be elevated into IND/CTA enabling studies in the future, either on our own or in collaboration with larger pharmaceutical companies. Our three priority programs are: DCR-PHXC for the treatment of primary hyperoxaluria (PH); a program for an undisclosed rare disease; and DCR-HBVS for the treatment of chronic hepatitis B virus (HBV) infection. Our programs in clinical candidate selection include a program for the treatment of hypercholesterolemia, for which DCR-PCSK9 has been selected as a provisional clinical candidate, and multiple

programs targeting undisclosed targets in chronic liver diseases,

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cardiovascular diseases and additional rare diseases. In October 2017, we filed a CTA for our lead GalXC product candidate, DCR-PHXC, with the Medicines and Healthcare products Regulatory Agency (MHRA) in the United Kingdom (UK), and in December 2017, we dosed the first human in the Group A portion of the Phase 1 clinical trial of DCR-PHXC. On March 30, 2018, we received a notice from the United States (U.S.) Food and Drug Administration (FDA) indicating that our proposed clinical investigation for DCR-PHXC referenced in our IND may proceed. We have received regulatory and ethical approvals for the trial in the UK, France and Germany. A CTA has been submitted and is pending approval in the Netherlands. We expect to file for additional regulatory clearance for our programs in 2018 and 2019.

The table below sets forth the state of development of our various GalXC RNAi platform product candidates as of May 11, 2018.

Our current GalXC RNAi platform development programs are as follows:

Primary Hyperoxaluria. We are developing DCR-PHXC for the treatment of all types of PH. PH is a family of rare inborn errors of metabolism in which the liver produces excessive levels of oxalate, which in turn causes damage to the kidneys and to other tissues in the body. DCR-PHXC is currently being investigated in a Phase 1 clinical trial called PHYOX. In preclinical models of PH, DCR-PHXC reduces oxalate production to near-normal levels, ameliorating the disease condition.

We have submitted CTAs for the PHYOX study in the UK, France and Germany and have received the appropriate regulatory and ethical approvals. A CTA has been submitted and is pending approval in the Netherlands. On March 30, 2018, we received a notice from the U.S. FDA indicating that our proposed clinical investigation for DCR-PHXC referenced in our IND may proceed. We have completed dosing of all normal healthy volunteers (NHV) in the Group A portion of the study. While the study is still blinded toward treatment assignment, there have been no discontinuations and no serious adverse events. There have been two mild-to-moderate transient injection site reactions lasting up to a total of 36 hours at the highest doses of 6 and 12 mg/kg. With the completion of the Group A portion of the study in NHVs, we have started on the Group B portion of the study and dosing of the first PH patient with DCR-PHXC is imminent. PHYOX is a Phase 1 single ascending-dose study of DCR-PHXC in NHVs and patients with PH. The study is divided into two groups: Group A is a placebo-controlled, single-blind, single center study, which has enrolled 25 NHVs; Group B is an open-label, multi-center study enrolling up to 16 patients with PH type 1 (PH1) and PH type 2 (PH2). The primary objective of the study is to evaluate the safety and tolerability of single doses of DCR-PHXC in both

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groups. Secondary objectives are to characterize the pharmacokinetics of single doses of DCR-PHXC in NHVs and patients with PH, and to evaluate the pharmacodynamic effects of single doses of DCR-PHXC on biochemical markers including, but not limited to, changes in urine oxalate concentrations. We hope to achieve clinical proof-of-concept (POC) results in the second half of 2018. Additionally, we expect to initiate a multi-dose Phase 2/3 study in the first quarter of 2019, pending positive POC data and regulatory feedback.

To facilitate DCR-PHXC development, we have completed our Primary HYperoxaluria Observational Study (PHYOS), an international, multicenter, observational study in patients with a genetically confirmed diagnosis of PH1. PHYOS collected data on key biochemical parameters implicated in the pathogenesis of PH1. We are using the data to better understand the baseline PH1 disease state, which will help guide long-term drug development plans. In July 2017, at the 12th International Workshop on Primary Hyperoxaluria for Professionals, Patients and Families in Tenerife, Spain, we reported interim data from the study s 20 enrolled patients with a median age at screening of 21 years (range 12-61 years). The patients had been diagnosed at a median age of 7 years (range 1-59 years), and 14 patients (74%) had a medical history of renal stones. Over the six-month observation period, the variability (coefficient of variation) between 24-hour urine measurements of oxalate at different time points was 28%. Our clinical team is using these data to design clinical studies using 24-hour urinary oxalate excretion as a surrogate marker for clinical benefit. We expect to publish data from PHYOS in 2018.

An undisclosed rare disease involving the liver. We are developing a GalXC-based therapeutic, targeting a liver-expressed gene involved in a serious rare disease. For competitive reasons, we have not yet publicly disclosed the target gene or disease. We have selected this target gene and disease based on criteria that include having a strong therapeutic hypothesis, a readily-identifiable patient population, the availability of a potentially predictive biomarker, high unmet medical need, favorable competitive positioning and what we believe is a rapid projected path to approval. The disease is a genetic disorder, where mutations in the disease gene lead to the production of an abnormal protein. The protein causes progressive liver damage and fibrosis, in some cases leading to cirrhosis and liver failure, and we believe that silencing of the disease gene will prevent production of the abnormal protein and thereby slow or stop progression of the liver fibrosis. Greater than 100,000 people in the U.S. are believed to be homozygous (i.e. having identical pairs of genes for any given pair of hereditary characteristics) for the mutation that causes the liver disease, and at least 20% of those people, and potentially a significantly higher fraction, are believed to have liver-associated disease as a consequence. We are seeking a risk-sharing collaborator for this program before we file regulatory clearances to initiate a clinical trial, which we expect to be prepared to file in the second half of 2018.

Chronic Hepatitis B Virus infection. We have declared a GalXC RNAi platform-based product candidate for the treatment of HBV, DCR-HBVS, and are conducting formal non-clinical development studies. We expect to file regulatory clearances to initiate a clinical trial during the fourth quarter of 2018. Current therapies for HBV rarely lead to a long-term immunological cure as measured by the clearance of HBV surface antigen (HBsAg) and sustained HBV deoxyribonucleic acid (DNA) suppression in patient plasma or blood. DCR-HBVS targets HBV messenger RNA, and leads to greater than 99% reduction in circulated HBsAg in mouse models of HBV infection. Based on these preclinical studies, and only if we receive appropriate regulatory approval to begin human clinical trials, we hope to determine the potential of DCR-HBVS to reduce HBsAg and HBV DNA levels in the blood of HBV patients in a commercially attractive subcutaneous dosing paradigm.

Hypercholesterolemia (PCSK9 targeted therapy). We are using our GalXC RNAi platform to develop a therapeutic that targets the PCSK9 gene for the treatment of hypercholesterolemia. The Company has selected a provisional clinical candidate for the program, but is continuing to explore ways to further optimize the program. PCSK9 is a validated target for hypercholesterolemia, and there are FDA-approved therapies targeting PCSK9 that are based on monoclonal antibody technology. Based on preclinical studies, we believe that our GalXC RNAi platform has the potential to produce a PCSK9-targeted therapy with attractive commercial properties, such as small subcutaneous injection volumes and less frequent dosing.

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Additional pipeline programs. We have developed a robust portfolio of additional targets and diseases that we plan to pursue either on our own or in collaboration with partners. We have applied our GalXC technology to multiple gene targets across our disease focus areas of rare diseases, chronic liver diseases and cardiovascular diseases. Pursuant to our strategy, we are seeking collaborations with larger pharmaceutical companies to advance our programs in the areas of chronic liver diseases and cardiovascular diseases. Both these disease areas represent large and diverse patient populations, requiring complex clinical development and commercialization paths that we believe can be more effectively pursued in collaboration with larger pharmaceutical companies. For our additional rare diseases, we are continuing to assess their potential for clinical success and market opportunity while optimizing our GalXC molecules. For our additional pipeline programs (including PCSK9), we may utilize more advanced versions of our GalXC technology that further improve pharmaceutical properties of the GalXC molecules, including enhancing the duration of action and potency. We have further optimized our GalXC technology platform, enabling the development of next generation GalXC molecules. Improvements to our GalXC compound include modification of the tetraloop end of the molecule, which can be applied to any target gene, resulting in a substantially longer duration of action in animal models across multiple targets. Modification of the tetraloop only impacts the passenger strand and does not impact the guide strand. These modifications are unique to our GalXC molecules and, we believe, provide a competitive advantage for the Company.

In addition to the GalXC development programs outlined above, we are party to a collaborative research and license agreement with Boehringer Ingelheim International GmbH (BI) (the BI Agreement), pursuant to which the Company and BI jointly research and develop product candidates for the treatment of chronic liver diseases, with an initial focus on nonalcoholic steatohepatitis (NASH) using our GalXC platform. NASH is caused by the buildup of fat in the liver, potentially leading to liver fibrosis and cirrhosis. NASH has an especially high prevalence among obese and diabetic patients and is an area of high unmet medical need. The BI Agreement is for the development of product candidates against one target gene with an option for BI to add the development of product candidates that target a second gene. We are working exclusively with BI to develop the product candidates against the undisclosed target gene. We are responsible for the discovery and initial profiling of the product candidates, including primary pre-clinical studies, synthesis, and delivery. BI is responsible for evaluating and selecting the product candidates for further development. If BI selects one or more product candidates, it will be responsible for further pre-clinical development, clinical development, manufacturing and commercialization of those products. Also pursuant to the BI Agreement, we granted BI a worldwide license in connection with the research and development of the product candidates and will transfer to BI intellectual property rights of the product candidates selected by BI for clinical development and commercialization. We also may provide assistance to BI in order to help BI further develop selected product candidates. Pursuant to the BI Agreement, BI agreed to pay us a non-refundable upfront payment of $10.0 million for the first target. During the term of the research program, BI will reimburse us the cost of materials and third-party expenses that have been included in the preclinical studies up to an agreed-upon limit. We are eligible to receive up to $191.0 million in potential development and commercial milestones related to the initial target. We are also eligible to receive royalty payments on potential global net sales, subject to certain adjustments, tiered from high single digits up to low double-digits. BI s option to add a second target would provide for an option fee payment and success-based development and commercialization milestones and royalty payments to us.

We are party to a collaboration for our early generation of non-GalXC Dicer Substrate RNAi technology against two targets, the KRAS oncogene and an additional undisclosed gene, with the global pharmaceutical company Kyowa Hakko Kirin Co., Ltd. (KHK), to use for development in oncology and formulated using KHK s proprietary drug delivery system. KHK has provided us with notice of termination related to the non-KRAS program.

We also have developed a wholly owned clinical candidate, DCR-BCAT, targeting the ß-catenin oncogene. DCR-BCAT is based on an extended version of our earlier generation non-GalXC Dicer Substrate RNAi technology and is delivered by our lipid nanoparticle tumor delivery system, EnCore™. We plan to

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out-license, spin out or seek external funding to advance the DCR-BCAT opportunity, given our focus on our GalXC platform-based programs.

Our executive management team has extensive experience in the biopharmaceutical industry. In addition, various members of our management team and our board of directors have contributed to the progress of the RNAi field through their substantial involvement in companies such as Cephalon Inc., Genta Inc., GlaxoSmithKline plc, Pfizer Inc., Sanofi S.A (Sanofi), Sirna Therapeutics, Inc. (Sirna), and other companies. Our co-founder and chief executive officer, Douglas M. Fambrough III, Ph.D., was a lead venture capital investor and board member of Sirna, an early RNAi company acquired by Merck & Co., Inc. (Merck) in 2006 for $1.1 billion. He played a pivotal role in the restructuring of Ribozyme Pharmaceuticals into Sirna, the management of the company as a member of its Board of Directors, and the execution of its 2006 acquisition by Merck.

Our Corporate Information

We were incorporated in Delaware in October 2006. Our principal executive offices are located at 87 Cambridgepark Drive, Cambridge, MA 02140, and our main telephone number is (617) 621-8097. Additional information can be found on our website, at *dicerna.com*, and in our periodic and current reports filed with the SEC. Copies of our current and periodic reports filed with the SEC are available at the SEC Public Reference Room at 100 F Street, N.E., Washington, D.C. 20549, and online at *sec.gov* and our website at *dicerna.com.* The information contained in, or that can be accessed through, our website is not part of, and is not incorporated into, this prospectus and should not be considered part of this prospectus.

For additional information about our Company, please refer to other documents we have filed with the SEC and that are incorporated by reference into this prospectus, as listed under the heading Incorporation of Certain Information by Reference.

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RISK FACTORS

An investment in our securities is speculative in nature and involves a high degree of risk. Before deciding whether to invest in our securities, you should carefully consider the discussion of the material risks of investing in our securities contained in our filings with the SEC, as well as in the applicable prospectus supplement, in evaluating us and our business and prospects before you decide to purchase any of our securities. You should also be aware that this document and other public statements we make may contain statements that do not relate strictly to historical fact, any of which may be forward-looking statements within the meaning of the U.S. Private Securities Litigation Reform Act of 1995, and should take into account the considerations relating to such statements discussed under Risk Factors or any similar heading in the applicable prospectus supplement and in our filings we make with the SEC. Any of the risks and uncertainties set forth therein could materially and adversely affect our business, results of operations, cash flow and financial condition, which in turn could materially and adversely affect the trading price or value of our securities. As a result, you could lose all or part of your investment.

The risks and uncertainties we have described are not the only ones facing our company. Additional risks and uncertainties not presently known to us or that we currently deem immaterial may also affect our business operations.

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USE OF PROCEEDS

Unless otherwise described in the applicable prospectus supplement, we intend to use the net proceeds from the sale of any securities described in this prospectus for preclinical studies and clinical trials, with the remainder of any net proceeds from sales of securities being used for continued technology platform development, working capital and general corporate purposes.

We may set forth additional information concerning our expected use of net proceeds from sales of securities in the applicable prospectus supplement relating to the specific offering. Pending use of net proceeds as described above, we may invest net proceeds in interest-bearing, investment-grade securities.

The applicable prospectus supplement may not identify precisely the amounts we plan to spend on each of the uses of proceeds listed above or any other uses of proceeds that we may identify in that applicable prospectus supplement. In addition, the amounts actually expended for each purpose may vary significantly depending upon numerous factors, including:

- the costs and results of research, development and product candidate testing, including preclinical studies and clinical trials;
- costs and results of the regulatory approval process;
- costs and structure of potential acquisitions, collaborations or other transactions;
- the structure of and changes in our relationships with licensors, licensees and collaborators;
- the costs of filing, prosecuting, defending and enforcing patent claims;
- manufacturing, marketing and other costs associated with commercialization of products; and
- changes in the focus and direction of our research and development programs.

DIVIDEND POLICY

We have never declared or paid any cash dividends on our capital stock and do not anticipate paying any cash dividends in the foreseeable future. Payment of cash dividends, if any, in the future will solely be at the discretion of our board of directors and will depend on then-existing conditions, including our financial condition, operating results, contractual restrictions, capital requirements, business prospects and other factors our board of directors may deem relevant.

GENERAL DESCRIPTION OF SECURITIES

We may offer shares of common or preferred stock, various series of senior or subordinated debt securities, warrants, other rights to purchase securities, or units consisting of combinations of the foregoing, in each case from time to time under this prospectus, together with the applicable prospectus supplement, at prices and on terms to be determined by market conditions at the time of offering. This prospectus provides you with a general description of the securities we may offer. At the time we offer a particular type or series of securities, we will provide an applicable prospectus supplement describing the specific amounts, prices and other important terms of the securities, including, to the extent applicable:

designation or classification;

aggregate principal amount or aggregate offering price;

voting or other rights;

rates and times of payment of interest, dividends or other payments;

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liquidation preference;

original issue discount;

maturity;

ranking;

restrictive covenants;

redemption, conversion, exercise, exchange, settlement or sinking fund terms, including prices or rates, and any provisions for changes to or adjustments in such prices or rates and in the securities or other property receivable upon conversion, exercise, exchange or settlement;

any securities exchange or market listing arrangements; and

important U.S. federal income tax considerations.

This prospectus may not be used to offer or sell securities unless accompanied by an applicable prospectus supplement. The applicable prospectus supplement may add, update or change information contained in this prospectus or in documents incorporated by reference in this prospectus. You should read the prospectus supplement related to any securities being offered.

We may sell the securities directly to or through underwriters, dealers or agents. We and our underwriters, dealers or agents reserve the right to accept or reject all or part of any proposed purchase of securities. If we do offer securities through underwriters or agents, we will include in the applicable prospectus supplement (i) the names of the underwriters or agents and applicable fees, discounts and commissions to be paid to them; (ii) details regarding over-allotment options, if any; and (iii) net proceeds to us.

The following descriptions are not complete and may not contain all the information you should consider before investing in any securities we may offer hereunder; they are summarized from, and qualified by reference to, our amended and restated certificate of incorporation, bylaws and the other documents referred to in the descriptions, all of which are or will be publicly filed with the SEC, as applicable. See Where You Can Find More Information.

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DESCRIPTION OF CAPITAL STOCK

The following summary description sets forth some of the general terms and provisions of our capital stock. Because this is a summary description, it does not contain all of the information that may be important to you. For a more detailed description of our common stock, you should refer to the applicable provisions of the General Corporation Law of the State of Delaware (the DGCL) and our certificate of incorporation and bylaws as in effect at the time of any offering. Copies of our Amended and Restated Certificate of Incorporation, as amended, and our Amended and Restated Bylaws are included as exhibits to the registration statement of which this prospectus forms a part.

General

Our authorized capital stock consists of 150 million shares of common stock, par value $0.0001 per share, and 5 million shares of preferred stock, par value $0.0001 per share. As of May 11, 2018, there were 52,821,624 shares of common stock outstanding, none held as treasury stock, 87,901 subject to outstanding warrants to purchase common stock (including outstanding warrants to purchase preferred stock that became exercisable for shares of common stock upon the closing of our initial public offering), 7,264,991 reserved for issuance upon exercise of outstanding stock options granted under Company incentive plans, and 1,750,471 available for future issuance pursuant to our existing stock incentive plans. No shares of preferred stock are issued and outstanding.

Common Stock. Holders of our common stock are entitled to one vote for each share of common stock held of record for the election of directors and on all matters submitted to a vote of stockholders. In the election of directors, a majority of the votes cast at a meeting of stockholders is sufficient to elect a director, except that if the number of nominees exceeds the number of directors to be elected, then a plurality of the votes cast at a meeting of stockholders is sufficient to elect a director. Our stockholders do not have cumulative voting rights in the election of directors. Accordingly, holders of a majority of the voting shares are able to elect all of the directors. Except as noted below under Anti-Takeover Effects of Provisions of Delaware Law and Our Charter Documents, a majority vote of common stockholders is generally required to take action under our certificate of incorporation and bylaws. Holders of our common stock are entitled to receive dividends ratably, if any, as may be declared by our board of directors out of legally available funds, subject to any preferential dividend rights of any preferred stock then outstanding. Upon our dissolution, liquidation or winding up, holders of our common stock are entitled to share ratably in our net assets legally available after the payment of all our debts and other liabilities, subject to the preferential rights of any preferred stock then outstanding. Holders of our common stock have no preemptive, subscription or conversion rights, and there are no redemption or sinking fund provisions applicable to our common stock. The rights, preferences and privileges of holders of common stock are subject to, and may be adversely affected by, the rights of the holders of shares of any series of preferred stock that we may designate and issue in the future. All outstanding shares of common stock are fully paid and non-assessable. American Stock Transfer & Trust Company, LLC is the transfer agent and registrar for our common stock.

Preferred Stock. Our board of directors has the authority, without further vote or action by the stockholders, to designate and issue shares of preferred stock in one or more series and to designate the rights, preferences and privileges of each series, which may be greater than the rights of the common stock. We will fix in a certificate of designation the number of shares, the designation and the rights, preferences and privileges, including any dividend, conversion, voting or preemptive rights, terms of redemption or repurchase, liquidation preferences and sinking fund terms, auction and remarketing procedures, and any transfer or other restrictions or limitations of or relating to any series of preferred stock that we sell under this prospectus and applicable prospectus supplements. The DGCL provides that in addition to any voting rights that may be provided in the applicable certificate of designation, preferred stock holders have the right to vote separately as a class on a proposed amendment to our certificate of incorporation involving certain fundamental changes in their rights. Preferred stock terms could adversely affect the

voting power or other rights of common stock holders and the likelihood that they would receive dividend or liquidation payments, and could have the effect of delaying, deferring or preventing a change in control. You should read the applicable prospectus or prospectus supplement and the certificate of designation relating to any series of preferred stock we may offer.

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Outstanding Warrants. As of May 11, 2018, we had outstanding warrants as follows:

- five warrants to purchase an aggregate of 2,198 shares of our common stock with an exercise price of $250 per share, each exercisable at any time on or before June 17, 2020; and
- seven warrants to purchase an aggregate of 85,703 shares of our common stock with an exercise price of $7.00, each exercisable at any time on or before June 26, 2018.

Registration Rights

We are party to an amended and restated registration rights agreement dated as of April 11, 2017, as amended, pursuant to which certain of our stockholders are entitled to demand, Form S-3 and piggyback registration rights. The shares of common stock that they may cause to be registered are referred to as registrable securities .

Demand registration rights

Subject to certain limitations, each holder of registrable securities has the right to demand we file a registration statement on Form S-1 to register all or a portion of their registrable securities, provided that the aggregate offering price of the registrable securities to be sold under the registration statement on Form S-1 is at least $5.0 million, net of underwriting discounts and commissions.

Form S-3 registration rights

Subject to certain limitations, each holder of registrable securities has the right to demand we file an unlimited number of registration statements on Form S-3, provided that the anticipated aggregate offering price of the registrable securities to be sold under the registration statement on Form S-3 exceeds $5.0 million, net of underwriting discounts and commissions.

Piggyback registration rights

Subject to certain conditions, if we propose to register any of our securities under the Securities Act, for sale to the public, the holders of registrable securities are entitled to receive written notice of such registration and to request that we include some or all of their registrable securities for resale in the registration statement. Under certain conditions, the managing underwriter of the offering will have the right to limit the number of shares of selling stockholders to be included in such registration.

Expenses of registration; indemnification

We are generally required to bear all registration expenses incurred in connection with the demand, Form S-3 and piggyback registrations described above. The amended and restated registration rights agreement contains customary indemnification provisions with respect to registration rights.

Termination of registration rights

The demand, Form S-3 and piggyback registration rights described above will terminate on the earlier to occur of (i) the date on which no holder holds any registrable securities and (ii) the date on which we are no longer subject to

the reporting requirements of Section 13 or 15(d) of the Exchange Act and are no longer otherwise required to report on an annual or quarterly basis on forms provided for such annual or quarterly reporting pursuant to the rules and regulations promulgated by the SEC.

Anti-Takeover Effects of Provisions of Delaware Law and Our Charter Documents

Our certificate of incorporation and bylaws include a number of provisions that may have the effect of encouraging persons considering unsolicited tender offers or other unilateral takeover proposals to negotiate with our board of directors rather than pursue non-negotiated takeover attempts. These provisions include the items described below.

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Removal of directors

Our certificate of incorporation and bylaws provide that subject to any limitations imposed by law and the rights of the holders of any series of our preferred stock, the board of directors or any individual director may be removed from office at any time without cause by the affirmative vote of the holders of a majority of the voting power of all the then-outstanding shares of voting stock of the Company, entitled to vote at an election of directors.

No written consent of stockholders

Our certificate of incorporation and bylaws provide that all stockholder actions are required to be taken by a vote of the stockholders at an annual or special meeting, and that stockholders may not take any action by written consent in lieu of a meeting.

Meetings of stockholders

Our certificate of incorporation and bylaws provide that special meetings of stockholders, which the Company is not obligated to call more than once per calendar year, may only be called by the chairman of our board of directors, our chief executive officer, our board of directors pursuant to a resolution adopted by a majority of the total number of authorized directors, or, subject to certain conditions, by our secretary at the request of the stockholders holding of record, in the aggregate, shares entitled to cast not less than ten percent of the votes at a meeting of the stockholders (assuming all shares entitled to vote at such meeting were present and voted). In addition, our bylaws limit the business that may be conducted at an annual meeting of stockholders to those matters properly brought before the meeting.

Advance notice requirements

Our bylaws establish advance notice procedures with regard to stockholder proposals relating to the nomination of candidates for election as directors or new business to be brought before meetings of our stockholders. These procedures provide that notice of stockholder proposals must be timely given in writing to our secretary prior to the meeting at which the action is to be taken. Generally, to be timely, notice must be received at our principal executive offices not less than the close of business on the ninetieth (90th) day nor earlier than the close of business on the one hundred twentieth (120th) day prior to the first anniversary of the annual meeting for the preceding year. The notice must contain certain information specified in the bylaws. These provisions may have the effect of precluding the conduct of certain business at a meeting if the proper procedures are not followed. These provisions may also discourage or deter a potential acquirer from conducting a solicitation of proxies to elect the acquirer s own slate of directors or otherwise attempting to obtain control of our company.

Amendment to certificate of incorporation and bylaws

Our certificate of incorporation provides that the affirmative votes of the holders of at least a majority of the voting power of all of the then-outstanding shares of our voting stock will be required to amend certain provisions of our certificate of incorporation, including provisions relating to the size of our board of directors, removal of directors, special meeting of stockholders and actions by written consent. The affirmative votes of the holders of at least a majority of the voting power of all of the then-outstanding shares of our voting stock will be required to amend or repeal our bylaws. In addition, our bylaws may be amended or repealed by our board of directors, subject to any limitations set forth in the bylaws.

Blank check preferred stock

Our certificate of incorporation provides for 5,000,000 authorized shares of preferred stock. The existence of authorized but unissued shares of preferred stock may enable our board of directors to render more difficult or to discourage an attempt to obtain control of us by means of a merger, tender offer, proxy contest or otherwise. For example, if in the due exercise of its fiduciary obligations, our board of directors were to determine that a

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takeover proposal is not in the best interests of us or our stockholders, our board of directors could cause shares of preferred stock to be issued without stockholder approval in one or more private offerings or other transactions that might dilute the voting or other rights of the proposed acquirer or insurgent stockholder or stockholder group. In this regard, our certificate of incorporation grants our board of directors broad power to establish the rights and preferences of authorized and unissued shares of preferred stock. The issuance of shares of preferred stock could decrease the amount of earnings and assets available for distribution to holders of shares of common stock. The issuance may also adversely affect the rights and powers, including voting rights, of these holders and may have the effect of delaying, deterring or preventing a change in control of us.

Delaware Law

We are subject to the provisions of Section 203 of the DGCL, which, subject to certain exceptions, prohibits a publicly-held 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 the interested stockholder attained such status with the approval of the board of directors or the business combination is approved in a prescribed manner. A business combination includes a merger or asset sale involving or other transaction resulting in a financial benefit to the interested stockholder. Subject to various exceptions, an interested stockholder is a person who, together with affiliates and associates, owns, or within the past three years did own, 15% or more of a corporation s voting stock. This statute could prohibit or delay the accomplishment of mergers or other takeover or change in control attempts and, accordingly, may discourage attempts to acquire the Company.

Delaware as sole and exclusive forum

Our bylaws provide, that unless we consent in writing to an alternative forum, the Court of Chancery of the State of Delaware shall, to the fullest extent permitted by law, be the sole and exclusive forum for (i) any derivative action or proceeding brought on behalf of us, (ii) any action asserting a claim of breach of a fiduciary duty owed by any of our directors, officers or other employees, to us or our stockholders, (iii) any action asserting a claim against us arising pursuant to any provision of the DGCL, as amended, or our certificate of incorporation or bylaws, (iv) any action to interpret, apply, enforce or determine the validity of our certificate of incorporation or bylaws, or (v) any action asserting a claim governed by the internal affairs doctrine.

Charter Documents

Our bylaws provide that we will indemnify our directors and executive officers to the fullest extent permitted by Delaware law and that we may indemnify our other officers, employees and other agents. We may enter into indemnification contracts with our directors and officers and purchase insurance on behalf of any person whom we are required or permitted to indemnify. In addition, our certificate of incorporation provides that the liability of our directors for monetary damages shall be eliminated, except for (i) breach of the directors duty of loyalty to the Company or its stockholders, (ii) acts or omissions not in good faith or which involve intentional misconduct or a knowing violation of law, (iii) violating Section 174 of the DGCL, or (iv) any transaction from which the director derived an improper personal benefit. Pursuant to Delaware law and subject to the foregoing exceptions, our directors shall not be liable for monetary damages for breach of the directors fiduciary duty of care to the Company and its stockholders. This provision does not eliminate the duty of care: in appropriate circumstances, equitable remedies such as injunctive or other forms of non-monetary relief remain available under Delaware law, and it does not affect a director s responsibilities under any other law, such as U.S. federal securities laws or state or federal environmental or other laws.

Stock Exchange Listing

Our common stock trades on The NASDAQ Global Select Market under the symbol DRNA.

Transfer Agent and Registrar

The transfer agent and registrar for our common stock is American Stock Transfer & Trust Company, LLC.

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DESCRIPTION OF DEBT SECURITIES

We may issue debt securities from time to time, in one or more series, as senior, subordinated or junior subordinated, convertible or non-convertible and secured or unsecured debt. Any senior debt securities will rank equally with any unsubordinated debt. Subordinated debt securities will rank equally with any other subordinated debt of the same ranking we may issue. Convertible debt securities will be convertible into or exchangeable for our common stock or other securities at predetermined conversion rates, and conversion may be mandatory or at the holder s option.

Debt securities will be issued under one or more indentures, which are instruments between us and a national banking association or other eligible party acting as trustee on behalf of holders of debt securities. Following is a summary of certain general features of debt securities we may offer; we will describe the particular terms of any debt securities that we may offer in more detail in the applicable prospectus supplement, which may differ in certain respects from the terms we describe below. You should read the applicable prospectus supplement, any free writing prospectus we may authorize and the indentures, supplemental indentures and forms of debt securities relating to any series of debt securities we may offer.

General. Except as we may otherwise provide in the applicable prospectus supplement, the relevant indenture will provide that debt securities may be issued from time to time in one or more series. The indenture will not limit the amount of debt securities that may be issued thereunder, and will provide that the specific terms of any series of debt securities shall be set forth in, or determined pursuant to, an authorizing resolution, an officers certificate or a supplemental indenture, if any, relating to such series.

We will describe in each applicable prospectus supplement the following terms relating to any series of debt securities, including, to the extent applicable:

- the title or designation;
- whether the debt securities will be secured or unsecured, and the terms of any security;
- whether the debt securities will be subject to subordination, and any terms thereof;
- any limit upon the aggregate principal amount;
- the date or dates on which the debt securities may be issued and on which we will pay the principal;
- the interest rate, which may be fixed or variable, or the method for determining the rate, the date interest will begin to accrue, the date or dates interest will be payable and the record dates for interest payment dates or the method for determining them;

the manner in which the amounts of payment of principal of, premium (if any) or interest on the debt securities will be determined, if these amounts may be determined by reference to an index based on a currency or currencies other than that in which the debt securities are denominated or designated to be payable or by reference to a commodity, commodity index, stock exchange index or financial index;

the currency of denomination;

if payments of principal of, premium (if any) or interest will be made in one or more currencies or currency units other than that or those in which the debt securities are denominated, the manner in which the exchange rate with respect to these payments will be determined;

the place or places where the principal of, premium (if any) and interest will be payable, where debt securities of any series may be presented for registration of transfer, exchange or conversion, and where notices and demands to or upon the Company in respect of the debt securities may be made;

the form of consideration in which principal of, premium (if any) or interest will be paid;

the terms and conditions upon which we may redeem the debt securities;

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any obligation we have to redeem or purchase the debt securities pursuant to any sinking fund, amortization or analogous provisions or at the option of a holder;

the dates on which and the price or prices at which we will repurchase the debt securities at the option of holders and other detailed terms and provisions of these obligations;

the denominations in which the debt securities will be issued, if other than denominations of $1,000 and any integral multiple thereof;

the portion of principal amount payable upon declaration of acceleration of the maturity date, if other than the principal amount;

whether the debt securities are to be issued at any original issuance discount and the amount of discount with which the debt securities may be issued;

whether the debt securities will be issued in certificated or global form and, in such case, the depositary and the terms and conditions, if any, upon which interests in such global security or securities may be exchanged in whole or in part for the individual securities represented thereby;

provisions, if any, for defeasance in whole or in part and any addition or change to provisions related to satisfaction and discharge;

the form of the debt securities;

the terms and conditions upon which convertible debt securities will be convertible or exchangeable into our securities or property or those of another person, if at all, and any additions or changes, if any, to permit or facilitate the same;

any provisions granting special rights to holders upon the occurrence of specified events;

any restriction or condition on transferability;

any addition or change in the provisions related to compensation and reimbursement of the trustee;

any addition to or change in the events of default described in this prospectus or in the indenture and any change in the acceleration provisions so described;

whether the debt securities will restrict our ability to pay dividends, or will require us to maintain any asset ratios or reserves;

whether we will be restricted from incurring any additional indebtedness;

any addition to or change in the covenants described in this prospectus or in the indenture, including terms of any restrictive covenants; and

any other terms which may modify or delete any provision of the indenture.

We may issue debt securities that provide for an amount less than their stated principal amount to be due and payable upon declaration of acceleration of their maturity pursuant to the terms of the indenture. We will provide you with information on the U.S. federal income tax considerations and other special considerations applicable to any debt securities in the applicable prospectus supplement.

Conversion or Exchange Rights. We will set forth in the applicable prospectus supplement the terms, if any, on which a series of debt securities may be convertible into or exchangeable for our common stock or other securities. We will include provisions as to whether conversion or exchange is mandatory, at the option of the holder or at our option. We may include provisions pursuant to which the number of shares of our common stock or other securities that the holders of debt securities receive would be subject to adjustment.

Consolidation, Merger or Sale; No Protection in Event of a Change of Control or Highly Leveraged Transaction. Except as we may otherwise provide in the applicable prospectus supplement, the indenture will

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provide that we may not merge or consolidate with or into another entity, or sell other than for cash or lease all or substantially all our assets to another entity, or purchase all or substantially all the assets of another entity unless we are the surviving entity or, if we are not the surviving entity, the successor, transferee or lessee entity expressly assumes all of our obligations under the indenture or the debt securities, as appropriate.

Unless we state otherwise in the applicable prospectus supplement, the debt securities will not contain any provisions that may afford holders additional protection in the event we experience a change of control or in the event of a highly-leveraged transaction (whether or not such transaction results in a change of control), which could adversely affect them.

Events of Default Under the Indenture. Except as we may otherwise provide in the applicable prospectus supplement, the following will be events of default under the indenture with respect to any series of debt securities that we may issue:

- if we fail to pay interest when due and our failure continues for 90 days and the time for payment has not been extended or deferred;
- if we fail to pay the principal, or premium, if any, when due whether by maturity or called for redemption;
- if we fail to pay a sinking fund installment, if any, when due and our failure continues for 30 days;
- if we fail to observe or perform any other covenant relating to the debt securities, other than a covenant specifically relating to and for the benefit of holders of another series of debt securities, and our failure continues for 90 days after we receive written notice from the trustee or holders of not less than a majority in aggregate principal amount of the outstanding series; and
- if specified events of bankruptcy, insolvency or reorganization occur as to the Company.

No event of default with respect to a particular series of debt securities (except as to certain events of bankruptcy, insolvency or reorganization) will necessarily constitute an event of default with respect to any other series. The occurrence of an event of default may constitute an event of default under any credit or similar agreements we may have in existence from time to time. In addition, the occurrence of certain events of default or an acceleration under the indenture may constitute an event of default under certain of our other indebtedness outstanding from time to time.

Except as we may otherwise provide in the applicable prospectus supplement, if an event of default with respect to debt securities of any series at the time outstanding occurs and is continuing, then the trustee or the holders of not less than a majority in principal amount of the outstanding series may, by a notice in writing to us (and to the trustee if given by the holders), declare to be due and payable immediately the principal (or, if the debt securities are discount securities, that portion of the principal amount as may be specified in the terms of such securities) of and premium and accrued and unpaid interest, if any, on all such debt securities. Before a judgment or decree for payment of the money due has been obtained with respect to any series, the holders of a majority in principal amount of that series (or, at a meeting of holders at which a quorum is present, the holders of a majority in principal amount represented at such meeting) may rescind and annul the acceleration if all events of default, other than the non-payment of accelerated

principal, premium, if any, and interest, if any, have been cured or waived as provided in the applicable indenture (including payments or deposits in respect of principal, premium or interest that had become due other than as a result of such acceleration) and the Company has deposited with the trustee or paying agent a sum sufficient to pay all amounts owed to the trustee under the indenture, all arrears of interest, if any, and the principal and premium, if any, on the debt securities that have become due other than by such acceleration. We refer you to the applicable prospectus supplement relating to any discount securities for the particular provisions relating to acceleration of a portion of the principal amount thereof upon the occurrence of an event of default.

Subject to the terms of the indenture, and except as we may otherwise provide in a prospectus supplement, if an event of default under the indenture shall occur and be continuing, the trustee will be under no obligation to

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exercise any of its rights or powers under such indenture at the request or direction of any of the holders of the applicable series, unless such holders have offered the trustee reasonable indemnity. The holders of a majority in principal amount of any series will have the right to direct the time, method and place of conducting any proceeding for any remedy available to the trustee, or exercising any trust or power conferred on the trustee, with respect to that series, provided that, subject to the terms of the indenture, the trustee need not take any action that it believes, upon the advice of counsel, might involve it in personal liability or might be unduly prejudicial to holders not involved in the proceeding.

Except as we may otherwise provide in the applicable prospectus supplement, a holder of the debt securities of any series will only have the right to institute a proceeding under the indenture or to appoint a receiver or trustee, or to seek other remedies if:

- the holder previously has given written notice to the trustee of a continuing event of default with respect to that series;
- the holders of at least a majority in aggregate principal amount outstanding of that series have made written request, and such holders have offered reasonable indemnity to the trustee to institute the proceeding as trustee; and
- the trustee does not institute the proceeding, and does not receive from the holders of a majority in aggregate principal amount outstanding of that series (or at a meeting of holders at which a quorum is present, the holders of a majority in principal amount of such series represented at such meeting) other conflicting directions within 60 days after the notice, request and offer.

Except as we may otherwise provide in the applicable prospectus supplement, these limitations will not apply to a suit instituted by a holder of debt securities if we default in the payment of the principal, premium, if any, or interest on, them.

We will periodically file statements with the applicable trustee regarding our compliance with specified covenants in the applicable indenture.

Modification of Indenture; Waiver. Except as we may otherwise provide in the applicable prospectus supplement, we and the trustee may, without the consent of any holders of any series, execute a supplemental indenture to change the indenture with respect to specific matters, including, among other things:

- to surrender any right or power conferred upon us;
- to provide, change or eliminate any restrictions on payment of principal of or premium, if any; provided that any such action shall not adversely affect the interests of the holders of debt securities of any series in any material respect;

to change or eliminate any of the provisions of the indenture; provided that any such change or elimination shall become effective only when there is no outstanding debt security created prior to the execution of such supplemental indenture that is entitled to the benefit of such provision and as to which such supplemental indenture would apply;

to evidence any successor entity to us;

to evidence and provide for the acceptance of appointment by a successor trustee with respect to one or more series of debt securities and to add or change provisions of the indenture to facilitate the administration thereof by more than one trustee;

to cure any ambiguity, mistake, manifest error, omission, defect or inconsistency in the indenture or to conform the text of any provision in the indenture or in any supplemental indenture to any description thereof in the applicable section of a prospectus, prospectus supplement or other offering document that was intended to be a verbatim recitation of a provision of the indenture or of any supplemental indenture;

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to add to or change or eliminate any provision of the indenture as shall be necessary or desirable in accordance with any amendments to the U.S. Trust Indenture Act of 1939;

to make any change in any series of debt securities that does not adversely affect in any material respect the interests of the holders thereof; and

to supplement any of the provisions of the indenture to such extent as shall be necessary to permit or facilitate the defeasance and discharge of any series of debt securities; provided that any such action shall not adversely affect the interests of holders of any debt securities.

In addition, and except as we may otherwise provide in the applicable prospectus supplement, under the indenture the rights of holders of a series of debt securities may be changed by us and the trustee with the written consent of the holders of at least a majority in aggregate principal amount outstanding (or, at a meeting of holders of such series at which a quorum is present, the holders of a majority in principal amount represented at such meeting) that is affected. We and the trustee may, however, make the following changes only with the consent of each holder of any outstanding debt securities affected:

extending the fixed maturity;

reducing the principal amount, reducing the rate of or extending the time of payment of interest, or any premium payable upon redemption;

reducing the principal amount of discount securities payable upon acceleration of maturity;

making the principal of or premium or interest payable in currency other than that stated;

impairing the right to institute suit for the enforcement of any payment on or after the fixed maturity date;

materially adversely affecting the economic terms of any right to convert or exchange; and

reducing the percentage of debt securities, the holders of which are required to consent to any amendment or waiver; or modifying, without the written consent of the trustee, the rights, duties or immunities of the trustee.

Except for certain specified provisions, and except as we may otherwise provide in the applicable prospectus supplement, the holders of at least a majority in principal amount of any series (or, at a meeting of holders of such series at which a quorum is present, the holders of a majority in principal amount represented at such meeting) may, on behalf of the holders of all debt securities of that series, waive our compliance with provisions of the indenture. The holders of a majority in principal amount of the outstanding debt securities of any series may, on behalf of all such holders, waive any past default under the indenture with respect to that series and its consequences, other than a

default in the payment of the principal of, premium or any interest; provided, however, that the holders of a majority in principal amount of the outstanding debt securities of any series may rescind an acceleration and its consequences, including any related payment default that resulted from the acceleration.

Discharge. Except as we may otherwise provide in the applicable prospectus supplement, the indenture will provide that we can elect to be discharged from our obligations with respect to one or more series of debt securities. In order to exercise our rights to be discharged, we must deposit with the trustee money or government obligations sufficient to pay all the principal of, the premium, if any, and interest on, the debt securities of the affected series on the dates payments are due.

Form, Exchange and Transfer. Except as we may otherwise provide in the applicable prospectus supplement, we will issue debt securities only in fully registered form without coupons and, unless we otherwise specify in the applicable prospectus supplement, in denominations of $1,000 and any integral multiple thereof. Except as we may otherwise provide in the applicable prospectus supplement, the indenture will provide that we may issue debt securities in temporary or permanent global form and as book-entry securities that will be deposited with a depositary named by us and identified in a prospectus supplement with respect to that series.

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Subject to the terms of the indenture and the limitations applicable to global securities set forth in the applicable prospectus supplement, holders may present the debt securities for exchange or for registration of transfer, duly endorsed or with the form of transfer endorsed thereon duly executed if so required by us or the security registrar, at the office of the security registrar or at the office of any transfer agent designated by us for this purpose. Unless otherwise provided in the debt securities or the indenture, we will make no service charge for any registration of transfer or exchange, but we may require payment of any taxes or other governmental charges.

We will name in the applicable prospectus supplement the security registrar, and any transfer agent in addition to the security registrar, that we initially designate for any debt securities. We may at any time designate additional transfer agents or rescind the designation of any transfer agent or approve a change in the office through which any transfer agent acts, except that we will be required to maintain a transfer agent in each place of payment for the debt securities of each series.

Except as we may otherwise provide in a prospectus supplement, if we elect to redeem the debt securities of any series, we will not be required to:

- issue, register the transfer of, or exchange any debt securities of that series during a period beginning at the opening of business 15 days before the day of mailing of a notice of redemption of any debt securities that may be selected for redemption and ending at the close of business on the day of the mailing; or

- register the transfer of or exchange any debt securities so selected for redemption, in whole or in part, except the unredeemed portion of any debt securities we are redeeming in part.

Information Concerning the Trustee. The trustee, other than during the occurrence and continuance of an event of default under the indenture, will undertake to perform only those duties as are specifically set forth in the indenture. Upon an event of default, the trustee must use the same degree of care as a prudent person would exercise or use in the conduct of his or her own affairs. Subject to this provision, the trustee will be under no obligation to exercise any of the powers given it by the indenture at the request of any holder unless it is offered reasonable security and indemnity against the costs, expenses and liabilities that it might incur.

Payment and Paying Agents. Unless we otherwise indicate in the applicable prospectus supplement, we will make payment of interest on any interest payment date to the person in whose name the debt securities, or one or more predecessor securities, are registered at the close of business on the regular record date for the interest.

Unless we otherwise indicate in the applicable prospectus supplement, we will pay principal of and any premium and interest at the office of the trustee or, at the option of the Company, by check payable to the holder. Unless we otherwise indicate in a prospectus supplement, we will designate the corporate trust office of the trustee our sole paying agent for payments. We will name in the applicable prospectus supplement any other paying agents that we initially designate. We will maintain a paying agent in each place of payment.

All money we pay to a paying agent or the trustee for the payment of principal or any premium or interest which remains unclaimed at the end of two years after such principal, premium or interest has become due and payable will be repaid to us, and the holder of the security thereafter may look only to us for payment thereof.

Governing Law. The indenture and the debt securities will be governed and construed in accordance with the laws of the State of New York.

No Personal Liability of Directors, Officers, Employees and Stockholders. No incorporator, stockholder, employee, agent, officer, director or subsidiary of ours will have any liability for any obligations of ours or, due to the creation of any indebtedness under the debt securities, the indentures or supplemental indentures. The indenture provides that all such liability is expressly waived and released as a condition of, and as consideration for, the execution of such indentures and the issuance of the debt securities.

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DESCRIPTION OF WARRANTS, OTHER RIGHTS AND UNITS

We may from time to time issue warrants or other rights (together, Rights), in one or more series, for the purchase of shares of our common stock or preferred stock. We may issue Rights independently or together with such securities, and such Rights may be attached to or separate from them. Rights will be evidenced by a Rights certificate issued under one or more Rights agreements between us and a Rights agent which will act solely as our agent in connection with the Rights and will not have any obligation or relationship of agency or trust for or with any holders or beneficial owners of Rights.

We may issue securities in units (Units), each consisting of two or more types of securities. For example, we might issue Units consisting of a combination of shares of our common stock and warrants to purchase shares of our common stock. If we issue Units, the applicable prospectus supplement will contain information with regard to each of the securities that is a component of the Units. In addition, the applicable prospectus supplement will describe the terms of any Units we issue. The forms of any certificates and agreements relating to such Units will be filed as exhibits to the registration statement of which this prospectus forms a part by amendment thereof or as exhibits to a Current Report on Form 8-K incorporated herein by reference.

The applicable prospectus supplement and such forms may add, update or change the terms and conditions of the Rights or Units described in this prospectus. You should read the prospectus supplements, Rights agreements and Rights certificates that contain the terms of the Rights in their entirety.

The particular terms of each issue of Rights or Units will be described in the applicable prospectus supplement, including, to the extent applicable:

- the title of the Rights or Units;
- any initial offering price;
- the title, aggregate principal amount or number and terms of the securities purchasable upon exercise of the Rights;
- the principal amount or number of securities purchasable upon exercise of each Right and the price at which that principal amount or number may be purchased upon exercise of each Right;
- the currency or currency units in which any offering price and any exercise price are payable;
- the title and terms of any related securities with which the Rights are issued and the number of the Rights issued with each security;
- any date on and after which the Rights or Units and the related securities will be separately transferable;

any minimum or maximum number of Rights that may be exercised at any one time;

the date on which the right to exercise the Rights will commence and the date on which the right will expire;

a discussion of U.S. federal income tax, accounting or other considerations applicable to the Rights or Units;

whether the Rights represented by the Rights certificates, if applicable, will be issued in registered or bearer form and, if registered, where they may be transferred and registered;

any anti-dilution provisions of the Rights or Units;

any redemption or call provisions applicable to the Rights;

any provisions for changes to or adjustments in the exercise price of any Rights; and

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any additional terms of the Rights or Units, including terms, procedures and limitations relating to exchange and exercise of the Rights or Units.

Rights certificates will be exchangeable for new Rights certificates of different denominations and, if in registered form, may be presented for registration of transfer, and Rights may be exercised, at the corporate trust office of the Rights agent or any other office indicated in the applicable prospectus supplement. Before the exercise of Rights, holders of Rights will not be entitled to payments of any dividends, principal, premium or interest on securities purchasable upon exercise of the Rights, to vote, consent or receive any notice as a holder of and in respect of any such securities or to enforce any covenants in any indenture, or to exercise any other rights whatsoever as a holder of securities purchasable upon exercise of the Rights.

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PLAN OF DISTRIBUTION

We may sell the offered securities in and outside the United States (1) through underwriters or dealers, (2) directly to one or more purchasers, including to a limited number of institutional purchasers, to a single purchaser or to our affiliates and stockholders, (3) through agents or (4) through a combination of any of these methods.

If underwriters or dealers are used in the sale, the securities will be acquired by the underwriters or dealers for their own account and may be resold from time to time in one or more transactions, including:

- in one or more transactions at a fixed price or prices, which may be changed from time to time;
- in at-the-market offerings, within the meaning of Rule 415(a)(4) of the Securities Act, to or through a market maker or into an existing trading market, on an exchange or otherwise;
- through a market maker or into an existing trading market on an exchange or otherwise;
- at prices related to those prevailing market prices; or
- at negotiated prices.

The applicable prospectus supplement will set forth the following information to the extent applicable:

- the terms of the offering;
- the names of any underwriters, dealers or agents;
- the name or names of any managing underwriter or underwriters;
- the purchase price of the securities;
- the net proceeds from the sale of the securities;
- any delayed delivery arrangements;
- any underwriting discounts, commissions and other items constituting underwriters compensation;

any initial public offering price;

any discounts or concessions allowed or reallowed or paid to dealers; and

any commissions paid to agents.

Sale through Underwriters or Dealers

If any securities are offered through underwriters, the underwriters will acquire the securities for their own account and may resell them from time to time in one or more transactions, including negotiated transactions, at a fixed public offering price or at varying prices determined at the time of sale. Underwriters may offer and sell securities to the public either through underwriting syndicates represented by one or more managing underwriters or directly by one or more firms acting as underwriters. Unless otherwise provided in the applicable prospectus supplement, the obligations of the underwriters to purchase the securities will be subject to certain conditions, and the underwriters will be obligated to purchase all of the offered securities if they purchase any of them. In connection with the sale of securities, underwriters may be deemed to have received compensation from us in the form of underwriting discounts or commissions and dealers may receive compensation from the underwriters in the form of discounts or concessions. The underwriters may change from time to time any initial public offering price and any discounts or concessions allowed or reallowed or paid to dealers.

In order to facilitate the offering of securities, the underwriters may engage in transactions that stabilize, maintain or otherwise affect the price of the securities. Specifically, the underwriters may overallot in connection

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with the offering, creating a short position in the securities for their account. In addition, to cover overallotments or to stabilize the price of the shares, the underwriters may bid for, and purchase, shares in the open market. Finally, an underwriting syndicate may reclaim selling concessions allowed to an underwriter or a dealer for distributing the securities in the offering if the syndicate repurchases previously distributed shares in transactions to cover syndicate short positions, in stabilization transactions, or otherwise. Any of these activities may stabilize or maintain the market price of the offered securities above independent market levels. The underwriters are not required to engage in these activities, and may discontinue any of these activities at any time.

Some or all of the securities that we offer through this prospectus may be new issues of securities with no established trading market. Any underwriters to whom we sell securities for public offering and sale may make a market in those securities, but they will not be obligated to do so and they may discontinue any market making at any time without notice. Accordingly, we cannot assure you of the liquidity of, or continued trading markets for, any securities offered pursuant to this prospectus.

If any securities are offered through dealers, we will sell the securities to them as principals. They may then resell those securities to the public at varying prices determined by the dealers at the time of resale.

Direct Sales and Sales through Agents

We may sell the securities directly to purchasers. If the securities are sold directly to institutional investors or others who may be deemed to be underwriters within the meaning of the Securities Act with respect to any sale of those securities, we will describe the terms of any such sales in the applicable prospectus supplement. We may also sell the securities through agents designated from time to time. Sales may be made by means of ordinary brokers transactions on The NASDAQ Global Select Market at market prices, in block transactions and such other transactions as agreed by us and any agent. In the applicable prospectus supplement, we will name any agent involved in the offer or sale of the offered securities, and we will describe any commissions payable to the agent. Unless otherwise provided in the applicable prospectus supplement, any agent will agree to use its reasonable best efforts to solicit purchases for the period of its appointment.

At-the-Market Offerings

To the extent that we make sales through one or more underwriters or agents in at-the-market offerings, we will do so pursuant to the terms of a sales agency financing agreement or other at-the-market offering arrangement between us, on one hand, and the underwriters or agents, on the other. If we engage in at-the-market sales pursuant to any such agreement, we will issue and sell our securities through one or more underwriters or agents, which may act on an agency basis or a principal basis. During the term of any such agreement, we may sell securities on a daily basis in exchange transactions or otherwise as we agree with the underwriters or agents. Any such agreement will provide that any securities sold will be sold at prices related to the then prevailing market prices for our securities. Therefore, exact figures regarding proceeds that will be raised or commissions to be paid cannot be determined at this time. Pursuant to the terms of the agreement, we may agree to sell, and the relevant underwriters or agents may agree to solicit offers to purchase blocks of our common stock or other securities. The terms of any such agreement will be set forth in more detail in the applicable prospectus supplement.

Remarketing Arrangements

Offered securities may also be offered and sold, if we so indicate in the applicable prospectus supplement, in connection with a remarketing upon their purchase, in accordance with a redemption or repayment pursuant to their terms, or otherwise, by one or more remarketing firms, acting as principals for their own accounts or as our agents.

Any remarketing firm will be identified and the terms of its agreements, if any, with us and its compensation will be described in the applicable prospectus supplement. Remarketing firms may be deemed to be underwriters of the offered securities under the Securities Act.

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Delayed Delivery Contracts

If we so indicate in the applicable prospectus supplement, we may authorize agents, underwriters or dealers to solicit offers by certain institutions to purchase securities from us pursuant to contracts providing for payment and delivery on a specified future date. The applicable prospectus supplement will describe the conditions to those contracts and the commission payable for solicitation of those contracts.

General Information

We may have agreements with the agents, dealers, underwriters and remarketing firms to indemnify them against certain civil liabilities, including liabilities under the Securities Act, or to contribute with respect to payments that the agents, dealers or underwriters may be required to make. Agents, dealers, underwriters and remarketing firms may be customers of, engage in transactions with or perform services for us in the ordinary course of their businesses.

Each underwriter, dealer and agent participating in the distribution of any of the securities that are issuable in bearer form will agree that it will not offer, sell or deliver, directly or indirectly, securities in bearer form in the United States or to United States persons, other than qualifying financial institutions, during the restricted period, as defined in United States Treasury Regulations Section 1.163-5(c)(2)(i)(D)(7).

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LEGAL MATTERS

Sidley Austin LLP, Palo Alto, California will issue an opinion regarding the legality of certain of the offered securities. Any underwriters will be advised about other issues relating to any offering by their own legal counsel.

EXPERTS

The consolidated financial statements incorporated in this prospectus by reference from the Company s Annual Report on Form 10-K, have been audited by Deloitte & Touche LLP, an independent registered public accounting firm, as stated in their report, which is incorporated herein by reference. Such financial statements have been so incorporated in reliance upon the report of such firm given upon their authority as experts in accounting and auditing.

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The information in this prospectus is not complete and may be changed. We may not sell these securities until the registration statement filed with the U.S. Securities and Exchange Commission is effective. This prospectus is not an offer to sell these securities and it is not soliciting an offer to buy these securities in any jurisdiction where the offer or sale is not permitted.

SUBJECT TO COMPLETION, DATED MAY 16, 2018

PROSPECTUS

$100,000,000

Common Stock

We have entered into a sales agreement with Cowen and Company, LLC (Cowen) relating to shares of our common stock offered by this prospectus. In accordance with the terms of the sales agreement, we may offer and sell shares of our common stock having an aggregate offering price of up to $100,000,000 from time to time through Cowen acting as our agent.

Our common stock is listed on The NASDAQ Global Select Market under the symbol DRNA . On May 11, 2018, the last reported sale price of our common stock on The NASDAQ Global Select Market was $14.46 per share.

Sales of our common stock, if any, under this prospectus will be made in sales deemed to be at the market offerings as defined in Rule 415 promulgated under the Securities Act of 1933, as amended (the Securities Act). Cowen is not required to sell any specific amount of securities, but will act as our sales agent using commercially reasonable efforts consistent with its normal trading and sales practices, on mutually agreed terms between Cowen and us. There is no arrangement for funds to be received in any escrow, trust or similar arrangement.

The compensation to Cowen for sales of common stock sold pursuant to the sales agreement will be an amount up to 3% of the gross proceeds of any shares of common stock sold under the sales agreement. In connection with the sale of the common stock on our behalf, Cowen will be deemed to be an underwriter within the meaning of the Securities Act and the compensation of Cowen will be deemed to be underwriting commissions or discounts. We have also agreed to provide indemnification and contribution to Cowen with respect to certain liabilities, including liabilities under the Securities Act or the Exchange Act of 1934, as amended.

Our business and an investment in our common stock involve significant risks. These risks are described under the caption Risk Factors beginning on page S-8 of this prospectus and in the documents incorporated by reference into this prospectus.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or passed upon the accuracy or adequacy of this prospectus. Any representation to the contrary is a criminal offense.

Cowen

, 2018

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ABOUT THIS PROSPECTUS

This prospectus is part of a shelf registration statement on Form S-3 that we filed with the Securities and Exchange Commission (the SEC). Under the shelf registration process, we may offer shares of our common stock having an aggregate offering price of up to $100,000,000 from time to time under this prospectus at prices and on terms to be determined by market conditions at the time of the offering.

We provide information to you about this offering of shares of our common stock in two separate documents that are bound together: (1) this at-the-market sales agreement prospectus, which describes the specific details regarding this offering; and (2) the accompanying base prospectus, which provides general information, some of which may not apply to this offering. Generally, when we refer to this prospectus, we are referring to both documents combined. If information in this at-the-market sales agreement prospectus is inconsistent with the accompanying base prospectus, you should rely on this prospectus. However, if any statement in one of these documents is inconsistent with a statement in another document having a later date for example, a document incorporated by reference in this prospectus the statement in the document having the later date modifies or supersedes the earlier statement as our business, financial condition, results of operations and prospects may have changed since the earlier dates.

You should rely only on the information contained in, or incorporated by reference into, this prospectus and in any free writing prospectus that we may authorize for use in connection with this offering. We have not, and Cowen has not, authorized any other person to provide you with different information. If anyone provides you with different or inconsistent information, you should not rely on it. We are not, and Cowen is not, making an offer to sell or soliciting an offer to buy our securities in any jurisdiction in which an offer or solicitation is not authorized or in which the person making that offer or solicitation is not qualified to do so or to anyone to whom it is unlawful to make an offer or solicitation. You should assume that the information appearing in this prospectus, the documents incorporated by reference into this prospectus, and in any free writing prospectus that we may authorize for use in connection with this offering, is accurate only as of the date of those respective documents. Our business, financial condition, results of operations and prospects may have changed since those dates. You should read this prospectus, the documents incorporated by reference into this prospectus, and any free writing prospectus that we may authorize for use in connection with this offering, in their entirety before making an investment decision. You should also read and consider the information in the documents to which we have referred you in the sections of this prospectus entitled Where You Can Find More Information and Incorporation by Reference.

We are offering to sell, and seeking offers to buy, shares of common stock only in jurisdictions where offers and sales are permitted. The distribution of this prospectus and the offering of the common stock in certain jurisdictions may be restricted by law. Persons outside the United States who come into possession of this prospectus must inform themselves about, and observe any restrictions relating to, the offering of the common stock and the distribution of this prospectus outside the United States. This prospectus does not constitute, and may not be used in connection with, an offer to sell, or a solicitation of an offer to buy, any securities offered by this prospectus by any person in any jurisdiction in which it is unlawful for such person to make such an offer or solicitation.

In this prospectus, the terms Dicerna, Company, we, us, our and similar terms refer to Dicerna Pharmaceuticals, Delaware corporation, and its subsidiaries unless the context otherwise requires.

This prospectus and the information incorporated herein by reference include trademarks, service marks and trade names owned by us or other companies. All trademarks, service marks and trade names included or incorporated by reference in this prospectus are the property of their respective owners.

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PROSPECTUS SUMMARY

This summary highlights certain information about us, this offering and selected information contained elsewhere in or incorporated by reference into this prospectus. This summary is not complete and does not contain all of the information that you should consider before deciding whether to invest in the securities covered by this prospectus. For a more complete understanding of Dicerna and this offering, we encourage you to read and consider carefully the more detailed information in this prospectus, including the information incorporated by reference in this prospectus and the information included in any free writing prospectus that we have authorized for use in connection with this offering, including the information referred to under the heading Risk Factors in this prospectus beginning on page S-8.

Overview

Dicerna is a biopharmaceutical company focused on the discovery and development of innovative subcutaneously delivered ribonucleic acid (RNA) interference (RNAi)-based pharmaceuticals using our GalXC™ RNAi platform for the treatment of diseases involving the liver, including rare diseases, viral infectious diseases, chronic liver diseases and cardiovascular diseases. Within these therapeutic areas, we believe our GalXC RNAi platform will allow us to build a broad pipeline of therapeutics with commercially attractive pharmaceutical properties, including a subcutaneous route of administration, infrequent dosing (e.g., dosing that is monthly or quarterly, and potentially even less frequent), high therapeutic index, and specificity to a single target gene.

All of our GalXC drug discovery and development efforts are based on the therapeutic modality of RNAi, a highly potent and specific mechanism for silencing the activity of a targeted gene. In this naturally occurring biological process, double-stranded RNA molecules induce the enzymatic destruction of the messenger ribonucleic acid (mRNA) of a target gene that contains sequences that are complementary to one strand of the therapeutic double-stranded RNA molecule. The Company s approach is to design proprietary double-stranded RNA molecules that have the potential to engage the enzyme Dicer and initiate an RNAi process to silence a specific target gene. Our GalXC RNAi platform utilizes a particular structure of double-stranded RNA molecules configured for subcutaneous delivery to the liver. Due to the enzymatic nature of RNAi, a single GalXC molecule incorporated into the RNAi machinery can destroy hundreds or thousands of mRNAs from the targeted gene.

The GalXC RNAi platform supports Dicerna s long-term strategy to retain, subject to the evaluation of potential licensing opportunities as they may arise, a full or substantial ownership stake and to invest internally in diseases with focused patient populations, such as certain rare diseases. We see such diseases as representing opportunities that carry a relatively higher probability of success, with genetically and molecularly defined disease markers, high unmet need, a limited number of Centers of Excellence to facilitate reaching these patients, and the potential for more rapid clinical development programs. For more complex diseases with multiple gene dysfunctions and larger patient populations, we plan to pursue collaborations that can provide the enhanced scale, resources and commercial infrastructure required to maximize these prospects, such as the BI Agreement, as defined and discussed below.

Development Programs

In choosing which development programs to advance, we apply scientific, clinical, and commercial criteria that we believe allow us to best leverage our GalXC RNAi platform and maximize value. The Company is focusing its efforts on three priority therapeutic programs that currently have a Clinical Trial Application (CTA) filed, Investigational New Drug application (IND) filed or are in enabling studies in preparation to file additional regulatory clearances to initiate clinical trials. The Company is also focusing its efforts on a series of programs in the clinical candidate selection stage that may be elevated into IND/CTA enabling studies in the future, either on our own or in

collaboration with larger pharmaceutical companies. Our three priority programs are: DCR-PHXC

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for the treatment of primary hyperoxaluria (PH); a program for an undisclosed rare disease; and DCR-HBVS for the treatment of chronic hepatitis B virus (HBV) infection. Our programs in clinical candidate selection include a program for the treatment of hypercholesterolemia, for which DCR-PCSK9 has been selected as a provisional clinical candidate, and multiple programs targeting undisclosed targets in chronic liver diseases, cardiovascular diseases and additional rare diseases. In October 2017, we filed a CTA for our lead GalXC product candidate, DCR-PHXC, with the Medicines and Healthcare products Regulatory Agency (MHRA) in the United Kingdom (UK), and in December 2017, we dosed the first human in the Group A portion of the Phase 1 clinical trial of DCR-PHXC. On March 30, 2018, we received a notice from the United States (U.S.) Food and Drug Administration (FDA) indicating that our proposed clinical investigation for DCR-PHXC referenced in our IND may proceed. We have received regulatory and ethical approvals for the trial in the UK, France and Germany. A CTA has been submitted and is pending approval in the Netherlands. We expect to file for additional regulatory clearance for our programs in 2018 and 2019.

The table below sets forth the state of development of our various GalXC RNAi platform product candidates as of May 11, 2018.

Our current GalXC RNAi platform development programs are as follows:

Primary Hyperoxaluria. We are developing DCR-PHXC for the treatment of all types of PH. PH is a family of rare inborn errors of metabolism in which the liver produces excessive levels of oxalate, which in turn causes damage to the kidneys and to other tissues in the body. DCR-PHXC is currently being investigated in a Phase 1 clinical trial called PHYOX. In preclinical models of PH, DCR-PHXC reduces oxalate production to near-normal levels, ameliorating the disease condition.

We have submitted CTAs for the PHYOX study in the UK, France and Germany and have received the appropriate regulatory and ethical approvals. A CTA has been submitted and is pending approval in the Netherlands. On March 30, 2018, we received a notice from the U.S. FDA indicating that our proposed clinical investigation for DCR-PHXC referenced in our IND may proceed. We have completed dosing of all normal healthy volunteers (NHV) in the Group A portion of the study. While the study is still blinded toward treatment assignment, there have been no discontinuations and no serious adverse events. There have been two mild-to-moderate transient injection site reactions lasting up to a total of 36 hours at the highest doses of 6 and 12 mg/kg. With the completion of the Group A portion of the study in NHVs, we have started on the Group B portion of the study and dosing of the first PH patient

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with DCR-PHXC is imminent. PHYOX is a Phase 1 single ascending-dose study of DCR-PHXC in NHVs and patients with PH. The study is divided into two groups: Group A is a placebo-controlled, single-blind, single center study, which has enrolled 25 NHVs; Group B is an open-label, multi-center study enrolling up to 16 patients with PH type 1 (PH1) and PH type 2 (PH2). The primary objective of the study is to evaluate the safety and tolerability of single doses of DCR-PHXC in both groups. Secondary objectives are to characterize the pharmacokinetics of single doses of DCR-PHXC in NHVs and patients with PH, and to evaluate the pharmacodynamic effects of single doses of DCR-PHXC on biochemical markers including, but not limited to, changes in urine oxalate concentrations. We hope to achieve clinical proof-of-concept (POC) results in the second half of 2018. Additionally, we expect to initiate a multi-dose Phase 2/3 study in the first quarter of 2019, pending positive POC data and regulatory feedback.

To facilitate DCR-PHXC development, we have completed our Primary HYperoxaluria Observational Study (PHYOS), an international, multicenter, observational study in patients with a genetically confirmed diagnosis of PH1. PHYOS collected data on key biochemical parameters implicated in the pathogenesis of PH1. We are using the data to better understand the baseline PH1 disease state, which will help guide long-term drug development plans. In July 2017, at the 12th International Workshop on Primary Hyperoxaluria for Professionals, Patients and Families in Tenerife, Spain, we reported interim data from the study s 20 enrolled patients with a median age at screening of 21 years (range 12-61 years). The patients had been diagnosed at a median age of 7 years (range 1-59 years), and 14 patients (74%) had a medical history of renal stones. Over the six-month observation period, the variability (coefficient of variation) between 24-hour urine measurements of oxalate at different time points was 28%. Our clinical team is using these data to design clinical studies using 24-hour urinary oxalate excretion as a surrogate marker for clinical benefit. We expect to publish data from PHYOS in 2018.

An undisclosed rare disease involving the liver. We are developing a GalXC-based therapeutic, targeting a liver-expressed gene involved in a serious rare disease. For competitive reasons, we have not yet publicly disclosed the target gene or disease. We have selected this target gene and disease based on criteria that include having a strong therapeutic hypothesis, a readily-identifiable patient population, the availability of a potentially predictive biomarker, high unmet medical need, favorable competitive positioning and what we believe is a rapid projected path to approval. The disease is a genetic disorder, where mutations in the disease gene lead to the production of an abnormal protein. The protein causes progressive liver damage and fibrosis, in some cases leading to cirrhosis and liver failure, and we believe that silencing of the disease gene will prevent production of the abnormal protein and thereby slow or stop progression of the liver fibrosis. Greater than 100,000 people in the U.S. are believed to be homozygous (i.e. having identical pairs of genes for any given pair of hereditary characteristics) for the mutation that causes the liver disease, and at least 20% of those people, and potentially a significantly higher fraction, are believed to have liver-associated disease as a consequence. We are seeking a risk-sharing collaborator for this program before we file regulatory clearances to initiate a clinical trial, which we expect to be prepared to file in the second half of 2018.

Chronic Hepatitis B Virus infection. We have declared a GalXC RNAi platform-based product candidate for the treatment of HBV, DCR-HBVS, and are conducting formal non-clinical development studies. We expect to file regulatory clearances to initiate a clinical trial during the fourth quarter of 2018. Current therapies for HBV rarely lead to a long-term immunological cure as measured by the clearance of HBV surface antigen (HBsAg) and sustained HBV deoxyribonucleic acid (DNA) suppression in patient plasma or blood. DCR-HBVS targets HBV messenger RNA, and leads to greater than 99% reduction in circulated HBsAg in mouse models of HBV infection. Based on these preclinical studies, and only if we receive

appropriate regulatory approval to begin human clinical trials, we hope to determine the potential of DCR-HBVS to reduce HBsAg and HBV DNA levels in the blood of HBV patients in a commercially attractive subcutaneous dosing paradigm.

Hypercholesterolemia (PCSK9 targeted therapy). We are using our GalXC RNAi platform to develop a therapeutic that targets the PCSK9 gene for the treatment of hypercholesterolemia. The Company has selected a provisional clinical candidate for the program, but is continuing to explore

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ways to further optimize the program. PCSK9 is a validated target for hypercholesterolemia, and there are FDA-approved therapies targeting PCSK9 that are based on monoclonal antibody technology. Based on preclinical studies, we believe that our GalXC RNAi platform has the potential to produce a PCSK9-targeted therapy with attractive commercial properties, such as small subcutaneous injection volumes and less frequent dosing.

Additional pipeline programs. We have developed a robust portfolio of additional targets and diseases that we plan to pursue either on our own or in collaboration with partners. We have applied our GalXC technology to multiple gene targets across our disease focus areas of rare diseases, chronic liver diseases and cardiovascular diseases. Pursuant to our strategy, we are seeking collaborations with larger pharmaceutical companies to advance our programs in the areas of chronic liver diseases and cardiovascular diseases. Both these disease areas represent large and diverse patient populations, requiring complex clinical development and commercialization paths that we believe can be more effectively pursued in collaboration with larger pharmaceutical companies. For our additional rare diseases, we are continuing to assess their potential for clinical success and market opportunity while optimizing our GalXC molecules. For our additional pipeline programs (including PCSK9), we may utilize more advanced versions of our GalXC technology that further improve pharmaceutical properties of the GalXC molecules, including enhancing the duration of action and potency. We have further optimized our GalXC technology platform, enabling the development of next generation GalXC molecules. Improvements to our GalXC compound include modification of the tetraloop end of the molecule, which can be applied to any target gene, resulting in a substantially longer duration of action in animal models across multiple targets. Modification of the tetraloop only impacts the passenger strand and does not impact the guide strand. These modifications are unique to our GalXC molecules and, we believe, provide a competitive advantage for the Company.

In addition to the GalXC development programs outlined above, we are party to a collaborative research and license agreement with Boehringer Ingelheim International GmbH (BI) (the BI Agreement), pursuant to which the Company and BI jointly research and develop product candidates for the treatment of chronic liver diseases, with an initial focus on nonalcoholic steatohepatitis (NASH) using our GalXC platform. NASH is caused by the buildup of fat in the liver, potentially leading to liver fibrosis and cirrhosis. NASH has an especially high prevalence among obese and diabetic patients and is an area of high unmet medical need. The BI Agreement is for the development of product candidates against one target gene with an option for BI to add the development of product candidates that target a second gene. We are working exclusively with BI to develop the product candidates against the undisclosed target gene. We are responsible for the discovery and initial profiling of the product candidates,
including primary pre-clinical studies, synthesis, and delivery. BI is responsible for evaluating and selecting the product candidates for further development. If BI selects one or more product candidates, it will be responsible for further pre-clinical development, clinical development, manufacturing and commercialization of those products. Also pursuant to the BI Agreement, we granted BI a worldwide license in connection with the research and development of the product candidates and will transfer to BI intellectual property rights of the product candidates selected by BI for clinical development and commercialization. We also may provide assistance to BI in order to help BI further develop selected product candidates. Pursuant to the BI Agreement, BI agreed to pay us a non-refundable upfront payment of $10.0 million for the first target. During the term of the research program, BI will reimburse us the cost of materials and third-party expenses that have been included in the preclinical studies up to an agreed-upon limit. We are eligible to receive up to $191.0 million in potential development and commercial milestones related to the initial target. We are also eligible to receive royalty payments on potential global net sales, subject to certain adjustments, tiered from high single digits up to low double-digits. BI s option to add a second target would provide for an option fee payment and success-based development and commercialization milestones and royalty payments to us.

We are party to a collaboration for our early generation of non-GalXC Dicer Substrate RNAi technology against two targets, the KRAS oncogene and an additional undisclosed gene, with the global pharmaceutical company Kyowa Hakko Kirin Co., Ltd. (KHK), to use for development in oncology and formulated using KHK s

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proprietary drug delivery system. KHK has provided us with notice of termination related to the non-KRAS program.

We also have developed a wholly owned clinical candidate, DCR-BCAT, targeting the ß-catenin oncogene. DCR-BCAT is based on an extended version of our earlier generation non-GalXC Dicer Substrate RNAi technology and is delivered by our lipid nanoparticle tumor delivery system, EnCore™. We plan to out-license, spin out or seek external funding to advance the DCR-BCAT opportunity, given our focus on our GalXC platform-based programs.

Our executive management team has extensive experience in the biopharmaceutical industry. In addition, various members of our management team and our board of directors have contributed to the progress of the RNAi field through their substantial involvement in companies such as Cephalon Inc., Genta Inc., GlaxoSmithKline plc, Pfizer Inc., Sanofi S.A (Sanofi), Sirna Therapeutics, Inc. (Sirna), and other companies. Our co-founder and chief executive officer, Douglas M. Fambrough III, Ph.D., was a lead venture capital investor and board member of Sirna, an early RNAi company acquired by Merck & Co., Inc. (Merck) in 2006 for $1.1 billion. He played a pivotal role in the restructuring of Ribozyme Pharmaceuticals into Sirna, the management of the company as a member of its Board of Directors, and the execution of its 2006 acquisition by Merck.

Our Corporate Information

We were incorporated in Delaware in October 2006. Our principal executive offices are located at 87 Cambridgepark Drive, Cambridge, MA 02140, and our main telephone number is (617) 621-8097. Additional information can be found on our website, at *dicerna.com*, and in our periodic and current reports filed with the SEC. Copies of our current and periodic reports filed with the SEC are available at the SEC Public Reference Room at 100 F Street, N.E., Washington, D.C. 20549, and online at *sec.gov* and our website at *dicerna.com.* The information contained in, or that can be accessed through, our website is not part of, and is not incorporated into, this prospectus and should not be considered part of this prospectus.

For additional information about our Company, please refer to other documents we have filed with the SEC and that are incorporated by reference into this prospectus, as listed under the heading Incorporation of Certain Information by Reference.

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THE OFFERING

Common stock offered by us	Shares having an aggregate offering price of up to $100,000,000.
Common stock to be outstanding after this offering	Up to 6,915,629 shares, assuming the sale of $100,000,000 of shares at a sales price of $14.46 per share, which was the closing price on The NASDAQ Global Select Market on May 11, 2018. The actual number of shares issued and outstanding will vary depending on the sales price under this offering.
Manner of offering	At-the-market offering that may be made from time to time through our sales agent, Cowen. See Plan of Distribution on page S-15 of this prospectus.
Use of proceeds	We currently intend to use the net proceeds from this offering, if any, for research and development activities, general corporate purposes, capital expenditures and working capital. See Use of Proceeds on page S-12 of this prospectus.
NASDAQ Global Select Market symbol	DRNA
Risk factors	Investing in our securities involves a high degree of risk. See Risk Factors beginning on page S-8 of this prospectus and the other information included in, or incorporated by reference into, this prospectus for a discussion of certain factors that you should carefully consider before deciding to invest in shares of our common stock.

The number of shares of common stock shown above to be outstanding immediately following this offering is based on 52,821,624 shares outstanding as of May 11, 2018 and excludes:

- 85,703 shares of our common stock issuable upon the exercise of outstanding warrants as of May 11, 2018, at an exercise price of $7.00 per share;
- 2,198 shares of our common stock issuable upon the exercise of outstanding warrants as of May 11, 2018, at an exercise price of $250.00 per share;
- 7,264,991 shares of our common stock issuable upon the exercise of outstanding options as of May 11, 2018, at a weighted average exercise price of $8.65 per share; and

1,750,471 shares of our common stock available for future issuance pursuant to our existing stock incentive plans as of May 11, 2018.

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RISK FACTORS

We face a variety of significant and diverse risks, many of which are inherent in our business. You should carefully consider the risks described under the caption Risk Factors in our most recent annual report on Form 10-K, subsequent quarterly reports on Form 10-Q and other filings we make with the SEC pursuant to Section 13(a), 13(c), 14 or 15(d) of the Securities Exchange Act of 1934, as amended (the Exchange Act), incorporated by reference herein, before making an investment decision. In addition to such other risks, set forth below are risks related to this offering. The occurrence of any of the risks set forth above or below could materially and adversely affect our business, prospects, financial condition, results of operations or cash flow. Other risks and uncertainties that we do not now consider to be material or of which we are not now aware may become important factors that affect us in the future. You should carefully consider the risks and uncertainties described below and in the documents incorporated by reference herein before deciding to invest in our common stock.

Additional Risks Related to This Offering

We have broad discretion in the use of the net proceeds from this offering.

Our management will have broad discretion in the application of the net proceeds from this offering and could spend the proceeds in ways with which you may not agree. Accordingly, you will be relying on the judgment of our management with regard to the use of the net proceeds, and you will not have the opportunity, as part of your investment decision, to assess whether the proceeds are being used appropriately. It is possible that the net proceeds will be invested or otherwise used in a way that does not yield a favorable, or any, return for the Company.

Investors in this offering will experience immediate and substantial dilution in the net tangible book value per share of the common stock they purchase.

Since the price per share of our common stock being offered is higher than the net tangible book value per share of our common stock, you will suffer substantial dilution in the net tangible book value of the common stock you purchase in this offering. See the section entitled Dilution in this prospectus for a more detailed discussion of the dilution you will incur if you purchase common stock in this offering. In addition, we have a significant number of options outstanding. If the holders of these options exercise such options, you may incur further dilution.

Our stockholders may experience significant dilution as a result of future equity offerings and exercise of outstanding options.

In order to raise additional capital, we may in the future offer additional shares of our common stock or other securities convertible into or exchangeable for our common stock. We cannot assure you that we will be able to sell shares or other securities in any other offering at a price per share that is equal to or greater than the price per share paid by investors in this offering, and investors purchasing shares or other securities in the future could have rights superior to existing stockholders. The price per share at which we sell additional shares of our common stock or other securities convertible into or exchangeable for our common stock in future transactions may be higher or lower than the price per share in this offering.

In addition, we have a significant number of securities convertible into, or allowing the purchase of, our common stock. As of May 11, 2018, 1,750,471 shares of common stock were reserved for future issuance under our stock incentive plans. As of that date, there were also options to purchase 7,264,991 shares of our common stock outstanding and warrants to purchase 87,901 shares of our common stock outstanding. The exercise of outstanding options or warrants having an exercise price per share that is less than the offering price per share in this offering will

increase dilution to investors in this offering.

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Future sales of our common stock in the public market could cause our stock price to fall.

Sales of a substantial number of shares of our common stock in the public market, or the perception that these sales might occur, could depress the market price of our common stock and could impair our ability to raise capital through the sale of additional equity securities. As of May 11, 2018, we had 52,821,624 shares of common stock outstanding, all of which shares, other than shares held by our directors and certain officers, were eligible for sale in the public market, subject in some cases to compliance with the requirements of Rule 144, including the volume limitations and manner of sale requirements. In addition, shares of common stock issuable upon exercise of outstanding options and shares reserved for future issuance under our stock incentive plans will become eligible for sale in the public market to the extent permitted by applicable vesting requirements and subject in some cases to compliance with the requirements of Rule 144.

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SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus includes and incorporates by reference forward-looking statements within the meaning of the U.S. Private Securities Litigation Reform Act of 1995 and releases issued by the SEC and within the meaning of Section 27A of the Securities Act, and Section 21E of the Exchange Act. All statements other than statements of historical fact are forward-looking statements for purposes of this prospectus. In some cases, you can identify forward-looking statements by terminology such as may, could, will, would, should, expect, plan, anticip estimate, intend, predict, seek, contemplate, project, continue, potential, ongoing, goal, or the neg or other comparable terminology. These forward-looking statements include, but are not limited to, statements about:

- how long we expect to maintain liquidity to fund our planned level of operations and our ability to obtain additional funds for our operations;
- the initiation, timing, progress and results of our research and development programs, preclinical studies, any clinical trials and IND, CTA, New Drug Application (NDA) and other regulatory submissions;
- our ability to identify and develop product candidates for treatment of additional disease indications;
- our or a collaborator s ability to obtain and maintain regulatory approval of any of our product candidates;
- the rate and degree of market acceptance of any approved product candidates;
- the commercialization of any approved product candidates;
- our ability to establish and maintain additional collaborations and retain commercial rights for our product candidates in the collaborations;
- the implementation of our business model and strategic plans for our business, technologies and product candidates;
- our estimates of our expenses, ongoing losses, future revenue and capital requirements;
- our ability to obtain and maintain intellectual property protection for our technologies and product candidates and our ability to operate our business without infringing the intellectual property rights of others;
- our reliance on third parties to conduct our preclinical studies or any clinical trials;

our reliance on third party suppliers and manufacturers to supply the materials and components for, and manufacture, our research and development, preclinical and clinical trial drug supplies;

our ability to attract and retain qualified key management and technical personnel;

our dependence on our existing collaborator, BI, for developing, obtaining regulatory approval for and commercializing product candidates in the collaboration;

our receipt and timing of any milestone payments or royalties under our research collaboration and license agreement with BI or any future arrangements with any other collaborators;

our expectations regarding the time during which we will be an emerging growth company under the Jumpstart Our Business Startups Act;

our financial performance; and

developments relating to our competitors or our industry.

These statements relate to future events or to our future financial performance and involve known and unknown risks, uncertainties and other factors that may cause our actual results, performance or achievements to be

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materially different from any future results, performance or achievements expressed or implied by these forward-looking statements. In evaluating such forward-looking statements, you should specifically consider various factors that may cause actual results to differ materially from current expectations, including the risks outlined under the heading Risk Factors contained in this prospectus and any related free writing prospectus, and in any other documents incorporated herein or therein (including in our most recent annual report on Form 10-K, subsequent quarterly reports on Form 10-Q and other filings we make with the SEC pursuant to Section 13(a), 13(c), 14 or 15(d) of the Exchange Act). Any forward-looking statement in this prospectus reflects our current view with respect to future events and is subject to these and other risks, uncertainties and assumptions relating to our operations, results of operations, industry and future growth. Given these uncertainties, you should not place undue reliance on these forward-looking statements. Except as required by law, we assume no obligation to update or revise these forward-looking statements for any reason, even if new information becomes available in the future.

This prospectus also contains estimates, projections and other information concerning our industry, our business and the markets for certain drugs, including data regarding the estimated size of those markets, their projected growth rates and the incidence of certain medical conditions. Information that is based on estimates, forecasts, projections or similar methodologies is inherently subject to uncertainties and actual events or circumstances may differ materially from events and circumstances reflected in this information. Unless otherwise expressly stated, we obtained these industry, business, market and other data from reports, research surveys, studies and similar data prepared by third parties, industry, medical and general publications, government data and similar sources. In some cases, we do not expressly refer to the sources from which these data are derived.

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USE OF PROCEEDS

The amount of proceeds from this offering will depend upon the number of shares of our common stock sold and the market price at which they are sold. There can be no assurance that we will be able to sell any shares under, or fully utilize, the sales agreement with Cowen as a source of financing.

We currently intend to use the net proceeds from this offering, if any, for preclinical studies and clinical trials, with the remainder of any net proceeds from sales of securities being used for continued technology platform development, working capital and general corporate purposes. We may also use a portion of the net proceeds to acquire or invest in businesses, products or technologies that are complementary to our own. We regularly consider such opportunities but are not currently negotiating any such transactions. The amount and timing of these expenditures will depend on a number of factors, such as the timing, scope, progress and results of our research and development efforts, the timing and progress of any partnership efforts, and the competitive environment for our product candidates.

As of the date of this prospectus, we cannot specify with certainty all of the particular uses for the net proceeds to us from this offering, if any. As a result, our management will have broad discretion regarding the timing and application of the net proceeds from this offering. Pending the application of the net proceeds, we intend to invest the net proceeds in short-term, investment grade, interest-bearing securities.

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DILUTION

If you invest in our common stock, you will experience dilution to the extent of the difference between the price per share you pay in this offering and the net tangible book value per share of our common stock immediately after this offering. Our net tangible book value as of March 31, 2018 was approximately $87,886,000 or $1.70 per share of our common stock. Net tangible book value per share as of March 31, 2018 is equal to our total tangible assets minus total liabilities, all divided by the number of shares of common stock outstanding as of March 31, 2018.

After giving effect to the sale of $100,000,000 of shares of our common stock in this offering at an assumed offering price of $14.46 per share, the last reported sale price of our common stock on The NASDAQ Global Select Market on May 11, 2018, and after deducting estimated offering commissions and expenses payable by us, our as adjusted net tangible book value would have been approximately $184,613,550, or approximately $3.15 per share of common stock, as of March 31, 2018. This represents an immediate increase in net tangible book value of approximately $1.45 per share to existing stockholders and an immediate dilution of approximately $11.31 per share to investors in this offering. The following table illustrates this calculation on a per share basis.

Assumed public offering price per share		$ 14.46
Net tangible book value per share as of March 31, 2018	$ 1.70	
Increase in net tangible book value per share attributable to this offering	$ 1.45	
As adjusted net tangible book value per share as of March 31, 2018, after giving effect to this offering		$ 3.15
Dilution per share to new investors purchasing shares in this offering		$ 11.31

The table above assumes for illustrative purposes that an aggregate of 6,915,629 shares of our common stock are sold at a price of $14.46 per share, the last reported sale price of our common stock on The NASDAQ Global Select Market on May 11, 2018, for aggregate gross proceeds of $100,000,000. The shares sold in this offering, if any, will be sold from time to time at various prices. An increase of $1.00 per share in the price at which the shares are sold from the assumed offering price of $14.46 per share shown in the table above, assuming $100,000,000 of shares of our common stock is sold at that price, would increase our adjusted net tangible book value per share after the offering to $3.17 per share and would increase the dilution in net tangible book value per share to new investors in this offering to $12.29 per share, after deducting commissions and estimated aggregate offering expenses payable by us. A decrease of $1.00 per share in the price at which the shares are sold from the assumed offering price of $14.46 per share shown in the table above, assuming $100,000,000 of shares of our common stock is sold at that price, would decrease our adjusted net tangible book value per share after the offering to $3.12 per share and would decrease the dilution in net tangible book value per share to new investors in this offering to $10.34 per share, after deducting commissions and estimated aggregate offering expenses payable by us. This information is supplied for illustrative purposes only.

The number of shares of common stock shown above to be outstanding immediately following this offering is based on 51,781,429 shares outstanding as of March 31, 2018 and excludes:

- 85,703 shares of our common stock issuable upon the exercise of outstanding warrants as of March 31, 2018, at an exercise price of $7.00 per share;

2,198 shares of our common stock issuable upon the exercise of outstanding warrants as of March 31, 2018, at an exercise price of $250.00 per share;

7,171,978 shares of our common stock issuable upon the exercise of outstanding options as of March 31, 2018, at a weighted average exercise price of $8.67 per share; and

1,900,471 shares of our common stock available for future issuance pursuant to our existing stock incentive plans as of March 31, 2018.

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The above illustration of dilution per share to investors participating in this offering assumes no exercise of outstanding options to purchase our common stock or outstanding warrants to purchase shares of our common stock. The exercise of outstanding options and warrants having an exercise price per share that is less than the offering price per share in this offering will increase dilution to investors in this offering.

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PLAN OF DISTRIBUTION

We have entered into a sales agreement with Cowen under which we may issue and sell from time to time up to $100,000,000 of our common stock through Cowen as our sales agent. Sales of our common stock, if any, will be made at market prices by any method that is deemed to be an at the market offering as defined in Rule 415 under the Securities Act, including sales made directly on The Nasdaq Global Select Market or any other trading market for our common stock. If authorized by us in writing, Cowen may purchase shares of our common stock as principal.

Cowen will offer our common stock subject to the terms and conditions of the sales agreement on a daily basis or as otherwise agreed upon by us and Cowen. We will designate the maximum amount of common stock to be sold through Cowen on a daily basis or otherwise determine such maximum amount together with Cowen. Subject to the terms and conditions of the sales agreement, Cowen will use its commercially reasonable efforts to sell on our behalf all of the shares of common stock requested to be sold by us. We may instruct Cowen not to sell common stock if the sales cannot be effected at or above the price designated by us in any such instruction. Cowen or we may suspend the offering of our common stock being made through Cowen under the sales agreement upon proper notice to the other party. Cowen and we each have the right, by giving written notice as specified in the sales agreement, to terminate the sales agreement in each party s discretion at any time.

The aggregate compensation payable to Cowen as sales agent equals up to 3.0% of the gross sales price of the shares sold through it pursuant to the sales agreement. We have also agreed to reimburse Cowen up to $50,000 of Cowen s actual outside legal expenses incurred by Cowen in connection with this offering. We estimate that the total expenses of the offering payable by us, excluding commissions payable to Cowen under the sales agreement, will be approximately $272,450.

The remaining sales proceeds, after deducting any expenses payable by us and any transaction fees imposed by any governmental, regulatory, or self-regulatory organization in connection with the sales, will equal our net proceeds for the sale of such common stock.

Cowen will provide written confirmation to us following the close of trading on The Nasdaq Global Select Market on each day in which common stock is sold through it as sales agent under the sales agreement. Each confirmation will include the number of shares of common stock sold through it as sales agent on that day, the volume weighted average price of the shares sold, the percentage of the daily trading volume and the net proceeds to us.

To the extent any sales are made, we will report at least quarterly the number of shares of common stock sold through Cowen under the sales agreement, the net proceeds to us and the compensation paid by us to Cowen in connection with the sales of common stock.

Settlement for sales of common stock will occur, unless the parties agree otherwise, on the second business day that is also a trading day following the date on which any sales were made in return for payment of the net proceeds to us. There is no arrangement for funds to be received in an escrow, trust or similar arrangement.

In connection with the sales of our common stock on our behalf, Cowen may be deemed to be an underwriter within the meaning of the Securities Act, and the compensation paid to Cowen may be deemed to be underwriting commissions or discounts. We have agreed in the sales agreement to provide indemnification and contribution to Cowen against certain liabilities, including liabilities under the Securities Act. As sales agent, Cowen will not engage in any transactions that stabilizes our common stock.

Our common stock is listed on The Nasdaq Global Select Market and trades under the symbol DRNA. The transfer agent of our common stock is American Stock Transfer & Trust Company, LLC.

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Cowen and/or its affiliates have provided, and may in the future provide, various investment banking and other financial services for us for which services they have received and, may in the future receive, customary fees.

In addition, in the ordinary course of its business activities, Cowen and its affiliates may make or hold a broad array of investments and actively trade debt and equity securities (or related derivative securities) and financial instruments (including bank loans) for their own account and for the accounts of their customers. Such investments and securities activities may involve securities and/or instruments of ours or our affiliates. Cowen and its affiliates may also make investment recommendations and/or publish or express independent research views in respect of such securities or financial instruments and may hold, or recommend to clients that they acquire, long and/or short positions in such securities and instruments.

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LEGAL MATTERS

Certain legal matters in connection with the securities offered hereby will be passed upon for us by Sidley Austin LLP, Palo Alto, California. Cowen is being represented in connection with this offering by Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C., Boston, Massachusetts.

EXPERTS

The consolidated financial statements incorporated in this prospectus by reference from the Company s Annual Report on Form 10-K, have been audited by Deloitte & Touche LLP, an independent registered public accounting firm, as stated in their report, which is incorporated herein by reference. Such financial statements have been so incorporated in reliance upon the report of such firm given upon their authority as experts in accounting and auditing.

WHERE YOU CAN FIND MORE INFORMATION

We have filed with the SEC a registration statement on Form S-3 under the Securities Act of 1933, as amended (the Securities Act), with respect to the securities offered by this prospectus and the applicable prospectus supplement. This prospectus and the applicable prospectus supplement do not contain all of the information set forth in the registration statement and its exhibits and schedules in accordance with SEC rules and regulations. For further information with respect to us and the securities being offered by this prospectus and the applicable prospectus supplement, you should read the registration statement, including its exhibits and schedules. Statements contained in this prospectus and the applicable prospectus supplement, including documents that we have incorporated by reference, as to the contents of any contract or other document referred to are not necessarily complete, and, with respect to any contract or other document filed as an exhibit to the registration statement or any other such document, each such statement is qualified in all respects by reference to the corresponding exhibit. You should review the complete contract or other document to evaluate these statements. You may obtain copies of the registration statement and its exhibits via the SEC s EDGAR database or our website, or at the offices of the SEC, where they may be examined without charge at the Public Reference Room, at the address listed below, or obtained upon payment of the prescribed fees.

We file annual, quarterly and current reports, proxy statements and other documents with the SEC under the U.S. Securities Exchange Act of 1934, as amended (the Exchange Act). The SEC maintains a website that contains reports, proxy and information statements and other information regarding issuers, including us, that file electronically with the SEC. You may obtain documents that we file with the SEC at *sec.gov* and read and copy them at the SEC s Public Reference Room at 100 F Street N.E., Washington, DC 20549 (information on operation of the Public Reference Room is available by calling the SEC at 1-800-SEC-0330).

We also make these documents available on our website at *dicerna.com*. Our website and the information contained or connected to our website is not incorporated by reference in this prospectus or any prospectus supplement, and you should not consider it part of this prospectus or any prospectus supplement.

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INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

SEC rules permit us to incorporate information by reference in this prospectus and the applicable prospectus supplement. This means that we can disclose important information to you by referring you to another document filed separately with the SEC. The information incorporated by reference is considered to be part of this prospectus and the applicable prospectus supplement, except for information superseded by information contained in this prospectus or the applicable prospectus supplement itself or in any subsequently filed incorporated document. This prospectus and the applicable prospectus supplement incorporate by reference the documents set forth below that we have previously filed with the SEC (Commission File No. 001-36281), other than information in such documents that is deemed to be furnished and not filed. These documents contain important information about us and our business and financial condition.

- Annual Report on Form 10-K for the year ended December 31, 2017, filed with the SEC on March 8, 2018, as amended;
- Quarterly Report on Form 10-Q for the period ended March 31, 2018, filed with the SEC on May 14, 2018;
- Current Reports on Form 8-K, filed with the SEC on April 23, 2018 and April 26, 2018 (Items 1.01 and 3.02 only);
- Definitive Proxy Statement on Schedule 14A, filed with the SEC on April 26, 2018; and
- the description of our Common Stock contained in our Registration Statement on Form 8/A, dated January 28, 2014, including any amendments or reports filed for the purpose of updating such description.

All documents that we file (but not those that we furnish) pursuant to Section 13(a), 13(c), 14 or 15(d) of the Exchange Act, after the date of the initial registration statement of which this prospectus is a part and prior to the effectiveness of the registration statement shall be deemed to be incorporated by reference into this prospectus and will automatically update and supersede the information in this prospectus, and any previously filed documents. All documents that we file (but not those that we furnish) pursuant to Section 13(a), 13(c), 14 or 15(d) of the Exchange Act on or after the date of this prospectus and prior to the termination of the offering of any of the securities covered under this prospectus shall be deemed to be incorporated by reference into this prospectus and will automatically update and supersede the information in this prospectus, the applicable prospectus supplement and any previously filed documents.

Any statement contained herein or in a document incorporated or deemed to be incorporated by reference in this prospectus or the applicable prospectus supplement shall be deemed to be modified or superseded for purposes of this prospectus and such applicable prospectus supplement to the extent that a statement contained in this prospectus or such applicable prospectus supplement, or in any other subsequently filed document which also is or is deemed to be incorporated by reference in this prospectus and such applicable prospectus supplement, modifies or supersedes such earlier statement. Any statement so modified or superseded shall not be deemed, except as so modified or superseded, to constitute a part of this prospectus or such applicable prospectus supplement.

Documents incorporated by reference are available from us without charge, excluding all exhibits unless specifically incorporated by reference as an exhibit to this prospectus and the applicable prospectus supplement.

Prospective investors may obtain documents incorporated by reference in this prospectus and the applicable prospectus supplement by requesting them in writing or by telephone from us at our executive offices at:

Dicerna Pharmaceuticals, Inc.

87 Cambridgepark Drive

Cambridge, MA 02140

(617) 621-8097

Attention: Investor Relations and Corporate Communications

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$100,000,000

Common Stock

PROSPECTUS

Cowen

, 2018

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PART II

INFORMATION NOT REQUIRED IN PROSPECTUS

Item 14. ***Other Expenses of Issuance and Distribution***

Set forth below is an estimate (except in the case of the registration fee) of the amount of fees and expenses to be incurred in connection with the issuance and distribution of the offered securities, other than underwriting discounts and commissions.

Registration fee	$ 31,125
Legal fees and expenses	*
Accounting fees and expenses	*
Printing expenses	*
Transfer agent and registrar fees	*
Trustee fees (including counsel fees)	*
Miscellaneous	*
Total	*

* Since an indeterminate amount or number of securities or transactions may be covered by this registration statement, expenses of issuance and distribution of the securities are not currently determinable.

Item 15. ***Indemnification of Directors and Officers***

Section 145 of the DGCL provides that a Delaware corporation may indemnify any person who was or is a party or is threatened to be made a party to any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative (other than an action by or in the right of the corporation) by reason of the fact that he or she is or was a director, officer, employee or agent of the corporation or is or was serving at the request of the corporation as a director, officer, employee or agent of another corporation or enterprise, against expenses, judgments, fines and amounts paid in settlement actually and reasonably incurred by him or her in connection with such action, suit or proceeding if he or she acted in good faith and in a manner he or she reasonably believed to be in or not opposed to the best interests of the corporation, and, with respect to any criminal action or proceeding, had no cause to believe his or her conduct was unlawful.

Section 145(b) provides that a Delaware corporation may indemnify any person who was or is a party or is threatened to be made a party to any threatened, pending or completed action or suit by or in the right of the corporation to procure a judgment in its favor by reason of the fact that such person acted in any of the capacities set forth above, against expenses actually and reasonably incurred by him or her in connection with the defense or settlement of such action or suit if he or she acted under similar standards, except that no indemnification may be made in respect of any claim, issue or matter as to which such person shall have been adjudged to be liable to the corporation unless and only to the extent that the court in which such action or suit was brought shall determine that despite the adjudication of liability, such person is fairly and reasonably entitled to be indemnified for such expenses which the court shall deem proper.

Section 145 further provides that (i) to the extent a director or officer of a corporation has been successful in the defense of any action, suit or proceeding referred to in subsections (a) and (b) or in the defense of any claim, issue, or matter therein, he or she shall be indemnified against expenses (including attorneys fees) actually and reasonably incurred by him or her in connection therewith; (ii) indemnification provided for by Section 145 shall not be deemed exclusive of any other rights to which the indemnified party may be entitled; and (iii) the corporation may purchase and maintain insurance on behalf of a director or officer of the corporation against any liability asserted against him or her or incurred by him or her in any such capacity or arising out of his or her status as such whether or not the corporation would have the power to indemnify him or her against such liabilities under Section 145.

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Section 102(b)(7) of the DGCL provides that a corporation in its original certificate of incorporation or an amendment thereto validly approved by stockholders may eliminate or limit personal liability of members of its board of directors or governing body for breach of a director s fiduciary duty. No such provision, however, may eliminate or limit the liability of a director for breaching his or her duty of loyalty, failing to act in good faith, engaging in intentional misconduct or knowingly violating a law, paying a dividend or approving a stock repurchase which was illegal, or obtaining an improper personal benefit. A provision of this type has no effect on the availability of equitable remedies, such as injunction or rescission, for breach of fiduciary duty. Our certificate of incorporation contains such a provision.

Our certificate of incorporation and bylaws provide that we shall indemnify officers, directors, employees and agents of the Company, to the full extent permitted by and in the manner permissible under the laws of the State of Delaware. In addition, the bylaws permit the board of directors to authorize the Company to purchase and maintain insurance against any liability asserted against any director, officer employee or agent of the Company arising out of his or her capacity as such.

We have entered into Indemnification Agreements with each of its officers and directors, pursuant to which we have agreed to indemnify and advance expenses to such officers and director to the fullest extent permitted by applicable law.

We have obtained an insurance policy providing coverage for certain libilities of our officers and directors.

The foregoing statements are subject to the provisions of Sections 145 and 102(b)(7) of the DGCL, our bylaws and the certificate of incorporation, which bylaws and certificate of incorporation have been filed as exhibits to this registration statement.

Item 16. ***Exhibits***

Exhibit No.	Description
1.1	Form(s) of underwriting agreement(s).
1.2	Sales Agreement, dated as of May 16, 2018, between the Registrant and Cowen and Company, LLC.
3(i)*	Amended and Restated Certificate of Incorporation of the Registrant (previously filed in the Company s Current Report on Form 8-K dated February 5, 2014 and incorporated herein by reference).
3(ii)*	Amended and Restated Bylaws of the Registrant (previously filed in the Company s Current Report on Form 8-K dated February 5, 2014 and incorporated herein by reference).
4.1*	Form of Indenture (including form of Debt Securities) (previously filed in the Company s Registration Statement on Form S-3, Registration No. 333-202687).
4.2	Form(s) of Rights Agreement(s) (including form(s) of Rights).
4.3*	Specimen Common Stock Certificate, $0.0001 par value per share, of the Registrant (previously filed in the Company s Registration Statement on Form S-3, Registration No. 333-202687).

4.4	Form of Certificate of Designation of Preferred Stock.
4.5	Form of Common Stock Warrant Agreement and Warrant Certificate.
4.6	Form of Preferred Stock Warrant Agreement and Warrant Certificate.
4.7	Form of Certificate for Preferred Stock.

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Exhibit No.	Description
4.8*	Form of Amended and Restated Registration Rights Agreement (previously filed with the Company s Current Report on Form 8-K filed with the SEC on March 30, 2017).
4.9*	Form of First Amendment to Amended and Restated Registration Rights Agreement (previously filed with the Company s Current Report on Form 8-K filed with the SEC on December 18, 2017).
5.1	Opinion of Sidley Austin LLP.
23.1	Consent of Sidley Austin LLP (included in Exhibit 5.1).
23.2	Consent of Deloitte & Touche LLP.
24.1	Power of Attorney (included in Signature Page).
25.1	Statement of Eligibility of Trustee on Form T-1.

* Previously filed.
To be filed by amendment or as exhibit(s) to a Current Report of the Registrant on Form 8-K and incorporated herein by reference, as applicable.
To be filed by pre-effective amendment.
To be filed pursuant to Section 305(b)(2) of the U.S. Trust Indenture Act of 1939, as applicable.

Item 17. ***Undertakings***

(a) The undersigned Registrant hereby undertakes:

(1) To file, during any period in which offers or sales are being made, a post-effective amendment to this registration statement:

(i) To include any prospectus required by section 10(a)(3) of the Securities Act;

(ii) To reflect in the prospectus any facts or events arising after the effective date of the registration statement (or the most recent post-effective amendment thereof) which, individually or in the aggregate, represent a fundamental change in the information set forth in this registration statement. Notwithstanding the foregoing, any increase or decrease in volume of securities offered (if the total dollar value of securities offered would not exceed that which was registered) and any deviation from the low or high end of the estimated maximum offering range may be reflected in the form of prospectus filed with the Commission pursuant to Rule 424(b) if, in the aggregate, the changes in volume and price represent no more than a 20 percent change in the maximum aggregate offering price set forth in the Calculation of Registration Fee table in the effective registration statement; and

(iii) To include any material information with respect to the plan of distribution not previously disclosed in this registration statement or any material change to such information in this registration statement;

provided, however, that subparagraphs (i), (ii) and (iii) do not apply if the information required to be included in a post-effective amendment by those paragraphs is contained in reports filed with or furnished to the Commission by the Registrant pursuant to Section 13 or Section 15(d) of the Exchange Act that are incorporated by reference in this registration statement, or is contained in a form of prospectus filed pursuant to Rule 424(b) that is part of the registration statement.

(2) That, for the purpose of determining any liability under the Securities Act, each such post effective amendment shall be deemed to be a new registration statement relating to the securities offered herein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

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(3) To remove from registration by means of a post-effective amendment any of the securities being registered which remain unsold at the termination of the offering.

(4) That, for the purpose of determining liability under the Securities Act to any purchaser:

(i) Each prospectus filed by the Registrant pursuant to Rule 424(b)(3) shall be deemed to be part of the registration statement as of the date the filed prospectus was deemed part of and included in the registration statement; and

(ii) Each prospectus required to be filed pursuant to Rule 424(b)(2), (b)(5), or (b)(7) as part of a registration statement in reliance on Rule 430B relating to an offering made pursuant to Rule 415(a)(1)(i), (vii) or (x) for the purpose of providing the information required by Section 10(a) of the Securities Act shall be deemed to be part of and included in the registration statement as of the earlier of the date such form of prospectus is first used after effectiveness or the date of the first contract of sale of securities in the offering described in the prospectus. As provided in Rule 430B, for liability purposes of the issuer and any person that is at that date an underwriter, such date shall be deemed to be a new effective date of the registration statement relating to the securities in the registration statement to which that prospectus relates, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof. Provided, however, that no statement made in a registration statement or prospectus that is part of the registration statement or made in a document incorporated or deemed incorporated by reference into the registration statement or prospectus that is part of the registration statement will, as to a purchaser with a time of contract of sale prior to such effective date, supersede or modify any statement that was made in the registration statement or prospectus that was part of the registration statement or made in any such document immediately prior to such effective date.

(5) That, for the purpose of determining liability of the Registrant under the Securities Act to any purchaser in the initial distribution of the securities:

The undersigned Registrant undertake that in a primary offering of securities of the undersigned Registrant pursuant to this registration statement, regardless of the underwriting method used to sell the securities to the purchaser, if the securities are offered or sold to such purchaser by means of any of the following communications, the undersigned Registrant will be sellers to the purchaser and will be considered to offer or sell such securities to such purchaser:

(i) Any preliminary prospectus or prospectus of the undersigned Registrant relating to the offering required to be filed pursuant to Rule 424;

(ii) Any free writing prospectus relating to the offering prepared by or on behalf of the undersigned Registrant or used or referred to by the undersigned Registrant;

(iii)

The portion of any other free writing prospectus relating to the offering containing material information about the undersigned Registrant or their securities provided by or on behalf of the undersigned Registrant; and

(iv) Any other communication that is an offer in the offering made by the undersigned Registrant to the purchaser.

(b) The undersigned Registrant hereby further undertakes that, for the purposes of determining any liability under the Securities Act, each filing of the annual reports of the Registrant pursuant to Section 13(a) or Section 15(d) of the Exchange Act that are incorporated by reference in this registration statement, if any, shall be deemed to be a new registration statement relating to the securities offered herein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

(c) Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers and controlling persons of the Registrant pursuant to the provisions described under Item 15 of this

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registration statement, or otherwise, the Registrant has been advised that in the opinion of the Commission such indemnification is against public policy as expressed in the Securities Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the Registrant of expenses incurred or paid by a director, officer or controlling person of the Registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the Registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it or them is against public policy as expressed in such the Securities Act and will be governed by the final adjudication of such issue.

(d) The undersigned Registrant hereby undertakes that:

(1) For purposes of determining any liability under the Securities Act, the information omitted from the form of prospectus filed as part of this registration statement in reliance upon Rule 430A and contained in a form of prospectus filed by the Registrant pursuant to Rule 424(b)(1) or (4) or 497(h) under the Securities Act shall be deemed to be part of this registration statement as of the time it was declared effective; and

(2) For purposes of determining any liability under the Securities Act, each post-effective amendment that contains a form of prospectus shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

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Exhibit Index

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4.9*	Form of First Amendment to Amended and Restated Registration Rights Agreement (previously filed with the Company s Current Report on Form 8-K filed with the SEC on December 18, 2017).
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23.2	Consent of Deloitte & Touche LLP.
24.1	Power of Attorney (included in Signature Page).
25.1	Statement of Eligibility of Trustee on Form T-1.

* Previously filed.
To be filed by amendment or as exhibit(s) to a Current Report of the Registrant on Form 8-K and incorporated herein by reference, as applicable.
To be filed by pre-effective amendment.
To be filed pursuant to Section 305(b)(2) of the U.S. Trust Indenture Act of 1939, as applicable.

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SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, the Registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-3 and has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized in the City of Cambridge, State of Massachusetts, on May 16, 2018.

DICERNA PHARMACEUTICALS, INC.

By: /s/ Douglas M. Fambrough, III
Douglas M. Fambrough, III, Ph.D.
Chief Executive Officer and Director
(Principal Executive Officer)

/s/ John B. Green
John B. Green
Chief Financial Officer (Principal Financial Officer and Principal Accounting Officer)

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POWER OF ATTORNEY

We, the undersigned directors and officers of Dicerna Pharmaceuticals, Inc. (the Company), hereby severally constitute and appoint Douglas M. Fambrough, III, Ph.D. and John B. Green, and each of them singly, our true and lawful attorneys, with full power to them, and to each of them singly, to sign for us and in our names in the capacities indicated below, the registration statement on Form S-3 filed herewith, and any and all pre-effective and post-effective amendments to said registration statement, and any registration statement filed pursuant to Rule 462(b) under the Securities Act of 1933, as amended, in connection with the registration under the Securities Act of 1933, as amended, of equity securities of the Company, and to file or cause to be filed the same, with all exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith, as fully to all intents and purposes as each of them might or could do in person, and hereby ratifying and confirming all that said attorneys, and each of them, or their substitute or substitutes, shall do or cause to be done by virtue of this Power of Attorney. This Power of Attorney does not revoke any power of attorney previously granted by the undersigned, or any of them.

Pursuant to the requirements of the Securities Act of 1933, as amended, this registration statement has been signed by the following persons in the capacities indicated on the date indicated:

Signature	Title	Date
/s/ Douglas M. Fambrough, III		May 16, 2018
Douglas M. Fambrough, III, Ph.D.	Chief Executive Officer and Director (Principal Executive Officer)	
/s/ John B. Green	Chief Financial Officer (Principal Financial Officer and Principal	May 16, 2018
John B. Green	Accounting Officer)	
/s/ David M. Madden	Director	May 16, 2018
David M. Madden		
/s/ Martin Freed	Director	May 16, 2018
Martin Freed, M.D.		
/s/ Brian K. Halak	Director	May 16, 2018
Brian K. Halak, Ph.D.		
/s/ Stephen J. Hoffman	Director	May 16, 2018
Stephen J. Hoffman, M.D., Ph.D.		
/s/ Peter Kolchinsky	Director	May 16, 2018

Peter Kolchinsky, Ph.D.		
/s/ Adam M. Koppel	Director	May 16, 2018
Adam M. Koppel, M.D., Ph.D.		
/s/ Denis H. Langer	Director	May 16, 2018
Denis H. Langer, M.D., J.D.		
/s/ Bruce Peacock	Director	May 16, 2018
Bruce Peacock		