

UNITED STATES SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

Amendment No. 3
To

FORM S-1

REGISTRATION STATEMENT
UNDER
THE SECURITIES ACT OF 1933

Onconova Therapeutics, Inc.

(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction of incorporation or organization)

2834
(Primary Standard Industrial Classification Code Number)

22-3627252
(I.R.S. Employer Identification No.)

**375 Pheasant Run
Newtown, PA 18940
(267) 759-3680**

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

**Ramesh Kumar, Ph.D.
President and Chief Executive Officer
Onconova Therapeutics, Inc.**

**375 Pheasant Run
Newtown, PA 18954
(267) 759-3680**

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

Copy to:

Joanne R. Soslow
Morgan, Lewis & Bockius LLP
1701 Market Street
Philadelphia, PA 19103
(215) 963-5000

**Steven M. Skolnick
Michael J. Lerner**
Lowenstein Sandler LLP
1251 Avenue of the Americas
New York, New York 10022
(212) 262-6700

Approximate date of commencement of proposed sale to the public: From time to time 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 of 1933, please 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 post-effective amendment filed pursuant to Rule 462(c) under the Securities Act of 1933, 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 definitions of "large accelerated filer", "accelerated filer", "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer	<input type="radio"/>	Accelerated filer	<input type="radio"/>
Non-accelerated filer	<input type="radio"/> (Do not check if a smaller reporting company)	Smaller reporting company	<input checked="" type="radio"/>
		Emerging growth company	<input checked="" type="radio"/>

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with 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(2)
Units, each Unit consisting of one share of common stock, par value \$0.01 per share ("Common Stock"), and one warrant ("Warrant") to purchase [0.025] share of Series B Convertible Preferred Stock, par value \$0.01 per share ("Series B Preferred Stock")(3)	\$ 28,750,000	\$ 3,579.38
(i) Common Stock included in the Units(4)	Included with the Units above	—
(ii) Warrants included in the Units(4)	Included with the Units above	—
Pre-Funded Units in lieu of Units, each Pre-Funded Unit consisting of one pre-funded warrant ("Pre-Funded Warrant") to purchase one share of Common Stock and one Warrant to purchase [0.025] share of Series B Preferred Stock(3)	Included with the Units above	—
(i) Pre-Funded Warrants included in the Pre-Funded Units(4)	Included with the Units above	—
(ii) Warrants included in the Pre-Funded Units(4)	Included with the Units above	—
Shares of Series B Preferred Stock underlying Warrants included in the Units and Pre-Funded Units	\$ 28,750,000	\$ 3,579.38
Shares of Common Stock underlying Pre-Funded Warrants included in the Pre-Funded Units(3)	Included with the Units above	—
Total	\$ 57,500,000	\$ 7,158.76(5)

(1) Estimated solely for purposes of computing the amount of the registration fee pursuant to Rule 457(o) under the Securities Act of 1933, as amended (the "Securities Act"). Includes securities subject to the underwriter's option to purchase additional securities.

(2) Pursuant to Rule 416 under the Securities Act, the shares of Common Stock registered hereby also include an indeterminate number of additional shares of Common Stock as may, from time to time, become issuable by reason of stock splits, stock dividends, recapitalizations or other similar transactions.

(3) The proposed maximum aggregate offering price of the Units and Pre-Funded Units (including the Common Stock issuable upon exercise of the Pre-Funded Warrants included in the Pre-Funded Units), if any, is \$17,250,000 and includes the offering price of any additional shares of Common Stock and Warrants that the underwriter has an option to purchase.

(4) No additional registration fee is payable pursuant to Rule 457(i) under the Securities Act.

(5) The registrant previously paid \$4,429.49 in connection with the initial filing of the Registration Statement and the filing of Amendment No. 1.

The registrant hereby amends this registration statement on such date or dates as may be necessary to delay its effective date until the registrant files 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, as amended, or until the registration statement shall become effective on such date as the Securities and Exchange Commission, acting pursuant to said Section 8(a), may determine.

The information in this prospectus is not complete and may be changed. We may not sell these securities until the Securities and Exchange Commission declares our registration statement effective. This preliminary prospectus is not an offer to sell these securities and we are not soliciting an offer to buy these securities in any state where the offer or sale is not permitted.

Subject to completion, dated April 26, 2018

PRELIMINARY PROSPECTUS



Onconova Therapeutics, Inc.

Up to 54,347,826 Units (each Unit contains one Share of Common Stock and one Warrant to purchase 0.025 share of Series B Convertible Preferred Stock)

Up to 54,347,826 Pre-Funded Units (each Pre-Funded Unit contains one Pre-Funded Warrant to purchase one Share of Common Stock and one Warrant to purchase 0.025 share of Series B Convertible Preferred Stock)

(Up to 1,358,696 Shares of Series B Convertible Preferred Stock Underlying the Warrants) and

(Up to 54,347,826 Shares of Common Stock Underlying the Pre-Funded Warrants)

We are offering up to 54,347,826 Units (“Units,” each Unit consisting of one share of Common Stock, par value \$0.01 per share (“Common Stock”) and one warrant (the “Warrant”) to purchase 0.025 share of our Series B Convertible Preferred Stock, par value \$0.01 per share (“Series B Preferred Stock”). Each Warrant contained in a Unit has an exercise price of \$ per share of Common Stock. The Warrants contained in the Units will be exercisable immediately and will expire on the 18-month anniversary of the date (the “Charter Amendment Date”) on which we publicly announce through the filing of a Current Report on Form 8-K that the amendment to our certificate of incorporation to sufficiently increase our authorized shares of Common Stock to cover the conversion of all outstanding shares of Series B Preferred Stock into Common Stock has been filed with the Secretary of State of the State of Delaware.

We are also offering the shares of Series B Preferred Stock that are issuable from time to time upon exercise of the Warrants contained in the Units. We do not currently have a sufficient number of authorized shares of Common Stock to cover the shares issuable upon the conversion of Series B Preferred Stock. As a result, before any shares of Series B Preferred Stock can become convertible, we need to receive stockholder approval of an amendment (the “Charter Amendment”) to our Tenth Amended and Restated Certificate of Incorporation, as amended, to sufficiently increase our authorized shares of Common Stock to cover the conversion of all outstanding shares of Series B Preferred Stock into Common Stock. We have agreed in the underwriting agreement for this offering to use our reasonable efforts to obtain such approval within 45 days from the date of this prospectus, and we intend to seek such approval at a special meeting of stockholders or at our 2018 annual meeting of stockholders. We cannot assure you that we will be able to obtain requisite stockholder approval of the Charter Amendment. The Series B Preferred Stock is not convertible until the next business day after the Charter Amendment Date starting at which time each 0.025 share of the Series B Preferred Stock will be convertible into one share of Common Stock. In the event our stockholders do not approve the Charter Amendment, the Series B Preferred Stock will not be convertible into Common Stock and the value of the Warrants and the Series B Preferred Stock may be negatively affected.

We are also offering to each purchaser whose purchase of Units in this offering would otherwise result in the purchaser, together with its affiliates and certain related parties, beneficially owning more than 4.99% of our outstanding Common Stock immediately following the consummation of this offering, the opportunity to purchase, if the purchaser so chooses, pre-funded units (“Pre-Funded Units,” each Pre-Funded Unit consisting of one Pre-Funded Warrant (“Pre-Funded Warrant”) to purchase one share of Common Stock and one Warrant to purchase 0.025 share of Series B Preferred Stock) in lieu of Units that would otherwise result in the purchaser’s beneficial ownership exceeding 4.99% of our outstanding Common Stock (or at the election of the purchaser, 9.99%). Each Pre-Funded Warrant contained in a Pre-Funded Unit will be exercisable into one share of Common Stock. The purchase price of each Pre-Funded Unit will equal the price per Unit being sold to the public in this offering minus \$0.01, and the exercise price of each Pre-Funded Warrant included in the Pre-Funded Unit will be \$0.01 per share of Common Stock. This offering also relates to the shares of Common Stock issuable upon exercise of any Pre-Funded Warrants contained in the Pre-Funded Units sold in this offering. Each Warrant contained in a Pre-Funded Unit has an exercise price of \$ per 0.025 share of Series B Preferred Stock. The Warrants contained in the Pre-Funded Units will be exercisable immediately and will expire on the 18-month anniversary of the Charter Amendment Date. We are also offering the shares of Series B Preferred Stock that are issuable from time to time upon exercise of the Warrants contained in the Pre-Funded Units.

Our Common Stock is listed on the Nasdaq Capital Market under the symbol “ONTX.” On April 25, 2018, the last reported sale price of Common Stock on the Nasdaq Capital Market was \$0.46 per share. The actual offering price per Unit and Pre-Funded Unit, and the exercise price of the Warrants, as applicable, will be determined by negotiation between us and the underwriter at the time of pricing, and may be at a discount to the current market price. We do not intend to apply for listing of the Pre-Funded Warrants, the Warrants or Series B Preferred Stock on any securities exchange or other nationally recognized trading system. There is no established public trading market for the Pre-Funded Warrants, the Warrants or Series B Preferred Stock, and we do not expect a market to develop.

For each Pre-Funded Unit we sell, the number of Units we are offering will be decreased on a one-for-one basis. Units and the Pre-Funded Units will not be issued or certificated. The shares of Common Stock or Pre-Funded Warrants, as the case may be, and the Warrants can only be purchased together in this offering but the securities contained in the Units or Pre-Funded Units will be issued separately.

One or more of our directors have indicated interests in purchasing approximately 10% of the Units to be sold in this offering at the public offering price and on the same terms as the other purchasers in this offering. However, because indications of interest are not binding agreements or commitments to purchase, the underwriter could determine to sell more, fewer or no Units to our director(s) in this offering, or our director(s) could determine to purchase more, fewer or no Units in this offering.

You should rely only on the information contained herein or incorporated by reference in this prospectus. We have not authorized any other person to provide you with different information.

Investing in our securities involves risks. See “Risk Factors” beginning on page 11 of this prospectus and in the documents incorporated by reference into this prospectus.

	Per Unit	Per Pre-Funded Unit	Total
Public offering price	\$	\$	\$
Underwriting discounts and commissions (1)	\$	\$	\$
Proceeds, before expenses, to us (2)	\$	\$	\$

(1) In addition, we have agreed to pay the underwriter a management fee in the amount of 1.0% of the aggregate offering price and to reimburse the underwriter for certain expenses. See “Underwriting” for additional information.

(2) Excludes potential proceeds from the exercise of the Warrants or the Pre-Funded Warrants being offered pursuant to this prospectus.

We have granted the underwriter the option to purchase up to 8,152,174 additional shares of Common Stock at a purchase price of \$ per share and/or Warrants to purchase up to an aggregate of 203,804 shares of Series B Preferred Stock at a purchase price of \$0.01 per Warrant with an exercise price of \$ per 0.025 share of Series B Preferred Stock, less the underwriting discounts and commissions. The underwriter may exercise its option at any time and from time to time within 30 days from the date of this prospectus. If the underwriter exercises the option in full, the total underwriting discounts and commissions payable by us will be \$, and the total proceeds to us, before expenses, will be \$.

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

The underwriter expects to deliver the securities to purchasers on or about , 2018.

Sole Book-Running Manager

H.C. Wainwright & Co.

The date of this prospectus is , 2018.

[Table of Contents](#)

TABLE OF CONTENTS

	Page
ABOUT THIS PROSPECTUS	1
PROSPECTUS SUMMARY	2
THE OFFERING	9
RISK FACTORS	11
CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS	14
USE OF PROCEEDS	16
CAPITALIZATION	17
DILUTION	19
DESCRIPTION OF CAPITAL STOCK	21
DESCRIPTION OF SECURITIES WE ARE OFFERING	26
UNDERWRITING	33
EXPERTS	36
LEGAL MATTERS	36
WHERE YOU CAN FIND MORE INFORMATION	36
INCORPORATION BY REFERENCE	36

[Table of Contents](#)

ABOUT THIS PROSPECTUS

Unless the context otherwise requires, references in this prospectus to “Onconova,” “Onconova Therapeutics,” “Company,” “we,” “us” and “our” refer to Onconova Therapeutics, Inc. and its consolidated subsidiaries. This prospectus is part of a registration statement that we have filed with the Securities and Exchange Commission, which we refer to as the SEC or the Commission, utilizing a registration process. It is important for you to read and consider all of the information contained in this prospectus and any applicable prospectus before making a decision whether to invest in our securities. You should also

read and consider the information contained in the exhibits filed with our registration statement, of which this prospectus is a part, as described in “Where You Can Find More Information” in this prospectus.

You should rely only on the information contained in this prospectus and any applicable prospectus supplement, including the information incorporated by reference. Neither we nor the underwriter have authorized anyone to provide you with different information. We are not offering to sell or soliciting offers to buy, and will not sell, any securities in any jurisdiction where it is unlawful. You should assume that the information contained in this prospectus or any prospectus supplement, as well as information contained in a document that we have previously filed or in the future will file with the SEC is accurate only as of the date of this prospectus, the applicable prospectus supplement or the document containing that information, as the case may be.

[Table of Contents](#)

PROSPECTUS SUMMARY

The following summary highlights certain information contained elsewhere in this prospectus and the documents incorporated by reference herein. This summary does not contain all the information you will need in making your investment decision. You should carefully read this entire prospectus and the documents incorporated by reference herein. You should pay special attention to the “Risk Factors” section of this prospectus and the financial statements and other information incorporated by reference in this prospectus.

Our Business

Overview

We are a clinical-stage biopharmaceutical company focused on discovering and developing novel small molecule product candidates primarily to treat cancer. Using our proprietary chemistry platform, we have created a library of targeted agents designed to work against cellular pathways important to cancer cells. We believe that the product candidates in our pipeline have the potential to be efficacious in a variety of cancers. We have one Phase 3 clinical-stage product candidate and two other clinical-stage product candidates (one of which is being developed for treatment of acute radiation syndromes) and several preclinical programs. Substantially all of our current effort is focused on our lead product candidate, rigosertib. Rigosertib is being tested in an intravenous formulation as a single agent, and an oral formulation in combination with azacitidine, in clinical trials for patients with higher-risk myelodysplastic syndromes (“MDS”).

In December 2015, we enrolled the first patient into our INSPIRE trial, a randomized controlled Phase 3 clinical trial of intravenous rigosertib (“rigosertib IV”) in a population of patients with higher-risk MDS after failure of hypomethylating agent (“HMA”) therapy. The primary endpoint of INSPIRE is overall survival. An interim analysis of the trial was performed in January 2018 and we anticipate reporting topline data from the INSPIRE trial in the first half of 2019.

Our net losses were \$24.1 million and \$19.7 million for the years ended December 31, 2017 and 2016, respectively. As of December 31, 2017, we had an accumulated deficit of \$362.3 million.

Rigosertib

Rigosertib is a small molecule that we believe blocks cellular signaling by targeting RAS effector pathways. This is believed to be mediated by the interaction of rigosertib to the RAS-binding domain (“RBD”), found in many RAS effector proteins, including the Raf and PI3K kinases. We believe this mechanism of action provides a new approach to block the interactions between RAS and its targets containing RBD sites. Rigosertib is currently being tested in clinical trials as a single agent, and in combination with azacitidine, in patients with MDS. We have enrolled more than 1,300 patients in rigosertib clinical trials for MDS and other conditions. We were a party to a license and development agreement with Baxalta (as defined below), which granted Baxalta certain rights to commercialize rigosertib in Europe. The Baxalta agreement was terminated on August 30, 2016, at which time the European rights reverted to us at no cost. We are party to a collaboration agreement with SymBio, which grants SymBio certain rights to commercialize rigosertib in Japan and Korea. We are party to a license agreement with Pint Pharma International SA (“Pint”), which grants Pint certain rights to commercialize rigosertib in Latin America. We have retained development and commercialization rights to rigosertib in the rest of the world, including in the United States and Europe, although we could consider licensing commercialization rights to other territories as we continue to seek additional funding. Previously we were a party to a license and development agreement with Baxalta (as defined below), which granted Baxalta certain rights to commercialize rigosertib in Europe. The Baxalta agreement was terminated on August 30, 2016, at which time the European rights reverted to us at no cost.

The table below summarizes our rigosertib clinical stage programs.

[Table of Contents](#)

Disease	Formulation	Indication	Stage	Expected Timelines	Potential Market Opportunity (US)/Benefit	
MDS	Intravenous	HR - following HMA failure No approved product following HMA failure	Phase 3 Interim analysis completed	Phase 3 completion 2019	~ 5,000 patients	No directly competing FDA approved product in the market
	Oral	HR - prior to HMAs In combination with AZA	Phase 2	Phase 3 protocol in 2018	~ 18,000	No oral NCE approved since 2005
	Oral	Lower Risk	Phase 2	Select patient population in 2018	> 10,000	Longer potential duration of treatment
RASopathies	Intravenous and oral	JMML/other RAS Pathway diseases	Phase 1	-NIH CRADA signed -Proof of concept 2019	Rare disease	Pediatric clinical trial

Rigosertib IV for higher-risk MDS

We are developing an IV version of rigosertib for the treatment of higher-risk MDS following the failure of HMA therapy. In early 2014, we announced topline survival results from our “ONTIME” trial, a multi-center Phase 3 clinical trial of rigosertib IV as a single agent versus best supportive care including low dose Ara-C. The ONTIME trial did not meet its primary endpoint of an improvement in overall survival in the intent-to-treat population, although improvements in median overall survival were observed in various pre-specified and exploratory subgroups of higher-risk MDS patients. As a result, additional clinical work is on-going.

During 2014 and 2015, we held meetings with the U.S. Food and Drug Administration (“FDA”), European Medicines Agency (“EMA”), and several European national regulatory authorities to discuss and seek guidance on a path for approval of rigosertib IV in higher-risk MDS patients whose disease had failed HMA therapy. After discussions with the FDA and EMA, we refined our patient eligibility criteria by defining what we believe to be a more homogenous patient population. After regulatory feedback, input from key opinion leaders in the U.S. and Europe and based on learnings from the ONTIME study, we designed a new randomized controlled Phase 3 trial, referred to as INSPIRE. The INSPIRE trial is enrolling higher-risk MDS patients under 82 years of age who have progressed on, relapsed, or failed to respond to, previous treatment with HMAs within nine months or nine cycles over the course of one year after initiation of HMA therapy, and had their last dose of HMA within six months prior to enrollment in the trial. Patients are randomized to either rigosertib with best supportive care, or the physician’s choice of therapy with best supportive care. The primary endpoint of this study is the sequential analysis of overall survival of all randomized patients in the intent-to-treat (“ITT”) population and the International Prognostic Scoring System- Revised (IPSS-R) Very High Risk subgroup. The first patient in the INSPIRE trial was enrolled at the MD Anderson Cancer Center in December 2015, the first patient in Europe was enrolled in March, 2016, and the first patient in Japan was enrolled in July, 2016.

Enrollment for the INSPIRE Phase 3 trial for second-line higher-risk MDS patients is highly selective with stringent entry criteria as outlined above. Currently, the INSPIRE study has opened approximately 175 trial sites in 22 countries across four continents, and has enrolled more than 170 patients. Our partner, Symbio Pharmaceuticals, has opened more than 30 sites in Japan. The selection of countries and trial sites is carefully undertaken to ensure availability of appropriate patients meeting eligibility criteria. Since these criteria are purposely designed to be narrow and selective, extensive site screening and education is integral to our plan. At launch, the INSPIRE trial was expected to enroll 225 patients and the outcome is measured by overall survival.

The INSPIRE trial included a pre-planned interim analysis triggered by 88 events (deaths), which occurred in December 2017. The statistical analysis plan (“SAP”) for the INSPIRE trial featured an adaptive trial design,

[Table of Contents](#)

permitting several options following the interim analysis, which included continuation of the trial as planned, discontinuation of the trial for futility or safety, trial expansion using pre-planned sample size re-estimation, and trial continuation for only the pre-defined treatment subgroup of patients classified as Very High Risk (“VHR”) based on the IPSS-R.

After review of the interim data, in January 2018 the Independent Data Monitoring Committee (“DMC”) recommended continuation of the trial with a one-time expansion in enrollment, using a pre-planned sample size re-estimation, consistent with the SAP. As recommended by the DMC, the expanded INSPIRE study will continue to enroll eligible patients based on the current trial criteria of the overall ITT population and will increase enrollment by adding 135 patients to the original target to reach a total enrollment of 360 patients, with the aim of increasing the power of the trial. Due to the adaptive trial design and the DMC’s assessment, the INSPIRE trial will continue to analyze both the ITT and the VHR population for the primary endpoint of overall survival. The design of the trial with the expanded study enrollment will be identical to the current study design and will include the sequential analysis of the overall survival endpoint in the ITT population and if required the pre-specified VHR subgroup. The Company remains blinded to the specific interim analysis results. We anticipate reporting topline data from the INSPIRE trial in the first half of 2019.

Safety and Tolerability of rigosertib in MDS and other hematologic malignancies

A comprehensive analysis of IV and rigosertib oral safety in patients with Myelodysplastic Syndromes (MDS) and Acute Myeloid Leukemia (AML) was presented in December 2016 at the American Society of Hematology (ASH) Annual Meeting. The most commonly reported treatment-emergent adverse events (TEAEs) in $\geq 10\%$ of patients with MDS/AML (n= 335) receiving rigosertib intravenous (IV) monotherapy were fatigue (33%), nausea (33%), diarrhea (27%), constipation (25%), anaemia (24%) and pyrexia (24%). The most common \geq Grade 3 AEs were anaemia (21%), febrile neutropenia (13%), pneumonia (12%) and thrombocytopenia (11%). The most common serious AEs were febrile neutropenia (10%), pneumonia (9%), and sepsis (7%). The most common AEs leading to discontinuation of IV rigosertib were sepsis and pneumonia (3% each).

Rigosertib oral in combination with azacitidine for higher-risk MDS

We are developing rigosertib oral for use in combination with azacitidine prior to treatment with HMA therapy for higher risk MDS. In December 2016, at the American Society of Hematology (ASH) Annual Meeting, we presented Phase 1/2 data from the initial portion of an ongoing rigosertib oral and azacitidine combination trial in higher-risk MDS. 33 of 40 MDS patients enrolled were evaluable for response at the time of the analysis. The median age of patients was 66, with 73% being male. The IPSS-R distribution was: 7.5% Low, 12.5% Intermediate, 37.5% High, 32.5% Very High and 10% unknown. 76% of patients responded per 2006 International Working Group (IWG) criteria. Responses were as follows:

Response per IWG 2006

	Overall Evaluable (N=33)	No prior HMA (N=20)	Prior HMA (N=13)
Complete remission (CR)	8(24)%	7(35)%	1(8)%
Marrow CR + hematologic improvement	10(30)%	6(30)%	4(31)%
Marrow CR alone	6(18)%	3(15)%	3(23)%
Hematologic improvement alone	1(3)%	1(5)%	0
Stable disease	8(24)%	3(15)%	5(38)%
Overall IWG response	25(76)%	17(85)%	8(62)%
Clinical benefit response	19(58)%	14(70)%	5(38)%

The median duration of response was 8 months for CR, 12.3 months for marrow CR.

[Table of Contents](#)

Safety/Tolerability of the Combination:

Based upon a comprehensive analysis of patients receiving oral rigosertib in combination with azacitidine that was presented in 2016, the combination of rigosertib oral and azacitidine was well tolerated. The most common TEAEs in $\geq 10\%$ of patients with MDS/AML (n=54) receiving rigosertib oral and azacitidine were nausea (41%), fatigue (39%), diarrhea (37%), constipation (37%) and dysuria (28%). The most common serious AEs were pneumonia (11%) and febrile neutropenia (7%). The most common AEs leading to discontinuation were AML (4%) and pneumonia (4%).

Next steps for rigosertib oral in combination with azacitidine for higher-risk MDS

Following an end of Phase 2 meeting with the Food and Drug Administration (FDA) in September 2016, we began development of a Phase 3 protocol. The Phase 3 trial will be designed as a global 1:1 randomized, placebo-controlled trial of rigosertib oral plus azacitidine compared to azacitidine plus oral placebo. Based on the results of the Phase 1/2 Study, full dose of azacitidine will be used in combination with rigosertib oral, as defined in the product insert for azacitidine. The patient population studied in this trial will be first-line (HMA naïve) higher-risk MDS patients. The primary endpoint for assessment of efficacy will be the composite Response Rate of complete remission (CR) + partial remission (PR), as per the IWG 2006 Response Criteria. The trial will be under the review of a DMC. Formal FDA review may be sought via the Special Protocol Assessment (SPA) mechanism. We will not commence the Phase 3 trial without additional financing.

While the Phase 3 trial is being designed, we have expanded the Phase 1/2 trial cohort by enrolling 45 additional patients. Under a protocol expansion, we are using the expanded cohorts to explore dose optimization by increasing the dose of rigosertib oral to a total of 1120 mg in combination with full dose azacitidine and varying the dose administration scheme of rigosertib oral (560 mg 9 AM/560 mg 9 PM and 840 mg 9 AM/280 mg 9 PM) to identify an optimal dose and schedule. During this expansion, we also instituted risk-mitigation strategies, as further described below, in order to address a prior urinary adverse event of interest, hematuria. After amendments were filed with the regulatory agencies, we started the expansion phase of this trial in the U.S. sites that participated in the initial trial. Since the trial initiation, we have added additional US sites to complete enrollment of the expanded trial. The first patient was enrolled in April 2017 and as of April 2017 half of all of the planned patients have been enrolled in the expansion trial; and the trial is ongoing.

In March 2018, at the 6th International Bone Marrow Failure Disease Symposium, we presented data on the incidence of hematuria in 37 higher-risk MDS patients receiving rigosertib oral in combination with azacitidine as part of the Phase 1/2 expanded cohort. In the first part of the Phase 1/2 study, prior to the study expansion, of 42 patients studied with oral rigosertib 840 mg total and azacitidine, the incidence of hematuria was 48%. In 37 patients studied with oral rigosertib 1120 mg total and azacitidine in the Phase 1/2 expanded cohort, with the use of risk-mitigating strategies to minimize hematuria, the incidence of hematuria was 11%. The study is ongoing. The risk-mitigating strategies employed are as follows:

Risk-Mitigation Strategies to Minimize Hematuria:

2nd RIGO dose must be administered at 3 PM (± 1 hour) at least 2 hours after lunch to avoid a nocturnal bladder dwell time	Oral hydration of at least two liters of fluid per day is encouraged	Mandatory bladder emptying prior to bedtime	Urine pH approximately 2 hrs after AM dose. Sodium bicarbonate suggested administration of 650 TID if pH tests < 7.5
---	--	---	--

The comparison of the hematuria results from the two parts of this study are presented below:

Hematuria Comparison Between Rigosertib Combination Therapy Parts 1 and 2:

All Patients on Combination Part 1 (Rigosertib 840 mg total & Azacitidine)	42
Patients with hematuria	20 (48%)
Patients with grade 1 or 2 hematuria	17 (40%)
Patients with grade ≥ 3 hematuria	5 (12%)
All Patients on Combination Part 2 (Rigosertib 1120 mg total) & Azacitidine) with risk-mitigation strategies	37
Patients with hematuria	4 (11%)

Patients with grade 1 or 2 hematuria
Patients with grade ≥ 3 hematuria

4 (11%)
0 (0%)

In June 2017, at the Congress of the European Hematology Association Meeting, we updated the data from the Phase 1/2 trial and highlighted results in AML patients included in this study. Response data was presented on eight evaluable patients with AML who were tested with the rigosertib and azacitidine combination. For the eight evaluable patients with AML, the combination was well tolerated and the safety profile was similar to single-agent azacitidine, based on safety information in the azacitidine FDA approved label. Based on the presented results of the combination studies, the authors concluded that continued study in AML was warranted. We will not commence further development of rigosertib oral in combination with azacitidine for AML without additional financing.

Upon completion of our Phase 1/2 study, we will submit the study results to the applicable regulatory authorities. The final results of this study may differ from the results presented above and the applicable regulatory authorities may not agree with our analyses. We will not commence the Phase 3 trial of oral rigosertib in combination with azacitidine for higher-risk MDS or AML without additional financing.

Rigosertib oral for lower-risk MDS

We are also developing rigosertib oral as a single agent treatment for lower risk MDS. Higher-risk MDS patients suffer from a shortfall in normal circulating blood cells, or cytopenias, as well as elevated levels of cancer cells, or blasts in their bone marrow and sometimes in their peripheral blood with a significant rate of transformation to acute leukemia. Lower-risk MDS patients suffer mainly from cytopenias, that is low levels of red blood cells, white blood cells or platelets. Thus, lower-risk MDS patients depend on transfusions and growth factors or other therapies to improve their low blood counts; but have a lower rate of acute leukemic transformation.

We have explored single agent rigosertib oral as a treatment for lower-risk MDS in two Phase 2 clinical trials, 09-05 and 09-07. In December 2017, we presented data at the Annual ASH Meeting from the 09-05 Phase 2 trial. This data demonstrated a 44% rate of achieving transfusion independence in the cohort of Lower -risk MDS patients treated with rigosertib oral at a dose of 560 mg BID (1120 mg over 24 hrs). To date, Phase 2 clinical data has indicated that further study of single agent rigosertib oral in transfusion-dependent, lower-risk MDS patients is warranted. Rigosertib has been generally well tolerated, except for urinary side effects at higher dose levels. Future clinical trials

5

[Table of Contents](#)

will be needed to evaluate dosing and schedule modifications and their impact on efficacy and safety results of rigosertib oral in lower-risk MDS patients.

Data presented from the 09-05 trial also suggested the potential of a genomic methylation assessment of bone marrow cells to prospectively identify lower-risk MDS patients likely to respond to rigosertib oral. We therefore expanded the 09-05 trial by adding an additional cohort of 20 patients to advance the development of this genomic methylation test. To date, a biomarker which would predict response has not been identified. Further testing and development of rigosertib oral for lower-risk MDS will be required. We will not commence further development of rigosertib oral for lower-risk MDS without additional financing.

Safety and Tolerability of rigosertib oral in MDS and other hematologic malignancies

As presented at the December 2016 ASH Annual Meeting, rigosertib oral as a monotherapy was evaluated in four Phase 1 and 2 studies in MDS and other hematologic malignancies. One study is completed and a clinical study report is available. The most common TEAEs in $\geq 10\%$ of patients with MDS/AML (n=168) were pollakiuria (increased urinary frequency) (35%), fatigue (32%), diarrhea (26%), dysuria (29%) and haematuria (24%). The most common \geq Grade 3 AEs were anaemia (17%), thrombocytopenia (5%), haematuria (4%) and urinary tract infection (4%). The most common serious AE was pneumonia (6%). The most common AEs leading to discontinuation of patients receiving rigosertib oral as monotherapy were dysuria (8%), urinary tract pain (7%), haematuria (5%) and urinary frequency (5%).

In addition to the above described clinical trials, we are continuing the preclinical and chemistry, manufacturing, and control work for IV and rigosertib oral.

Rare Disease Program in “RASopathies”

Based on new mechanism of action data published last year, we are initiating a collaborative development program focusing on a group of rare diseases with a well-defined molecular basis in expression or defects involving the Ras Effector Pathways. Since “RASopathies” are rare diseases affecting young children, we are embarking on a multifaceted collaborative program involving patient advocacy, government and academic organizations. The RASopathies are a group of rare diseases which share a well-defined molecular basis in expression or defects involving Ras Effector Pathways. They are usually caused by germline mutations in genes that alter the RAS subfamily and mitogen-activated protein kinases that control signal transduction, and are among the most common genetic syndromes. Together, this group of diseases can impact more than 1 in 1000 individuals, according to RASopathiesNet.

In January 2018, we entered into a Cooperative Research and Development Agreement (CRADA) with the National Cancer Institute (NCI), part of the National Institutes of Health (NIH). Under the terms of the CRADA, the NCI will conduct research, including preclinical laboratory studies and a clinical trial, on rigosertib in pediatric cancer associated RASopathies.

As part of the CRADA, we will provide rigosertib supplies and initial funding towards non-clinical studies. The NCI will fund the majority of the research, including the cost of the clinical trial, which is expected to start in 2018. A clinical trial protocol has been developed and will be reviewed by the Institutional Review Board.

While the NCI will conduct a trial for RASopathy related cancers in pediatric patients, Onconova will focus on initiating a trial as well in Juvenile Myelomonocytic Leukemia (JMML), a well-described RASopathy affecting children which is incurable without an allogeneic hematopoietic stem cell transplant.

6

Other Programs

The vast majority of the Company's efforts are now devoted to the advanced stage development of rigosertib for unmet medical needs of MDS patients. Other programs are either paused, inactive or require only minimal internal resources and efforts.

Briciclib

Briciclib, another of our product candidates, is a small molecule targeting an important intracellular regulatory protein, Cyclin D1, which is often found at elevated levels in cancer cells. Cyclin D1 expression is regulated through a process termed cap-dependent translation, which requires the function of eukaryotic initiation factor 4E protein. In vitro evidence indicates briciclib binds to eukaryotic initiation factor 4E protein, blocking cap-dependent translation of Cyclin D1 and other cancer proteins, such as c-MYC, leading to tumor cell death. We have been conducting a Phase 1 multi-site dose-escalation trial of briciclib in patients with advanced solid tumors refractory to current therapies. Safety and efficacy assessments are complete in six of the seven dose-escalation cohorts of patients in this trial. As of December 2015, the Investigational New Drug ("IND") for briciclib is on full clinical hold following a drug product lot testing failure. We will be required to undertake appropriate remedial actions prior to re-initiating the clinical trial and completing the final dose-escalation cohort.

Recilisib

Recilisib is a product candidate being developed in collaboration with the U.S. Department of Defense for acute radiation syndromes. We have completed four Phase 1 trials to evaluate the safety and pharmacokinetics of recilisib in healthy human adult subjects using both subcutaneous and oral formulations. We have also conducted animal studies and clinical trials of recilisib under the FDA's Animal Rule, which permits marketing approval for new medical countermeasures for which conventional human efficacy studies are not feasible or ethical, by relying on evidence from adequate and well-controlled studies in appropriate animal models to support efficacy in humans when the results of those studies establish that the drug is reasonably likely to produce a human clinical benefit. Human safety data, however, is still required. Ongoing studies of recilisib, focusing on animal models and biomarker development to assess the efficacy of recilisib are being conducted by third parties with government funding. We anticipate that any future development of recilisib beyond these ongoing studies would be conducted solely with government funding or by collaboration. Use of government funds to finance the research and development in whole or in part means any future effort to commercialize recilisib will be subject to federal laws and regulations on U.S. government rights in intellectual property. Additionally, we are subject to laws and regulations governing any research contracts, grants, or cooperative agreements under which government funding was provided.

Preclinical Product Candidates

In addition to our three clinical-stage product candidates, we have several product candidates that target kinases, cellular metabolism or cell division in preclinical development. We may explore additional collaborations to further the development of these product candidates as we focus internally on our more advanced programs.

Positive preclinical data was announced at the American Association for Cancer Research (AACR) annual meeting, which took place April 1-5, 2017 in Washington, DC, for ON 123300, a first-in-class dual inhibitor of CDK4/6 + ARK5, and for ON 150030, a novel Type 1 inhibitor of FLT3 and Src pathways. We believe our CDK inhibitor is differentiated from other agents in the market (Palbociclib, Ribociclib and Abemaciclib) or in development (such as the compounds being developed by G1 Therapeutics) by its dual inhibition of CDK4/6 + ARK5. We are party to a license and collaboration agreement with HanX Biopharmaceuticals, Inc. ("HanX"), which grants HanX certain rights to commercialize ON 123300 in China. We continue to carry out research to enhance the pre-clinical data package for this compound in an attempt to seek additional partners outside of China for co-development of this novel compound.

In a preclinical Rb+ve xenograft model for breast cancer, ON 123300 activity was shown to be similar to Palbociclib (Pfizer's Ibrance®). Moreover, based on the same preclinical model, ON 123300 may have the potential advantage of reduced neutropenia when compared to Palbociclib. Whereas both compounds resulted in decreased RBC and platelet counts in this preclinical model system, Palbociclib was found to have a more prominent and statistically significant ($P < 0.05$) inhibitory effect on neutrophil counts when compared to ON 123300.

In December 2017, we entered into a license and collaboration agreement with HanX Biopharmaceuticals, Inc. ("HanX"), a company focused on development of novel oncology products, for the further development, registration and commercialization of ON 123300 in Greater China. Under the terms of the agreement, we received an upfront payment, and would receive regulatory and commercial milestone payments, as well as royalties on sales in the Greater China territory. The key feature of the collaboration is that HanX will provide all funding required for Chinese IND enabling studies necessary for filing an IND with the Chinese Food and Drug Administration. The studies would be conducted to meet the Good Laboratory Practice ("GLP") requirements of FDA such that we could simultaneously file an IND with the US FDA. We and HanX will oversee the IND enabling studies. We will maintain global rights outside of China.

In March 2018, Onconova and HanX completed the pre-Investigational New Drug, or pre-IND, consultation with FDA. These discussions provided guidance for the manufacturing of ON 123300 and the pre-clinical development plan for the submission of an IND application.

In April 2018, at the American Association for Cancer Research 2018 Annual Meeting, we announced an advance in pre-clinical development and the presentation of new pre-clinical data for ON 123300. The data from preclinical studies demonstrates that there is a differential metabolism of ON 123300 in male versus female rodents. As a result, the drug exposure is almost 2-3 fold higher in female rats. Based upon preclinical animal liver microsome studies, this differential effect appears to be limited to rodents, and is not observed in preclinical studies with human liver microsomes. Based on the preclinical liver microsome metabolism data from other species, relevant species have been selected along with the dosing strategy to be implemented in GLP toxicological studies to be conducted by HanX.

We were incorporated in Delaware in December 1998 and commenced operations in January 1999. Our principal executive offices are located at 375 Pheasant Run, Newtown, Pennsylvania 18940, and our telephone number is (267) 759-3680. Our website address is www.onconova.com. The information on, or that can be accessed through, our website is not part of this prospectus.

[Table of Contents](#)

THE OFFERING

Units offered by us in this offering	Up to 54,347,826 Units, each consisting of one share of Common Stock and one Warrant to purchase 0.025 share of Series B Preferred Stock.
Pre-Funded Units offered by us in this offering	We are also offering to each purchaser whose purchase of Units in this offering would otherwise result in the purchaser, together with its affiliates and certain related parties, beneficially owning more than 4.99% of our outstanding Common Stock immediately following the consummation of this offering, the opportunity to purchase, if the purchaser so chooses, Pre-Funded Units (each Pre-Funded Unit consisting of one Pre-Funded Warrant to purchase one share of Common Stock and one Warrant to purchase 0.025 share of Series B Preferred Stock) in lieu of Units that would otherwise result in the purchaser's beneficial ownership exceeding 4.99% of our outstanding Common Stock (or at the election of the purchaser, 9.99%). Each Pre-Funded Warrant contained in a Pre-Funded Unit will be exercisable for one share of Common Stock. The purchase price of each Pre-Funded Unit will equal the price per Unit being sold to the public in this offering minus \$0.01, and the exercise price of each Pre-Funded Warrant included in the Pre-Funded Unit will be \$0.01 per share of Common Stock. This offering also relates to the shares of Common Stock issuable upon exercise of any Pre-Funded Warrants contained in the Pre-Funded Units sold in this offering. For each Pre-Funded Unit we sell, the number of Units we are offering will be decreased on a one-for-one basis. Because we will issue a Warrant as part of each Unit or Pre-Funded Unit, the number of Warrants sold in this offering will not change as a result of a change in the mix of the Units and Pre-Funded Units sold.
Warrants offered by us in this offering	Warrants to purchase an aggregate of up to 1,358,696 shares of Series B Preferred Stock. Each Unit and each Pre-Funded Unit includes a Warrant to purchase 0.025 share of Series B Preferred Stock. Each Warrant contained in a Unit or Pre-Funded Unit has an exercise price of \$ per 0.025 share of Series B Preferred Stock, will be immediately separable from the Common Stock or Pre-Funded Warrant, as the case may be, will be exercisable immediately and will expire on the 18-month anniversary of the Charter Amendment Date.
Series B Preferred Stock	This prospectus also relates to the offering of the shares of Series B Preferred Stock issuable upon the exercise of the Warrants. The Series B Preferred Stock is not convertible until the next business day after the Charter Amendment Date, starting at which time each 0.025 share of the Series B Preferred Stock is convertible into one share of Common Stock. Notwithstanding the foregoing, we shall not effect any conversion of the Series B Preferred Stock, to the extent that, after giving effect to an attempted conversion, the holder of shares of Series B Preferred Stock (together with such holder's affiliates, and any persons acting as a group together with such holder or any of such holder's affiliates) would beneficially own a number of shares of Common Stock in excess of 4.99% of the shares of Common Stock then outstanding after giving effect to such exercise. In the event our stockholders do not approve the Charter Amendment, the Series B Preferred Stock will not be convertible into Common Stock and the value of the Warrants and the Series B Preferred Stock may be negatively affected. For additional information, see the subsection entitled "Description of Securities We Are Offering — Series B Convertible Preferred Stock" in this prospectus.
Insider Participation	One or more of our directors have indicated interests in purchasing approximately 10% of the Units to be sold in this offering at the public offering price and on the same terms as the other purchasers in this offering. However, because indications of interest are not binding agreements or commitments to purchase, the underwriter could determine to sell more, fewer or no Units to our director(s) in this offering, or our director(s) could determine to purchase more, fewer or no Units in this offering.
Offering Price	\$ per Unit \$ per Pre-Funded Unit
Option to purchase additional securities	The underwriter has the option to purchase up to 8,152,174 additional shares of Common Stock at a purchase price of \$ per share and/or Warrants to purchase up to an aggregate of 203,804 shares of Series B Preferred Stock at a purchase price of \$0.01 per Warrant with an exercise price of \$ per 0.025 share of Series B Preferred Stock, less the underwriting discounts and commissions. The underwriter may exercise its option at any time and from time to time within 30 days from the date of this prospectus.
Common stock to be outstanding after this offering	73,773,989 shares of Common Stock (assuming no sale of any Pre-Funded Units), or 81,926,163 shares of Common Stock if the underwriter exercises its option to purchase additional Units in full (assuming no sale of any

Pre-Funded Units).

Use of proceeds

We estimate that the net proceeds to us from this offering will be approximately \$22.2 million (\$26.0 million if the underwriter's option to purchase additional Units is exercised in full), based on an assumed public offering price per Unit of \$0.46, the last reported sale price of Common Stock on the Nasdaq Capital Market on April 25, 2018, and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. We intend to use the net proceeds from this offering to fund the development of our clinical and preclinical programs, for other research and development activities and for general corporate purposes, which may include capital expenditures and funding working capital needs. See "Use of Proceeds" on page 16.

Risk factors

You should read the "Risk Factors" section of this prospectus and in the documents incorporated by reference into this prospectus for a discussion of factors to consider before deciding to invest in our securities.

Listing

Common Stock is listed on the Nasdaq Capital Market under the symbol "ONTX." We do not intend to apply for listing of the Pre-Funded Warrants, the Warrants or Series B Preferred Stock on any securities exchange or other nationally recognized trading system. There is no established public trading market for the Pre-Funded Warrants, the Warrants or Series B Preferred Stock, and we do not expect a market to develop.

The number of shares of Common Stock outstanding after the offering is based on 19,426,163 shares outstanding as of March 31, 2018, and excludes as of such date:

- 1,118,849 shares of Common Stock issuable upon the exercise of stock options outstanding at March 31, 2018 with a weighted average exercise price of approximately \$25.00 per share;
- 15,232,146 shares of Common Stock issuable upon the exercise of outstanding or issuable warrants at March 31, 2018 with a weighted average exercise price of approximately \$1.82 per share (includes Common Stock issuable for warrants which are exercisable for our Series A Convertible Preferred Stock, which is convertible to Common Stock); to the extent the preferred stock warrant repricing described under "Underwriting – Company Lock-up Waiver Agreement" occurs, preferred stock warrants to purchase an aggregate of 994,750 shares of our Series A Convertible Preferred Stock, which are convertible into an aggregate of 9,947,500 shares of Common Stock, will be repriced, and the weighted average exercise price of all outstanding or issuable warrants at March 31, 2018 taking into account such repricing will be approximately \$1.46 per share based on an assumed public offering price per Unit of \$0.46, the last reported sale price of Common Stock on the Nasdaq Capital Market on April 25, 2018;
- 0 shares of Common Stock issuable upon the conversion of our Series A Convertible Preferred Stock at March 31, 2018 (no shares of Series A Preferred Stock were issued and outstanding and 1,044,488 shares of Series A Preferred Stock were reserved for issuance upon the exercise of outstanding preferred stock warrants as of March 31, 2018);
- 33,779 shares of Common Stock reserved for future issuance under our 2013 Equity Compensation Plan at March 31, 2018; and
- any additional shares of Common Stock that we may issue to Lincoln Park Capital Fund, LLC ("Lincoln Park"), pursuant to a purchase agreement we entered into on October 8, 2015, which provides that, upon the terms and subject to the conditions and limitation set forth therein, Lincoln Park is committed to purchase up to an aggregate of an additional \$15 million of shares of Common Stock over the term of the purchase agreement, should we elect to sell shares to Lincoln Park.

As of April 20, 2018, the total number of our outstanding shares of Common Stock was 20,243,108.

Unless otherwise indicated, all information contained in this prospectus assumes (i) no exercises by the underwriter of its option to purchase additional securities and (ii) no sale of any Pre-Funded Warrants.

RISK FACTORS

Our business is influenced by many factors that are difficult to predict, and that involve uncertainties that may materially affect actual operating results, cash flows and financial condition. Before making an investment decision, you should carefully consider these risks, including those set forth below and those described in the "Risk Factors" section of our Annual Report on Form 10-K, as filed with the SEC on March 16, 2018, which is incorporated by reference into this prospectus, as well as any amendment or update to our risk factors reflected in subsequent filings with the SEC, and you should also carefully consider any other information we include or incorporate by reference in this prospectus.

Any of the risks we describe below or in the information incorporated herein by reference in this prospectus could cause our business, financial condition or operating results to suffer. The market price of Common Stock could decline if one or more of these risks and uncertainties develop into actual events. You could lose all or part of your investment.

Risks Associated with this Offering

Our management will have broad discretion over the use of any net proceeds from this offering, you may not agree with how we use the proceeds, and the proceeds may not be invested successfully.

Our management will have broad discretion as to the use of any net proceeds from this offering and could use them for purposes other than those contemplated at the time of this offering. Accordingly, you will be relying on the judgment of our management with regard to the use of any proceeds from the sale of shares of our securities in this offering, 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 proceeds will be invested in a way that does not yield a favorable, or any, return for you.

We may be required to raise additional financing by issuing new securities with terms or rights superior to those of our existing securityholders, which could adversely affect the market price of shares of Common Stock and our business.

We will require additional financing to fund future operations, including expansion in current and new markets, development and acquisition, capital costs and the costs of any necessary implementation of technological innovations or alternative technologies. We may not be able to obtain financing on favorable terms, if at all. If we raise additional funds by issuing equity securities, the percentage ownership of our current stockholders will be reduced, and the holders of the new equity securities may have rights superior to those of our existing securityholders, which could adversely affect the market price of Common Stock and the voting power of shares of Common Stock. If we raise additional funds by issuing debt securities, the holders of these debt securities would similarly have some rights senior to those of our existing securityholders, and the terms of these debt securities could impose restrictions on operations and create a significant interest expense for us which could have a materially adverse effect on our business.

You will experience immediate and substantial dilution in the net tangible book value per share of Common Stock included in the Units or issuable upon exercise of the Pre-Funded Warrants in this offering.

Since the effective price per share of Common Stock included in the Units or issuable upon exercise of the Pre-Funded Warrants being offered is substantially higher than the net tangible book deficit per share of Common Stock outstanding prior to this offering, you will suffer immediate and substantial dilution in the net tangible book value of Common Stock included in the Units or issuable upon the exercise of the Pre-Funded Warrants issued in this offering. See the section titled "Dilution" below for a more detailed discussion of the dilution you will incur if you purchase Units in this offering. To the extent outstanding stock options or warrants to purchase Common Stock are exercised, or outstanding warrants to purchase shares of our Series A Convertible Preferred Stock are exercised and the resulting shares of Series A Convertible Preferred Stock are converted into shares of Common Stock, there will be further dilution to new investors.

[Table of Contents](#)

Our shareholders may experience significant dilution as a result of future equity offerings or issuances.

In order to raise additional capital or pursue strategic transactions, we may in the future offer, issue or sell additional shares of Common Stock or other securities convertible into or exchangeable for shares of Common Stock. We cannot assure you that we will be able to sell shares or other securities in any other transaction at a price per share or that have an exercise price or conversion price per shares that is equal to or greater than the price for the securities purchased 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 or issue additional shares of Common Stock or other securities convertible into or exchangeable for Common Stock future transactions may be higher or lower than such price.

There is no public market for the Warrants, the Pre-Funded Warrants or the Series B Preferred Stock underlying the Warrants.

There is no established public trading market for the Warrants, the Pre-Funded Warrants or the Series B Preferred Stock underlying the Warrants, and we do not expect a market to develop. In addition, we do not intend to apply to list the Warrants, the Pre-Funded Warrants or the Series B Preferred Stock underlying the Warrants on any national securities exchange or other nationally recognized trading system, including The Nasdaq Capital Market. Without an active market, the liquidity of the Warrants, the Pre-Funded Warrants or the Series B Preferred Stock underlying the Warrants will be limited.

The Warrants and the Pre-Funded Warrants in this offering are speculative in nature.

Neither the Warrants nor the Pre-Funded Warrants in this offering confer any rights of Common Stock or Series B Preferred Stock ownership on its holders, such as voting rights or the right to receive dividends, but rather merely represent the right to acquire shares of Common Stock or Series B Preferred Stock at a fixed price, as the case maybe, and, with respect to the Warrants, during a fixed period of time. Specifically, commencing on the date of issuance, holders of the Warrants may exercise their right to acquire Series B Preferred Stock and pay an exercise price of \$ _____ per 0.025 share of Series B Preferred Stock, subject to certain adjustments, prior to the expiration of the Warrants.

Moreover, following this offering, the market value of the Warrants and the Pre-Funded Warrants, if any, is uncertain and there can be no assurance that the market value of the Warrants or the Pre-Funded Warrants will equal or exceed their imputed offering price. Neither the Warrants nor the Pre-Funded Warrants will be listed or quoted for trading on any market or exchange.

If we do not obtain shareholder approval to increase the number of our authorized shares of common stock in an amount sufficient to issue shares to those who purchase Warrants in this offering, the Warrants included in this offering may not have any value and you could lose part or all of your investment.

We do not currently have a sufficient number of authorized shares of Common Stock to cover the shares issuable upon conversion of the Series B Preferred stock being offered by this prospectus. As a result, before the Series B Preferred Stock can become convertible, we need to receive stockholder approval of the Charter Amendment (which is an amendment to our Tenth Amended and Restated Certificate of Incorporation, as amended, to sufficiently increase our authorized shares of Common Stock to cover the conversion of all outstanding shares of Series B Preferred Stock into Common Stock). We have agreed in the underwriting agreement for this offering to use our reasonable efforts to obtain such approval within 45 days from the date of this prospectus, and we intend to seek such approval at a special meeting of stockholders or at our 2018 annual meeting of stockholders. We cannot assure you that we will be able to obtain requisite stockholder approval of the Charter Amendment. In the event our stockholders do not approve the Charter Amendment, the Series B Preferred Stock will not be convertible into Common Stock and the value of the Warrants and the Series B Preferred Stock may be negatively affected.

Sales of a significant number of shares of Common Stock in the public markets, or the perception that such sales could occur, could depress the market price of Common Stock.

Sales of a substantial number of shares of Common Stock or securities convertible or exchangeable into Common Stock in the public markets could depress the market price of Common Stock and impair our ability to raise capital through the sale of additional equity securities. We cannot predict the effect that future sales of Common Stock would have on the market price of Common Stock.

Upon completion of this offering, based on our shares outstanding as of March 31, 2018, we will have 73,773,989 shares of Common Stock outstanding based on the issuance and sale of 54,347,826 Units in this offering, assuming no sale of any Pre-Funded Units. Of these shares, only 1,604,207 shares are subject to a contractual lock-up with the underwriter for this offering for a period of 120 days following this offering. These shares can be sold, subject to any applicable volume limitations under federal securities laws, after the earlier of the expiration of, or release from, the 120-day lock-up period. The balance of our outstanding shares of Common Stock, including any shares of Common Stock included in the Units, and shares of Common Stock issuable upon the exercise of the Pre-Funded Warrants or issuable upon the conversion of the Series B Preferred Stock underlying the Warrants purchased in this offering, other than shares acquired by our current stockholders who are also subject to the contractual lock-up, may be resold into the public market immediately without restriction, unless owned or purchased by our affiliates. Moreover, some of the holders of Common Stock have the right, subject to specified conditions, to require us to file registration statements covering their shares or to include their shares in registration statements that we may file for ourselves or other stockholders.

As of March 31, 2018, there were approximately 1,118,849 shares subject to outstanding options or that are otherwise issuable under our 2013 Equity Compensation Plan, all of which shares we have registered under the Securities Act of 1933, as amended, or the Securities Act, on a registration statement on Form S-8. These shares can be

[Table of Contents](#)

freely sold in the public market upon issuance, subject to volume limitations applicable to affiliates and the lock-up agreements described above, to the extent applicable.

We do not intend to pay any cash dividends on Common Stock in the foreseeable future and, therefore, any return on your investment in Common Stock must come from increases in the fair market value and trading price of Common Stock.

We do not intend to pay any cash dividends on Common Stock in the foreseeable future and, therefore, any return on your investment in Common Stock must come from increases in the fair market value and trading price of Common Stock.

If we issue substantially all of our available authorized shares of Common Stock in this offering, we will not be able to issue additional shares for future capital raising transactions or strategic transactions unless we obtain stockholders' approval to amend our certificate of incorporation to increase the number of authorized shares of Common Stock.

We have 100,000,000 authorized shares of Common Stock. As of April 20, 2018, we had 20,243,108 shares of Common Stock outstanding, 1,118,849 shares of Common Stock issuable upon the exercise of outstanding stock options, 15,232,146 shares of Common Stock issuable upon the exercise of outstanding warrants, 33,799 shares of Common Stock reserved for future issuance under our 2013 Equity Compensation Plan and 5,200,000 shares of Common Stock reserved for issuance under our effective registration statement on Form S-1 (Filed No. 333-207533) in connection with our agreement with Lincoln Park. As a result, as of April 20, 2018, we had approximately 58.2 million authorized shares of Common Stock available for issuance. On April 26, 2018, in connection with this offering, certain investors who purchased preferred stock warrants in the February 2018 Offering (defined later), agreed to waive the exercise of an aggregate of 8,942,501 shares of Common Stock issuable upon the conversion of shares of Series A Convertible Preferred Stock underlying their preferred stock warrants. In addition, H.C. Wainwright & Co., LLC, the underwriter for the February 2018 Offering, and certain of its affiliates, agreed to waive the exercise of an aggregate of 797,375 shares of Common Stock issuable upon the conversion of shares of Series A Convertible Preferred Stock underlying their preferred stock warrants acquired in the February 2018 Offering. Our board of directors unreserved these shares, which became authorized and unissued shares. As a result, as of April 26, 2018, we have approximately 67.7 million authorized shares of Common Stock available for issuance. If we issue substantially all of our available authorized shares of Common Stock in this offering which we expect to do, we will not be able to issue additional shares for future capital raising transactions or strategic transactions unless we obtain stockholders' approval to amend our certificate of incorporation to increase the number of authorized shares of Common Stock. This may cause a delay in our future capital raising, collaboration, partnership or other strategic transactions, and may have a material adverse effect on our business and financial condition.

We may issue additional series of preferred stock that rank senior or equally to the Series B Preferred Stock as to dividend payments and liquidation preference.

Neither our certificate of incorporation nor the Certificate of Designation for the Series B Preferred Stock prohibits us from issuing additional series of preferred stock that would rank senior or equally to the Series B Preferred Stock as to dividend payments and liquidation preference. Our certificate of incorporation provides that we have the authority to issue up to 5,000,000 shares of preferred stock, 1,044,488 shares have been designated as Series A Convertible Preferred Stock. The Series B Preferred Stock will rank equally with the Series A Convertible Preferred Stock as to dividend payments and liquidation preference. The issuances of other series of preferred stock could have the effect of reducing the amounts available to the Series B Preferred Stock in the event of our liquidation, winding-up or dissolution. It may also reduce cash dividend payments on the Series B Preferred Stock if we do not have sufficient funds to pay dividends on all Series B Preferred Stock outstanding and outstanding parity preferred stock.

The Series B Preferred Stock will rank junior to all our liabilities to third party creditors in the event of a bankruptcy, liquidation or winding up of our assets.

In the event of bankruptcy, liquidation or winding up, our assets will be available to pay obligations on the Series B Preferred Stock only after all our liabilities have been paid. The Series B Preferred Stock will effectively rank junior to all existing and future liabilities held by third party creditors. The terms of the Series B Preferred Stock do not restrict our ability to raise additional capital in the future through the issuance of debt. In the event of bankruptcy, liquidation or winding up, there may not be sufficient assets remaining, after paying our liabilities, to pay amounts due on any or all of the Series B Preferred Stock then outstanding.

Future issuances of preferred stock may adversely affect the market price for Common Stock.

Additional issuances and sales of preferred stock, or the perception that such issuances and sales could occur, may cause prevailing market prices for Common Stock to decline and may adversely affect our ability to raise additional capital in the financial markets at times and prices favorable to us.

We are not in compliance with the Nasdaq continued listing requirements. If we are unable to comply with the continued listing requirements of the Nasdaq Capital Market, Common Stock could be delisted, which could affect Common Stock's market price and liquidity and reduce our ability to raise capital.

We are required to meet certain qualitative and financial tests to maintain the listing of our securities on The Nasdaq Capital Market. As previously disclosed, as of March 31, 2017, June 30, 2017, September 30, 2017 and December 31, 2017, our total stockholders' equity was \$(2.7) million, \$0.4 million, \$(6.1) million and \$(10.9) million, respectively. As a result, we did not comply with the Nasdaq's \$2.5 million minimum stockholders' equity requirement, nor the alternative compliance standards under Nasdaq Listing Rule 5550(b) for the continued listing of our securities on The Nasdaq Capital Market. In addition, as previously disclosed, the Nasdaq Staff notified us of the noncompliance and, after granting a grace period and reviewing our proposed plan to regain compliance, the Nasdaq Staff had determined to seek to delist our securities from Nasdaq unless we requested a hearing before a Nasdaq Hearings Panel (the "Panel"). Accordingly, we requested and had a hearing on January 18, 2018 before the Panel, which has the authority to grant us an additional extension of time to regain compliance.

On February 2, 2018, we received a letter from the Panel stating that the Panel had granted the Company an extension to April 13, 2018 to regain compliance with the continued listing requirements of the Nasdaq Capital Market, which may be accomplished by demonstrating minimum stockholders' equity of \$2.5 million or having a market value of listed securities of at least \$35 million for ten consecutive trading days, as defined in Nasdaq Listing Rule 5550(b).

As of April 13, 2018, we were not able to regain compliance. On April 11, 2018, we submitted a written request to the Panel requesting an extension to May 14, 2018 to regain compliance.

On April 23, 2018, we received a letter from the Panel stating that the Panel has granted us an extension to May 14, 2018 to regain compliance.

There is no assurance that we will regain compliance on or before May 14, 2018, and even if we do, that we will be able to maintain compliance. If we are unable to regain compliance by May 14, 2018 or maintain compliance and our securities are delisted, it could be more difficult to buy or sell our securities and to obtain accurate quotations, and the price of our securities could suffer a material decline. Delisting could also impair our ability to raise capital.

CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus and the documents incorporated by reference herein and therein contain forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, or the Securities Act, and Section 21E of the Securities Exchange Act of 1934, as amended, or the Exchange Act. All statements, other than statements of historical facts, contained in this prospectus and the documents incorporated by reference herein regarding our strategy, future operations, financial position, future revenues, projected costs, prospects, plans and objectives of management are forward-looking statements. We may, in some cases, use terms such as "believes," "estimates," "anticipates," "expects," "plans," "intends," "may," "could," "might," "will," "should," "approximately" or other words that convey uncertainty of future events or outcomes to identify these forward-looking statements. Forward-looking statements appear in a number of places throughout this prospectus and the documents incorporated by reference herein, and include statements regarding our intentions, beliefs, projections, outlook, analyses or current expectations concerning, among other things, our ongoing and planned preclinical development and clinical trials, the timing of and our ability to make regulatory filings and obtain and maintain regulatory approvals for our product candidates, protection of our intellectual property portfolio, the degree of clinical utility of our products, particularly in specific patient populations, our ability to develop commercial and manufacturing functions, expectations regarding clinical trial data, our results of operations, cash needs, financial condition, liquidity, prospects, growth and strategies, the industry in which we operate and the trends that may affect the industry or us.

By their nature, forward-looking statements involve risks and uncertainties because they relate to events, competitive dynamics and industry change, and depend on the economic circumstances that may or may not occur in the future or may occur on longer or shorter timelines than anticipated. Although we believe that we have a reasonable basis for each forward-looking statement contained in this prospectus and in documents incorporated by reference herein, we caution you that forward-looking statements are not guarantees of future performance and that our actual results of operations, financial condition and liquidity, and the development of the industry in which we operate may differ materially from the forward-looking statements contained in this prospectus.

Actual results could differ materially and adversely from our forward-looking statements due to a number of factors, including, without limitation, risks related to:

- our need for additional financing for our INSPIRE trial and other operations, and our ability to obtain sufficient funds on acceptable terms when needed, and our plans and future needs to scale back operations if adequate financing is not obtained;
- our ability to continue as a going concern;
- our estimates regarding expenses, future revenues, capital requirements and needs for additional financing;
- the success and timing of our preclinical studies and clinical trials, including site initiation and patient enrollment, and regulatory approval of protocols for future clinical trials;
- our ability to enter into, maintain and perform collaboration agreements with other pharmaceutical companies, for funding and commercialization of our clinical drug product candidates or preclinical compounds, and our ability to achieve certain milestones under those agreements;
- the difficulties in obtaining and maintaining regulatory approval of our product candidates, and the labeling under any approval we may obtain;

- our plans and ability to develop, manufacture and commercialize our product candidates;
- our failure to recruit or retain key scientific or management personnel or to retain our executive officers;

[Table of Contents](#)

- the size and growth of the potential markets for our product candidates and our ability to serve those markets;
- regulatory developments in the United States and foreign countries;
- the rate and degree of market acceptance of any of our product candidates;
- obtaining and maintaining intellectual property protection for our product candidates and our proprietary technology;
- the successful development of our commercialization capabilities, including sales and marketing capabilities;
- recently enacted and future legislation and regulation regarding the healthcare system;
- the success of competing therapies and products that are or may become available;
- our ability to maintain the listing of our securities on a national securities exchange;
- the potential for third party disputes and litigation; and
- the performance of third parties, including contract research organizations and third-party manufacturers.

Any forward-looking statements that we make in this prospectus and the documents incorporated by reference herein speak only as of the date of such statement, and we undertake no obligation to update such statements whether as a result of any new information, future events, changed circumstances or otherwise. Comparisons of results for current and any prior periods are not intended to express any future trends or indications of future performance, unless expressed as such, and should only be viewed as historical data.

You should also read carefully the factors described in the “Risk Factors” section of this prospectus and in documents incorporated by reference herein, to better understand the risks and uncertainties inherent in our business and underlying any forward-looking statements. As a result of these factors, we cannot assure you that the forward-looking statements in this prospectus and in documents incorporated by reference herein will prove to be accurate. Furthermore, if our forward-looking statements prove to be inaccurate, the inaccuracy may be material. In light of the significant uncertainties in these forward-looking statements, you should not regard these statements as a representation or warranty by us or any other person that we will achieve our objectives and plans in any specified timeframe, or at all.

We obtained the industry, market and competitive position data in this prospectus and in documents incorporated by reference herein from our own internal estimates and research as well as from industry and general publications and research surveys and studies conducted by third parties. Industry publications and surveys generally state that the information contained therein has been obtained from sources believed to be reliable. We believe this data is accurate in all material respects as of the date of this prospectus.

[Table of Contents](#)

USE OF PROCEEDS

We estimate that the net proceeds to us from this offering will be approximately \$22.2 million, based on an assumed public offering price per Unit of \$0.46, the last reported sale price of Common Stock on the Nasdaq Capital Market on April 26, 2018, assuming the sale of 54,347,826 Units and no sale of any Pre-Funded Units in this offering, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us, and excluding the proceeds, if any, from the exercise of Warrants issued pursuant to this offering. If the underwriter exercises its option to purchase the additional Units in full, we estimate that the net proceeds will be approximately \$26.0 million, based on an assumed public offering price per Unit of \$0.46, the last reported sale price of Common Stock on the Nasdaq Capital Market on April 25, 2018, assuming the sale of 62,500,000 Units and no sale of any Pre-Funded Units in this offering, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us, and excluding the proceeds, if any, from the exercise of the Warrants issued pursuant to this offering.

We intend to use the net proceeds from this offering to fund the development of our clinical and preclinical programs, for other research and development activities and for general corporate purposes, which may include capital expenditures and funding our working capital needs. We expect from time to time to evaluate the acquisition of businesses, products and technologies for which a portion of the net proceeds may be used, although we currently are not planning or negotiating any such transactions.

The amounts actually expended for each purpose may vary significantly depending upon numerous factors, including the amount and timing of the proceeds from this offering and progress with the clinical development of our product candidates. Expenditures will also depend upon the establishment of collaborative arrangements with other companies, the availability of additional financing and other factors. Investors will be relying on the judgment of our management regarding the application of the proceeds of any sale of shares of our securities.

As of the date of this prospectus, we cannot specify with certainty all of the particular uses of the proceeds from this offering. Accordingly, we will retain broad discretion over the use of such proceeds. Pending the use of the net proceeds from this offering as described above, we intend to invest the net proceeds in investment-grade, interest-bearing securities.

The actual offering price per Unit and Pre-Funded Unit, and the exercise price of the Warrants, as applicable, will be as determined by negotiation between us and the underwriter at the time of pricing, and may be at a discount to the current market price of Common Stock. These estimates exclude the proceeds, if any, from the exercise of the Warrants in this offering. If all of the Warrants sold in this offering were to be exercised in cash at an assumed exercise price of \$0.46 per 0.025 share of Series B Preferred Stock, we would receive additional net proceeds of approximately \$25.0 million. However, the Warrants contain a cashless exercise provision that permits exercise of the Warrants on a cashless basis (i) at any time when there is no effective registration statement under the Securities Act of 1933, as amended, covering the issuance of the underlying shares of Series B Preferred Stock or (ii) on the expiration date of the Warrant. We cannot predict when or if the Warrants will be exercised or whether they will be exercised for cash. It is possible that the Warrants may be exercised solely on a cashless basis.

A \$0.25 increase or decrease in the assumed public offering price per Unit of \$0.46, the last reported sale price of Common Stock on the Nasdaq Capital Market on April 25, 2018, would increase or decrease the net proceeds to us from this offering by \$12.5 million, assuming that the number of Units offered by us, as set forth on the cover page of this prospectus, remains the same, assuming no sale of any Pre-Funded Units, after deducting the estimated underwriter discounts and commissions and estimated offering expenses payable by us, and excluding the proceeds, if any, from the exercise of the Warrants issued pursuant to this offering.

Similarly, each increase or decrease of 1,000,000 Units offered by us would increase or decrease the net proceeds to us by approximately \$0.4 million, assuming the assumed public offering price per Unit of \$0.46 remains the same, assuming no sale of any Pre-Funded Units, after deducting the underwriting discounts and commissions and estimated offering expenses payable by us, and excluding the proceeds, if any, from the exercise of the Warrants issued pursuant to this offering.

[Table of Contents](#)

CAPITALIZATION

The following table presents our cash, cash equivalents and capitalization, as of December 31, 2017:

- on an actual basis;
- on a pro forma basis to give effect to (i) our underwritten public offering (the “February 2018 Offering”) of 7,005,000 shares of Common Stock, pre-funded warrants to purchase 2,942,500 shares of Common Stock and preferred stock warrants to purchase 994,750 shares of our Series A Convertible Preferred Stock pursuant to an underwriting agreement between us and H.C. Wainwright & Co., LLC dated as of February 8, 2018 and (ii) subsequent exercises of pre-funded warrants to purchase 1,650,000 shares of Common Stock (together with the February 2018 Offering, the “Prior Transactions”); and
- on a pro forma as adjusted basis to give further effect to the sale of 54,347,826 Units in this offering at an assumed public offering price per Unit of \$0.46, the last reported sale price of Common Stock on the Nasdaq Capital Market on April 25, 2018, assuming no sale of any Pre-Funded Warrants, after deducting estimated underwriting discounts and commissions and estimate offering expenses payable by us, and excluding the proceeds, if any, from the exercise of the Warrants issued pursuant to this offering.

You should read this information in conjunction with our consolidated financial statements and notes thereto incorporated by reference into this prospectus.

	December 31, 2017 (unaudited)		
	Actual	Pro Forma	Pro Forma as Adjusted
Cash and cash equivalents	\$ 4,024,000	\$ 12,724,000	\$ 34,943,000
Long-term liabilities	5,864,000	5,864,000	5,864,000
Stockholders’ (deficit) equity:			
Preferred stock, \$0.01 par value, 5,000,000 authorized, none issued and outstanding, actual, pro forma and pro form as adjusted			
Common stock, \$0.01 par value, 25,000,000 authorized, 10,771,163 issued and outstanding, actual; 25,000,000 authorized, 19,426,163 shares issued and outstanding, pro forma; 100,000,000 shares authorized, 73,773,989 issued and outstanding, pro forma as adjusted (1)	108,000	194,000	737,000
Additional paid-in capital	350,514,000	359,128,000	380,804,000
Accumulated other comprehensive loss	3,000	3,000	3,000
Accumulated deficit	(362,316,000)	(362,316,000)	(362,316,000)
Total Onconova Therapeutics, Inc. stockholders’ (deficit) equity	(11,691,000)	(2,991,000)	10,360,000
Non-controlling interest	830,000	830,000	830,000
Total stockholders’ (deficit) equity	(10,861,000)	(2,161,000)	20,058,000

(1) On March 21, 2018, we filed with the Secretary of State of the State of Delaware a Certificate of Amendment to our Tenth Amended and Restated Certificate of Incorporation, as amended to increase the number of authorized shares of our capital stock from 30,000,000 shares to 105,000,000 shares in order to increase the number of authorized shares of Common Stock 25,000,000 shares to 100,000,000 shares.

The above table is based on 10,771,163 shares of Common Stock outstanding as of December 31, 2017 and excludes:

- 894,996 shares of Common Stock issuable upon the exercise of stock options outstanding at December 31, 2017 with a weighted average exercise price of approximately \$40.41 per share;

[Table of Contents](#)

- 3,294,771 shares of Common Stock issuable upon the exercise of outstanding warrants at December 31, 2017 with a weighted average exercise price of approximately \$5.10 per share and, on a pro forma basis giving effect to the Prior Transactions, 15,032,146 shares of Common Stock issuable upon the exercise of outstanding warrants at December 31, 2017 with a weighted average exercise price of approximately \$1.83 per share (includes Common Stock issuable for warrants which are exercisable for our Series A Convertible Preferred Stock, which is convertible to Common Stock); to the extent the preferred stock warrant repricing described under “Underwriting — Company Lock-up Waiver Agreement” occurs, preferred stock warrants to purchase an aggregate of 994,750 shares of our Series A Convertible Preferred Stock, which are convertible into an aggregate of 9,947,500 shares of Common Stock, will be repriced, and the weighted average exercise price of all outstanding warrants at December 31, 2017, on a pro forma basis giving effect to the Prior Transactions, taking into account such repricing will be approximately \$1.55 per share based on an assumed public offering price per Unit of \$0.56, the last reported sale price of Common Stock on the Nasdaq Capital Market on April 20, 2018;
- 57,632 shares of Common Stock reserved for future issuance under our 2013 Equity Compensation Plan at December 31, 2017; and
- any additional shares of Common Stock that we may issue to Lincoln Park, pursuant to a purchase agreement we entered into on October 8, 2015, which provides that, upon the terms and subject to the conditions and limitation set forth therein, Lincoln Park is committed to purchase up to an aggregate of an additional \$15 million of shares of Common Stock over the term of the purchase agreement, should we elect to sell shares to Lincoln Park.

Each \$0.25 increase or decrease in the assumed public offering price per Unit of \$0.46, the last reported sale price of our Common Stock on the Nasdaq Capital Market on April 25, 2018, would increase or decrease the net proceeds to us from this offering by \$12.5 million, assuming that the number of Units offered by us, as set forth on the cover page of this prospectus, remains the same, assuming no sale of any Pre-Funded Units, after deducting the estimated underwriter discounts and commissions and estimated offering expenses payable by us, and excluding the proceeds, if any, from the exercise of the Warrants issued pursuant to this offering. We may also increase or decrease the number of Units offered in this offering. Each increase or decrease of 1,000,000 Units offered by us would increase or decrease the net proceeds to us by approximately \$0.4 million, assuming the assumed public offering price per Unit of \$0.46 remains the same, assuming no sale of any Pre-Funded Units, after deducting the underwriting discounts and commissions and estimated offering expenses payable by us, and excluding the proceeds, if any, from the exercise of the Warrants issued pursuant to this offering. The as adjusted information discussed above is illustrative only and will be adjusted based on the actual public offering price and other terms of this offering as determined between us and the underwriter at pricing.

[Table of Contents](#)

DILUTION

If you invest in Common Stock in this offering, your interest will be diluted to the extent of the difference between the effective public offering price per share of Common Stock included in the Units or issuable upon the exercise of the Pre-Funded Warrants and the pro forma as adjusted net tangible book value per share of Common Stock after this offering. As of December 31, 2017, our historical net tangible book value was \$(10.9) million, or \$(1.01) per share, based on 10,771,163 shares of Common Stock outstanding as of December 31, 2017. Our historical net tangible book value per share represents the amount of our total tangible assets reduced by the amount of our total liabilities, divided by the total number of shares of Common Stock outstanding as of December 31, 2017.

On a pro forma basis, after giving effect to the Prior Transactions, our net tangible book value at December 31, 2017 would have been \$(2.2) million, or \$(0.11) per share.

After giving further effect to our sale in this offering of 54,347,826 Units at an assumed public offering price per Unit of \$0.46, the last reported sale price of Common Stock on the Nasdaq Capital Market on April 25, 2018, assuming no sale of any Pre-Funded Units in this offering, and after deducting the underwriting discounts and commissions and estimated offering expenses payable by us, and excluding the proceeds, if any, from the exercise of the Warrants issued in this offering, our pro forma as adjusted net tangible book value as of December 31, 2017 would have been \$20.1 million, or \$0.27 per share. This represents an immediate increase of pro forma net tangible book value of \$0.38 per share to our existing stockholders and an immediate dilution of pro forma net tangible book value of \$0.19 per share to investors purchasing Units in this offering. The following table illustrates this per share dilution.

Assumed public offering price per Unit		\$	0.46
Historical net tangible book value (deficit) per share as of December 31, 2017	\$	(1.01)	
Pro forma increase in net tangible book value per share attributable to the Prior Transactions		0.90	
Pro forma net tangible book value per share December 31, 2017		(0.11)	
Increase in pro forma net tangible book value per share attributable to investors purchasing in this offering		0.38	
Pro forma as adjusted net tangible book value per share as of December 31, 2017 after this offering			0.27
Dilution per share to investors purchasing in this offering		\$	0.19

Each \$0.25 increase or decrease in the assumed public offering price per Unit of \$0.46, the last reported sale price of our Common Stock on the Nasdaq Capital Market on April 25, 2018, would increase or decrease the net proceeds to us from this offering by \$12.5 million, increase or decrease our pro forma as adjusted net tangible book value per share after this offering by approximately \$0.17, and increase or decrease the dilution per share to new investors purchasing in this offering by \$0.08, assuming that the number of Units offered by us, as set forth on the cover page of this prospectus, remains the same, assuming no sale of any Pre-Funded Units, after deducting the estimated underwriter discounts and commissions and estimated offering expenses payable by us, and excluding the proceeds, if any, from the exercise of the Warrants issued pursuant to this offering. We may also increase or decrease the number of Units offered in this offering. Each increase or decrease of 1,000,000 Units offered by us would increase or decrease the net proceeds to us by approximately \$0.4 million, increase or decrease our pro forma as adjusted net tangible book value per share after this offering by \$0.01, and increase or decrease the

dilution per share to new investors purchasing in this offering by \$0.01, assuming the assumed public offering price per Unit of \$0.46 remains the same, assuming no sale of any Pre-Funded Units, after deducting the underwriting discounts and commissions and estimated offering expenses payable by us, and excluding the proceeds, if any, from the exercise of the Warrants issued pursuant to this offering. The as adjusted information discussed above is illustrative only and will be adjusted based on the actual public offering price and other terms of this offering as determined between us and the underwriter at pricing.

If the underwriter exercises its option to purchase additional Units in full, and assuming no sale of any Pre-Funded Units in this offering, the pro forma as adjusted net tangible book value per share after this offering would be \$0.29 per share, the increase in pro forma net tangible book value per share to existing stockholders would be \$0.40 per share and the dilution to new investors purchasing Units in this offering would be \$0.17 per share.

The above discussion and table are based on 10,771,163 shares of Common Stock outstanding as of December 31, 2017, actual, and 19,426,163 shares of Common Stock outstanding as of December 31, 2017 pro forma and exclude:

19

[Table of Contents](#)

- 894,996 shares of Common Stock issuable upon the exercise of stock options outstanding at December 31, 2017 with a weighted average exercise price of approximately \$40.41 per share;
- 3,294,771 shares of Common Stock issuable upon the exercise of outstanding warrants at December 31, 2017 with a weighted average exercise price of approximately \$5.10 per share and, on a pro forma basis giving effect to the Prior Transactions, 15,032,146 shares of Common Stock issuable upon the exercise of outstanding warrants at December 31, 2017 with a weighted average exercise price of approximately \$1.83 per share (includes Common Stock issuable for warrants which are exercisable for our Series A Convertible Preferred Stock, which is convertible to Common Stock); to the extent the preferred stock warrant repricing described under “Underwriting — Company Lock-up Waiver Agreement” occurs, preferred stock warrants to purchase an aggregate of 994,750 shares of our Series A Convertible Preferred Stock, which are convertible into an aggregate of 9,947,500 shares of Common Stock, will be repriced, and the weighted average exercise price of all outstanding warrants at December 31, 2017, on a pro forma basis giving effect to the Prior Transactions, taking into account such repricing will be approximately \$1.55 per share based on an assumed public offering price per Unit of \$0.56, the last reported sale price of Common Stock on the Nasdaq Capital Market on April 20, 2018;
- 57,632 shares of Common Stock reserved for future issuance under our 2013 Equity Compensation Plan at December 31, 2017; and
- any additional shares of Common Stock that we may issue to Lincoln Park, pursuant to a purchase agreement we entered into on October 8, 2015, which provides that, upon the terms and subject to the conditions and limitation set forth therein, Lincoln Park is committed to purchase up to an aggregate of an additional \$15 million of shares of Common Stock over the term of the purchase agreement, should we elect to sell shares to Lincoln Park.

To the extent that outstanding options or warrants are exercised, you will experience further dilution. In addition, we may choose to raise additional capital due to market conditions or strategic considerations even if we believe we have sufficient funds for our current or future operating plans. To the extent that additional capital is raised through the sale of equity or convertible debt securities, the issuance of these securities could result in further dilution to our stockholders.

20

[Table of Contents](#)

DESCRIPTION OF CAPITAL STOCK

Our authorized capital stock consists of 100,000,000 shares of Common Stock, par value \$0.01 per share, and 5,000,000 shares of preferred stock, par value \$0.01 per share. As of March 31, 2018, 19,426,163 shares of Common Stock, and no shares of our preferred stock, were outstanding.

Common Stock

Subject to the preferences that may be applicable to any outstanding preferred stock, holders of Common Stock are entitled to receive ratably any dividends that may be declared by our board of directors out of funds legally available for that purpose. Holders of Common Stock are entitled to one vote for each share on all matters voted on by stockholders, including the election of directors. Holders of Common Stock do not have any conversion, redemption, sinking fund or preemptive rights. In the event of our dissolution, liquidation or winding up, holders of Common Stock are entitled to share ratably in any assets remaining after the satisfaction in full of the prior rights of creditors and the aggregate liquidation preference of any preferred stock then outstanding. The rights, preferences and privileges of the 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, and any shares of Common Stock that we may issue in the future will be, fully paid and non-assessable.

We do not currently have a sufficient number of authorized shares of Common Stock to cover the shares issuable upon the conversion of Series B Preferred Stock. As a result, before any shares of Series B Preferred Stock can become convertible, we need to receive stockholder approval of the Charter Amendment to sufficiently increase our authorized shares of Common Stock to cover the conversion of all outstanding shares of Series B Preferred Stock into Common Stock. We have agreed in the underwriting agreement for this offering to use our reasonable efforts to obtain such approval within 45 days from the date of this prospectus, and we intend to seek such approval at a special meeting of stockholders or at our 2018 annual meeting of stockholders. If approved by our stockholders, we intend to file the Charter Amendment with the Secretary of State of Delaware as soon as practicable following the special meeting or the annual meeting, as the case may be, and the Charter Amendment will be effective upon such filing.

We cannot assure you that we will be able to obtain requisite stockholder approval of the Charter Amendment. If the Charter Amendment is not approved by our stockholders, our Tenth Amended and Restated Certificate of Incorporation, as amended, will continue as currently in effect. In the event our stockholders do not approve the Charter Amendment, the Series B Preferred Stock will not be convertible into Common Stock and the value of the Warrants and the Series B Preferred Stock may be negatively affected.

Preferred Stock

We may issue any class of preferred stock in any series. Our board of directors has the authority, subject to limitations prescribed under Delaware law, to issue preferred stock in one or more series, to establish from time to time the number of shares to be included in each series and to fix the designation, powers, preferences and rights of the shares of each series and any of its qualifications, limitations and restrictions. Our board of directors can also increase or decrease the number of shares of any series, but not below the number of shares of that series then outstanding. Our board of directors may authorize the issuance of preferred stock with voting or conversion rights that could adversely affect the voting power or other rights of the holders of the Common Stock. The issuance of preferred stock, while providing flexibility in connection with possible acquisitions and other corporate purposes, could, among other things, have the effect of delaying, deferring or preventing a change in control of our company and may adversely affect the market price of Common Stock and the voting and other rights of the holders of Common Stock.

Following this offering, we will have designated 1,796,875 shares of our preferred stock as Series B Convertible Preferred Stock. See “Description of Securities We Are Offering — Series B Convertible Preferred Stock” for a description of our Series B Convertible Preferred Stock.

Series A Convertible Preferred Stock

General

Our Board of Directors is authorized to issue up to 5,000,000 shares of preferred stock in one or more series without shareholder approval. Our Board of Directors may determine the designations, powers, preferences and the relative, participating, optional or other special rights, and any qualification, limitations and restrictions, of each series of preferred stock. Our Board of Directors has designated 1,044,488 shares of preferred stock as Series A Convertible Preferred Stock, which we refer to herein as the Series A Preferred Stock. As of March 31, 2018, there were no shares of preferred stock outstanding.

Rank

The Series A Preferred Stock ranks (1) on parity with Common Stock on an “as converted” basis, (2) senior to any series of our capital stock hereafter created specifically ranking by its terms junior to the Series A Preferred Stock, (3) on parity with any series of our capital stock hereafter created specifically ranking by its terms on parity with the Series A Preferred Stock, and (4) junior to any series of our capital stock hereafter created specifically ranking by its terms senior to the Series A Preferred Stock in each case, as to dividends or distributions of assets upon our liquidation, dissolution or winding up whether voluntary or involuntary.

Conversion

Each 0.1 share of the Series A Preferred Stock is convertible into one (1) share of Common Stock, provided that the holder will be prohibited from converting Series A Preferred Stock into shares of Common Stock if, as a result

[Table of Contents](#)

of such conversion, the holder would own more than 4.99% of the number of shares of Common Stock outstanding immediately after giving effect to the issuance of the shares of Common Stock issuable upon conversion of the Series A Preferred Stock, or, at the election of a holder, together with its affiliates, would own more than 9.99% of the number of shares of Common Stock outstanding immediately after giving effect to the issuance of the shares of Common Stock issuable upon conversion of the Series A Preferred Stock. The conversion rate of the Series A Preferred Stock is subject to proportionate adjustments for stock splits, reverse stock splits and similar events, but is not subject to adjustment based on price anti-dilution provisions.

Dividends

In addition to stock dividends or distributions for which proportionate adjustments will be made, holders of Series A Preferred Stock are entitled to receive dividends on shares of Series A Preferred Stock equal, on an as-if-converted-to-common-stock basis, to and in the same form as dividends actually paid on shares of the Common Stock when, as and if such dividends are paid on shares of the Common Stock. No other dividends are payable on shares of Series A Preferred Stock.

Voting Rights

Except as provided in the Certificate of Designation or as otherwise required by law, the holders of Series A Preferred Stock will have no voting rights. However, we may not, without the consent of holders of a majority of the outstanding shares of Series A Preferred Stock, alter or change adversely the powers, preferences or rights given to the Series A Preferred Stock, increase the number of authorized shares of Series A Preferred Stock, or enter into any agreement with respect to the foregoing.

Liquidation Rights

Upon any liquidation, dissolution or winding-up of the Company, whether voluntary or involuntary, the holders of Series A Preferred Stock are entitled to receive, *pari passu* with the holders of Common Stock, out of the assets available for distribution to stockholders an amount equal to such amount per share as would have been payable had all shares of Series A Preferred Stock been converted into Common Stock immediately before such liquidation, dissolution or winding up, without giving effect to any limitation on conversion as a result of the Beneficial Ownership Limitation, as described below.

Beneficial Ownership Limitation

We may not effect any conversion of the Series A Preferred Stock, and a holder does not have the right to convert any portion of the Series A Preferred Stock to the extent that, after giving effect to the conversion set forth in a notice of conversion such holder would beneficially own in excess of the Beneficial Ownership Limitation, or such holder, together with such holder’s affiliates, and any persons acting as a group together with such holder or affiliates, would beneficially own in excess of the Beneficial Ownership Limitation. The “Beneficial Ownership Limitation” is 4.99% of the number of shares

of the Common Stock outstanding immediately after giving effect to the issuance of shares of Common Stock issuable upon conversion of Series A Preferred Stock held by the applicable holder. A holder may, with 61 days prior notice to us, elect to increase or decrease the Beneficial Ownership Limitation; provided, however, that in no event may either the holder Beneficial Ownership Limitation or the affiliate Beneficial Ownership Limitation be 9.99% or greater.

Exchange Listing

Our Series A Preferred Stock is not listed on the Nasdaq Capital Market, any national securities exchange or other nationally recognized trading system. Our Common Stock issuable upon conversion of the Series A Preferred Stock is listed on the Nasdaq Capital Market.

Failure to Deliver Conversion Shares.

If we fail to timely deliver shares of Common Stock upon conversion of the Series A Preferred Stock (the “Conversion Shares”) within the time period specified in the Certificate of Designation (within three trading days after

[Table of Contents](#)

delivery of the notice of conversion, or any shorter standard settlement period in effect with respect to trading market on the date notice is delivered), and if the holder has not exercised its Buy-In rights as described below with respect to such shares, then we are obligated to pay to the holder, as liquidated damages, an amount equal to \$50 per trading day (increasing to \$100 per trading day after the third trading day and \$200 per trading day after the tenth trading day) for each \$5,000 of Conversion Shares for which the Series A Preferred Stock converted which are not timely delivered. If we make such liquidated damages payments, we are not also obligated to make Buy-In payments with respect to the same Conversion Shares.

Compensation for Buy-In on Failure to Timely Deliver Shares

If we fail to timely deliver the Conversion Shares to the holder, and if after the required delivery date the holder is required by its broker to purchase (in an open market transaction or otherwise) or the holder or its brokerage firm otherwise purchases, shares of Common Stock to deliver in satisfaction of a sale by the holder of the Conversion Shares which the holder anticipated receiving upon such conversion or exercise (a “Buy-In”), then we are obligated to (A) pay in cash to the holder the amount, if any, by which (x) the holder’s total purchase price (including brokerage commissions, if any) for the shares of Common Stock so purchased, minus any amounts paid to the holder by us as liquidated damages for late delivery of such shares, exceeds (y) the amount obtained by multiplying (1) the number of Conversion Shares that we were required to deliver times (2) the price at which the sell order giving rise to such purchase obligation was executed, and (B) at the option of the holder, either reinstate the portion of the Series A Preferred Stock and equivalent number of Conversion Shares for which such conversion was not honored (in which case such conversion shall be deemed rescinded) or deliver to the holder the number of shares of Common Stock that would have been issued had we timely complied with its conversion and delivery obligations.

Subsequent Rights Offerings; Pro Rata Distributions

If we grant, issue or sell any Common Stock equivalents pro rata to the record holders of any class of shares of Common Stock (the “Purchase Rights”), then a holder of Series A Preferred Stock will be entitled to acquire, upon the terms applicable to such Purchase Rights, the aggregate Purchase Rights which the holder could have acquired if the holder had held the number of shares of Common Stock acquirable upon conversion of the Series A Preferred Stock (without regard to any limitations on conversion). If we declare or make any dividend or other distribution of its assets (or rights to acquire its assets) to holders of Common Stock, then a holder of Series A Preferred Stock is entitled to participate in such distribution to the same extent as if the holder had held the number of shares of Common Stock acquirable upon complete conversion of the Series A Preferred Stock (without regard to any limitations on conversion).

Fundamental Transaction

If, at any time while the Series A Preferred Stock is outstanding, (i) the Company, directly or indirectly, in one or more related transactions effects any merger or consolidation of the Company with or into another person, (ii) the Company, directly or indirectly, effects any sale, lease, license, assignment, transfer, conveyance or other disposition of all or substantially all of its assets in one or a series of related transactions, (iii) any, direct or indirect, purchase offer, tender offer or exchange offer (whether by the Company or another person) is completed pursuant to which holders of Common Stock are permitted to sell, tender or exchange their shares for other securities, cash or property and has been accepted by the holders of 50% or more of the outstanding Common Stock, (iv) the Company, directly or indirectly, in one or more related transactions effects any reclassification, reorganization or recapitalization of the Common Stock or any compulsory share exchange pursuant to which the Common Stock is effectively converted into or exchanged for other securities, cash or property, or (v) the Company, directly or indirectly, in one or more related transactions consummates a stock or share purchase agreement or other business combination (including, without limitation, a reorganization, recapitalization, spin-off or scheme of arrangement) with another person whereby such other person acquires more than 50% of the outstanding shares of Common Stock (not including any shares of Common Stock held by the other person or other persons making or party to, or associated or affiliated with the other persons making or party to, such stock or share purchase agreement or other business combination) (each a “Series A Preferred Stock Fundamental Transaction”), then the Series A Preferred Stock automatically converts and the holder will receive, for each Conversion Share that would have been issuable upon such conversion immediately prior to the occurrence of such Series A Preferred Stock Fundamental Transaction (without regard to the Beneficial Ownership Limitation), the number of shares of Common Stock of the successor or acquiring corporation or of the Company, if it

[Table of Contents](#)

is the surviving corporation, and any additional consideration (the “Series A Preferred Stock Alternate Consideration”) receivable as a result of such Series A Preferred Stock Fundamental Transaction by a holder of the number of shares of Common Stock for which the Series A Preferred Stock is convertible immediately prior to such Series A Preferred Stock Fundamental Transaction (without regard to the Beneficial Ownership Limitation). For purposes of any such conversion, the determination of the conversion ratio will be appropriately adjusted to apply to such Series A Preferred Stock Alternate Consideration based on the amount of Alternate Consideration issuable in respect of one share of Common Stock in such Series A Preferred Stock Fundamental Transaction.

If holders of Common Stock are given any choice as to the securities, cash or property to be received in a Series A Preferred Stock Fundamental Transaction, then the holder will be given the same choice as to the Series A Preferred Stock Alternate Consideration it receives upon automatic conversion of the Series A Preferred Stock following such Fundamental Transaction.

Delaware Anti-Takeover Law and Provisions in Our Certificate of Incorporation and Bylaws

Delaware Anti-Takeover Law

We are subject to Section 203 of the Delaware General Corporation Law. Section 203 generally prohibits a public Delaware corporation from engaging in a “business combination” with an “interested stockholder” for a period of three years after the date of the transaction in which the person became an interested stockholder, unless:

- prior to the date of the transaction, the board of directors of the corporation approved either the business combination or the transaction which resulted in the stockholder becoming an interested stockholder;
- upon consummation of the transaction that resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced, excluding specified shares; or
- at or subsequent to the date of the transaction, the business combination is approved by the board of directors and authorized at an annual or special meeting of stockholders, and not by written consent, by the affirmative vote of at least 66²/₃% of the outstanding voting stock which is not owned by the interested stockholder.

Section 203 defines a “business combination” to include:

- any merger or consolidation involving the corporation and the interested stockholder;
- any sale, lease, exchange, mortgage, pledge, transfer or other disposition of 10% or more of the assets of the corporation to or with the interested stockholder;
- subject to exceptions, any transaction that results in the issuance or transfer by the corporation of any stock of the corporation to the interested stockholder;
- subject to exceptions, any transaction involving the corporation that has the effect of increasing the proportionate share of the stock of any class or series of the corporation beneficially owned by the interested stockholder; or
- the receipt by the interested stockholder of the benefit of any loans, advances, guarantees, pledges or other financial benefits provided by or through the corporation.

In general, Section 203 defines an “interested stockholder” as any person that is:

- the owner of 15% or more of the outstanding voting stock of the corporation;
- stock of the corporation at any time within three years immediately prior to the affiliate or associate of the corporation who was the owner of 15% or more of the outstanding voting relevant date; or

[Table of Contents](#)

- the affiliates and associates of the above.

Under specific circumstances, Section 203 makes it more difficult for an “interested stockholder” to effect various business combinations with a corporation for a three-year period, although the stockholders may, by adopting an amendment to the corporation’s certificate of incorporation or bylaws, elect not to be governed by this section, effective 12 months after adoption.

Our certificate of incorporation and bylaws do not exclude us from the restrictions of Section 203. We anticipate that the provisions of Section 203 might encourage companies interested in acquiring us to negotiate in advance with our board of directors since the stockholder approval requirement would be avoided if a majority of the directors then in office approve either the business combination or the transaction that resulted in the stockholder becoming an interested stockholder.

Certificate of Incorporation and Bylaws

Provisions of our certificate of incorporation and bylaws may delay or discourage transactions involving an actual or potential change of control or change in our management, including transactions in which stockholders might otherwise receive a premium for their shares, or transactions that our stockholders might otherwise deem to be in their best interests. Therefore, these provisions could adversely affect the price of Common Stock. Among other things, our certificate of incorporation and bylaws will:

- permit our board of directors to issue up to 5,000,000 shares of preferred stock, with any rights, preferences and privileges as they may designate;
- provide that all vacancies on our board of directors, including as a result of newly created directorships, may, except as otherwise required by law, be filled by the affirmative vote of a majority of directors then in office, even if less than a quorum;
- require that any action to be taken by our stockholders must be effected at a duly called annual or special meeting of stockholders and not be taken by written consent;

- provide that stockholders seeking to present proposals before a meeting of stockholders or to nominate candidates for election as directors at a meeting of stockholders must provide advance notice in writing, and also specify requirements as to the form and content of a stockholder's notice;
- not provide for cumulative voting rights, thereby allowing the holders of a majority of the shares of Common Stock entitled to vote in any election of directors to elect all of the directors standing for election; and
- provide that special meetings of our stockholders may be called only by the board of directors or by such person or persons requested by a majority of the board of directors to call such meetings.

Transfer Agent

The transfer agent and registrar for Common Stock is EQ Shareowner Services.

Listing

Our Common Stock is listed on the Nasdaq Capital Market under the symbol "ONTX."

[Table of Contents](#)

DESCRIPTION OF SECURITIES WE ARE OFFERING

We are offering (i) up to 54,347,826 Units, each Unit consisting of one share of Common Stock and one Warrant to purchase 0.025 share of Series B Preferred Stock, or (ii) up to 54,347,826 Pre-Funded Units, each Pre-Funded Unit consisting of one Pre-Funded Warrant to purchase one share of Common Stock and one Warrant to purchase 0.025 share of Series B Preferred Stock. For each Pre-Funded Unit we sell, the number of Units we are offering will be decreased on a one-for-one basis. The share of Common Stock and accompanying Warrant included in each Unit will be issued separately, and the Pre-Funded Warrant to purchase one share of Common Stock and the accompanying Warrant included in each Pre-Funded Unit will be issued separately. Units or Pre-Funded Units will not be issued or certificated. We are also registering the shares of Common Stock included in the Units and the shares of Common Stock issuable from time to time upon exercise of the Pre-Funded Warrants included in the Pre-Funded Units, the Warrants included in the Units and the Pre-Funded Units offered hereby, the Pre-Funded Warrants included in the Pre-Funded Units and the shares of Series B Preferred Stock issuable upon conversion of the Warrants.

Common Stock

The material terms and provisions of Common Stock and each other class of our securities which qualifies or limits Common Stock are described under the caption "Description of Capital Stock" in this prospectus.

Series B Convertible Preferred Stock

General

Our Board of Directors is authorized to issue up to 5,000,000 shares of preferred stock in one or more series without shareholder approval. Our Board of Directors may determine the designations, powers, preferences and the relative, participating, optional or other special rights, and any qualification, limitations and restrictions, of each series of preferred stock. In February 2018 our Board of Directors designated 1,044,488 shares of preferred stock as Series A Convertible Preferred Stock. As of April 20, 2018, there were no shares of preferred stock outstanding.

Our Board of Directors has designated 1,796,875 shares of preferred stock as Series B Convertible Preferred Stock, which we refer to herein as the Series B Preferred Stock.

Rank

The Series B Preferred Stock ranks (1) on parity with Common Stock on an "as converted" basis, (2) senior to any series of our capital stock hereafter created specifically ranking by its terms junior to the Series B Preferred Stock, (3) on parity with Series A Preferred Stock and any series of our capital stock hereafter created specifically ranking by its terms on parity with the Series B Preferred Stock, and (4) junior to any series of our capital stock hereafter created specifically ranking by its terms senior to the Series B Preferred Stock in each case, as to dividends or distributions of assets upon our liquidation, dissolution or winding up whether voluntary or involuntary.

Conversion

We do not currently have a sufficient number of authorized shares of Common Stock to cover the shares issuable upon the conversion of Series B Preferred Stock. As a result, before any shares of Series B Preferred Stock can become convertible, we need to receive stockholder approval of the Charter Amendment to sufficiently increase our authorized shares of Common Stock to cover the conversion of all outstanding shares of Series B Preferred Stock into Common Stock. We have agreed in the underwriting agreement for this offering to use our reasonable efforts to obtain such approval within 45 days from the date of this prospectus, and we intend to seek such approval at a special meeting of stockholders or at our 2018 annual meeting of stockholders. We cannot assure you that we will be able to obtain requisite stockholder approval of the Charter Amendment. Series B Preferred Stock is not convertible until the next business day after the Charter Amendment Date (which is the date on which we publicly announce through the filing of a Current Report on Form 8-K that the Charter Amendment has been filed with the Secretary of State of the State of Delaware), starting at which time each 0.025 share of the Series B Preferred Stock is convertible into one (1) share of Common Stock, provided that the holder will be prohibited from converting Series B Preferred Stock into shares of Common Stock if, as a result of such conversion, the holder would own more than 4.99% of the number of shares of Common Stock outstanding immediately after giving effect to the issuance of the shares of Common Stock issuable upon conversion of the Series B Preferred Stock, or, at the election of a holder, together with its affiliates, would own more than 9.99% of the number of shares of Common Stock outstanding immediately after giving effect to the issuance of the shares of Common Stock issuable upon conversion of the Series B Preferred Stock. The conversion rate of the Series B Preferred Stock is subject to

proportionate adjustments for stock splits, reverse stock splits and similar events, but is not subject to adjustment based on price anti-dilution provisions. In the event our stockholders do not approve the Charter Amendment, the Series B Preferred Stock will not be convertible into Common Stock and the value of Series B Preferred Stock may be negatively affected.

Dividends

In addition to stock dividends or distributions for which proportionate adjustments will be made, holders of Series B Preferred Stock are entitled to receive dividends on shares of Series B Preferred Stock equal, on an as-if-converted-to-common-stock basis, to and in the same form as dividends actually paid on shares of the Common Stock when, as and if such dividends are paid on shares of the Common Stock. No other dividends are payable on shares of Series B Preferred Stock.

[Table of Contents](#)

Voting Rights

Except as provided in the Certificate of Designation or as otherwise required by law, the holders of Series B Preferred Stock will have no voting rights. However, we may not, without the consent of holders of a majority of the outstanding shares of Series B Preferred Stock, alter or change adversely the powers, preferences or rights given to the Series B Preferred Stock, increase the number of authorized shares of Series B Preferred Stock, or enter into any agreement with respect to the foregoing.

Liquidation Rights

Upon any liquidation, dissolution or winding-up of the Company, whether voluntary or involuntary, the holders of Series B Preferred Stock are entitled to receive, *pari passu* with the holders of Common Stock, out of the assets available for distribution to stockholders an amount equal to such amount per share as would have been payable had all shares of Series B Preferred Stock been converted into Common Stock immediately before such liquidation, dissolution or winding up, without giving effect to any limitation on conversion as a result of the Beneficial Ownership Limitation, as described below.

Beneficial Ownership Limitation

We may not effect any conversion of the Series B Preferred Stock, and a holder does not have the right to convert any portion of the Series B Preferred Stock to the extent that, after giving effect to the conversion set forth in a notice of conversion such holder would beneficially own in excess of the Beneficial Ownership Limitation, or such holder, together with such holder's affiliates, and any persons acting as a group together with such holder or affiliates, would beneficially own in excess of the Beneficial Ownership Limitation. The "Beneficial Ownership Limitation" is 4.99% of the number of shares of the Common Stock outstanding immediately after giving effect to the issuance of shares of Common Stock issuable upon conversion of Series B Preferred Stock held by the applicable holder. A holder may, with 61 days prior notice to us, elect to increase or decrease the Beneficial Ownership Limitation; provided, however, that in no event may either the holder Beneficial Ownership Limitation or the affiliate Beneficial Ownership Limitation be 9.99% or greater.

Exchange Listing

We do not plan on making an application to list the shares of Series B Preferred Stock on the Nasdaq Capital Market, any national securities exchange or other nationally recognized trading system. Our Common Stock issuable upon conversion of the Series B Preferred Stock is listed on the Nasdaq Capital Market.

Failure to Deliver Conversion Shares.

If we fail to timely deliver shares of Common Stock upon conversion of the Series B Preferred Stock (the "Conversion Shares") within the time period specified in the Certificate of Designation (within three trading days after delivery of the notice of conversion, or any shorter standard settlement period in effect with respect to trading market on the date notice is delivered), and if the holder has not exercised its Buy-In rights as described below with respect to such shares, then we are obligated to pay to the holder, as liquidated damages, an amount equal to \$50 per trading day (increasing to \$100 per trading day after the third trading day and \$200 per trading day after the tenth trading day) for each \$5,000 of Conversion Shares for which the Series B Preferred Stock converted which are not timely delivered. If we make such liquidated damages payments, we are not also obligated to make Buy-In payments with respect to the same Conversion Shares.

Compensation for Buy-In on Failure to Timely Deliver Shares

If we fail to timely deliver the Conversion Shares to the holder, and if after the required delivery date the holder is required by its broker to purchase (in an open market transaction or otherwise) or the holder or its brokerage firm otherwise purchases, shares of Common Stock to deliver in satisfaction of a sale by the holder of the Conversion Shares which the holder anticipated receiving upon such conversion or exercise (a "Buy-In"), then we are obligated to (A) pay in cash to the holder the amount, if any, by which (x) the holder's total purchase price (including brokerage commissions, if any) for the shares of Common Stock so purchased, minus any amounts paid to the holder by us as liquidated damages for late delivery of such shares, exceeds (y) the amount obtained by multiplying (1) the number of Conversion Shares that we were required to deliver times (2) the price at which the

[Table of Contents](#)

sell order giving rise to such purchase obligation was executed, and (B) at the option of the holder, either reinstate the portion of the Series B Preferred Stock and equivalent number of Conversion Shares for which such conversion was not honored (in which case such conversion shall be deemed rescinded) or deliver to the holder the number of shares of Common Stock that would have been issued had we timely complied with its conversion and delivery obligations.

If we grant, issue or sell any Common Stock equivalents pro rata to the record holders of any class of shares of Common Stock (the “Purchase Rights”), then a holder of Series B Preferred Stock will be entitled to acquire, upon the terms applicable to such Purchase Rights, the aggregate Purchase Rights which the holder could have acquired if the holder had held the number of shares of Common Stock acquirable upon conversion of the Series B Preferred Stock (without regard to any limitations on conversion). If we declare or make any dividend or other distribution of its assets (or rights to acquire its assets) to holders of Common Stock, then a holder of Series B Preferred Stock is entitled to participate in such distribution to the same extent as if the holder had held the number of shares of Common Stock acquirable upon complete conversion of the Series B Preferred Stock (without regard to any limitations on conversion).

Fundamental Transaction

If, at any time while the Series B Preferred Stock is outstanding, (i) the Company, directly or indirectly, in one or more related transactions effects any merger or consolidation of the Company with or into another person, (ii) the Company, directly or indirectly, effects any sale, lease, license, assignment, transfer, conveyance or other disposition of all or substantially all of its assets in one or a series of related transactions, (iii) any, direct or indirect, purchase offer, tender offer or exchange offer (whether by the Company or another person) is completed pursuant to which holders of Common Stock are permitted to sell, tender or exchange their shares for other securities, cash or property and has been accepted by the holders of 50% or more of the outstanding Common Stock, (iv) the Company, directly or indirectly, in one or more related transactions effects any reclassification, reorganization or recapitalization of the Common Stock or any compulsory share exchange pursuant to which the Common Stock is effectively converted into or exchanged for other securities, cash or property, or (v) the Company, directly or indirectly, in one or more related transactions consummates a stock or share purchase agreement or other business combination (including, without limitation, a reorganization, recapitalization, spin-off or scheme of arrangement) with another person whereby such other person acquires more than 50% of the outstanding shares of Common Stock (not including any shares of Common Stock held by the other person or other persons making or party to, or associated or affiliated with the other persons making or party to, such stock or share purchase agreement or other business combination) (each a “Series B Preferred Stock Fundamental Transaction”), then the Series B Preferred Stock automatically converts and the holder will receive, for each Conversion Share that would have been issuable upon such conversion immediately prior to the occurrence of such Series B Preferred Stock Fundamental Transaction (without regard to the Beneficial Ownership Limitation), the number of shares of Common Stock of the successor or acquiring corporation or of the Company, if it is the surviving corporation, and any additional consideration (the “Series B Preferred Stock Alternate Consideration”) receivable as a result of such Series B Preferred Stock Fundamental Transaction by a holder of the number of shares of Common Stock for which the Series B Preferred Stock is convertible immediately prior to such Series B Preferred Stock Fundamental Transaction (without regard to the Beneficial Ownership Limitation). For purposes of any such conversion, the determination of the conversion ratio will be appropriately adjusted to apply to such Series B Preferred Stock Alternate Consideration based on the amount of Alternate Consideration issuable in respect of one share of Common Stock in such Series B Preferred Stock Fundamental Transaction. If holders of Common Stock are given any choice as to the securities, cash or property to be received in a Series B Preferred Stock Fundamental Transaction, then the holder will be given the same choice as to the Series B Preferred Stock Alternate Consideration it receives upon automatic conversion of the Series B Preferred Stock following such Fundamental Transaction.

[Table of Contents](#)

The Warrants

The following is a summary of all material terms and provisions of the Warrants that are being offered hereby, the form of which has been filed as an exhibit to the registration statement of which this prospectus is a part. Prospective investors should carefully review the terms and provisions of the form of Warrant for a complete description of the terms and conditions of the Warrants.

Duration and Exercise Price

Each Warrant offered hereby will have an exercise price equal to \$ _____ per 0.025 share of Series B Preferred Stock. The Warrants will be immediately exercisable and may be exercised until the 18-month anniversary of the Charter Amendment Date, at which time they will be automatically exercised on a cashless basis. The exercise price and number of shares of Series B Preferred Stock issuable upon exercise is subject to appropriate adjustment in the event of stock dividends, stock splits, reorganizations or similar events affecting Series B Preferred Stock and the exercise price. The Warrants will be issued separately from the Common Stock or Pre-Funded Warrants sold as part of the Units or Pre-Funded Units, respectively, and may be transferred separately immediately thereafter. Warrants will be issued in certificated form only.

Exercisability

The Warrants will be exercisable, at the option of each holder, in whole or in part, by delivering to us a duly executed exercise notice accompanied by payment in full for the number of shares of Series B Preferred Stock purchased upon such exercise (except in the case of a cashless exercise as discussed below).

Cashless Exercise

If, at the time a holder exercises its Warrants, a registration statement registering the issuance of the shares of Series B Preferred Stock underlying the Warrants under the Securities Act is not then effective or available for the issuance of such shares, then in lieu of making the cash payment otherwise contemplated to be made to us upon such exercise in payment of the aggregate exercise price, the holder may elect instead to receive upon such exercise (either in whole or in part) the net number of shares of Series B Preferred Stock determined according to a formula set forth in the Warrant. The Warrants will be automatically exercised on a cashless basis on the expiration date.

[Table of Contents](#)

Fundamental Transactions

In the event of any fundamental transaction, as described in the Warrants and generally including any merger with or into another entity, sale of all or substantially all of our assets, tender offer or exchange offer, or reclassification of Common Stock, then upon any subsequent exercise of a Warrant, the holder will have the right to receive as alternative consideration, for each share of Common Stock that the holder would have received upon such holder's exercise of the Warrant into shares of Series B Preferred Stock and the conversion of such shares of Series B Preferred Stock to shares of Common Stock (without giving effect to any limitation on conversion as a result of the Series B Preferred Stock Beneficial Ownership Limitation) immediately prior to the occurrence of such fundamental transaction, the number of shares of common stock of the successor or acquiring corporation or of our company, if it is the surviving corporation, and any additional consideration receivable upon or as a result of such transaction by a holder of the number of shares of Common Stock for which the holder would have received upon such holder's exercise of the Warrant into shares of Series B Preferred Stock and the conversion of such shares of Series B Preferred Stock to shares of Common Stock (without giving effect to any limitation on conversion as a result of the Series B Preferred Stock Beneficial Ownership Limitation) immediately prior to the occurrence of such fundamental transaction.

Transferability

Subject to applicable laws and a standard legend with regard to restriction on transfer only in compliance with a public offering or an available exemption therefrom, the Warrant may be transferred at the option of the holder upon surrender of the Warrant to us together with the appropriate instruments of transfer.

No Listing

There is no established trading market for the Warrants, and we do not expect an active trading market to develop. We do not intend to apply to list the Warrants on any securities exchange or other trading market. Without a trading market, the liquidity of the Warrants will be extremely limited.

Right as a Stockholder

Except as otherwise provided in the Warrants or by virtue of the holder's ownership of shares of Series B Preferred Stock, such holder of Warrants does not have the rights or privileges of a holder of Series B Preferred Stock, including any voting rights, until such holder exercises such holder's Warrants.

Waivers and Amendments

No term of the Warrants may be amended or waived without the written consent of the holder of such warrant.

Pre-Funded Warrants

The following is a summary of all material terms and provisions of the Pre-Funded Warrants that are being offered hereby, the form of which has been filed as an exhibit to the registration statement of which this prospectus is a part. Prospective investors should carefully review the terms and provisions of the form of Pre-Funded Warrant for a complete description of the terms and conditions of the Pre-Funded Warrants.

Pre-funded warrants provide any purchaser in this offering with the ability to purchase Pre-Funded Units (each Pre-Funded Unit consisting of one Pre-Funded Warrant to purchase one share of Common Stock and one Warrant to purchase 0.025 share of Series B Preferred Stock) in lieu of Units that would otherwise result in the purchaser's beneficial ownership exceeding 4.99% of our outstanding Common Stock (or, at the election of the purchaser, 9.99%). This is accomplished through purchasing Pre-Funded Warrants at a price equal to the purchase price for Units, less \$0.01, which \$0.01 is the exercise price for the Pre-Funded Warrants. Each Pre-Funded Warrant is exercisable into one share of Common Stock as offered hereunder. Thus, the purchaser is paying essentially the purchase price for a Unit at closing of the offering but is not deemed to beneficially own the shares of Common Stock included in the Units until the purchaser exercises the Pre-Funded Warrant. Once purchased, the purchase price of the Pre-Funded Warrants is not refundable. While the Pre-Funded Warrants permit waiver of provisions by us and the holder of the Pre-Funded Warrants, this would not affect the pre-funding as that is the purchase price of the instrument which is paid at the time of closing and becomes part of our proceeds received from this offering. In addition, the Pre-Funded Warrants are perpetual and do not have an expiration date.

[Table of Contents](#)

Duration and Exercise Price

Each Pre-Funded Warrant will have an outstanding exercise price per share equal to \$0.01. The Pre-Funded Warrants will be immediately exercisable and may be exercised at any time until the Pre-Funded Warrants are exercised in full. The exercise price and number of shares of Common Stock issuable upon exercise is subject to appropriate adjustment in the event of stock dividends, stock splits, reorganizations or similar events affecting Common Stock and the exercise price. The Pre-Funded Warrants will be issued separately from the accompanying Warrants included in the Pre-Funded Units, and may be transferred separately immediately thereafter.

Exercisability

The Pre-Funded Warrants will be exercisable, at the option of each holder, in whole or in part, by delivering to us a duly executed exercise notice accompanied by payment in full for the number of shares of Common Stock purchased upon such exercise (except in the case of a cashless exercise as discussed below). A holder (together with its affiliates) may not exercise any portion of the Pre-Funded Warrant to the extent that the holder would own more than 4.99% of the outstanding Common Stock immediately after exercise, except that upon at least 61 days' prior notice from the holder to us, the holder may increase the amount of ownership of outstanding Common Stock after exercising the holder's Pre-Funded Warrants up to 9.99% of the number of shares of Common Stock outstanding immediately after giving effect to the exercise, as such percentage ownership is determined in accordance with the terms of the Pre-Funded Warrants. Purchasers of Pre-Funded Units in this offering may also elect prior to the issuance of the Pre-Funded Warrants to have the initial exercise limitation set at 9.99% of our outstanding Common Stock.

Cashless Exercise

If, at the time a holder exercises its Pre-Funded Warrants, there is no effective registration statement registering, or the prospectus contained therein is not available for an issuance of the shares of Common Stock underlying the Pre-Funded Warrants to the holder, then in lieu of making the cash payment

otherwise contemplated to be made to us upon such exercise in payment of the aggregate exercise price, the holder may elect instead to exercise its Pre-Funded Warrants on a cashless basis and receive upon such exercise (either in whole or in part) the net number of shares of Common Stock determined according to a formula set forth in the Pre-Funded Warrant.

Fundamental Transactions

In the event of any fundamental transaction, as described in the Pre-Funded Warrants and generally including any merger with or into another entity, sale of all or substantially all of our assets, tender offer or exchange offer, or reclassification of Common Stock, then upon any subsequent exercise of a Pre-Funded Warrant, the holder will have the right to receive as alternative consideration, for each share of Common Stock that would have been issuable upon such exercise immediately prior to the occurrence of such fundamental transaction, the number of shares of Common Stock of the successor or acquiring corporation or of our company, if it is the surviving corporation, and any additional consideration receivable upon or as a result of such transaction by a holder of the number of shares of Common Stock for which the Pre-Funded Warrant is exercisable immediately prior to such event.

Transferability

Subject to applicable laws, a Pre-Funded Warrant may be transferred at the option of the holder upon surrender of the Pre-Funded Warrant to us together with the appropriate instruments of transfer.

Fractional Shares

No fractional shares of Common Stock will be issued upon the exercise of the Pre-Funded Warrants. Rather, the number of shares of Common Stock to be issued will be rounded up to the nearest whole number.

Trading Market

There is no established trading market for the Pre-Funded Warrants on any securities exchange or nationally recognized trading system, and we do not expect an active trading market to develop. We do not intend to list the

[Table of Contents](#)

Pre-Funded Warrants on any securities exchange or other trading market. Without a trading market, the liquidity of the Pre-Funded Warrants will be extremely limited.

Right as a Stockholder

Except as otherwise provided in the Pre-Funded Warrants or by virtue of the holder's ownership of shares of Common Stock, such holder of Pre-Funded Warrants does not have the rights or privileges of a holder of Common Stock, including any voting rights, until such holder exercises such holder's Pre-Funded Warrants.

[Table of Contents](#)

UNDERWRITING

We have entered into an underwriting agreement dated _____, 2018, with H.C. Wainwright & Co., LLC as the sole book-running manager of this offering. Subject to the terms and conditions of the underwriting agreement, we have agreed to sell to the underwriter and the underwriter has agreed to purchase from us, at the public offering price less the underwriting discounts and commissions set forth on the cover page of this prospectus. The public offering price shown on the cover page of this prospectus was determined by negotiation between us and the underwriter at the time of pricing, and may be at a discount to the current market price.

A copy of the underwriting agreement has been filed as an exhibit to the registration statement of which this prospectus is a part. The shares we are offering are being offered by the underwriter subject to certain conditions specified in the underwriting agreement.

We have been advised by the underwriter that it proposes to offer the shares directly to the public at the public offering price set forth on the cover page of this prospectus. Any shares sold by the underwriter to securities dealers will be sold at the public offering price less a selling concession not in excess of \$ _____ per share.

The underwriting agreement provides that the underwriter's obligation to purchase the securities we are offering is subject to conditions contained in the underwriting agreement. The underwriter is obligated to purchase and pay for all of the securities offered by this prospectus.

No action has been taken by us or the underwriter that would permit a public offering of our securities in any jurisdiction where action for that purpose is required. None of the securities included in this offering may be offered or sold, directly or indirectly, nor may this prospectus or any other offering material or advertisements in connection with the offer and sales of any of the securities be distributed or published in any jurisdiction, except under circumstances that will result in compliance with the applicable rules and regulations of that jurisdiction. Persons who receive this prospectus are advised to inform themselves about and to observe any restrictions relating to this offering of the securities and the distribution of this prospectus. This prospectus is neither an offer to sell nor a solicitation of any offer to buy the securities in any jurisdiction where that would not be permitted or legal.

The underwriter has advised us that it does not intend to confirm sales to any accounts over which it exercises discretionary authority.

Underwriting Discounts, Commissions and Expenses

We have agreed to pay an underwriter discount equal to 8% of the aggregate gross proceeds raised in this offering.

The following table shows the public offering price, underwriting discounts and commissions and proceeds, before expenses to us. These amounts are shown assuming both no exercise and full exercise of the underwriter's option to purchase additional securities.

	Per Unit	Per Pre-Funded Unit	Total	
			Without Option Exercise	With Full Option Exercise
Public offering price				
Underwriting discounts and commissions				
Proceeds, before expenses, to us				

We estimate the total expenses payable by us for this offering to be approximately \$2.8 million, which amount includes (i) an assumed underwriting discounts and commissions of \$2.0 million (\$2.3 million if the underwriter's option to purchase additional securities is exercised in full) based upon the assumed public offering price per Unit of \$0.46 (the last reported sale price of Common Stock on the Nasdaq Capital Market on April 25, 2018), (ii) an assumed management fee in the amount of \$250,000 which represents 1.0% of the assumed aggregate offering price,

[Table of Contents](#)

(iii) \$50,000 non-accountable expense allowance payable to the underwriter, (iv) reimbursement of the accountable expenses of the underwriter equal to \$110,000 (none of which has been paid in advance), including the legal fees of the underwriter being paid by us, and (v) other estimated expenses of approximately \$371,000 which include legal, accounting, printing costs and various fees associated with the registration and listing of our shares.

Right of First Refusal

We have also granted the underwriter, for a period of 10 months from the closing date of this offering, a right of first refusal to act as sole book-running manager for each and every future public or private equity or debt offering by us or any of our successors or subsidiaries. We have also agreed to a tail fee equal to the cash and warrant compensation in this offering if any investor to which the underwriter introduced us with respect to this offering during the term of its engagement provides us with further capital in a public or private offering or capital raising transaction, with certain exceptions, during the 6-month period following termination of our engagement of the underwriter.

Option to Purchase Additional Securities

We have granted the underwriter the option to purchase up to 8,152,174 additional shares of Common Stock at a purchase price of \$ per share and/or Warrants to purchase up to an aggregate of 203,804 shares of Series B Preferred Stock at a purchase price of \$0.01 per Warrant with an exercise price of \$ per 0.025 share of Series B Preferred Stock, less the underwriting discounts and commissions. The underwriter may exercise its option at any time and from time to time within 30 days from the date of this prospectus. If any additional securities are purchased pursuant to the option, the underwriter will offer these securities on the same terms as those on which the other securities are being offered hereby.

Listing

Common Stock is currently traded on the Nasdaq Capital Market under the symbol "ONTX." On April 25, 2018, the last reported sale price of Common Stock was \$0.46 per share. We do not intend to apply for listing of the Pre-Funded Warrants, the Warrants or the Series B Preferred Stock on any securities exchange or other nationally recognized trading system. There is no established public trading market for the Pre-Funded Warrants, the Warrants or the Series B Preferred Stock, and we do not expect a market to develop.

Lock-up Agreements

Our officers and directors and certain of our stockholders have agreed with the underwriter to be subject to a lock-up period of 90 days following the date of this prospectus. This means that, during the applicable lock-up period, such persons may not offer for sale, contract to sell, sell, distribute, grant any option, right or warrant to purchase, pledge, hypothecate or otherwise dispose of, directly or indirectly, any shares of Common Stock or any securities convertible into, or exercisable or exchangeable for, shares of Common Stock. Certain limited transfers are permitted during the lock-up period if the transferee agrees to these lock-up restrictions. We have also agreed in the underwriting agreement, subject to certain exceptions, to similar lock-up restrictions on the issuance and sale of our securities for 120 days from the date of this prospectus. The underwriter may, in its sole discretion and without notice, waive the terms of any of these lock-up agreements.

[Table of Contents](#)

Insider Participation

One or more of our directors have indicated interests in purchasing approximately 10% of the Units to be sold in this offering at the public offering price and on the same terms as the other purchasers in this offering. However, because indications of interest are not binding agreements or commitments to purchase, the underwriter could determine to sell more, fewer or no Units to our director(s) in this offering, or our director(s) could determine to purchase more, fewer or no Units in this offering.

Company Lock-Up Waiver Agreement

In connection with our underwritten public offering of securities closed on February 12, 2018 (the "February 2018 Offering"), we agreed to certain restrictions (the "Company Lock-Up") set forth in Section 5(j) of the Underwriting Agreement dated as of February 8, 2018 (the "February 2018 Underwriting Agreement") between us and H.C. Wainwright & Co., LLC, as the underwriter for the February 2018 Offering. Under the Company Lock-Up,

during a period of one hundred and thirty-five (135) days from February 8, 2018, we will not, without the prior written consent of H.C. Wainwright & Co., LLC, (i) offer, pledge, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, lend or otherwise transfer or dispose of, directly or indirectly, or announce the issuance or proposed issuance of, any Common Stock or any securities convertible into or exercisable or exchangeable for Common Stock or (ii) enter into any swap or other agreement that transfers, in whole or in part, any of the economic consequences of ownership of Common Stock, whether any such transaction described in clause (i) or (ii) above is to be settled by delivery of Common Stock or such other securities, in cash or otherwise, subject to certain exceptions.

In connection with this offering, on April 16, 2018, we entered into a Lock-Up Waiver Agreement (the “Lock-Up Waiver Agreement”) with H.C. Wainwright & Co., LLC and certain holders of the Company’s preferred stock warrants issued in the February 2018 Offering (the “Preferred Stock Warrants”), pursuant to which (i) H.C. Wainwright & Co., LLC waived the Company Lock-Up solely with respect to this offering, and (ii) we agree to reduce the exercise price of the Preferred Stock Warrants such that the exercise price of the Preferred Stock Warrants shall be equal to 105% of the public offering price of Common Stock sold in this offering (but only to the extent that such public offering price is lower than the current exercise price of the Preferred Stock Warrants) and that such repricing shall be effective concurrently with the closing of this offering.

Stabilization, Short Positions and Penalty Bids

The underwriter may engage in syndicate covering transactions, stabilizing transactions and penalty bids or purchases for the purpose of pegging, fixing or maintaining the price of Common Stock:

- Syndicate covering transactions involve purchases of securities in the open market after the distribution has been completed in order to cover syndicate short positions. Such a naked short position would be closed out by buying securities in the open market. A naked short position is more likely to be created if the underwriter is concerned that there could be downward pressure on the price of the securities in the open market after pricing that could adversely affect investors who purchase in the offering.
- Stabilizing transactions permit bids to purchase the underlying security so long as the stabilizing bids do not exceed a specific maximum.
- Penalty bids permit the underwriter to reclaim a selling concession from a syndicate member when the securities originally sold by the syndicate member are purchased in a stabilizing or syndicate covering transaction to cover syndicate short positions.

These syndicate covering transactions, stabilizing transactions and penalty bids may have the effect of raising or maintaining the market prices of our securities or preventing or retarding a decline in the market prices of our securities. As a result, the price of Common Stock may be higher than the price that might otherwise exist in the open market. Neither we nor the underwriter make any representation or prediction as to the effect that the transactions described above may have on the price of Common Stock. These transactions may be effected on the Nasdaq Capital Market, in the over-the-counter market or on any other trading market and, if commenced, may be discontinued at any time.

In connection with this offering, the underwriter also may engage in passive market making transactions in Common Stock in accordance with Regulation M during a period before the commencement of offers or sales of shares of Common Stock in this offering and extending through the completion of the distribution. In general, a passive market maker must display its bid at a price not in excess of the highest independent bid for that security. However, if all independent bids are lowered below the passive market maker’s bid that bid must then be lowered when specific purchase limits are exceeded. Passive market making may stabilize the market price of the securities at a level above that which might otherwise prevail in the open market and, if commenced, may be discontinued at any time.

Neither we nor the underwriter make any representation or prediction as to the direction or magnitude of any effect that the transactions described above may have on the prices of our securities. In addition, neither we nor the underwriter make any representation that the underwriter will engage in these transactions or that any transactions, once commenced, will not be discontinued without notice.

Indemnification

We have agreed to indemnify the underwriter against certain liabilities, including certain liabilities arising under the Securities Act, or to contribute to payments that the underwriter may be required to make for these liabilities.

Other Relationships

The underwriter and its respective affiliates have engaged in, and may in the future engage in, investment banking and other commercial dealings in the ordinary course of business with us or our affiliates. The underwriter has received, or may in the future receive, customary fees and commissions for these transactions. The underwriter of this offering also acted as underwriter in our offering consummated in February 2018, for which it received compensation.

[Table of Contents](#)

EXPERTS

The consolidated financial statements of Onconova Therapeutics, Inc. at December 31, 2017 and 2016, and for the years then ended, appearing in our Annual Report (Form 10-K) for the year ended December 31, 2017 have been audited by Ernst & Young LLP, independent registered public accounting firm, as set forth in their report thereon (which contains an explanatory paragraph describing conditions that raise substantial doubt about the Company’s ability to continue as a going concern as described in Note 1 to the consolidated financial statements) included therein and incorporated herein by reference. Such financial statements are incorporated herein by reference in reliance upon such report given on the authority of such firm as experts in accounting and auditing.

LEGAL MATTERS

The validity of the securities being offered by this prospectus will be passed upon by Morgan, Lewis & Bockius LLP, Philadelphia, Pennsylvania. The underwriter is being represented in connection with this offering by Lowenstein Sandler LLP, New York, New York.

WHERE YOU CAN FIND MORE INFORMATION

We file annual, quarterly and current reports, proxy and information statements and other information with the SEC. Our SEC filings, including the registration statement, are available to the public from the SEC's website at www.sec.gov. To receive copies of public records not posted to the SEC's website at prescribed rates, you may complete an online form at www.sec.gov, send a fax to (202) 772-9337 or submit a written request to the SEC, Office of FOIA/PA Operations, 100 F Street, N.E., Washington, D.C. 20549. Please call the SEC at 1-800-SEC-0330 for further information.

We also make available free of charge on our website, www.onconova.com, all materials that we file electronically with the SEC, including our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, Section 16 reports and amendments to those reports as soon as reasonably practicable after such materials are electronically filed with, or furnished to, the SEC. Information contained on our website or any other website is not incorporated by reference into this prospectus and does not constitute a part of this prospectus.

INCORPORATION BY REFERENCE

The SEC allows us to "incorporate by reference" the information we file with it, which means that we can disclose important information to you by referring you to those documents. The information incorporated by reference is considered to be part of this prospectus, and information that we file later with the SEC will automatically update and supersede this information. We incorporate by reference the documents listed below:

- Our Annual Report on Form 10-K for the fiscal year ended December 31, 2017 that we filed with the SEC on March 16, 2018, as amended by Amendment No.1 thereto filed with the SEC on April 25, 2018;
- Our definitive proxy statement for our 2018 Special Meeting of Stockholders filed with the SEC on February 28, 2018;
- Our Current Reports on Form 8-K filed with the SEC on January 17, 2018, January 30, 2018, February 6, 2018, February 8, 2018, March 8, 2018, March 22, 2018, April 19, 2018 and April 23, 2018;
- The description of Common Stock contained in our registration statement on Form 8-A filed on July 23, 2013 (Registration no. 001-36020) with the SEC, including any amendment or report filed for the purpose of updating such description; and
- All documents filed by us with the SEC pursuant to Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act on or after the date of this prospectus and before we terminate the offering under this prospectus.

36

[Table of Contents](#)

We will provide without charge to each person, including any beneficial owner, to whom this prospectus is delivered, upon his or her written or oral request, a copy of any or all documents referred to above which have been or may be incorporated by reference into this prospectus but not delivered with this prospectus excluding exhibits to those documents unless they are specifically incorporated by reference into those documents. You can request those documents from us, at no cost, by writing or telephoning us at: Onconova Therapeutics, Inc., 375 Pheasant Run, Newtown, Pennsylvania, 18940, (267) 759-3680, Attention: Suzanne Hutchinson.

The most recent information that we file with the SEC automatically updates and supersedes older information. The information contained in any such filing will be deemed to be a part of this prospectus, commencing on the date on which the filing is made.

Information furnished under Items 2.02 or 7.01 (or corresponding information furnished under Item 9.01 or included as an exhibit) in any past or future Current Report on Form 8-K that we file with the SEC, unless otherwise specified in such report, is not incorporated by reference in this prospectus.

37

[Table of Contents](#)



Onconova Therapeutics, Inc.

Up to 54,347,826 Units (each Unit contains one Share of Common Stock and one Warrant to purchase 0.025 share of Series B Convertible Preferred Stock)

Up to 54,347,826 Pre-Funded Units (each Pre-Funded Unit contains one Pre-Funded Warrant to purchase one Share of Common Stock and one Warrant to purchase 0.025 share of Series B Convertible Preferred Stock)

(Up to 1,358,696 shares of Series B Convertible Preferred Stock Underlying the Warrants) and

(Up to 54,347,826 Shares of Common Stock Underlying the Pre-Funded Warrants)

, 2018

[Table of Contents](#)

PART II
Information Not Required In Prospectus

Item 13. Other Expenses of Issuance and Distribution.

The following is a statement of estimated expenses in connection with the issuance and distribution of the securities being registered, excluding dealer-manager fees. All expenses incurred with respect to the registration of the Common Stock will be borne by us. All amounts are estimates except the SEC registration fee, the FINRA filing fee and the Nasdaq listing of additional shares notification fee.

	Amount to be Paid
SEC Registration Fee	\$ 7,159
FINRA Filing Fee	9,125
Nasdaq Fee	5,000
Printing Expenses	30,000
Legal Fees and Expenses	200,000
Accounting Fees and Expenses	78,000
Transfer Agent Fees and Expenses	20,000
Miscellaneous Expenses	22,164
Total	<u>\$ 371,448</u>

Item 14. Indemnification of Directors and Officers.

We are incorporated under the laws of the State of Delaware. Section 145 of the Delaware General Corporation Law provides that a Delaware corporation may indemnify any persons who are, or are threatened to be made, parties 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 such corporation), by reason of the fact that such person was an officer, director, employee or agent of such corporation, or is or was serving at the request of such person as an officer, director, employee or agent of another corporation or enterprise. The indemnity may include expenses (including attorneys' fees), judgments, fines and amounts paid in settlement actually and reasonably incurred by such person in connection with such action, suit or proceeding, provided that such person acted in good faith and in a manner he or she reasonably believed to be in or not opposed to the corporation's best interests and, with respect to any criminal action or proceeding, had no reasonable cause to believe that his or her conduct was illegal. A Delaware corporation may indemnify any persons who are, or are threatened to be made, a party to any threatened, pending or completed action or suit by or in the right of the corporation by reason of the fact that such person was a director, officer, employee or agent of such corporation, or is or was serving at the request of such corporation as a director, officer, employee or agent of another corporation or enterprise. The indemnity may include expenses (including attorneys' fees) actually and reasonably incurred by such person in connection with the defense or settlement of such action or suit provided that such person acted in good faith and in a manner he or she reasonably believed to be in or not opposed to the corporation's best interests except that no indemnification is permitted without judicial approval if the officer or director is adjudged to be liable to the corporation. Where an officer or director is successful on the merits or otherwise in the defense of any action referred to above, the corporation must indemnify him

II-1

[Table of Contents](#)

or her against the expenses which such officer or director has actually and reasonably incurred. Our certificate of incorporation and bylaws provide for the indemnification of our directors and officers to the fullest extent permitted under the Delaware General Corporation Law.

Section 102(b)(7) of the Delaware General Corporation Law permits a corporation to provide in its certificate of incorporation that a director of the corporation shall not be personally liable to the corporation or its stockholders for monetary damages for breach of fiduciary duties as a director, except for liability for any:

- transaction from which the director derives an improper personal benefit;
- act or omission not in good faith or that involves intentional misconduct or a knowing violation of law;
- unlawful payment of dividends or redemption of shares; or
- breach of a director's duty of loyalty to the corporation or its stockholders.

Our certificate of incorporation includes such a provision. Expenses incurred by any officer or director in defending any such action, suit or proceeding in advance of its final disposition shall be paid by us upon delivery to us of an undertaking, by or on behalf of such director or officer, to repay all amounts so advanced if it shall ultimately be determined that such director or officer is not entitled to be indemnified by us.

As permitted by the Delaware General Corporation Law, we have entered into indemnification agreements with our directors and executive officers. These agreements, among other things, require us to indemnify each director and officer to the fullest extent permitted by law and advance expenses to each indemnitee in connection with any proceeding in which indemnification is available.

At present, there is no pending litigation or proceeding involving any of our directors or executive officers as to which indemnification is required or permitted, and we are not aware of any threatened litigation or proceeding that may result in a claim for indemnification.

We have an insurance policy covering our officers and directors with respect to certain liabilities, including liabilities arising under the Securities Act.

Item 15. Recent Sales of Unregistered Securities.

On April 4, 2018, the Company sold 816,945 shares of Common Stock to Pint Pharma GmbH for \$1,250,000 in connection with the Company's License, Development and Commercialization Agreement with Pint Pharma International SA and the related Securities Purchase Agreement with Pint Pharma GmbH. The sale of such shares was not registered under the Securities Act because it was made in a transaction exempt from registration under Section 4(a)(2) of the Securities Act and/or Rule 506 promulgated thereunder.

On March 26, 2018, the Company agreed to issue to World Wide Holdings, LLC d/b/a Invictus Resources ("Invictus"), in connection with that certain Master Services Agreement between the Company and Invictus, warrants for Common Stock. The warrants issuable as of March 26, 2018 are exercisable for (i) 75,000 shares of Common Stock at a price of \$0.94 per share of Common Stock and (ii) 125,000 shares of Common Stock at a price of \$1.41 per share of Common Stock. The sale of such securities to Invictus was not registered under the Securities Act because it was made in a transaction exempt from registration under Section 4(a)(2) of the Securities Act and/or Rule 506 promulgated thereunder.

On February 12, 2018, the Company issued warrants to H.C. Wainwright & Co., LLC as additional underwriter compensation in connection with an underwritten offering of securities of the Company. These warrants are exercisable for 49,737.5 shares of Series A Preferred Stock, which are convertible into 497,375 shares of Common Stock subject to the terms of the Series A Preferred Stock. These warrants have an exercise price of \$1.2625 per 0.1 share of Series A Preferred Stock. The sale of such securities to H.C. Wainwright & Co., LLC was not registered under the Securities Act because it was made in a transaction exempt from registration under Section 4(a)(2) of the Securities Act and/or Rule 506 promulgated thereunder.

On October 8, 2015, the Company entered into the Purchase Agreement with Lincoln Park, pursuant to which the Company has the right to sell to, and Lincoln Park is obligated to purchase from the Company, up to \$16.5 million in shares of the Company's Common Stock, subject to certain limitations, from time to time, over the 36-month period commencing on the date that this registration statement is declared effective by the SEC and a final prospectus in connection therewith is filed. On October 8, 2015, Lincoln Park purchased 846,755 shares of the

[Table of Contents](#)

Company's Common Stock for a total purchase price of \$1,500,000 as an initial purchase under the Purchase Agreement and the Company issued 200,000 shares of Common Stock pursuant to the terms of the Purchase Agreement as consideration for its commitment to purchase additional shares of Common Stock under the Purchase Agreement. The sale of such shares to Lincoln Park was not registered under the Securities Act because it was made in a transaction exempt from registration under Section 4(a)(2) of the Securities Act and/or Rule 506 promulgated thereunder.

On January 5, 2016, the Company entered into a Securities Purchase Agreement (the "Purchase Agreement") with an institutional investor (the "Investor") providing for the issuance and sale by the Company of 1,936,842 shares of the Company's Common Stock at a purchase price of \$0.95 per share and warrants to purchase 968,421 shares of the Company's Common Stock (the "Private Placement Warrants") for aggregate gross proceeds of \$1,840,000. The shares of the Company's Common Stock were offered pursuant to an effective shelf registration statement on Form S-3, declared effective by the SEC on November 20, 2014 (File No. 333-199219). The Private Placement Warrants were issued and sold without registration under the Securities Act in reliance on the exemptions provided by Section 4(a)(2) of the Securities Act and/or Regulation D promulgated thereunder and in reliance upon similar exemptions under applicable state laws. Each Private Placement Warrant shall be initially exercisable on the six (6) month anniversary of the issuance date at an exercise price equal to \$1.15 per share of Common Stock, subject to customary adjustments, and have a term of exercise of five (5) years from the initial exercise date. H.C. Wainwright & Co., LLC acted as the Company's exclusive placement agent for the issuance and sale of the shares of Common Stock and Private Placement Warrants, and was paid a cash fee equal to 7.5% of the gross proceeds received by the Company from the sale of the securities in the transactions and was reimbursed by the Company for up to \$50,000 in expenses.

Item 16. Exhibits and Financial Statement Schedules.

(a) Exhibits

The exhibits to the registration statement are listed in the Exhibit Index to this registration statement and are incorporated herein by reference.

(b) Financial statement schedules

All schedules have been omitted because either they are not required, are not applicable or the information is otherwise set forth in the financial statements and related notes thereto.

Item 17. Undertakings.

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 of 1933 (the "Act");

(ii) To reflect in the prospectus any facts or events arising after the effective date of this registration statement (or the most recent post-effective amendment thereof) which, individually or in the aggregate, represent a fundamental change in the information in the 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% 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.

II-3

[Table of Contents](#)

Provided, however, that Paragraphs (1)(i), (1)(ii) and (1)(iii) of this section 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 the 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 Act, each such post-effective amendment 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.

(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 of the registrant under the Securities Act of 1933 to any purchaser in the initial distribution of the securities, the undersigned registrant undertakes 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 a seller 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 (§230.424 of this chapter);

(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 its 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.

The undersigned registrant hereby undertakes that, for purposes of determining any liability under the Securities Act of 1933, each filing of the registrant's annual report pursuant to section 13(a) or section 15(d) of the Securities Exchange Act of 1934 (and, where applicable, each filing of an employee benefit plan's annual report pursuant to section 15(d) of the Securities Exchange Act of 1934) that is incorporated by reference in the registration statement 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.

Insofar as indemnification for liabilities arising under the Securities Act of 1933 may be permitted to directors, officers and controlling persons of the registrant pursuant to the foregoing provisions, or otherwise, the registrant has been advised that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in the 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 is against public policy as expressed in the Act and will be governed by the final adjudication of such issue.

The undersigned registrant hereby undertakes that:

(1) For purposes of determining any liability under the Securities Act of 1933, the information omitted from the form of prospectus filed as part of this registration statement in reliance upon Rule 430A and contained in a

II-4

[Table of Contents](#)

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.

(2) For the purpose of determining any liability under the Securities Act of 1933, 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.

[Table of Contents](#)

EXHIBIT INDEX

Exhibit Number	Exhibit Description
1.1	Form of Underwriting Agreement
3.1	Tenth Amended and Restated Certificate of Incorporation of Onconova Therapeutics, Inc. (Incorporated by reference to Exhibit 3.1 to the Company's Current Report on Form 8-K filed on July 30, 2013).
3.2	Amended and Restated Bylaws of Onconova Therapeutics, Inc. (Incorporated by reference to Exhibit 3.1 to the Company's Current Report on Form 8-K filed on July 30, 2013).
3.3	Certificate of Amendment to Tenth Amended and Restated Certificate of Incorporation of Onconova Therapeutics, Inc. (Incorporated by reference to Exhibit 3.1 to the Company's Current Report on Form 8-K filed on May 31, 2016).
3.4	Certificate of Designation of Series A Convertible Preferred Stock (Incorporated by reference to Exhibit 3.1 to the Company's Current Report on Form 8-K filed on February 8, 2018).
3.5	Certificate of Amendment to Tenth Amended and Restated Certificate of Incorporation of Onconova Therapeutics, Inc., as amended (Incorporated by reference to Exhibit 3.1 to the Company's Current Report on Form 8-K filed on March 22, 2018).
3.6	Certificate of Designation of Series B Convertible Preferred Stock
4.1	Form of Certificate of Common Stock (Incorporated by reference to Exhibit 4.1 to Pre-Effective Amendment No. 1 the Company's Registration Statement on Form S-1 filed on July 11, 2013).
4.2	Eighth Amended and Restated Stockholders' Agreement, effective as of July 27, 2012, by and among Onconova Therapeutics, Inc. and certain stockholders named therein (Incorporated by reference to Exhibit 4.2 to Pre-Effective Amendment No. 1 to the Company's Registration Statement on Form S-1 filed on July 11, 2013).
4.3	Amendment No. 1 to Eighth Amended and Restated Stockholders' Agreement, effective as of July 9, 2013 (Incorporated by reference to Exhibit 4.2 to Pre-Effective Amendment No. 1 the Company's Registration Statement on Form S-1 filed on July 11, 2013).
4.4	Form of Warrant Certificate issued pursuant to Warrant Agreement, dated as of July 27, 2016, by and between Onconova Therapeutics, Inc. and Wells Fargo Bank, N.A., as Warrant Agent (Incorporated by reference to Exhibit 4.1 to the Company's Quarterly Report on Form 10-Q filed on August 15, 2016).
4.5	Warrant Agreement, dated as of July 27, 2016, by and between Onconova Therapeutics, Inc. and Wells Fargo Bank, N.A., as Warrant Agent (Incorporated by reference to Exhibit 4.2 to the Company's Quarterly Report on Form 10-Q filed on August 15, 2016).
4.6	Form of Pre-Funded Warrants issued as of July 27, 2016 (Incorporated by reference to Exhibit 4.3 to the Company's Quarterly Report on Form 10-Q filed on August 15, 2016).
4.7	Form of Underwriter Warrant issued as of February 12, 2018 (Incorporated by reference to Exhibit 4.1 to the Company's Current Report on Form 8-K filed on February 8, 2018).
4.8	Form of Preferred Stock Warrant issued as of February 12, 2018 (Incorporated by reference to Exhibit 4.2 to the Company's Current Report on Form 8-K filed on February 8, 2018).
4.9	Form of Pre-Funded Warrant issued as of February 12, 2018 (Incorporated by reference to Exhibit 4.3 to the Company's Current Report on Form 8-K filed on February 8, 2018).

[Table of Contents](#)

4.10**	Form of Warrant
4.11**	Form of Pre-Funded Warrant
5.1	Opinion of Morgan, Lewis & Bockius LLP
10.1*	Development and License Agreement, effective as of September 19, 2012, by and between Onconova Therapeutics, Inc. and Baxter Healthcare SA (Incorporated by reference to Exhibit 10.1 to Pre-Effective Amendment No. 2 the Company's Registration Statement on Form S-1 filed on July 18, 2013).
10.2*	License Agreement, effective as of July 5, 2011, by and between Onconova Therapeutics, Inc. and SymBio Pharmaceuticals Limited (Incorporated by reference to Exhibit 10.2 to Pre-Effective Amendment No. 2 the Company's Registration Statement on Form S-1 filed on July 18, 2013).
10.3*	First Amendment to License Agreement, effective as of September 2, 2011, by and between Onconova Therapeutics, Inc. and SymBio

- [Pharmaceuticals Limited \(Incorporated by reference to Exhibit 10.3 to the Company's Registration Statement on Form S-1 filed on June 14, 2013\).](#)
- 10.4* [License Agreement, effective as of January 1, 1999, by and between Onconova Therapeutics, Inc. and Temple University—Of The Commonwealth System of Higher Education \(Incorporated by reference to Exhibit 10.4 to the Company's Registration Statement on Form S-1 filed on June 14, 2013\).](#)
- 10.5* [Amendment to License Agreement, effective as of September 1, 2000, by and between Temple University—Of The Commonwealth System of Higher Education and Onconova Therapeutics, Inc. \(Incorporated by reference to Exhibit 10.5 to the Company's Registration Statement on Form S-1 filed on June 14, 2013\).](#)
- 10.6* [Amendments to Exclusive License Agreement, effective as of March 21, 2013, by and between Temple University—Of The Commonwealth System of Higher Education and Onconova Therapeutics, Inc. \(Incorporated by reference to Exhibit 10.6 to the Company's Registration Statement on Form S-1 filed on June 14, 2013\).](#)
- 10.7* [Limited Liability Company Agreement of GBO, LLC, dated as of December 12, 2012, by and between Onconova Therapeutics, Inc. and GVK Biosciences Private Limited \(Incorporated by reference to Exhibit 10.12 to the Company's Registration Statement on Form S-1 filed on June 14, 2013\).](#)
- 10.8 [Onconova Therapeutics, Inc. 2007 Equity Compensation Plan, and forms of agreement thereunder \(Incorporated by reference to Exhibit 10.13 to Pre-Effective Amendment No. 1 the Company's Registration Statement on Form S-1 filed on July 11, 2013\).](#)
- 10.9 [Employment Agreement, effective as of July 1, 2015, by and between Onconova Therapeutics, Inc. and Ramesh Kumar, Ph.D. \(Incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on July 8, 2015\).](#)
- 10.10 [Letter Agreement, effective as of January 1, 2016, by and between Onconova Therapeutics, Inc. and Ramesh Kumar, Ph.D. \(Incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K filed on February 17, 2016\).](#)
- 10.11 [Amended and Restated Employment Agreement, effective as of July 1, 2015, by and between Onconova Therapeutics, Inc. and Thomas McKearn, M.D., Ph.D. \(Incorporated by reference to](#)
-

[Table of Contents](#)

- [Exhibit 10.2 to the Company's Current Report on Form 8-K filed on July 8, 2015\).](#)
- 10.12 [Amended and Restated Employment Agreement, effective as of July 1, 2015, by and between Onconova Therapeutics, Inc. and Ajay Bansal. \(Incorporated by reference to Exhibit 10.4 to the Company's Current Report on Form 8-K filed on July 8, 2015\).](#)
- 10.13 [Consulting Agreement, effective as of January 1, 2012, by and between Onconova Therapeutics, Inc. and E. Premkumar Reddy, Ph.D., including Consultant Agreement Renewal, dated February 27, 2013 \(Incorporated by reference to Exhibit 10.23 to the Company's Registration Statement on Form S-1 filed on June 14, 2013\).](#)
- 10.14 [Form of Indemnification Agreement entered into by and between Onconova Therapeutics, Inc. and each director and executive officer \(Incorporated by reference to Exhibit 10.24 to Pre-Effective Amendment No. 1 the Company's Registration Statement on Form S-1 filed on July 11, 2013\).](#)
- 10.15 [Onconova Therapeutics, Inc. 2013 Equity Compensation Plan, and forms of agreement thereunder \(Incorporated by reference to Exhibit 10.25 to Pre-Effective Amendment No. 1 the Company's Registration Statement on Form S-1 filed on July 11, 2013\).](#)
- 10.16 [Onconova Therapeutics, Inc. 2013 Performance Bonus Plan \(Incorporated by reference to Exhibit 10.26 to Pre-Effective Amendment No. 1 the Company's Registration Statement on Form S-1 filed on July 11, 2013\).](#)
- 10.17 [Employment Agreement, effective as of July 1, 2015, by and between Onconova Therapeutics, Inc. and Dr. Manoj Manair \(Incorporated by reference to Exhibit 10.3 to the Company's Current Report on Form 8-K filed on July 8, 2015\).](#)
- 10.18 [Employment Agreement, effective as of July 1, 2015, by and between Onconova Therapeutics, Inc. and Mark Guerin \(Incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K filed on February 17, 2016\).](#)
- 10.19 [Amended and Restated Employment Agreement, effective as of July 1, 2015, by and between Onconova Therapeutics, Inc. and Steven M. Fruchtman, M.D. \(Incorporated by reference to Exhibit 10.5 to the Company's Quarterly Report on Form 10-Q filed on August 13, 2015\).](#)
- 10.20 [Purchase Agreement between Onconova Therapeutics, Inc. and Lincoln Park Capital Fund, LLC, dated October 8, 2015 \(Incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on October 8, 2015\).](#)
- 10.21 [Dealer-Manager Agreement dated July 7, 2016, between Onconova Therapeutics, Inc. and Maxim Group LLC \(Incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on July 13, 2016\).](#)
- 10.22 [At Market Issuance Sales Agreement, dated December 5, 2016, between Onconova Therapeutics, Inc. and FBR Capital Markets & Co. \(Incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on December 5, 2016\).](#)
- 10.23 [Letter Agreement, effective as of January 1, 2017, by and between Onconova Therapeutics, Inc. and Ramesh Kumar, Ph.D. \(Incorporated by reference to Exhibit 10.27 to the Company's Annual Report on Form 10-K filed on March 29, 2017\).](#)

- 21.1 [Subsidiaries of Onconova Therapeutics, Inc. \(Incorporated by reference to Exhibit 21.1 to the Company's Annual Report on Form 10-K filed on March 16, 2018\).](#)
- 23.1 [Consent of Ernst & Young, LLP.](#)

[Table of Contents](#)

- 23.2 [Consent of Morgan, Lewis & Bockius LLP \(included in Exhibit 5.1\).](#)
- 24.1** [Power of Attorney \(included on the signature page\).](#)

* Confidential treatment has been requested with respect to certain portions of this exhibit. Omitted portions have been filed separately with the Securities and Exchange Commission.

** Previously filed

[Table of Contents](#)

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-1 and has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized, in Newtown, Pennsylvania on April 26, 2018.

Onconova Therapeutics, Inc.

By: /s/ RAMESH KUMAR, PH.D

Name: Ramesh Kumar, Ph.D

Title: *President and Chief Executive Officer*

Pursuant to the requirements of the Securities Act of 1933, this registration statement has been signed by the following persons in the capacities indicated on April 26, 2018.

<u>Name</u>	<u>Title</u>
<u>/s/ RAMESH KUMAR, PH.D.</u> Ramesh Kumar, Ph.D.	Director, President and Chief Executive Officer (Principal Executive Officer)
<u>/s/ MARK GUERIN</u> Mark Guerin	Chief Financial Officer (Principal Financial Officer and Principal Accounting Officer)
<u>*</u> Henry S. Bienen, Ph.D.	Director
<u>*</u> Jerome E. Groopman, M.D.	Director
<u>*</u> Michael B. Hoffman	Chairman, Board of Directors
<u>*</u> James J. Marino	Director
<u>*</u> Viren Mehta, Pharm.D	Director
<u>*</u> E. Premkumar Reddy, Ph.D	Director
<u>*</u> Jack E. Stover	Director

*By: /s/ Ramesh Kumar, Ph.D.

Name: Ramesh Kumar, Ph.D., Attorney-in-Fact

[] Shares of Common Stock

Pre-Funded Warrants to Purchase [] Shares of Common Stock

and

[] Warrants to Purchase [] Shares of Series B Convertible Preferred Stock

Onconova Therapeutics, Inc.

UNDERWRITING AGREEMENT

April [], 2018

H.C. Wainwright & Co., LLC
430 Park Avenue, 4th Floor
New York, New York 10022

Ladies and Gentlemen:

Onconova Therapeutics, Inc. a Delaware corporation (the “Company”), proposes to issue and sell to H.C. Wainwright & Co., LLC (the “Underwriter”) an aggregate of [] Units (as defined below) and [] Pre-Funded Units (as defined below) representing (i) an aggregate of (a) [] shares (the “Firm Shares”) of the common stock, par value \$0.01 per share, of the Company (“Common Stock”) and (b) pre-funded warrants to purchase [] shares of Common Stock at an exercise price of \$0.01 per share (the “Pre-Funded Warrants”); and (ii) [] warrants (the “Firm Warrants” and, collectively with the Firm Shares and the Pre-Funded Warrants, the “Firm Securities”) to purchase an aggregate of [] shares of the Series B Convertible Preferred Stock, par value \$0.01 per share, of the Company (“Series B Preferred Stock”). The amount and form of the Firm Securities to be purchased by the Underwriter is set forth opposite its name on **Schedule I** hereto. The Company also proposes to sell to the Underwriter, at the option of the Underwriter, up to an additional [] shares of Common Stock (the “Option Shares”) and/or [] warrants to purchase up to an aggregate of [] shares of Series B Preferred Stock (the “Option Warrants” and, together with the Option Shares, the “Option Securities”). The Firm Shares and the Option Shares are hereinafter referred to collectively as the “Shares”; the Firm Warrants and the Option Warrants are collectively referred to herein as the “Warrants”; the

shares of Series B Preferred Stock issuable upon exercise of the Warrants and the shares of Common Stock issuable upon exercise of the Pre-Funded Warrants are collectively referred to herein as the “Warrant Shares”; the shares of Common Stock issuable upon conversion of the Series B Preferred Stock issuable under the Warrants are collectively referred to as the “Conversion Shares”; and the Firm Securities, the Option Securities and the Warrant Shares are hereinafter referred to collectively as the “Securities”. The Shares and/or Pre-Funded Warrants and the Warrants shall be sold together as a fixed combination, each consisting of (i) one share of Common Stock or one Pre-Funded Warrant, and (ii) one Warrant to purchase 0.025 of a share of Series B Preferred Stock, with each combination consisting of one share of Common Stock and one Warrant to purchase 0.025 of a share of Preferred Stock being referred to herein as a “Unit” and each combination consisting of one Pre-Funded Warrant to purchase one Share of Common Stock and one Warrant to purchase 0.025 Share of Preferred Stock being referred to herein as a “Pre-Funded Unit.” The Shares and/or Pre-Funded Warrants and the Warrants in each of the Units or Pre-Funded Units, as applicable, shall be immediately separable and transferable upon issuance. The terms of the Warrants are set forth in the form of Warrant attached hereto as **Exhibit 1** and the terms of the Pre-Funded Warrants are set forth in the form of Pre-Funded Warrant attached hereto as **Exhibit 2**. Units and the Pre-Funded Units will not be issued or certificated. The shares of Common Stock or Pre-Funded Warrants, as the case may be, and the Warrants can only be purchased together but the securities contained in the Units or Pre-Funded units will be issued separately.

The Company confirms as follows its agreements with the Underwriter.

1. (a) The Company represents and warrants to, and agrees with, the Underwriter that, as of the date hereof and as of the Closing Date and each Option Closing Date, if any:
 - (i) A registration statement of the Company on Form S-1 (File No. 333-224315) in respect of the Securities and one or more pre-effective amendments thereto (collectively, the “Initial Registration Statement”) have been filed with the Securities and Exchange Commission (the “Commission”); the Initial Registration Statement and any post-effective amendment thereto, each in the form heretofore delivered to you, have been declared effective by the Commission in such form; other than a registration statement, if any, increasing the size of the offering (a “Rule 462(b) Registration Statement”), filed pursuant to Rule 462(b) under the Securities Act of 1933, as amended (the “Securities Act”), which became effective upon filing, no other document with respect to the Initial Registration Statement has heretofore been filed with the Commission; no stop order suspending the effectiveness of the Initial Registration Statement, any post-effective amendment thereto or the Rule 462(b) Registration Statement, if any, has been issued, no proceeding for that purpose has been initiated or, to the Company’s knowledge, threatened by the Commission and any request on the part of the Commission for additional information from the Company has been satisfied in all material respects; any preliminary prospectus included in the Initial Registration Statement, as originally filed or as part of any amendment thereto, or filed with the Commission pursuant to Rule 424(a) of the rules and regulations of the Commission under the Securities Act is hereinafter called a “Preliminary Prospectus”; the various parts of the Initial Registration Statement and the Rule 462(b)

Registration Statement, if any, including (i) all documents incorporated or deemed to be incorporated by reference therein, (ii) all schedules and exhibits thereto and (iii) the information contained in the form of final prospectus filed with the Commission pursuant to Rule 424(b) under the Securities Act and deemed by virtue of Rule 430A under the Securities Act to be part of the Initial Registration Statement at the time it was declared effective or such part of the Rule 462(b) Registration Statement, if any, became or hereafter becomes effective, each as amended at the time such part of the Initial Registration Statement became effective, are hereinafter collectively called the “Registration Statement”; the Preliminary Prospectus relating to the Securities that was included in the Registration Statement immediately prior to the Applicable Time (as defined in Section 1(a)(iii) hereof) is hereinafter called the “Pricing Prospectus”;

such final prospectus, in the form first filed pursuant to Rule 424(b) under the Securities Act, is hereinafter called the “Prospectus”; and any “issuer free writing prospectus” as defined in Rule 433 under the Securities Act relating to the Securities is hereinafter called an “Issuer Free Writing Prospectus”; and all references to the Registration Statement, any Preliminary Prospectus, the Pricing Prospectus, the Prospectus, any Issuer Free Writing Prospectus or any amendment or supplement to any of the foregoing shall be deemed to include the copy filed with the Commission pursuant to its Electronic Data Gathering, Analysis and Retrieval system (“EDGAR”). From the time of initial filing of the Initial Registration Statement with the Commission (or, if earlier, the first date on which the Company engaged directly or through any person authorized to act on its behalf in any Testing-the-Waters Communication) through the date hereof, the Company has been and is an “emerging growth company,” as defined in Section 2(a) of the Securities Act (an “Emerging Growth Company”). Any reference to “amend”, “amendment” or “supplement” with respect to the Registration Statement, the Rule 462 Registration Statement, any Preliminary Prospectus, the Pricing Prospectus, the Initial Registration Statement, the Pricing Disclosure Package (as defined below) or the Prospectus shall be deemed to refer to and include any documents filed after the effective date of the Initial Registration Statement, the Registration Statement or the Rule 462 Registration Statement or the date of such Preliminary Prospectus, the Pricing Prospectus, the Pricing Disclosure Package or the Prospectus, as the case may be under the Securities Exchange Act of 1934, as amended, and the rules and regulations of the Commission thereunder (collectively, the “Exchange Act”) that are deemed to be incorporated by reference therein. “Testing-the-Waters Communication” means any oral or written communication with potential investors undertaken in reliance on Section 5(d) of the Securities Act;

(ii) (1) at the respective times the Initial Registration Statement, any Rule 462(b) Registration Statement and any post-effective amendments thereto became effective and at the Closing Date (as defined herein) (and, if any Option Shares are purchased, at each Option Closing Date) (as defined herein), the Initial Registration Statement, any Rule 462(b) Registration Statement and any amendments and supplements thereto complied and will comply in all material respects with the requirements of the Securities Act and the rules and regulations of the Commission thereunder (the “Rules and Regulations”) and did not and will not contain an untrue statement of a material fact or omit to state a material fact required to be stated therein or necessary to make the statements therein not misleading, and (2) at the time the Prospectus or any amendments or supplements thereto were issued and at the Closing Date (and, if any Option Shares are purchased, at each Option Closing Date), neither the Prospectus nor any amendment or supplement thereto included or will include an untrue statement of a material fact or omitted or will omit to state a material fact necessary in order to make the statements therein, in the light of

3

the circumstances under which they were made, not misleading; provided that the representations and warranties in clauses (1) and (2) above shall not apply to statements in or omissions from the Registration Statement or the Prospectus made in reliance upon and in strict conformity with information furnished to the Company in writing by the Underwriter expressly for use in the Registration Statement or the Prospectus or any amendment or supplement thereto, it being understood and agreed that the only such information provided by the Underwriter is that described as such in Section 9(b) hereof. No order preventing or suspending the use of any Preliminary Prospectus, the Pricing Prospectus or any Issuer Free Writing Prospectus has been issued by the Commission;

Each Preliminary Prospectus, Pricing Prospectus, Issuer Free Writing Prospectus and the Prospectus filed as part of the Initial Registration Statement as originally filed or as part of any amendment thereto, or filed pursuant to Rule 424 under the Securities Act, complied when so filed in all material respects with the requirements of the Securities Act and the Rules and Regulations and each Preliminary Prospectus, Pricing Prospectus, Issuer Free Writing Prospectus and the Prospectus delivered to the Underwriter for use in connection with this offering was identical to the electronically transmitted copies thereof filed with the Commission pursuant to EDGAR, except to the extent permitted by Regulation S-T;

(iii) For the purposes of this Agreement, the “Applicable Time” is [6:00 a.m.] (Eastern time) on the date of this Agreement; the Pricing Prospectus as supplemented by the Issuer Free Writing Prospectuses, if any, issued at or prior to the Applicable Time and by the Written Testing-the-Waters Communications (as hereinafter defined), together with the information set forth in Schedule I hereto, taken together (collectively, the “Pricing Disclosure Package”) as of the Applicable Time, did not include any untrue statement of a material fact or omit to state any material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading; and each Issuer Free Writing Prospectus, if any, and/or Written Testing-the-Waters Communication listed on Schedule II hereto does not conflict with the information contained in the Registration Statement, the Pricing Prospectus or the Prospectus and each such Issuer Free Writing Prospectus and/or Written Testing-the-Waters Communication, as supplemented by and taken together with the Pricing Disclosure Package as of the Applicable Time, did not include any untrue statement of a material fact or omit to state any material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading; provided, however, that this representation and warranty shall not apply to statements or omissions made in an Issuer Free Writing Prospectus or Written Testing-the-Waters Communication in reliance upon and in conformity with the information furnished in writing to the Company by the Underwriter expressly for use therein;

(iv) The Company has filed a registration statement pursuant to the Exchange Act, to register the Common Stock, and such registration statement has been declared effective; the Company is not, and at the time of filing the Initial Registration Statement, was not an “ineligible issuer,” as defined under Rule 405 under the Securities Act;

(v) Each of the Company and its subsidiaries (each a “Subsidiary”) has been duly incorporated and is validly existing as a corporation or other entity in good standing

4

under the laws of its jurisdiction or organization, with power and authority (corporate and other) to own its properties and conduct its business as currently being carried on and as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, and, in the case of the Company, to enter into and perform its obligations under this Agreement, the Warrants and the Pre-Funded Warrants, and have been duly qualified as a foreign corporation or other entity for the transaction of business and is in good standing under the laws of each other jurisdiction in which it owns or leases properties or conducts any business so as to require such qualification, except where the failure to so qualify or be in good standing would not have a material adverse effect on the general affairs, business, prospects, management, properties, operations, condition (financial or otherwise) or results of operations of the Company and its Subsidiaries, taken as a whole (a “Material Adverse Effect”);

(vi) The Company has an authorized capitalization as set forth in the Pricing Prospectus, and all of the issued and outstanding shares of capital stock of the Company have been duly authorized and validly issued, are fully paid and non-assessable and conform to the descriptions

thereof contained in the Pricing Prospectus; and none of the issued and outstanding shares of capital stock of the Company are subject to any preemptive or similar rights;

(vii) The Securities which may be issued and sold by the Company to the Underwriter hereunder have been duly authorized and, when issued, delivered and paid for by the Underwriter in accordance with the terms of this Agreement will be validly issued and fully paid and non-assessable and will conform to the descriptions thereof contained in the Prospectus; and, except as otherwise stated in the Registration Statement, in the Pricing Disclosure Package and in the Prospectus, the issuance of such Securities is not subject to any preemptive or similar rights; the Company has filed the Certificate of Designation governing the terms of the Series B Preferred Stock with the Secretary of State of the State of Delaware (the "Certificate of Designation") and the Warrant Shares, when issued, paid for and delivered upon due exercise of the Warrants or the Pre-Funded Warrants, as applicable, will be duly authorized and validly issued, fully paid and non-assessable, free and clear from any preemptive or similar rights, and will be issued in compliance with all applicable securities laws. The Warrant Shares have been reserved for issuance. The Securities and the Conversion Shares, when issued, will conform in all material respects to the descriptions thereof set forth in the Registration Statement, in the Pricing Disclosure Package and in the Prospectus. Upon the approval of the Company's stockholders as required by Delaware law ("Stockholder Approval") of an amendment to the Company's Tenth Amended and Restated Certificate of Incorporation, as amended, to sufficiently increase the number of shares of Common Stock authorized for issuance to cover the conversion of all then-outstanding shares of Series B Preferred Stock into shares of Common Stock (the "Charter Amendment") and the filing of the Charter Amendment with the Secretary of State of the State of Delaware, the Conversion Shares shall be reserved for issuance and, the Conversion Shares, when issued, and delivered upon due conversion of the Warrant Shares, as applicable, will be duly authorized and validly issued, fully paid and non-assessable, free and clear from any preemptive or similar rights, and will be issued in compliance with all applicable securities laws.

(viii) This Agreement, the Warrants and the Pre-Funded Warrants, as applicable, have been duly authorized, executed and delivered by the

5

Company. This Agreement constitutes the legal, valid and binding obligation of the Company and is enforceable against the Company in accordance with its terms, except as enforceability may be limited by applicable bankruptcy, insolvency, reorganization, moratorium or similar laws affecting creditors' rights generally or subject to general principles of equity (regardless of whether such enforceability is considered in a proceeding in equity or at law), and except as enforceability of any indemnification or contribution provision may be limited under foreign, federal or state securities laws. When issued, the Warrants and the Pre-Funded Warrants will constitute the legal, valid and binding obligations of the Company, including to issue and sell, upon exercise thereof and payment of the respective exercise prices therefor, the number and type of securities of the Company called for thereby in accordance with the terms thereof, and such Warrants and Pre-Funded Warrants are enforceable against the Company in accordance with their respective terms, except as enforceability may be limited by applicable bankruptcy, insolvency, reorganization, moratorium or similar laws affecting creditors' rights generally or subject to general principles of equity (regardless of whether such enforceability is considered in a proceeding in equity or at law), and except as enforceability of any indemnification or contribution provision may be limited under foreign, federal or state securities laws;

(ix) The issue and sale of the Securities to be sold by the Company hereunder and under the Warrants and the Pre-Funded Warrants, as applicable, the execution hereof and thereof by the Company and the compliance by the Company with all of the provisions hereof and thereof and the consummation of the transactions herein and therein contemplated will not (1) conflict with or result in a breach or violation of any of the terms or provisions of, or constitute a default under, any indenture, mortgage, deed of trust, loan agreement or other agreement or instrument to which the Company or any of the Subsidiaries is a party or by which the Company or any of the Subsidiaries is bound or to which any of the material property or assets of the Company or any of the Subsidiaries is subject, (2) result in any violation of the provisions of the certificate or articles of incorporation or by-laws (or other organization documents) of the Company or any of the Subsidiaries or any statute or any order, rule or regulation of any court or governmental agency or body having jurisdiction over the Company or any of the Subsidiaries or any of their material properties or (3) require the consent, approval, authorization, order, registration or qualification of or with any such court or governmental agency or body for the issue and sale of the Securities to be sold by the Company hereunder and under the Warrants and the Pre-Funded Warrants, as applicable, or the consummation by the Company of the transactions contemplated hereby and thereby, except the registration under the Securities Act of the Securities and such consents, approvals, authorizations, registrations or qualifications as may be required under state securities, Blue Sky laws, the filing of the Certificate of Designation with the Secretary of State of the State of Delaware, obtaining Stockholder Approval and the filing of the Charter Amendment with the Secretary of State of the State of Delaware, or the rules and regulations of the Nasdaq Stock Market, LLC or the Financial Industry Regulatory Authority in connection with the purchase and distribution of the Securities by the Underwriter;

(x) Ernst & Young, LLP, who have certified certain financial statements of the Company, are independent public accountants as required by the Securities Act and the Rules and Regulations. The financial statements, together with related schedules and notes,

6

incorporated in the Registration Statement and the Pricing Prospectus comply in all material respects with the requirements of the Securities Act and present fairly the consolidated financial position, results of operations and changes in financial position of the Company on the basis stated in the Registration Statement at the respective dates or for the respective periods to which they apply; such statements and related notes have been prepared in accordance with United States generally accepted accounting principles ("GAAP") consistently applied throughout the periods involved, except as disclosed therein; and the selected financial data and the summary financial data included in the Pricing Prospectus present fairly the information shown therein and have been compiled on a basis consistent with that of the financial statements incorporated in the Registration Statement. The pro forma financial statements of the Company and the related notes thereto incorporated in the Registration Statement and the Pricing Prospectus present fairly the information shown therein, have been prepared in accordance with the Commission's rules and guidelines with respect to pro forma financial statements and have been properly compiled on the bases described therein, and the assumptions used in the preparation thereof are reasonable and the adjustments used therein are appropriate to give effect to the transactions and circumstances referred to therein. The interactive data in eXtensible Business Reporting Language included or incorporated by reference in the Registration Statement fairly presents the information called for in all material respects and has been prepared in accordance with the Commission's rules and guidelines applicable thereto;

(xi) Neither the Company nor any Subsidiary has sustained since the date of the latest audited financial statements included in the Pricing Prospectus any material loss or interference with its business from fire, explosion, flood or other calamity, whether or not covered by insurance, or from any labor dispute or court or governmental action, order or decree, otherwise than as set forth or contemplated in the Pricing Prospectus; and, since the

respective dates as of which information is given in the Registration Statement and the Pricing Prospectus, (1) there has not been any change in the capital stock (other than the issuance of shares of Common Stock upon the exercise or conversion of securities, or the grant of options, restricted stock or other equity-based awards under the Company's existing equity compensation plans) or long-term debt of the Company or any of the Subsidiaries, (2) there has not been any Material Adverse Effect, or any development that would reasonably be expected to result in a Material Adverse Effect, in or affecting the general affairs, business, prospects, management, financial position, shareholders' equity or results of operations of the Company and the Subsidiaries, taken as a whole, (3) there have been no transactions entered into by, and no obligations or liabilities, contingent or otherwise, incurred by the Company or any of the Subsidiaries, whether or not in the ordinary course of business, which are material to the Company and the Subsidiaries, taken as a whole or (4) there has been no dividend or distribution of any kind declared, paid or made by the Company on any class of its capital stock, in each case, otherwise than as set forth or contemplated in the Pricing Prospectus;

(xii) Neither the Company nor any of the Subsidiaries is (1) in violation of its certificate or articles of incorporation or bylaws (or other organization documents) or (2) in violation of any law, ordinance, administrative or governmental rule or regulation applicable to the Company or any of the Subsidiaries, or (3) in violation of any decree of any court or governmental agency or body having jurisdiction over the Company or any of the Subsidiaries, or (4) in default in the performance of any obligation, agreement or condition contained in any bond,

7

debenture, note or any other evidence of indebtedness or in any agreement, indenture, lease or other instrument to which the Company or any of the Subsidiaries is a party or by which any of them or any of their respective properties may be bound, except, in the case of clauses (2), (3) and (4), where any such violation or default, individually or in the aggregate, would not have a Material Adverse Effect;

(xiii) Each of the Company and each Subsidiary has good and marketable title to all real and tangible property described in the Pricing Prospectus as being owned by it, in each case free and clear of all liens, encumbrances and defects except such as are described in the Pricing Prospectus or are not material to the business of the Company or any Subsidiary; and any real property and buildings described in the Pricing Prospectus as being held under lease by the Company or any Subsidiary are held under valid, subsisting and enforceable leases with such exceptions as are not material and do not materially interfere with the use made and proposed to be made of such property and buildings by the Company or any Subsidiary;

(xiv) Other than as set forth in the Pricing Disclosure Package, there are no legal or governmental proceedings pending to which the Company or any of the Subsidiaries is a party or of which any property of the Company or any of the Subsidiaries is the subject which, if determined adversely to the Company or the Subsidiary, individually or in the aggregate, would have or may reasonably be expected to have a Material Adverse Effect, or would prevent or impair the consummation of the transactions contemplated by this Agreement and by the Warrants and the Pre-Funded Warrants, or which are required to be described in the Registration Statement or the Pricing Prospectus; and, to the Company's knowledge, no such proceedings are threatened or contemplated by governmental authorities or others;

(xv) The Company and the Subsidiaries possess all permits, licenses, approvals, consents and other authorizations (collectively, "Permits") issued by the appropriate federal, state, local or foreign regulatory agencies or bodies necessary to conduct the businesses now operated by them; the Company and the Subsidiaries are in compliance with the terms and conditions of all such Permits and all of the Permits are valid and in full force and effect, except, in each case, where the failure so to comply or where the invalidity of such Permits or the failure of such Permits to be in full force and effect, individually or in the aggregate, would not have a Material Adverse Effect; and neither the Company nor any Subsidiary has received any notice of proceedings relating to the revocation or material modification of any such Permits;

(xvi) No material labor dispute with the employees of the Company or the Subsidiaries exists, or, to the knowledge of the Company, is imminent. The Company is not aware of any existing or imminent labor disturbance by the employees of any of its or any Subsidiary's principal suppliers, manufacturers, customers or contractors, which, individually or in the aggregate, may reasonably be expected to result in a Material Adverse Effect;

(xvii) The Company and the Subsidiaries are insured by insurers of recognized financial responsibility against such losses and risks and in such amounts as are prudent and customary in the businesses in which they are engaged; neither the Company nor any Subsidiary has been refused any insurance coverage sought or applied for; and the Company has no reason to believe that either it or any Subsidiary will not be able to renew its existing insurance

8

coverage as and when such coverage expires or to obtain similar coverage from similar insurers as may be necessary to continue its business at a cost that would not have a Material Adverse Effect;

(xviii) The Company and each of its Subsidiaries have made and keep books, records and accounts, which, in reasonable detail, accurately and fairly reflect in all material respects the transactions and dispositions of the assets of the Company and its Subsidiaries. The Company maintains a system of internal accounting controls sufficient to provide reasonable assurance that (1) transactions are executed in accordance with management's general or specific authorizations; (2) transactions are recorded as necessary to permit preparation of financial statements in conformity with GAAP and to maintain accountability for assets; (3) access to assets is permitted only in accordance with management's general or specific authorization; (4) the recorded accountability for assets is compared with the existing assets at reasonable intervals and appropriate action is taken with respect to any differences; and (5) the interactive data in eXtensible Business Reporting Language included or incorporated by reference in the Registration Statement is in conformity with GAAP and is updated as necessary to comply in all material respects with the requirements of the Securities Act and the Commission's rules and guidelines applicable thereto and present fairly the consolidated financial position, results of operations and changes in financial position of the Company and the Subsidiaries on the basis stated in the Registration Statement at the respective dates or for the respective periods to which they apply;

(xix) Other than as set forth in the Pricing Disclosure Package, since the date of the latest audited financial statements included in the Pricing Prospectus, (a) the Company has not been advised of (1) any significant deficiencies in the design or operation of internal controls that could adversely affect the ability of the Company and each of its Subsidiaries to record, process, summarize and report financial data, or any material weaknesses in internal controls and (2) any fraud, whether or not material, that involves management or other employees who have a significant role in the internal controls of the Company and each of its Subsidiaries, and (b) since that date, there has been no change in the Company's internal control over financial reporting that has materially affected, or is reasonably likely to materially affect, the Company's internal control over financial reporting;

(xx) The Company maintains disclosure controls and procedures (as such term is defined in Rule 13a-15 (e) of the Exchange Act) that comply with the requirements of the Exchange Act; such disclosure controls and procedures are effective in all material respects to perform the functions for which they were established;

(xxi) All U.S. federal income tax returns of the Company and the Subsidiaries required by law to be filed have been filed and all taxes shown by such returns or otherwise assessed, which are due and payable, have been paid, except assessments against which appeals have been or will be promptly taken and as to which adequate reserves have been provided. The Company and the Subsidiaries have filed all other tax returns that are required to have been filed by them pursuant to applicable foreign, state, local or other law, except insofar as the failure to file such returns, individually or in the aggregate, would not result in a Material Adverse Effect, and have paid all taxes due pursuant to such returns or pursuant to any assessment received by the Company or any Subsidiary except for such taxes, if any, as are being contested in good faith and as to which adequate reserves have been provided. The charges, accruals and reserves on the

9

books of the Company and the Subsidiaries in respect of any income and corporation tax liability for any years not finally determined are adequate in all material respects to meet any assessments or re-assessments for additional income tax for any years not finally determined;

(xxii) There are no statutes, regulations, documents or contracts of a character required to be described in the Registration Statement or the Pricing Prospectus or to be filed as an exhibit to the Registration Statement which are not described or filed as required;

(xxiii) Neither the Company nor any of the Subsidiaries is in violation of any statute or any rule, regulation, decision or order of any governmental agency or body or any court, domestic or foreign, relating to the use, production, disposal or release of hazardous or toxic substances or relating to the protection or restoration of the environment or human exposure to hazardous or toxic substances (collectively, "environmental laws"), owns or operates any real property contaminated with any substance that is subject to any environmental laws, is liable for any off-site disposal or contamination pursuant to any environmental laws, or is subject to any claim relating to any environmental laws, which violation, contamination, liability or claim, individually or in the aggregate, would have a Material Adverse Effect; and the Company is not aware of any pending investigation which would reasonably be expected to lead to such a claim;

(xxiv) Each employee benefit plan, within the meaning of Section 3(3) of the Employee Retirement Income Security Act of 1974, as amended ("ERISA"), that is maintained, administered or contributed to by the Company or any Subsidiary for employees or former employees of the Company and its affiliates has been maintained in compliance with its terms and the requirements of any applicable statutes, orders, rules and regulations, including but not limited to ERISA and the Internal Revenue Code of 1986, as amended (the "Code"), except to the extent that failure to so comply, individually or in the aggregate, would not have a Material Adverse Effect. No prohibited transaction, within the meaning of Section 406 of ERISA or Section 4975 of the Code has occurred with respect to any such plan excluding transactions effected pursuant to a statutory or administrative exemption;

(xxv) Neither the Company nor any of its Subsidiaries, or any director, officer, nor, to the Company's knowledge, agent, employee or other person associated with or acting on behalf of the Company or any of its Subsidiaries, has (i) used any corporate funds for any unlawful contribution, gift, entertainment or other unlawful expense relating to political activity; (ii) made any direct or indirect unlawful payment to any foreign or domestic government official or employee from corporate funds, (iii) violated or is in violation of any provision of the Foreign Corrupt Practices Act of 1977, as amended, or (iv) made any bribe, unlawful rebate, payoff, influence payment, kickback or other unlawful payment;

(xxvi) Solely to the extent that the Sarbanes-Oxley Act of 2002, as amended, and the rules and regulations promulgated in connection therewith (the "Sarbanes-Oxley Act"), including Section 402 related to loans and Sections 302 and 906 related to certifications, are or have been applicable to the Company, there is and has been no failure on the part of the Company or any of the Company's directors or officers, in their capacities as such, to comply in all material respects with any applicable provisions of the Sarbanes-Oxley Act;

10

(xxvii) Except as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, the Company owns or has valid, binding and enforceable licenses or other rights under the patents, patent applications, licenses, inventions, copyrights, know how (including trade secrets and other unpatented and/or unpatentable proprietary or confidential information, systems or procedures), trademarks, service marks, trade names or other intellectual property necessary for, or used in the conduct, or the proposed conduct, of the business of the Company in the manner described in the Registration Statement, the Pricing Disclosure Package and the Prospectus (collectively, the "Intellectual Property"); the patents, trademarks, and copyrights, if any, included within the Intellectual Property are valid, enforceable, and subsisting; other than as disclosed in the Registration Statement, the Pricing Disclosure Package and the Prospectus, (A) the Company is not obligated to pay a material royalty, grant a license to, or provide other material consideration to any third party in connection with the Intellectual Property, (B) the Company has not received any notice of any claim of infringement, misappropriation or conflict with any asserted rights of others with respect to any of the Company's drug candidates, services, conduct of the business, processes or Intellectual Property, (C) to the knowledge of the Company, neither the conduct of the business, sale nor use of any of the discoveries, inventions, drug candidates, services or processes of the Company referred to in the Registration Statement, the Pricing Disclosure Package or the Prospectus do or will infringe, misappropriate or violate any right or valid patent claim of any third party, (D) none of the technology employed by the Company has been obtained or is being used by the Company in material violation of any contractual obligation binding on the Company or, to the Company's knowledge, upon any of its officers, directors or employees or otherwise in violation of the rights of any persons, (E) to the knowledge of the Company, no third party has any ownership right in or to any Intellectual Property that is owned by the Company, other than any co-owner of any patent constituting Intellectual Property who is listed on the records of the U.S. Patent and Trademark Office (the "USPTO") and any co-owner of any patent application constituting Intellectual Property who is named in such patent application, and, to the knowledge of the Company, no third party has any ownership right in or to any Intellectual Property in any field of use that is exclusively licensed to the Company, other than any licensor to the Company of such Intellectual Property, (F) there is no infringement by third parties of any Intellectual Property, (G) there is no pending or, to the Company's knowledge, threatened action, suit, proceeding or claim by others challenging the Company's rights in or to any Intellectual Property, and (H) there is no pending or, to the Company's knowledge, threatened action, suit, proceeding or claim by others challenging the validity or scope of any Intellectual Property. The Company is in material compliance with the terms of each agreement pursuant to which Intellectual Property has been licensed to the Company, and all such agreements are in full force and effect;

(xxviii) All patents and patent applications owned by or licensed to the Company or under which the Company has rights have, to the knowledge of the Company, been duly and properly filed and maintained; to the knowledge of the Company, the parties prosecuting such patent applications have complied with their duty of candor and disclosure to the USPTO in connection with such applications; and the Company is not aware of any facts required to be disclosed to the USPTO that were not disclosed to the USPTO and which would preclude the grant of a patent in connection with any such application or would reasonably be expected to form the basis of a finding of invalidity with respect to any patents that have issued with respect to such applications. To the Company's knowledge, all patents and patent applications owned by the

11

Company and filed with the USPTO or any foreign or international patent authority (the "Company Patent Rights") and all patents and patent applications in-licensed by the Company and filed with the USPTO or any foreign or international patent authority (the "In-licensed Patent Rights") have been duly and properly filed; the Company believes it has complied with its duty of candor and disclosure to the USPTO for the Company Patent Rights and, to the Company's knowledge, the licensors of the In-licensed Patent Rights have complied with their duty of candor and disclosure to the USPTO for the In-licensed Patent Rights;

(xxix) Except as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, the Company: (A) is and at all times has been in material compliance with all statutes, rules and regulations of the FDA and other comparable Governmental Entities applicable to the ownership, testing (including clinical trials and pre-clinical studies), development, manufacture, packaging, processing, use, distribution, marketing, labeling, promotion, sale, offer for sale, storage, import, export or disposal of any product under development, manufactured, sold or distributed by the Company ("Applicable Laws"); (B) has not received any FDA Form 483, notice of adverse finding, warning letter, untitled letter or other correspondence or notice from the FDA or any Governmental Authority alleging or asserting material noncompliance with any Applicable Laws or any licenses, certificates, approvals, clearances, exemptions, authorizations, permits and supplements or amendments thereto required by any such Applicable Laws ("Authorizations"); (C) possesses all material Authorizations and such Authorizations are valid and in full force and effect and the Company is not in material violation of any term of any such Authorizations; (D) has not received notice of any claim, action, suit, proceeding, hearing, enforcement, investigation, arbitration or other action from the FDA or any Governmental Authority or third party alleging that any product operation or activity is in material violation of any Applicable Laws or Authorizations and has no knowledge that the FDA, Health Canada or any Governmental Authority or third party is considering any such claim, litigation, arbitration, action, suit, investigation or proceeding; (E) has not received notice that the FDA, Health Canada or any Governmental Authority has taken, is taking or intends to take action to materially limit, suspend, modify or revoke any material Authorizations and has no knowledge that the FDA, Health Canada or any Governmental Authority is considering such action; and (F) has filed, obtained, maintained or submitted all material reports, documents, forms, notices, applications, records, claims, submissions and supplements or amendments as required by any Applicable Laws or Authorizations and that all such reports, documents, forms, notices, applications, records, claims, submissions and supplements or amendments were materially complete and correct on the date filed (or were corrected or supplemented by a subsequent submission);

(xxx) To the extent applicable, the Company has operated and currently is in compliance with all applicable health care laws, rules and regulations (except where such failure to operate or non-compliance would not, singly or in the aggregate, result in a Material Adverse Effect), including, without limitation, (i) the Federal, Food, Drug and Cosmetic Act (21 U.S.C. §§ 301 et seq.) and the rules and regulations promulgated thereunder (collectively, "FFDCA"); (ii) all applicable federal, state, and local and all applicable similar foreign healthcare laws, including, without limitation, the federal Anti-kickback Statute (42 U.S.C. § 1320a-7b(b)), the U.S. Physician Payments Sunshine Act (42 U.S.C. § 1320a-7h), the civil False Claims Act (31 U.S.C. §§ 3729 et seq.), the criminal False Claims Law (42 U.S.C. § 1320a-7b(a)), all criminal laws relating to

12

healthcare fraud and abuse, including but not limited to 18 U.S.C. Sections 286 and 287, the healthcare fraud criminal provisions under the U.S. Health Insurance Portability and Accountability Act of 1996 ("HIPAA") (42 U.S.C. Section 1320d et seq.); (iii) HIPAA, as amended by the Health Information Technology for Economic Clinical Health Act (42 U.S.C. Sections 17921 - 17931); ; (iv) the regulations promulgated pursuant to such laws; and (vii) any other similar local, state, federal, or foreign laws (collectively, the "Health Care Laws"). The Company has not received written notice or other communication of any claim, action, suit, audit, survey, proceeding, hearing, enforcement, investigation, arbitration or other action ("Action") from any court or arbitrator or Governmental Authority or regulatory authority or third party alleging that any product operation or activity is in violation of any Health Care Laws, and, to the Company's knowledge, no such Action is threatened. The Company is not a party to and does not have any ongoing reporting obligations pursuant to any corporate integrity agreement, deferred prosecution agreement, monitoring agreement, consent decree, settlement order, plan of correction or similar agreement imposed by any governmental or regulatory authority. Additionally, neither the Company, nor to the Company's actual knowledge, any of its employees, officers or directors, has been excluded, suspended or debarred from participation in any U.S. state or federal health care program or human clinical research pursuant to 42 U.S.C. § 1320a-7, 21 U.S.C. § 335a, or similar laws, or, to the knowledge of the Company, is subject to a governmental inquiry, investigation, proceeding, or other similar action that could reasonably be expected to result in debarment, suspension, or exclusion;

(xxxii) The non-clinical studies and clinical trials conducted by or, to the Company's knowledge, on behalf of the Company were and, if still ongoing, are being conducted in all material respects in accordance with applicable experimental protocols, procedures and controls pursuant to accepted professional scientific standards, current good clinical practices and current good laboratory practices as required under applicable Laws and all Authorizations and Applicable Laws, including, without limitation, the FFDCA, and the International Conference on Harmonization Guidelines; the descriptions of the results of such studies and clinical trials contained in the Registration Statement, the Pricing Disclosure Package and the Prospectus are, to the Company's knowledge, accurate and complete in all material respects and fairly present the material data derived from such studies and clinical trials; except to the extent disclosed in the Registration Statement, the Pricing Disclosure Package and the Prospectus, the Company is not aware of any studies or clinical trials, the results of which the Company believes reasonably call into question the study or trial results described or referred to in the Registration Statement, the Pricing Disclosure Package and the Prospectus when viewed in the context in which such results are described and the clinical state of development; and, except to the extent disclosed in the Registration Statement, the Pricing Disclosure Package or the Prospectus, the Company has not received any notices or correspondence from the FDA or any Governmental Entity requiring the termination or suspension of any studies or clinical trials conducted by or on behalf of the Company, other than ordinary course communications with respect to modifications in connection with the design and implementation of such clinical trials;

(xxxiii) Except as described in the Registration Statement, the Pricing Disclosure Package and the Prospectus, or as otherwise disclosed to the Underwriter, there are no persons with registration rights or other similar rights to have securities registered pursuant to the Registration Statement or otherwise registered by the Company under the Securities Act;

(xxxiii) The Company is not and, after giving effect to the offering and sale of the Securities as contemplated herein and the application of the net proceeds therefrom, including the proceeds received upon the exercise of the Warrants and the Pre-Funded Warrants, as described in the Pricing Prospectus, will not be an “investment company”, as such term is defined in the Investment Company Act of 1940, as amended (the “Investment Company Act”);

(xxxiv) The Company has not distributed and, prior to the later to occur of the Closing Date (as defined in Section 4 hereof) and completion of distribution of the Securities, will not distribute any offering materials in connection with the offering and sale of the Securities, other than the Pricing Prospectus, the Prospectus and, subject to compliance with Section 6 hereof, any Issuer Free Writing Prospectus; and the Company has not taken and will not take, directly or indirectly, any action designed to cause or result in, or which constitutes or might reasonably be expected to constitute, the stabilization or manipulation of the price of any security of the Company to facilitate the sale of the Securities. The Company (a) has not alone engaged in any Testing-the-Waters Communication and (b) has not authorized anyone other than the Underwriter to engage in Testing-the-Waters Communications. The Company reconfirms that the Underwriter has been authorized to act on its behalf in undertaking Testing-the-Waters Communications. The Company has not distributed any Written Testing-the-Waters Communications. “Written Testing-the-Waters Communication” means any Testing-the-Waters Communication that is a written communication within the meaning of Rule 405 under the Securities Act;

(xxxv) The statistical and market and industry-related data included in the Pricing Prospectus and the Prospectus are based on or derived from sources which the Company believes to be reliable and accurate or represent the Company’s good faith estimates that are made on the basis of data derived from such sources, and the Company has obtained the written consent to the use of such data from sources to the extent required;

(xxxvi) The audiovisual presentation made available to the public by the Company at [http://www.netroadshow.com/{address}] [or Company address](1) is a “bona fide electronic roadshow” for purposes of Rule 433(d)(8)(ii) of the Securities Act, and such presentation, together with the Pricing Prospectus, does not contain any untrue statement of material fact or omit to state a material fact necessary to make the statements therein, in light of the circumstances under which they were made, not misleading, except that the representations and warranties set forth in this paragraph do not apply to statements in or omissions from such presentation or Pricing Prospectus made in reliance upon and in strict conformity with information furnished to the Company in writing by the Underwriter through the Underwriter expressly for use therein; and

(xxxvii) Any certificate signed by any officer of the Company delivered to the Underwriter or to counsel for the Underwriter shall be deemed a representation and warranty by the Company to the Underwriter as to the matters covered thereby.

(1) NTD: To be confirmed.

2. Subject to the terms and conditions herein set forth, (a) the Company agrees to sell to the Underwriter and the Underwriter agrees to purchase from the Company, at a purchase price per Unit of \$[] and \$[] per Pre-Funded Unit (each a “Purchase Price”), the Firm Securities and (b) in the event and to the extent that the Underwriter shall exercise the election to purchase Option Shares and/or Option Warrants as provided below, the Company agrees to sell to the Underwriter, and the Underwriter agrees to purchase from the Company, at price per Share of \$[] (the “Share Option Purchase Price”) and \$0.0093 per Warrant (the “Warrant Option Purchase Price”), the Option Shares and/or the Option Warrants.

The Company hereby grants to the Underwriter the right to purchase at its election up to [] Option Shares at the Share Option Purchase Price, and/or up to [] Option Warrants to purchase [] shares of Series B Preferred Stock at the Warrant Option Purchase Price. The Underwriter may exercise its option to acquire Option Shares and/or Option Warrants in whole or in part from time to time only by written notice from the Underwriter to the Company, given within a period of thirty (30) calendar days after the date of this Agreement and setting forth the number of Option Shares and/or Option Warrants to be purchased and the date on which such Option Shares and/or Option Warrants are to be delivered, as determined by the Underwriter but in no event earlier than the Closing Date or, unless the Underwriter and the Company otherwise agree in writing, earlier than two or later than ten business days after the date of such notice.

3. It is understood that the Underwriter proposes to offer the Firm Shares, Firm Warrants and Pre-Funded Warrants for sale to the public upon the terms and conditions set forth in the Prospectus.

4. The Company will deliver the Firm Shares to the Underwriter through the facilities of the Depository Trust Company (“DTC”) for the account of the Underwriter, against payment of the purchase price therefor in Federal (same day) funds by official bank check or checks or wire transfer drawn to the order of the Company at the office of Lowenstein Sandler LLP, 1251 Avenue of the Americas, New York, NY 10020, at [10:00 A.M.], New York time, on [April], 2018, or at such other time not later than seven full business days thereafter as the Underwriter and the Company determine, such time being herein referred to as the “Closing Date”. The Company will deliver the certificates for the Pre-Funded Warrants and the Firm Warrants, as applicable, against payment of the purchase price therefor (a) in the case of any Pre-Funded Warrants and the Firm Warrants included as part of the Pre-Funded Units, by the purchasers thereof and (b) in the case of the Firm Warrants included as part of the Units, by the Underwriter, in definitive form, in such denominations and registered in such names as the Underwriter or its designees request, to the purchasers thereof on the Closing Date. For purposes of Rule 15c6-1 under the Exchange Act, the Closing Date (if later than the otherwise applicable settlement date) shall be the settlement date for payment of funds and delivery of the Securities. In the event that a purchaser delivers a Notice of Exercise (as defined in the Pre-Funded Warrants) on or prior to 12:00 P.M., New York time on the Closing Date, to exercise any Pre-Funded Warrants between the date hereof and the Closing Date, the Company shall deliver Warrant Shares with respect to such Pre-Funded Warrants to such purchaser on the Closing Date in connection with such Notice of Exercise. The Firm Shares and/or Pre-Funded Warrants and the Firm Warrants will be issued separately and may be transferred separately immediately upon issuance.

Each time for the delivery of and payment for the Option Shares and Option Warrants, being herein referred to as an “Option Closing Date”, which may be the Closing Date, shall be determined by the Underwriter as provided above. The Company will deliver the Option Shares being purchased on each Option Closing Date to the Underwriter through the facilities of DTC for the account of the Underwriter, against payment of the purchase price therefor in Federal (same day) funds by official bank check or checks or wire transfer drawn to the order of the Company at the above office of Lowenstein Sandler LLP, 1251 Avenue of the Americas, New York, NY 10020, at [10:00 A.M.], New York time on the applicable Option Closing Date. The Company will deliver the certificates for the Option Warrants being purchased on each Option Closing Date against payment of the purchase price therefor by the Underwriter, in definitive form, in such denominations and registered in such names as the Underwriter or its designees request, to the purchasers thereof on such Option Closing Date. The Option Shares and the Option Warrants, if any, will be issued separately and may be transferred separately immediately upon issuance.

The Company hereby grants the Underwriter (or any affiliate designated by the Underwriter) the right of first refusal for a period of ten (10) months from the Closing Date to act, in the case the Company or any Subsidiary decides to raise funds by means of a public offering or a private placement of equity or debt securities using an underwriter or placement agent, as sole book-running manager, sole underwriter or sole placement agent for such financing.

At the Closing Date and any Option Closing Date, the Company shall pay the Underwriter a management fee equal to 1.0% of the gross proceeds raised at the Closing Date and each Option Closing Date.

5. The Company covenants and agrees with the Underwriter as follows:

(a) The Company, subject to Section 5(b), will comply with the requirements of Rule 430A under the Securities Act, and will notify the Underwriter promptly (and in any event with 24 hours), and confirm the notice in writing, (i) when any post-effective amendment to the Registration Statement shall become effective, or any supplement to the Prospectus or any amended prospectus shall have been filed, to furnish the Underwriter with copies thereof, and to

16

file promptly all material required to be filed by the Company with the Commission pursuant to Rule 433(d) under the Securities Act, (ii) of the receipt of any comments from the Commission, (iii) of any request by the Commission for any amendment to the Registration Statement or any amendment or supplement to the Prospectus or for additional information, (iv) of the issuance by the Commission of any stop order suspending the effectiveness of the Registration Statement or of any order preventing or suspending the use of any Preliminary Prospectus, or of the suspension of the qualification of the Securities for offering or sale in any jurisdiction, or of the initiation or, to the Company’s knowledge, the threatening of any proceedings for any of such purposes; and (v) if the Company ceases to be an Emerging Growth Company at any time prior to the later of (A) completion of the distribution of the Securities within the meaning of the Securities Act and (B) completion of the 120-day restricted period referred to in Section 5(j) hereof. The Company will promptly effect the filings necessary pursuant to Rule 424(b) under the Securities Act and will take such steps as it deems necessary to ascertain promptly whether the form of prospectus transmitted for filing under Rule 424(b) was received for filing by the Commission and, in the event that it was not, it will promptly file such prospectus. The Company will make every reasonable effort to prevent the issuance of any stop order and, if any stop order is issued, to obtain the lifting thereof at the earliest possible moment.

(b) The Company will give the Underwriter notice of its intention to file or prepare any amendment to the Registration Statement (including any filing under Rule 462(b) under the Securities Act), or any amendment, supplement or revision to the Prospectus, or any Issuer Free Writing Prospectus, will furnish the Underwriter with copies of any such documents a reasonable amount of time prior to such proposed filing or use, as the case may be, and will not file or use any such document to which the Underwriter or counsel for the Underwriter shall reasonably object.

(c) The Company will use its reasonable best efforts to qualify the Securities for offering and sale under the securities laws of such jurisdictions as you may reasonably request and to comply with such laws in all material respects so as to permit the continuance of sales and dealings therein in such jurisdictions for as long as may be necessary to complete the distribution of the Securities, provided that nothing in this Section 5(c) shall require the Company to qualify as a foreign corporation in any jurisdiction in which it is not already so qualified, to file a general consent to service of process in any jurisdiction, or subject itself to taxation in any jurisdiction if it is not otherwise so subject.

(d) The Company has furnished or, upon written request, will deliver to the Underwriter, without charge, four signed copies of the Initial Registration Statement as originally filed, any Rule 462(b) Registration Statement and of each amendment to each (including exhibits filed therewith or incorporated by reference therein) and signed copies of all consents and certificates of experts, and will also, upon your written request, deliver to the Underwriter, without charge, a conformed copy of the Registration Statement as originally filed and of each amendment thereto (without exhibits) the Underwriter. The copies of the Registration Statement and each amendment thereto furnished to the Underwriter will be identical to the electronically transmitted copies thereof filed with the Commission pursuant to EDGAR, except to the extent permitted by Regulation S-T.

17

(e) The Company has delivered to the Underwriter, without charge, as many written and electronic copies of each Preliminary Prospectus as the Underwriter reasonably requested, and the Company hereby consents to the use of such copies for purposes permitted by the Securities Act. The Company will furnish to the Underwriter, without charge, prior to 5:00 P.M. New York time on the business day next succeeding the date of this Agreement and from time to time thereafter during the period when the Prospectus is required to be delivered in connection with sales of the Securities under the Securities Act or the Exchange Act or in lieu thereof, the notice referred to in Rule 173(a) under the Securities Act, such number of written and electronic copies of the Prospectus (as amended or supplemented) as the Underwriter may reasonably request. The Prospectus and any amendments or supplements thereto furnished to the Underwriter will be identical to the electronically transmitted copies thereof filed with the Commission pursuant to EDGAR, except to the extent permitted by Regulation S-T.

(f) The Company will comply with the Securities Act and the Rules and Regulations so as to permit the completion of the distribution of the Securities as contemplated in this Agreement and in the Prospectus. If at any time when, in the reasonable opinion of counsel for the Underwriter, a prospectus is required to be delivered in connection with sales of the Securities under the Securities Act or the Exchange Act (or in lieu thereof, the notice referred to in Rule 173(a) under the Securities Act), any event shall occur or condition shall exist as a result of which it is necessary, in the reasonable opinion of counsel for the Underwriter or for the Company, to amend the Registration Statement or amend or supplement the Prospectus in order that the Prospectus will not include any untrue statements of a material fact or omit to state a material fact necessary in order to make the statements therein not misleading in the light of the circumstances existing at the time it (or in lieu thereof, the notice referred to in Rule 173(a) under the Securities Act) is delivered to a purchaser, or if it shall be necessary, in the reasonable opinion of either such counsel, at any such time to amend the Registration Statement or amend or supplement the Prospectus in order to comply with the requirements of the Securities Act or the Rules and Regulations, the Company will promptly prepare and file with the Commission, subject to Section 5(b), such amendment or supplement as may be necessary to correct such statement or omission or to make the Registration Statement or the Prospectus comply with such requirements, and the Company will furnish to the Underwriter such number of written and electronic copies of such amendment or supplement as the Underwriter may reasonably request. The Company will provide the Underwriter with notice of the occurrence of any event during the period specified above that may give rise to the need to amend or supplement the Registration Statement or the Prospectus as provided in the preceding sentence promptly after the occurrence of such event. If at any time following the distribution of any Written Testing-the-Waters Communication there occurred or occurs an event or development as a result of which such Written Testing-the-Waters Communication included or would include an untrue statement of a material fact or omitted or would omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances existing at that subsequent time, not misleading, the Company will promptly notify the Underwriter and will promptly amend or supplement, at its own expense, such Written Testing-the-Waters Communication to eliminate or correct such untrue statement or omission.

(g) The Company will make generally available (within the meaning of Section 11(a) of the Securities Act) to its security holders and to the Underwriter as soon as practicable, but not later than 45 days after the end of its fiscal quarter in which the first anniversary date of

18

the effective date of the Registration Statement occurs, an earnings statement (in form complying with the provisions of Rule 158 under the Securities Act) covering a period of at least twelve consecutive months beginning after the effective date of the Registration Statement.

(h) The Company will use the net proceeds received by it from the sale of the Securities in the manner specified in the Pricing Disclosure Package under the heading "Use of Proceeds".

(i) The Company will use its reasonable best efforts to maintain the listing for quotation of the Common Stock (including the Shares and the shares of Common Stock issuable upon exercise of the Pre-Funded Warrants) on the Nasdaq Capital Market. As of the Closing Date, such shares will have been duly authorized for listing on the Nasdaq Capital Market subject to official notice of issuance.

(j) During a period of one hundred twenty (120) days from the date of the Prospectus, the Company will not, without the prior written consent of the Underwriter, (i) offer, pledge, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, lend or otherwise transfer or dispose of, directly or indirectly, or announce the issuance or proposed issuance of, any Common Stock or any securities convertible into or exercisable or exchangeable for Common Stock or (ii) enter into any swap or other agreement that transfers, in whole or in part, any of the economic consequences of ownership of Common Stock, whether any such transaction described in clause (i) or (ii) above is to be settled by delivery of Common Stock or such other securities, in cash or otherwise, other than (1) the Securities to be sold hereunder, (2) the issuance of equity-based awards granted pursuant to the Company's benefit plans existing on the date hereof that are referred to in the Prospectus, as such plans may be amended, (3) the issuance of shares of Common Stock upon the exercise of any such equity-based awards or (4) the issuance of equity-based securities in connection with collaborations, partnerships or other strategic transactions approved by a majority of the disinterested directors of the Company, provided that any such transaction shall only be with an operating company or an owner of an asset in a business synergistic with the business of the Company and shall provide to the Company additional benefits in addition to the investment of funds, but shall not include a transaction in which the Company is issuing securities primarily for the purpose of raising capital or to an entity whose primary business is investing in securities; provided that such securities are issued as "restricted securities" (as defined in Rule 144) and carry no registration rights that require or permit the filing of any registration statement in connection therewith during the prohibition period in this Section 5(j).

(k) The Company, during the period when the Prospectus is required to be delivered in connection with sales of the Securities under the Securities Act or the Exchange Act (or in lieu thereof, the notice referred to in Rule 173(a) under the Securities Act), will file all documents required to be filed with the Commission pursuant to the Exchange Act within the time periods required by the Exchange Act and the rules and regulations of the Commission thereunder.

(l) The Company will file with the Commission such information on Form 10-Q or Form 10-K as may be required pursuant to Rule 463 under the Securities Act.

19

(m) During a period of ten months from the effective date of the Registration Statement, the Company will furnish to you copies of all reports or other communications (financial or other) furnished to shareholders generally, and to deliver to you (i) as soon as they are available, copies of any reports and financial statements furnished to or filed with the Commission or any national securities exchange on which any class of securities of the Company is listed; provided that the Company will be deemed to have furnished such reports and financial statements to the extent they are filed on EDGAR.

(n) If the Company elects to rely upon Rule 462(b) under the Securities Act, the Company will file a Rule 462(b) Registration Statement with the Commission in compliance with Rule 462(b) by 10:00 P.M., Washington, D.C. time, on the date of this Agreement, and at the time of filing either to pay to the Commission the filing fee for the Rule 462(b) Registration Statement or to give irrevocable instructions for the payment of such fee pursuant to Rule 111(b) under the Securities Act.

(o) If so requested by the Underwriter, the Company shall cause to be prepared and delivered, at its expense, within one business day from the effective date of this Agreement, to the Underwriter an "electronic Prospectus" to be used by the Underwriter in connection with the offering and sale of the Securities. As used herein, the term "electronic Prospectus" means a form of the most recent Preliminary Prospectus, any Issuer Free Writing

Prospectus or the Prospectus, and any amendment or supplement thereto, that meets each of the following conditions: (i) it shall be encoded in an electronic format, reasonably satisfactory to the Underwriter, that may be transmitted electronically by the Underwriter to offerees and purchasers of the Securities, (ii) it shall disclose the same information as such paper Preliminary Prospectus, Issuer Free Writing Prospectus or the Prospectus, as the case may be; and (iii) it shall be in or convertible into a paper format or an electronic format, reasonably satisfactory to the Underwriter, that will allow investors to store and have continuously ready access to such Preliminary Prospectus, Issuer Free Writing Prospectus or the Prospectus at any future time, without charge to investors (other than any fee charged for subscription to the Internet generally). The Company hereby confirms that, if so requested by the Underwriter, it has included or will include in the Prospectus filed with the Commission an undertaking that, upon receipt of a request by an investor or his or her representative, the Company shall transmit or cause to be transmitted promptly, without charge, a paper copy of such paper Preliminary Prospectus, Issuer Free Writing Prospectus or the Prospectus to such investor or representative.

(p) The Company will use its reasonable efforts to promptly obtain Stockholder Approval within 45 days from the date of the Prospectus and file the Charter Amendment to sufficiently increase its authorized shares of Common Stock to cover the conversion of all outstanding shares of Series B Preferred Stock issuable upon exercise of the Warrants.

6. (a) The Company represents and agrees that, without the prior consent of the Underwriter, it has not made and will not make any offer relating to the Securities that would constitute a “free writing prospectus” as defined in Rule 405 under the Securities Act; the Underwriter represents and agrees that, without the prior consent of the Company, it has not made and will not make any offer relating to the Securities that would constitute a free writing

20

prospectus; any such free writing prospectus the use of which has been consented to by the Company and the Underwriter is listed on Schedule II hereto;

(b) The Company has complied and will comply with the requirements of Rule 433 under the Securities Act applicable to any Issuer Free Writing Prospectus, including timely filing with the Commission or retention where required and legending; the Company represents that it has satisfied and agrees that it will satisfy the conditions under Rule 433 under the Securities Act to avoid a requirement to file with the Commission any electronic road show;

(c) The Company agrees that if at any time following issuance of an Issuer Free Writing Prospectus any event occurred or occurs as a result of which such Issuer Free Writing Prospectus would conflict with the information in the Registration Statement, the Pricing Prospectus or the Prospectus or, when considered together with the information in the Pricing Prospectus and other Issuer Free Writing Prospectuses, would include an untrue statement of a material fact or omit to state any material fact necessary in order to make the statements therein, in light of the circumstances then prevailing, not misleading, the Company will give prompt notice thereof to the Underwriter and, if requested by the Underwriter, will prepare and furnish without charge to the Underwriter an Issuer Free Writing Prospectus or other document which will correct such conflict, statement or omission; provided, however, that this covenant shall not apply to any statements or omissions in an Issuer Free Writing Prospectus made in reliance upon and in strict conformity with information furnished in writing to the Company by an Underwriter through the Underwriter expressly for use therein.

7. Subject to Section 10 hereof, the Company covenants and agrees with the Underwriter that, whether or not the transactions contemplated by this Agreement are consummated, (a) the Company will pay or cause to be paid (i) \$50,000 for non-accountable expenses, (ii) up to \$100,000 for reasonable, documented fees and expenses of legal counsel and other reasonable, out-of-pocket expenses, and (iii) for the services of an escrow agent and any actual out-of-pocket cost of such clearing agent settlement and financing, so long as the cost does not exceed \$10,000; provided, however, that such reimbursement amount in no way shall limit the indemnification and contribution provisions of this Agreement.

8. The obligation of the Underwriter hereunder to purchase the Securities on the Closing Date or each Option Closing Date, as the case may be, are subject to the performance by the Company of its obligations hereunder and to the following additional conditions:

(a) The Prospectus shall have been filed with the Commission pursuant to Rule 424(b) under the Securities Act within the applicable time period prescribed for such filing by the Rules and Regulations and in accordance with Section 5(a); all material required to be filed by the Company pursuant to Rule 433(d) under the Securities Act shall have been filed with the Commission within the applicable time period prescribed for such filing by Rule 433 under the Securities Act; if the Company has elected to rely upon Rule 462(b) under the Securities Act, the Rule 462(b) Registration Statement shall have become effective by 10:00 P.M., Washington, D.C. time, on the date of this Agreement; no stop order suspending the effectiveness of the Registration Statement or any part thereof or the Prospectus or any part thereof or any Issuer Free Writing Prospectus shall have been issued and no proceeding for that purpose shall have been initiated or,

21

to the knowledge of the Company, threatened by the Commission or any state securities commission; and all requests for additional information on the part of the Commission shall have been complied with to the reasonable satisfaction of the staff of the Commission.

(b) The representations and warranties of the Company contained herein and in the Warrants, and the Pre-Funded Warrants, as applicable, are true and correct on and as of the Closing Date or the Option Closing Date, as the case may be, as if made on and as of the Closing Date or the Option Closing Date, as the case may be, and the Company shall have complied with all agreements and all conditions on its part to be performed or satisfied hereunder at or prior to the Closing Date or the Option Closing Date, as the case may be.

(c) Subsequent to the execution and delivery of this Agreement and prior to the Closing Date or the Option Closing Date, as the case may be, there shall not have occurred any downgrading, nor shall any notice have been given of (i) any downgrading, (ii) any intended or potential downgrading or (iii) any review or possible change that does not indicate an improvement, in the rating accorded any securities of or guaranteed by the Company or any Subsidiary by any “nationally recognized statistical rating organization”, as such term is defined for purposes of Rule 436(g)(2) under the Securities Act.

(d) (i) Neither the Company nor any Subsidiary shall have sustained since the date of the latest audited financial statements included in the Pricing Prospectus any material loss or interference with its business from fire, explosion, flood or other calamity, whether or not covered by insurance, or from any labor dispute or court or governmental action, order or decree, otherwise than as set forth or contemplated in the Pricing Prospectus and except as

described in the Registration Statement and the Pricing Disclosure Package, and (ii) since the respective dates as of which information is given in the Registration Statement and the Prospectus, (1) there shall not have been any change in the capital stock or long-term debt of the Company or any Subsidiary or (2) there shall not have been any Material Adverse Effect, or any development involving a prospective Material Adverse Effect, in or affecting the general affairs, business, prospects, management, financial position, shareholders' equity or results of operations of the Company and the Subsidiaries, considered as one enterprise, the effect of which, in any such case described in clause (i) or (ii), is in the judgment of the Underwriter so material and adverse as to make it impracticable or inadvisable to proceed with the public offering or the delivery of the Securities being delivered at such Closing Date or Option Closing Date, as the case may be, on the terms and in the manner contemplated in the Pricing Prospectus.

(e) The Underwriter shall have received on and as of the Closing Date or the Option Closing Date, as the case may be, a certificate of an executive officer of the Company, reasonably satisfactory to the Underwriter, to the effect (1) set forth in Sections 8(b) (with respect to the respective representations, warranties, agreements and conditions of the Company) and 8(c), (2) that none of the situations set forth in clause (i) or (ii) of Section 8(d) shall have occurred and (3) that no stop order suspending the effectiveness of the Registration Statement has been issued and to the knowledge of the Company, no proceedings for that purpose have been instituted or are pending or contemplated by the Commission.

22

(f) On the Closing Date or Option Closing Date, as the case may be, Morgan, Lewis & Bockius LLP, counsel for the Company, shall have furnished to the Underwriter their favorable written opinion, dated the Closing Date or the Option Closing Date, as the case may be, in form and substance satisfactory to counsel for the Underwriter.

(g) On the effective date of the Registration Statement and, if applicable, the effective date of the most recently filed post-effective amendment to the Registration Statement, Ernst & Young, LLP shall have furnished to the Underwriter a letter, dated the date of delivery thereof, in form and substance satisfactory to the Underwriter, containing statements and information of the type customarily included in accountants' "comfort letters" to underwriters with respect to the financial statements and certain financial information contained in the Registration Statement and the Prospectus.

(h) On the Closing Date or Option Closing Date, as the case may be, the Underwriter shall have received from Ernst & Young, LLP a letter, dated the Closing Date or such Option Closing Date, as the case may be, to the effect that they reaffirm the statements made in the letter or letters furnished pursuant to Section 8(g), except that the specified date referred to shall be a date not more than three business days prior to the Closing Date or such Option Closing Date, as the case may be.

(i) On the Closing Date or Option Closing Date, as the case may be, Lowenstein Sandler LLP, counsel for the Underwriter, shall have furnished to the Underwriter their favorable opinion dated the Closing Date or the Option Closing Date, as the case may be, with respect to the due authorization and valid issuance of the Securities, the Registration Statement, the Prospectus and other related matters as the Underwriter may reasonably request, and such counsel shall have received such papers and information as they may reasonably request to enable them to pass upon such matters.

(j) The Shares and the shares issuable upon exercise of the Pre-Funded Warrants to be delivered on the Closing Date or Option Closing Date, as the case may be, shall have been approved for listing on the Nasdaq Capital Market, subject to official notice of issuance.

(k) FINRA shall have confirmed that it has not raised any objection with respect to the fairness and reasonableness of the underwriting terms and conditions.

(l) The Underwriter shall have received "lock-up" agreements, each substantially in the form of Exhibit A hereto, from each executive officer and director of the Company, and such agreements shall be in full force and effect on the Closing Date or Option Closing Date, as the case may be.

(m) On the Closing Date or Option Closing Date, as the case may be, Khalilian Sira LLC, intellectual property counsel for the Company, shall have furnished to the Underwriter their favorable written opinion, dated the Closing Date or the Option Closing Date, as the case may be, in form and substance satisfactory to counsel for the Underwriter.

23

(n) On or prior to the Closing Date or Option Closing Date, as the case may be, the Company shall have furnished to the Underwriter such further information, certificates and documents as the Underwriter shall reasonably request.

(o) On or after the Applicable Time there shall not have occurred any of the following: (i) a suspension or material limitation in trading in securities generally on the Nasdaq Capital Market; (ii) a suspension or material limitation in trading in the Company's securities on the Nasdaq Capital Market; (iii) a general moratorium on commercial banking activities declared by any of Federal or New York State authorities or a material disruption in commercial banking or securities settlement or clearance services in the U.S.; (iv) the outbreak or escalation of hostilities involving the U.S. or the declaration by the U.S. of a national emergency or war or (v) the occurrence of any other calamity or crisis or any change in financial, political or economic conditions in the U.S. or elsewhere, if the effect of any such event specified in clause (iv) or (v) in the judgment of the Underwriter makes it impracticable or inadvisable to proceed with the public offering or the delivery of the Securities being delivered at such Closing Date or Option Closing Date, as the case may be, on the terms and in the manner contemplated in the Prospectus.

(p) The Company shall have filed the Certificate of Designation with the Secretary of State of the State of Delaware.

(q) The Company shall have delivered executed copies of the Warrants and the Pre-Funded Warrants, as applicable, to the public purchasers thereof.

If any condition specified in this Section 8 shall not have been fulfilled when and as required to be fulfilled, this Agreement may be terminated, subject to the provisions of Section 12, by the Underwriter by notice to the Company at any time at or prior to the Closing Date or Option Closing Date, as the case may be, and such termination shall be without liability of any party to any other party, except as provided in Section 12.

9. (a) The Company agrees to indemnify and hold harmless the Underwriter and each person, if any, who controls the Underwriter within the meaning of Section 15 of the Securities Act or Section 20(a) of the Exchange Act against any and all losses, liabilities, claims, damages and expenses whatsoever as incurred (including without limitation, reasonable attorneys' fees and any and all reasonable expenses whatsoever incurred in investigating, preparing or defending against any litigation, commenced or threatened, or any claim whatsoever, and any and all amounts paid in settlement of any claim or litigation), joint or several, to which they or any of them may become subject under the Securities Act, the Exchange Act or otherwise, insofar as such losses, liabilities, claims, damages or expenses (or actions in respect thereof) arise out of or are based upon any untrue statement or alleged untrue statement of a material fact contained in the Registration Statement, or any post-effective amendment thereof, any Preliminary Prospectus, the Pricing Prospectus or the Prospectus, or in any supplement thereto or amendment thereof, any Issuer Free Writing Prospectus, any Written Testing-the-Waters Communication, or any "issuer information" filed or required to be filed pursuant to Rule 433(d) under the Securities Act, or arise out of or are based upon the omission or alleged omission to state therein a material fact required to be stated therein or necessary to make the statements therein not misleading; provided, however,

24

that the Company will not be liable in any such case to the extent that any such loss, liability, claim, damage or expense arises out of or is based upon any such untrue statement or alleged untrue statement or omission or alleged omission made in the Registration Statement, or any post-effective amendment thereof, any Preliminary Prospectus, the Pricing Prospectus or the Prospectus, or in any supplement thereto or amendment thereof, any Issuer Free Writing Prospectus, or any Written Testing-the-Waters Communication in reliance upon and in strict conformity with written information furnished to the Company by or on behalf of the Underwriter expressly for use therein, it being understood and agreed that the only such information furnished by the Underwriter is the information described as such in Section 9(b) below.

(b) The Underwriter agrees to indemnify and hold harmless the Company, each of the directors of the Company, each of the officers of the Company who shall have signed the Registration Statement, and each other person, if any, who controls the Company within the meaning of Section 15 of the Securities Act or Section 20(a) of the Exchange Act, against any losses, liabilities, claims, damages and expenses whatsoever as incurred (including without limitation, reasonable attorneys' fees and any and all reasonable expenses whatsoever incurred in investigating, preparing or defending against any litigation, commenced or threatened, or any claim whatsoever, and any and all amounts paid in settlement of any claim or litigation), joint or several, to which they or any of them may become subject under the Act, the Exchange Act or otherwise, insofar as such losses, liabilities, claims, damages or expenses (or actions in respect thereof) arise out of or are based upon any untrue statement or alleged untrue statement of a material fact contained in the Registration Statement, or any post-effective amendment thereof, or any Preliminary Prospectus, the Pricing Prospectus or the Prospectus, or in any supplement thereto or amendment thereof, any Issuer Free Writing Prospectus or any Written Testing-the-Waters Communication, or arise out of or are based upon the omission or alleged omission to state therein a material fact necessary to make the statements therein not misleading, in each case to the extent, but only to the extent, that any such loss, liability, claim, damage or expense arises out of or is based upon any such untrue statement or alleged untrue statement or omission or alleged omission made therein in reliance upon and in strict conformity with written information furnished to the Company by or on behalf of the Underwriter, it being understood and agreed that the only such information furnished by the Underwriter consists of the following information in the Prospectus furnished on behalf of the Underwriter: the last paragraph at the bottom of the cover page concerning the timing of the delivery of the shares, the concession and reallocation figures appearing in the third paragraph under the caption "Underwriting" and the information contained in the first and third paragraphs in the section entitled Stabilization, Short Positions and Penalty Bids under the caption "Underwriting".

(c) Promptly after receipt by an indemnified party under Section 9(a) or 9(b) of notice of the commencement of any action, such indemnified party shall, if a claim in respect thereof is to be made against the indemnifying party under such Section, notify each party against whom indemnification is to be sought in writing of the commencement thereof (but the failure so to notify an indemnifying party shall not relieve it from any liability which it may have under this Section 9). In case any such action is brought against any indemnified party, and it notifies an indemnifying party of the commencement thereof, the indemnifying party will be entitled to participate therein, and jointly with any other indemnifying party similarly notified, to the extent it may elect by written notice delivered to the indemnified party promptly after receiving the

25

aforsaid notice from such indemnified party, to assume the defense thereof with counsel reasonably satisfactory to such indemnified party (who shall not, except with the consent of the indemnified party, be counsel to the indemnified party). Notwithstanding the foregoing, the indemnified party or parties shall have the right to employ its or their own counsel in any such case, but the fees and expenses of such counsel shall be at the expense of such indemnified party or parties unless (i) the employment of such counsel shall have been authorized in writing by one of the indemnifying parties in connection with the defense of such action, (ii) the indemnifying parties shall not have employed counsel to have charge of the defense of such action within a reasonable time after notice of commencement of the action, or (iii) such indemnified party or parties shall have reasonably concluded based on advice from outside counsel that there may be defenses available to it or them which are different from or additional to those available to one or all of the indemnifying parties (in which case the indemnifying parties shall not have the right to direct the defense of such action on behalf of the indemnified party or parties), in any of which events the reasonable fees and expenses of such counsel shall be borne by the indemnifying parties. In no event shall the indemnifying parties be liable for fees and expenses of more than one counsel (in addition to any local counsel) separate from their own counsel for all indemnified parties in connection with any one action or separate but similar or related actions in the same jurisdiction arising out of the same general allegations or circumstances, which counsel, in the event of indemnified parties under Section 9(a), shall be selected by the Underwriter. No indemnifying party shall, without the written consent of the indemnified party, effect the settlement or compromise of, or consent to the entry of any judgment with respect to, any pending or threatened action or claim in respect of which indemnification or contribution may be sought hereunder (whether or not the indemnified party is an actual or potential party to such action or claim) unless such settlement, compromise or judgment (i) includes an unconditional release of the indemnified party from all liability arising out of such action or claim and (ii) does not include a statement as to or an admission of fault, culpability or a failure to act, by or on behalf of any indemnified party. An indemnifying party shall not be liable for any settlement of any action or claim effected without its written consent (which consent will not be unreasonably withheld, conditioned or delayed).

(d) If the indemnification provided for in this Section 9 is unavailable to or insufficient to hold harmless an indemnified party under Section 9(a) or Section 9(b) in respect of any losses, liabilities, claims, damages or expenses (or actions in respect thereof) referred to therein, then each indemnifying party shall contribute to the amount paid or payable by such indemnified party as a result of such losses, liabilities, claims, damages or expenses (or actions in respect thereof) in such proportion as is appropriate to reflect the relative benefits received by the Company on the one hand and the Underwriter on the other from the offering of the Securities. If, however, the allocation provided by the immediately preceding sentence is not permitted by applicable law, then each indemnifying party shall contribute to such amount paid or payable by such indemnified party in such proportion as is appropriate to reflect not only such relative benefits but also the relative fault of the Company on the one hand and the Underwriter on the other in connection with the

statements or omissions which resulted in such losses, liabilities, claims, damages or expenses (or actions in respect thereof), as well as any other relevant equitable considerations. The relative benefits received by the Company on the one hand and the Underwriter on the other from the offering of the Securities shall be deemed to be in the same proportion as the total net proceeds from the offering (before deducting expenses) received by the Company bear to the total underwriting discounts and commissions received by the Underwriter,

in each case as set forth in the table on the cover page of the Prospectus. The relative fault shall be determined by reference to, among other things, whether the untrue or alleged untrue statement of a material fact or the omission or alleged omission to state a material fact relates to information supplied by the Company on the one hand or the Underwriter on the other and the parties' relative intent, knowledge, access to information and opportunity to correct or prevent such statement or omission.

The Company and the Underwriter agree that it would not be just and equitable if contributions pursuant to this Section 9(d) were determined by pro rata allocation (even if the Underwriter were treated as one entity for such purpose) or by any other method of allocation which does not take account of the equitable considerations referred to above in this Section 9(d). The amount paid or payable by an indemnified party as a result of the losses, liabilities, claims, damages or expenses (or actions in respect thereof) referred to above in this Section 9(d) shall be deemed to include any legal or other expenses reasonably incurred by such indemnified party in connection with investigating or defending any such action or claim. Notwithstanding the provisions of this Section 9(d), the Underwriter shall not be required to contribute any amount in excess of the amount by which the total price at which the Shares underwritten by it and distributed to the public were offered to the public exceeds the amount of any damages which the Underwriter has otherwise been required to pay by reason of such untrue or alleged untrue statement or omission or alleged omission.

No person guilty of fraudulent misrepresentation (within the meaning of Section 11(f) of the Securities Act) shall be entitled to contribution from any person who was not guilty of such fraudulent misrepresentation. The Underwriter's obligations in this Section 9(d) to contribute are several in proportion to their respective underwriting obligations and not joint.

(e) The obligations of the parties to this Agreement contained in this Section 9 are not exclusive and shall not limit any rights or remedies which may otherwise be available to any indemnified party at law or in equity.

10. If the Underwriter shall default in its obligations to purchase the Securities hereunder on the Closing Date or the Option Closing Date, as the case may be, and arrangements satisfactory to the Underwriter and the Company for the purchase of such shares of Common Stock by other persons are not made within forty-eight (48) hours after such default, this Agreement shall terminate; provided, in the event of any termination of this Agreement pursuant to this Section 10, the Company shall not be obligated to reimburse the Underwriter on account of any expenses, including expenses to be paid or reimbursed by it pursuant to Section 7.

11. Notwithstanding anything herein contained, this Agreement (or the obligations of the Underwriter with respect to any Option Shares and Option Warrants which have yet to be purchased) may be terminated, subject to the provisions of Section 12, in the absolute discretion of the Underwriter, by notice given to the Company, if after the execution and delivery of this Agreement and prior to the Closing Date or the Option Closing Date, as the case may be, (a) trading generally on the NYSE American or the New York Stock Exchange or on the Nasdaq Global Select Market, the Nasdaq Global Market or the Nasdaq Capital Market shall have been suspended or materially limited, or minimum or maximum prices for trading have been fixed, or maximum

ranges for prices have been required, by any of said exchanges or by such system or by order of the Commission, FINRA or any other governmental or regulatory authority, (b) trading of any securities of or guaranteed by the Company or any Subsidiary shall have been suspended on any exchange or in any over-the-counter market, (c) a general moratorium on commercial banking activities in New York shall have been declared by Federal, New York State or Maryland State authorities or a new restriction materially adversely affecting the distribution of the Firm Shares or the Option Shares, as the case may be, shall have become effective, or (d) there has occurred any material adverse change in the financial markets in the U.S. or the international financial markets, any outbreak of hostilities or escalation thereof or other calamity or crisis or any change or development involving a prospective change in national or international political, financial or economic conditions, in each case the effect of which is such as to make it, in the judgment of the Underwriter, impracticable to market the Securities to be delivered on the Closing Date or Option Closing Date, as the case may be, or to enforce contracts for the sale of the Securities.

If this Agreement is terminated pursuant to this Section 11, such termination will be without liability of any party to any other party except as provided in Section 12 hereof.

12. The respective indemnities, agreements, representations, warranties and other statements of the Company or its officers and of the Underwriter set forth in or made pursuant to this Agreement will remain in full force and effect, regardless of any investigation, or statement as to the results thereof, made by or on behalf of the Underwriter, the Company or any of their respective representatives, officers or directors or any controlling person, and will survive delivery of and payment for the Securities. If this Agreement is terminated pursuant to Section 8 or 11 or if for any reason the purchase of any of the Securities by the Underwriter is not consummated, the Company shall remain responsible for the actual, out-of-pocket expenses incurred by the Underwriter pursuant to Section 7, the respective obligations of the Company and the Underwriter pursuant to Section 9 and the provisions of Sections 12, 13 and 16 shall remain in effect and, if any Securities have been purchased hereunder the representations and warranties in Section 1 and all obligations under Section 5, and Section 6 shall also remain in effect. If this Agreement shall be terminated by the Underwriter under Section 8 or otherwise because of any failure or refusal on the part of the Company to comply with the terms or to fulfill any of the conditions of this Agreement (other than solely by reason of the failure of the Underwriter to perform its obligations hereunder), or if for any reason the Company shall be unable to perform its obligations under this Agreement (other than solely by reason of the failure of the Underwriter to perform its obligations hereunder) or any condition of the Underwriter's obligations cannot be fulfilled, the Company agrees to reimburse the Underwriter for all out-of-pocket expenses (including the fees and expenses of its counsel) reasonably incurred by the Underwriter in connection with this Agreement or the offering contemplated hereunder.

13. This Agreement shall inure to the benefit of and be binding upon the Company and the Underwriter, the officers and directors of the Company referred to herein, any controlling persons referred to herein and their respective successors and assigns. Nothing expressed or mentioned in this Agreement is intended or shall be construed to give any other person, firm or corporation any legal or equitable right, remedy or claim under or in respect of

14. All notices and other communications hereunder shall be in writing and shall be deemed to have been duly given upon receipt thereof by the recipient if mailed or transmitted by any standard form of telecommunication. Notices to the Underwriter shall be given to the Underwriter, c/o H.C. Wainwright & Co., LLC, Attention: Head of Investment Banking, Fax: 212-214-0803 with a copy to Lowenstein Sandler LLP, 1251 Avenue of the Americas, New York, NY 10020, fax: (973) 597-2476, Attention: Steven M. Skolnick. Notices to the Company shall be given to it at Onconova Therapeutics, Inc., 375 Pheasant Run, Newton, PA 18954 (fax no.: 484-713-6001); Attention: CEO; with a copy to Morgan Lewis & Bockius LLP, 1701 Market Street, Philadelphia, PA 19103 Attention Joanne R. Soslow (fax no.: 215-963-5001).

15. This Agreement may be signed in counterparts, each of which shall be an original and all of which together shall constitute one and the same instrument.

16. THIS AGREEMENT SHALL BE GOVERNED BY AND CONSTRUED IN ACCORDANCE WITH THE LAWS OF THE STATE OF NEW YORK, WITHOUT REGARD TO SUCH STATE'S PRINCIPLES OF CONFLICTS OF LAWS.

17. The parties hereby submit to the jurisdiction of and venue in the federal courts located in the City of New York, New York in connection with any dispute related to this Agreement, any transaction contemplated hereby, or any other matter contemplated hereby.

18. The Company acknowledges and agrees that (i) the purchase and sale of the Securities pursuant to this Agreement, including the determination of the public offering price of the Securities and any related discounts and commissions, is an arm's-length commercial transaction between the Company on the one hand, and the Underwriter, on the other, (ii) in connection therewith and with the process leading to such transaction the Underwriter is acting solely as a principal and not the agent or fiduciary of the Company or its stockholders, creditors, employees or any other party, (iii) no Underwriter has assumed an advisory or fiduciary responsibility in favor of the Company with respect to the offering contemplated hereby or the process leading thereto (irrespective of whether the Underwriter has advised or is currently advising the Company on other matters) or any other obligation to the Company except the obligations expressly set forth in this Agreement, and (iv) the Company has consulted its own legal and financial advisors to the extent it deemed appropriate. The Company agrees that it will not claim that the Underwriter has rendered advisory services of any nature or respect, or owes a fiduciary or similar duty to the Company, in connection with such transaction or the process leading thereto.

19. The Company acknowledges that the Underwriter's research analysts and research departments are required to be independent from their respective investment banking divisions and are subject to certain regulations and internal policies, and that the Underwriter's research analysts may hold views and make statements or investment recommendations and/or publish research reports with respect to the Company and/or the offering that differ from the views of their respective investment banking divisions. The Company hereby waives and releases, to the fullest extent permitted by law, any claims that the Company may have against the Underwriter with respect to any conflict of interest that may arise from the fact that the views expressed by their independent research analysts and research departments may be different from or inconsistent with

the views or advice communicated to the Company by the Underwriter's investment banking divisions. The Company acknowledges that the Underwriter is a full service securities firm and as such from time to time, subject to applicable securities laws, may effect transaction for its own account or the account of its customers and hold long or short positions in debt or equity securities of the companies that may be the subject of the transactions contemplated by this Agreement.

20. Notwithstanding anything herein to the contrary, the Company is authorized to disclose to any persons the U.S. federal and state income tax treatment and tax structure of the potential transaction and all materials of any kind (including tax opinions and other tax analyses) provided to the Company relating to that treatment and structure, without the Underwriter imposing any limitation of any kind. However, any information relating to the tax treatment and tax structure shall remain confidential (and the foregoing sentence shall not apply) to the extent necessary to enable any person to comply with securities laws. For this purpose, "tax structure" is limited to any facts that may be relevant to that treatment.

21. This Agreement (together with the other agreements and documents being delivered pursuant to or in connection with this Agreement) constitutes the entire agreement of the parties hereto with respect to the subject matter hereof and thereof, and supersedes all prior agreements and understandings of the parties, oral and written, with respect to the subject matter hereof. Except as otherwise contemplated herein, it is understood and agreed by the parties hereto that all other binding terms and conditions of those certain engagement letters between the Company and H.C. Wainwright & Co., LLC, dated January 24, 2018 and April 16, 2018, shall remain valid and binding on, and enforceable against, the Company and in full force and effect in accordance with the terms thereof.

22. The Company and the Underwriter hereby irrevocably waives, to the fullest extent permitted by applicable law, any and all right to trial by jury in any legal proceeding arising out of or relating to this Agreement or the transactions contemplated hereby.

If the foregoing is in accordance with your understanding of our agreement, please sign and return to the Company a counterpart hereof, whereupon this instrument will become a binding agreement among the Company and the Underwriter.

Very truly yours,

ONCONOVA THERAPEUTICS, INC.

By: _____
Name: _____
Title: _____

Accepted as of the date hereof:

H.C. WAINWRIGHT & CO., LLC

By: _____
Name: _____
Title: _____

31

SCHEDULE I

	Number of Firm Shares and Pre-Funded Warrants to be Purchased from the Company	Number of Firm Warrants to be Purchased from the Company	Number of Option Shares to be Purchased if the Option to Purchase additional Shares and/or Warrants is Fully Exercised	Number of Option Warrants to be Purchased if the Option to Purchase additional Shares and/or Warrants is Fully Exercised
H.C. Wainwright & Co., LLC	[]	[]	[]	[]

Number of Shares of Firm Shares: []

Number of Pre-Funded Warrants: []

Number of Firm Warrants: [] to purchase [] shares of Series B Preferred Stock

Number of Option Shares: []

Number of Option Warrants: [] to purchase [] shares of Series B Preferred Stock

Public Offering Price per Unit: \$[]

Public Offering Price per Pre-Funded Unit: \$[]

Pre-Funded Warrant Exercise Price: \$[]

Warrant Exercise Price: \$[]

Underwriting Discount per Unit and Pre-Funded Unit: \$[]

Proceeds to Company (before expenses): \$[]

32

SCHEDULE II

Free Writing Prospectuses and/or Testing-the-Water Communications

None.

33

EXHIBIT A

LOCK-UP AGREEMENT

April , 2018

H.C. Wainwright & Co., LLC
430 Park Avenue, 4th Floor
New York, New York 10022

Ladies and Gentlemen:

The undersigned refers to the proposed Underwriting Agreement (the “Underwriting Agreement”) among Onconova Therapeutics, Inc., a Delaware corporation (the “Company”), and the several underwriters named therein (the “Underwriters”). As an inducement to the Underwriters to execute the Underwriting Agreement in connection with the proposed public offering (the “Offering”) of securities of the Company pursuant to a Registration Statement on Form S-1, the undersigned hereby agrees that from the date hereof and until 120 days after the public offering date set forth on the final prospectus used for the Offering (the “Public Offering Date”) pursuant to the Underwriting Agreement (such 120 day period being referred to herein as the “Lock-Up Period”), the undersigned will not (and will cause any immediate family member, any partnership, corporation or other entity within the undersigned’s control, and any trustee of any trust that holds shares of common stock, par value \$0.01 per share (“Common Stock”) of the Company or other securities of the Company for the benefit of the undersigned or such immediate family member not to) offer, sell, contract to sell (including any short sale), pledge, hypothecate, establish an open “put equivalent position” within the meaning of Rule 16a-1(h) under the Securities Exchange Act of 1934, as amended (the “Exchange Act”), grant any option, right or warrant for the sale of, purchase any option or contract to sell, sell any option or contract to purchase, or otherwise encumber, dispose of or transfer, or grant any rights with respect to, directly or indirectly, any shares of Common Stock or securities convertible into or exchangeable or exercisable for any shares of Common Stock, enter into a transaction which would have the same effect, or enter into any swap, hedge or other arrangement that transfers, in whole or in part, any of the economic consequences of ownership of the Common Stock, whether any such aforementioned transaction is to be settled by delivery of the Common Stock or such other securities, in cash or otherwise, or publicly disclose the intention to make any such offer, sale, pledge or disposition, or to enter into any such transaction, swap, hedge or other arrangement, without, in each case, the prior written consent of H.C. Wainwright & Co., LLC (“HCW”), which consent may be withheld in HCW’s sole discretion. For purposes of this Lock-Up Agreement (the “Agreement”), “immediate family member” shall mean (i) the spouse of the undersigned and (ii) any lineal descendent, stepchild, parent, stepparent, grandparent, sibling, stepsibling, son-in-law, daughter-in-law, brother-in-law, sister-in-law, nephew or niece, including any such relationship by fact of legal adoption, of the undersigned or such spouse, in each case living in the undersigned’s household or whose principal residence is the undersigned’s household (regardless of whether such immediate family member may at the time be living

34

elsewhere due to educational activities, health care treatment, military service, temporary internship or employment or otherwise).

The foregoing restrictions shall not apply to *bona fide* gifts by the undersigned, provided that (a) each resulting transferee of the Company’s securities executes and delivers to HCW an agreement satisfactory to HCW certifying that such transferee is bound by the terms of this Agreement and has been in compliance with the terms hereof since the date first above written as if it had been an original party hereto and (b) to the extent any interest in the Company’s securities is retained by the undersigned (or an immediate family member), such securities shall remain subject to the restrictions contained in this Agreement.

In addition, the undersigned agrees that, during the Lock-Up Period, without the prior written consent of HCW (which consent may be withheld in its sole discretion): (a) the undersigned will not request, make any demand for or exercise any right with respect to, the registration of any Common Stock or any security convertible into or exercisable or exchangeable for Common Stock and (b) the undersigned waives any and all notice requirements and rights with respect to the registration of any such security pursuant to any agreement, understanding or otherwise to which the undersigned is a party.

Any Common Stock received upon exercise of options granted to the undersigned will also be subject to this Agreement. Any acquisition of Common Stock by the undersigned in the open market on or after the Public Offering Date (but not the disposition of such Common Stock) will not be subject to this Agreement. A transfer of Common Stock or other securities of the Company may be made (i) to an immediate family member, (ii) to a trust for the benefit of the undersigned or an immediate family member, (iii) by will or intestate succession upon the death of the undersigned, (iv) pursuant to operation of law, including pursuant to a domestic order or negotiated divorce settlement, and (v) if the undersigned is a corporation, limited liability company, partnership, trust, or other business entity, as part of a distribution, transfer or distribution by the undersigned to its stockholders, members, partners, beneficiaries or other equity holders, provided in each case (i) through (v) that the transferee agrees in writing prior to such transfer to be bound by the terms of this Agreement as if it were a party hereto and further provided that no filing under Section 16(a) of the Exchange Act reporting a reduction in beneficial ownership of shares of Common Stock shall be required or shall be voluntarily made during the Lock-Up Period.

The undersigned may also (a) transfer securities of the Company (i) to the Company in connection with the “cashless” exercise of options to purchase shares of Common Stock pursuant to employee benefit plans existing as of the date hereof and disclosed or incorporated by reference in the final prospectus relating to the Offering (provided that the restrictions on transfer set forth in this Agreement shall apply to shares of Common Stock issued upon such exercise, and provided further that no voluntary filing under Section 16(a) of the Exchange Act reporting such transfer shall be made during the Lock-Up Period and that if such filing is required to be made that the filing clearly indicate that such transfer or disposition is related to cashless net exercise) and (ii) pursuant to a bona fide third party tender offer, merger, consolidation or other similar transaction made to all holders of the Company’s capital stock involving a change of control of the Company (provided that in the event that the tender offer, merger, consolidation or other similar transaction is not completed, the undersigned’s Common Stock shall remain subject to the restrictions contained in this Agreement), (b) exercise any option to purchase Common Stock of the Company granted

35

under any equity incentive plan or stock purchase plan of the Company existing as of the date hereof and disclosed or incorporated by reference in the final prospectus relating to the Offering (provided that the restrictions on transfer set forth in this Agreement shall apply to shares of Common Stock issued upon such exercise, and provided further that no filing under Section 16(a) of the Exchange Act reporting such exercise shall be made during the Lock-Up Period, and that if such a filing is required to be made that the filing clearly indicate that it is related to such exercise) and (c) enter into a written plan meeting the requirements of Rule 10b5-1 under the Exchange Act relating to the sale or other disposition of securities of the Company (provided that the securities subject to such plan may not be sold or otherwise disposed of until after the expiration of the Lock-Up Period, and that the entry into such plan is not publicly disclosed, including in any filing under the Exchange Act).

In furtherance of the foregoing, the Company and its transfer agent and registrar are hereby authorized to (a) decline to make any transfer of shares of Common Stock if such transfer would constitute a violation or breach of this Agreement and (b) place legends and stop transfer instructions on any such shares of Common Stock owned or beneficially owned by the undersigned.

[Signature page follows]

36

This Agreement is irrevocable and shall be binding on the undersigned and the successors, heirs, personal representatives and assigns of the undersigned. This Agreement shall be governed by and construed in accordance with the laws of the State of New York, without regard to choice of law rules. This Agreement shall lapse and become null and void if the Public Offering Date shall not have occurred on or before May 31, 2018.

Very truly yours,

(Name - Please Print)

(Signature)

(Name of Signatory, in the case of entities - Please Print)

(Title of Signatory, in the case of entities - Please Print)

Address: _____

Accepted and Agreed:

Onconova Therapeutics, Inc.

By: _____

Name:

Title:

Exhibit 1 — Form of Warrant

38

Exhibit 2 — Form of Pre-Funded Warrant

39

ONCONOVA THERAPEUTICS, INC.

FORM OF

**CERTIFICATE OF DESIGNATION OF PREFERENCES,
RIGHTS AND LIMITATIONS
OF
SERIES B CONVERTIBLE PREFERRED STOCK**

PURSUANT TO SECTION 151 OF THE
DELAWARE GENERAL CORPORATION LAW

The undersigned, Ramesh Kumar, Ph.D., does hereby certify that:

1. He is the President, Chief Executive Officer of Onconova Therapeutics, Inc., a Delaware corporation (the "Corporation").
2. The Corporation is authorized to issue 5,000,000 shares of preferred stock, of which 1,044,488 shares have been designated as Series A Convertible Preferred Stock, par value \$0.01 per share (the "Series A Preferred Stock");
3. The following resolutions were duly adopted by the board of directors of the Corporation (the "Board of Directors"):
 - WHEREAS, the certificate of incorporation of the Corporation provides for a class of its authorized stock known as preferred stock, consisting of 5,000,000 shares, \$0.01 par value per share, issuable from time to time in one or more series;
 - WHEREAS, 1,044,488 of such preferred shares have already been designated as Series A Preferred Stock;
 - WHEREAS, the Board of Directors is authorized to fix the dividend rights, dividend rate, voting rights, conversion rights, rights and terms of redemption and liquidation preferences of any wholly unissued series of preferred stock and the number of shares constituting any series and the designation thereof, of any of them; and
 - WHEREAS, it is the desire of the Board of Directors, pursuant to its authority as aforesaid, to fix the rights, preferences, restrictions and other matters relating to a series of the preferred stock, which shall consist of 1,796,875 shares of the preferred stock which the Corporation has the authority to issue, as follows:

NOW, THEREFORE, BE IT RESOLVED, that the Board of Directors does hereby provide for the issuance of a series of preferred stock for cash or exchange of other securities, rights or property and does hereby fix and determine the rights, preferences, restrictions and other matters relating to such series of preferred stock as follows:

TERMS OF SERIES B CONVERTIBLE PREFERRED STOCK

Section 1. Designation, Amount and Par Value. The series of preferred stock shall be designated as its Series B Convertible Preferred Stock (the "Preferred Stock") and the number of shares so designated shall be up to 1,796,875 (which shall not be subject to increase without the written consent of holders of a majority in interest of the Preferred Stock then outstanding (each, a "Holder" and collectively, the "Holders"). Each share of Preferred Stock shall have a par value of \$0.01 per share and a stated value equal to \$[] (the "Stated Value").

Section 2. Definitions. For the purposes hereof, the following terms shall have the following meanings:

"Affiliate" means any Person that, directly or indirectly through one or more intermediaries, controls or is controlled by or is under common control with a Person, as such terms are used in and construed under Rule 405 of the Securities Act.

"Alternate Consideration" shall have the meaning set forth in Section 7(d).

"Beneficial Ownership Limitation" shall have the meaning set forth in Section 6(d).

"Business Day" means any day except any Saturday, any Sunday, any day which is a federal legal holiday in the

United States or any day on which banking institutions in the State of New York are authorized or required by law or other governmental action to close.

"Buy-In" shall have the meaning set forth in Section 6(c)(iv).

"Charter Amendment Date" means the date on which the Corporation publicly announces through the filing of a Current Report on Form 8-K that an amendment to the Corporation's Tenth Amended and Restated Certificate of Incorporation, as amended, to sufficiently increase the Corporation's authorized shares of Common Stock to cover the conversion of all outstanding shares of Series B Preferred Stock into Common Stock has been filed with the Secretary of State of the State of Delaware.

"Closing Date" means the Trading Day on which all of the Transaction Documents have been executed and delivered by the applicable parties thereto and all conditions precedent to the Corporation's obligations to deliver the Securities have been satisfied or waived.

"Commission" means the United States Securities and Exchange Commission.

“Common Stock” means the Corporation’s common stock, par value \$0.01 per share, and stock of any other class of securities into which such securities may hereafter be reclassified or changed.

“Common Stock Equivalents” means any securities of the Corporation or the Subsidiaries which would entitle the holder thereof to acquire at any time Common Stock, including, without limitation, any debt, preferred stock, rights, options, warrants or other instrument that is at any time convertible into or exercisable or exchangeable for, or otherwise entitles the holder thereof to receive, Common Stock.

“Conversion Amount” means the sum of the Stated Value at issue.

“Conversion Date” shall have the meaning set forth in Section 6(a)

“Conversion Price” shall have the meaning set forth in Section 6(b).

“Conversion Shares” means, collectively, the shares of Common Stock issuable upon conversion of the shares of Preferred Stock in accordance with the terms hereof.

“Exchange Act” means the Securities Exchange Act of 1934, as amended, and the rules and regulations promulgated thereunder.

“Fundamental Transaction” shall have the meaning set forth in Section 7(d)

“Holder” shall have the meaning given such term in Section 2.

“Initial Conversion Date” means the next business day after the Charter Amendment Date.

“Liquidation” shall have the meaning set forth in Section 5.

“New York Courts” shall have the meaning set forth in Section 8(d).

“Notice of Conversion” shall have the meaning set forth in Section 6(a).

“Person” means an individual or corporation, partnership, trust, incorporated or unincorporated association, joint venture, limited liability company, joint stock company, government (or an agency or subdivision thereof) or other entity of any kind.

“Preferred Stock” shall have the meaning set forth in Section 2.

“Representative” means H.C. Wainwright & Co., LLC

“Securities” means the Preferred Stock, the Warrants, the Warrant Shares and the Underlying Shares.

“Securities Act” means the Securities Act of 1933, as amended, and the rules and regulations promulgated thereunder.

“Share Delivery Date” shall have the meaning set forth in Section 6(c).

“Stated Value” shall have the meaning set forth in Section 1, as the same may be increased pursuant to Section 3.

“Subsidiary” means any subsidiary of the Corporation as set forth on Exhibit 21 to the Corporation’s Annual Report on Form 10-K most recently filed with the Commission.

“Successor Entity” shall have the meaning set forth in Section 7(d).

“Trading Day” means a day on which the principal Trading Market is open for business.

“Trading Market” means any of the following markets or exchanges on which the Common Stock is listed or quoted for trading on the date in question: the NYSE MKT, the Nasdaq Capital Market, the Nasdaq Global Market, the Nasdaq Global Select Market, the New York Stock Exchange (or any successors to any of the foregoing).

“Transaction Documents” means this Certificate of Designation, the Underwriting Agreement, the Warrants, all exhibits and schedules thereto and hereto and any other documents or agreements executed in connection with the transactions contemplated pursuant to the Underwriting Agreement.

“Transfer Agent” means EQ Shareowner Services, the current transfer agent of the Corporation, with a mailing address of 1110 Centre Pointe Curve #101, Mendota Heights, MN 55120, and any successor transfer agent of the Corporation.

“Underlying Shares” means the shares of Common Stock issued and issuable upon exercise of the Warrants and conversion of the Preferred Stock.

“Underwriting Agreement” means the underwriting agreement, dated as of [], 2018, between the Corporation and the Representative, as the sole book-running manager, modified and supplemented from time to time in accordance with its terms.

“Warrants” means, collectively, the Preferred Stock purchase warrants delivered to the holders on the Closing Date in accordance with the Underwriting Agreement, which Warrants shall be exercisable immediately and have a term of exercise which will expire on the 18-month anniversary of the Charter Amendment Date, at which point the Warrants will automatically be exercised on a cashless basis.

“Warrant Shares” means the shares of Preferred Stock issuable upon exercise of the Warrants.

Section 3. Dividends. Except for stock dividends or distributions for which adjustments are to be made pursuant to Section 7, Holders shall be entitled to receive, and the Corporation shall pay, dividends on shares of Preferred Stock equal (on an as-if-converted-to-Common-Stock basis) to and in the same form as dividends actually paid on shares of the Common Stock when, as and if such dividends are paid on shares of the Common Stock. No other dividends shall be paid on shares of Preferred Stock.

Section 4. Voting Rights. Except as otherwise provided herein or as otherwise required by law, the Preferred Stock shall have no voting rights. However, as long as any shares of Preferred Stock are outstanding, the Corporation shall not, without the affirmative vote of the Holders of a majority of the then outstanding shares of the Preferred Stock, (a) alter or change adversely the powers, preferences or rights given to the Preferred Stock or alter or amend this Certificate of Designation, (b) increase the number of authorized shares of Preferred Stock, or (c) enter into any agreement with respect to any of the foregoing.

Section 5. Liquidation. Upon any liquidation, dissolution or winding-up of the Corporation, whether voluntary or involuntary (a "Liquidation"), the Holders shall be entitled to receive out of the assets, whether capital or surplus, of the Corporation the same amount that a holder of Common Stock would receive if the Preferred Stock were fully converted (disregarding for such purpose any conversion limitations hereunder) to Common Stock which amounts shall be paid pari passu with all holders of Common Stock. The Corporation shall mail written notice of any such Liquidation, not less than 45 days prior to the payment date stated therein, to each Holder.

3

Section 6. Conversion.

a) Conversions at Option of Holder. Each share of Preferred Stock shall be convertible, at any time and from time to time from and after the Initial Conversion Date at the option of the Holder thereof, into that number of shares of Common Stock (subject to the limitations set forth in Section 6(d)) determined by dividing the Stated Value of such share of Preferred Stock by the Conversion Price. Holders shall effect conversions by providing the Corporation with the form of conversion notice attached hereto as Annex A (a "Notice of Conversion"). Each Notice of Conversion shall specify the number of shares of Preferred Stock to be converted, the number of shares of Preferred Stock owned prior to the conversion at issue, the number of shares of Preferred Stock owned subsequent to the conversion at issue and the date on which such conversion is to be effected, which date may not be prior to the date the applicable Holder delivers by facsimile such Notice of Conversion to the Corporation (such date, the "Conversion Date"). If no Conversion Date is specified in a Notice of Conversion, the Conversion Date shall be the date that such Notice of Conversion to the Corporation is deemed delivered hereunder. No ink-original Notice of Conversion shall be required, nor shall any medallion guarantee (or other type of guarantee or notarization) of any Notice of Conversion form be required. The calculations and entries set forth in the Notice of Conversion shall control in the absence of manifest or mathematical error. To effect conversions of shares of Preferred Stock, a Holder shall not be required to surrender the certificate(s) representing the shares of Preferred Stock to the Corporation unless all of the shares of Preferred Stock represented thereby are so converted, in which case such Holder shall deliver the certificate representing such shares of Preferred Stock promptly following the Conversion Date at issue. Shares of Preferred Stock converted into Common Stock in accordance with the terms hereof shall be canceled and shall not be reissued.

b) Conversion Price. The conversion price for the Preferred Stock shall equal \$[], subject to adjustment herein (the "Conversion Price").

c) Mechanics of Conversion

i) Delivery of Conversion Shares Upon Conversion. Not later than the earlier of (i) two (2) Trading Days and (ii) the number of Trading Days comprising the Standard Settlement Period (as defined below) after each Conversion Date (the "Share Delivery Date"), the Corporation shall deliver, or cause to be delivered, to the converting Holder (A) the number of Conversion Shares being acquired upon the conversion of the Preferred Stock, which Conversion Shares shall be free of restrictive legends and trading restrictions (except to the extent the Holder is subject to certain restrictions under applicable securities laws) and (B) a bank check in the amount of accrued and unpaid dividends. The Corporation shall deliver the Conversion Shares electronically through the Depository Trust Company or another established clearing corporation performing similar functions. As used herein, "Standard Settlement Period" means the standard settlement period, expressed in a number of Trading Days, on the Corporation's primary Trading Market with respect to the Common Stock as in effect on the date of delivery of the Notice of Conversion.

ii) Failure to Deliver Conversion Shares. If, in the case of any Notice of Conversion, such Conversion Shares are not delivered to or as directed by the applicable Holder by the Share Delivery Date, the Holder shall be entitled to elect by written notice to the Corporation at any time on or before its receipt of such Conversion Shares, to rescind such Conversion, in which event the Corporation shall promptly return to the Holder any original Preferred Stock certificate delivered to the Corporation and the Holder shall promptly return to the Corporation the Conversion Shares issued to such Holder pursuant to the rescinded Conversion Notice.

iii) Obligation Absolute. The Corporation's obligation to issue and deliver the Conversion Shares upon conversion of Preferred Stock in accordance with the terms hereof are absolute and unconditional, irrespective of any action or inaction by a Holder to enforce the same, any waiver or consent with respect to any provision hereof, the recovery of any judgment against any Person or any action to enforce the same, or any setoff, counterclaim, recoupment, limitation or termination, or any breach or alleged breach by such Holder or any other Person of any obligation to the Corporation or any violation or alleged violation of law by such Holder or any other person, and irrespective of any other circumstance which might otherwise limit such obligation of the Corporation to such Holder in connection with the issuance of such Conversion Shares; provided, however, that such delivery shall not operate as a waiver by the Corporation of any such action that the Corporation may have against such Holder. In the event a Holder shall elect to convert any or all of the Stated Value of its Preferred Stock, the Corporation may not refuse conversion based on any claim that such Holder or anyone associated or affiliated with such Holder has been engaged in any violation of law, agreement or for any other reason, unless an injunction from a court, on notice to Holder, restraining and/or enjoining conversion of all or part of the Preferred Stock of such Holder shall have been sought and obtained, and the Corporation posts a surety bond for the benefit of such Holder in the amount of 150% of the Stated Value of Preferred Stock which is subject to the injunction, which bond shall remain in effect until the completion of

4

arbitration/litigation of the underlying dispute and the proceeds of which shall be payable to such Holder to the extent it obtains judgment. In the absence of such injunction, the Corporation shall issue Conversion Shares and, if applicable, cash, upon a properly noticed conversion. If the Corporation fails to deliver to a Holder such Conversion Shares pursuant to Section 6(c)(i) on the Share Delivery Date applicable to such conversion, the Corporation shall pay to such Holder, in cash, as liquidated damages and not as a penalty, for each \$5,000 of Stated Value of Preferred Stock being converted, \$50 per Trading Day (increasing to \$100 per Trading Day on the third Trading Day and increasing to \$200 per Trading Day on the tenth Trading Day after such damages begin to accrue) for each Trading Day after the Share Delivery Date until such Conversion Shares are delivered or Holder rescinds such conversion. Nothing herein shall limit a Holder's right to pursue actual damages for the Corporation's failure to deliver Conversion Shares within the period specified herein and such Holder shall have the right to pursue all remedies available to it hereunder, at law or in equity including, without limitation, a decree of specific performance and/or injunctive relief. The exercise of any such rights shall not prohibit a Holder from seeking to enforce damages pursuant to any other Section hereof or under applicable law.

iv) Compensation for Buy-In on Failure to Timely Deliver Conversion Shares Upon Conversion. In addition to any other rights available to the Holder, if the Corporation fails for any reason to deliver to a Holder the applicable Conversion Shares by the Share Delivery Date pursuant to Section 6(c)(i), and if after such Share Delivery Date such Holder is required by its brokerage firm to purchase (in an open market transaction or otherwise), or the Holder's brokerage firm otherwise purchases, shares of Common Stock to deliver in satisfaction of a sale by such Holder of the Conversion Shares which such Holder was entitled to receive upon the conversion relating to such Share Delivery Date (a "Buy-In"), then the Corporation shall (A) pay in cash to such Holder (in addition to any other remedies available to or elected by such Holder) the amount, if any, by which (x) such Holder's total purchase price (including any brokerage commissions) for the Common Stock so purchased exceeds (y) the product of (1) the aggregate number of shares of Common Stock that such Holder was entitled to receive from the conversion at issue multiplied by (2) the actual sale price at which the sell order giving rise to such purchase obligation was executed (including any brokerage commissions) and (B) at the option of such Holder, either reissue (if surrendered) the shares of Preferred Stock equal to the number of shares of Preferred Stock submitted for conversion (in which case, such conversion shall be deemed rescinded) or deliver to such Holder the number of shares of Common Stock that would have been issued if the Corporation had timely complied with its delivery requirements under Section 6(c)(i). For example, if a Holder purchases shares of Common Stock having a total purchase price of \$11,000 to cover a Buy-In with respect to an attempted conversion of shares of Preferred Stock with respect to which the actual sale price of the Conversion Shares (including any brokerage commissions) giving rise to such purchase obligation was a total of \$10,000 under clause (A) of the immediately preceding sentence, the Corporation shall be required to pay such Holder \$1,000. The Holder shall provide the Corporation written notice indicating the amounts payable to such Holder in respect of the Buy-In and, upon request of the Corporation, evidence of the amount of such loss. Nothing herein shall limit a Holder's right to pursue any other remedies available to it hereunder, at law or in equity including, without limitation, a decree of specific performance and/or injunctive relief with respect to the Corporation's failure to timely deliver Conversion Shares upon conversion of the shares of Preferred Stock as required pursuant to the terms hereof.

v) Reservation of Shares Issuable Upon Conversion. The Corporation covenants that, following the Charter Amendment Date, it will at all times reserve and keep available out of its authorized and unissued shares of Common Stock for the sole purpose of issuance upon conversion of the Preferred Stock as herein provided, free from preemptive rights or any other actual contingent purchase rights of Persons other than the Holder (and the other holders of the Preferred Stock), not less than such aggregate number of shares of the Common Stock as shall be issuable (taking into account the adjustments and restrictions of Section 7) upon the conversion of the then outstanding shares of Preferred Stock. The Corporation covenants that all shares of Common Stock that shall be so issuable shall, upon issue, be duly authorized, validly issued, fully paid and nonassessable.

vi) Fractional Shares. No fractional shares or scrip representing fractional shares shall be issued upon the conversion of the Preferred Stock. As to any fraction of a share which the Holder would otherwise be entitled to purchase upon such conversion, the Corporation shall at its election, either pay a cash adjustment in respect of such final fraction in an amount equal to such fraction multiplied by the Conversion Price or round up to the next whole share.

vii) Transfer Taxes and Expenses. The issuance of Conversion Shares on conversion of this Preferred Stock shall be made without charge to any Holder for any documentary stamp or similar taxes that may be payable in respect of the issue or delivery of such Conversion Shares, provided that the Corporation shall not be required to pay any tax that may be payable in respect of any transfer involved in the issuance and delivery of any such Conversion Shares

upon conversion in a name other than that of the Holders of such shares of Preferred Stock and the Corporation shall not be required to issue or deliver such Conversion Shares unless or until the Person or Persons requesting the issuance thereof shall have paid to the Corporation the amount of such tax or shall have established to the satisfaction of the Corporation that such tax has been paid. The Corporation shall pay all Transfer Agent fees required for same-day processing of any Notice of Conversion and all fees to the Depository Trust Company (or another established clearing corporation performing similar functions) required for same-day electronic delivery of the Conversion Shares.

d) Beneficial Ownership Limitation. The Corporation shall not effect any conversion of the Preferred Stock, and a Holder shall not have the right to convert any portion of the Preferred Stock, to the extent that, after giving effect to the conversion set forth on the applicable Notice of Conversion, such Holder (together with such Holder's Affiliates, and any Persons acting as a group together with such Holder or any of such Holder's Affiliates (such Persons, "Attribution Parties")) would beneficially own in excess of the Beneficial Ownership Limitation (as defined below). For purposes of the foregoing sentence, the number of shares of Common Stock beneficially owned by such Holder and its Affiliates and Attribution Parties shall include the number of shares of Common Stock issuable upon conversion of the Preferred Stock with respect to which such determination is being made, but shall exclude the number of shares of Common Stock which are issuable upon (i) conversion of the remaining, unconverted Stated Value of Preferred Stock beneficially owned by such Holder or any of its Affiliates or Attribution Parties and (ii) exercise or conversion of the unexercised or unconverted portion of any other securities of the Corporation subject to a limitation on conversion or exercise analogous to the limitation contained herein (including, without limitation, the Preferred Stock or the Warrants) beneficially owned by such Holder or any of its Affiliates or Attribution Parties. Except as set forth in the preceding sentence, for purposes of this Section 6(d), beneficial ownership shall be calculated in accordance with Section 13(d) of the Exchange Act and the rules and regulations promulgated thereunder, it being acknowledged by the Holder that the Corporation is not representing to the Holder that such calculation is in compliance with Section 13(d) of the Exchange Act and the Holder is solely responsible for any schedules required to be filed in accordance therewith. To the extent that the limitation contained in this Section 6(d) applies, the determination of whether the Preferred Stock is convertible (in relation to other securities owned by such Holder together with any Affiliates and Attribution Parties) and of how many shares of Preferred Stock are convertible shall be in the sole discretion of such Holder, and the submission of a Notice of Conversion shall be deemed to be such Holder's determination of whether the shares of Preferred Stock may be converted (in relation to other securities owned by such Holder together with any Affiliates and Attribution Parties) and how many shares of the Preferred

Stock are convertible, in each case subject to the Beneficial Ownership Limitation. To ensure compliance with this restriction, each Holder will be deemed to represent to the Corporation each time it delivers a Notice of Conversion that such Notice of Conversion has not violated the restrictions set forth in this paragraph and the Corporation shall have no obligation to verify or confirm the accuracy of such determination. In addition, a determination as to any group status as contemplated above shall be determined in accordance with Section 13(d) of the Exchange Act and the rules and regulations promulgated thereunder. For purposes of this Section 6(d), in determining the number of outstanding shares of Common Stock, a Holder may rely on the number of outstanding shares of Common Stock as stated in the most recent of the following: (i) the Corporation's most recent periodic or annual report filed with the Commission, as the case may be, (ii) a more recent public announcement by the Corporation or (iii) a more recent written notice by the Corporation or the Transfer Agent setting forth the number of shares of Common Stock outstanding. Upon the written or oral request (which may be via email) of a Holder, the Corporation shall within one Trading Day confirm orally and in writing to such Holder the number of shares of Common Stock then outstanding. In any case, the number of outstanding shares of Common Stock shall be determined after giving effect to the conversion or exercise of securities of the Corporation, including the Preferred Stock, by such Holder or its Affiliates or Attribution Parties since the date as of which such number of outstanding shares of Common Stock was reported. The "Beneficial Ownership Limitation" shall be 4.99% of the number of shares of the Common Stock outstanding immediately after giving effect to the issuance of shares of Common Stock issuable upon conversion of Preferred Stock held by the applicable Holder. A Holder, upon notice to the Corporation, may increase or decrease the Beneficial Ownership Limitation provisions of this Section 6(d) applicable to its Preferred Stock provided that the Beneficial Ownership Limitation in no event exceeds 9.99% of the number of shares of the Common Stock outstanding immediately after giving effect to the issuance of shares of Common Stock upon conversion of this Preferred Stock held by the Holder and the provisions of this Section 6(d) shall continue to apply. Any such increase in the Beneficial Ownership Limitation will not be effective until the 61st day after such notice is delivered to the Corporation and shall only apply to such Holder and no other Holder. The provisions of this paragraph shall be construed and implemented in a manner otherwise than in strict conformity with the terms of this Section 6(d) to correct this paragraph (or any portion hereof) which may be defective or inconsistent with the intended Beneficial Ownership Limitation contained herein or to make changes or supplements necessary or desirable to properly give effect to such limitation. The limitations contained in this paragraph shall apply to a successor holder of Preferred Stock.

Section 7. Certain Adjustments.

a) Stock Dividends and Stock Splits. If the Corporation, at any time while this Preferred Stock is outstanding: (i)

6

pays a stock dividend or otherwise makes a distribution or distributions payable in shares of Common Stock on shares of Common Stock or any other Common Stock Equivalents (which, for avoidance of doubt, shall not include any shares of Common Stock issued by the Corporation upon conversion of, or payment of a dividend on, this Preferred Stock), (ii) subdivides outstanding shares of Common Stock into a larger number of shares, (iii) combines (including by way of a reverse stock split) outstanding shares of Common Stock into a smaller number of shares, or (iv) issues, in the event of a reclassification of shares of the Common Stock, any shares of capital stock of the Corporation, then the Conversion Price shall be multiplied by a fraction of which the numerator shall be the number of shares of Common Stock (excluding any treasury shares of the Corporation) outstanding immediately before such event, and of which the denominator shall be the number of shares of Common Stock outstanding immediately after such event. Any adjustment made pursuant to this Section 7(a) shall become effective immediately after the record date for the determination of stockholders entitled to receive such dividend or distribution and shall become effective immediately after the effective date in the case of a subdivision, combination or re-classification.

b) Subsequent Rights Offerings. In addition to any adjustments pursuant to Section 7(a) above, if at any time the Corporation grants, issues or sells any Common Stock Equivalents or rights to purchase stock, warrants, securities or other property pro rata to the record holders of any class of shares of Common Stock (the "Purchase Rights"), then the Holder of will be entitled to acquire, upon the terms applicable to such Purchase Rights, the aggregate Purchase Rights which the Holder could have acquired if the Holder had held the number of shares of Common Stock acquirable upon complete conversion of such Holder's Preferred Stock (without regard to any limitations on exercise hereof, including without limitation, the Beneficial Ownership Limitation) immediately before the date on which a record is taken for the grant, issuance or sale of such Purchase Rights, or, if no such record is taken, the date as of which the record holders of shares of Common Stock are to be determined for the grant, issue or sale of such Purchase Rights (provided, however, to the extent that the Holder's right to participate in any such Purchase Right would result in the Holder exceeding the Beneficial Ownership Limitation, then the Holder shall not be entitled to participate in such Purchase Right to such extent (or beneficial ownership of such shares of Common Stock as a result of such Purchase Right to such extent) and such Purchase Right to such extent shall be held in abeyance for the Holder until such time, if ever, as its right thereto would not result in the Holder exceeding the Beneficial Ownership Limitation).

c) Pro Rata Distributions. During such time as this Preferred Stock is outstanding, if the Corporation declares or makes any dividend or other distribution of its assets (or rights to acquire its assets) to holders of shares of Common Stock, by way of return of capital or otherwise (including, without limitation, any distribution of cash, stock or other securities, property or options by way of a dividend, spin off, reclassification, corporate rearrangement, scheme of arrangement or other similar transaction) (a "Distribution"), at any time after the issuance of this Preferred Stock, then, in each such case, the Holder shall be entitled to participate in such Distribution to the same extent that the Holder would have participated therein if the Holder had held the number of shares of Common Stock acquirable upon complete conversion of this Preferred Stock (without regard to any limitations on conversion hereof, including without limitation, the Beneficial Ownership Limitation) immediately before the date of which a record is taken for such Distribution, or, if no such record is taken, the date as of which the record holders of shares of Common Stock are to be determined for the participation in such Distribution (provided, however, to the extent that the Holder's right to participate in any such Distribution would result in the Holder exceeding the Beneficial Ownership Limitation, then the Holder shall not be entitled to participate in such Distribution to such extent (or in the beneficial ownership of any shares of Common Stock as a result of such Distribution to such extent) and the portion of such Distribution shall be held in abeyance for the benefit of the Holder until such time, if ever, as its right thereto would not result in the Holder exceeding the Beneficial Ownership Limitation).

d) Fundamental Transaction. If, at any time while this Preferred Stock is outstanding, (i) the Corporation, directly or indirectly, in one or more related transactions effects any merger or consolidation of the Corporation with or into another Person, (ii) the Corporation, directly or indirectly, effects any sale, lease, license, assignment, transfer, conveyance or other disposition of all or substantially all of its assets in one or a series of related transactions, (iii) any, direct or indirect, purchase offer, tender offer or exchange offer (whether by the Corporation or another Person) is completed pursuant to which holders of Common Stock are permitted to sell, tender or exchange their shares for other securities, cash or property and has been accepted by the holders of 50% or more of the outstanding Common Stock, (iv) the Corporation, directly or indirectly, in one or more related transactions effects any reclassification, reorganization or recapitalization of the Common Stock or any compulsory share exchange pursuant to which the Common Stock is effectively converted into or exchanged for other securities, cash or property, or (v) the Corporation, directly or indirectly, in one or more related transactions consummates a stock or share purchase agreement or other business combination (including, without limitation, a reorganization, recapitalization, spin-off or scheme of arrangement) with another Person whereby such other Person acquires more than 50% of the outstanding shares of Common Stock (not including any shares of Common Stock held by the other Person or other Persons making or party to, or associated or affiliated with the other Persons making or party to, such stock or share

shall have the right to receive, for each Conversion Share that would have been issuable upon such conversion immediately prior to the occurrence of such Fundamental Transaction (without regard to any limitation in Section 6(d) on the conversion of this Preferred Stock), the number of shares of Common Stock of the successor or acquiring corporation or of the Corporation, if it is the surviving corporation, and any additional consideration (the “Alternate Consideration”) receivable as a result of such Fundamental Transaction by a holder of the number of shares of Common Stock for which this Preferred Stock is convertible immediately prior to such Fundamental Transaction (without regard to any limitation in Section 6(d) on the conversion of this Preferred Stock). For purposes of any such conversion, the determination of the Conversion Price shall be appropriately adjusted to apply to such Alternate Consideration based on the amount of Alternate Consideration issuable in respect of one share of Common Stock in such Fundamental Transaction, and the Corporation shall apportion the Conversion Price among the Alternate Consideration in a reasonable manner reflecting the relative value of any different components of the Alternate Consideration. If holders of Common Stock are given any choice as to the securities, cash or property to be received in a Fundamental Transaction, then the Holder shall be given the same choice as to the Alternate Consideration it receives upon any conversion of this Preferred Stock following such Fundamental Transaction. To the extent necessary to effectuate the foregoing provisions, any successor to the Corporation or surviving entity in such Fundamental Transaction shall file a new Certificate of Designation with the same terms and conditions and issue to the Holders new preferred stock consistent with the foregoing provisions and evidencing the Holders’ right to convert such preferred stock into Alternate Consideration. The Corporation shall cause any successor entity in a Fundamental Transaction in which the Corporation is not the survivor (the “Successor Entity”) to assume in writing all of the obligations of the Corporation under this Certificate of Designation and the other Transaction Documents in accordance with the provisions of this Section 7(d) pursuant to written agreements in form and substance reasonably satisfactory to the Holder and approved by the Holder (without unreasonable delay) prior to such Fundamental Transaction and shall, at the option of the holder of this Preferred Stock, deliver to the Holder in exchange for this Preferred Stock a security of the Successor Entity evidenced by a written instrument substantially similar in form and substance to this Preferred Stock which is convertible for a corresponding number of shares of capital stock of such Successor Entity (or its parent entity) equivalent to the shares of Common Stock acquirable and receivable upon conversion of this Preferred Stock (without regard to any limitations on the conversion of this Preferred Stock) prior to such Fundamental Transaction, and with a conversion price which applies the conversion price hereunder to such shares of capital stock (but taking into account the relative value of the shares of Common Stock pursuant to such Fundamental Transaction and the value of such shares of capital stock, such number of shares of capital stock and such conversion price being for the purpose of protecting the economic value of this Preferred Stock immediately prior to the consummation of such Fundamental Transaction), and which is reasonably satisfactory in form and substance to the Holder. Upon the occurrence of any such Fundamental Transaction, the Successor Entity shall succeed to, and be substituted for (so that from and after the date of such Fundamental Transaction, the provisions of this Certificate of Designation and the other Transaction Documents referring to the “Corporation” shall refer instead to the Successor Entity), and may exercise every right and power of the Corporation and shall assume all of the obligations of the Corporation under this Certificate of Designation and the other Transaction Documents with the same effect as if such Successor Entity had been named as the Corporation herein.

e) Calculations. All calculations under this Section 7 shall be made to the nearest cent or the nearest 1/100th of a share, as the case may be. For purposes of this Section 7, the number of shares of Common Stock deemed to be issued and outstanding as of a given date shall be the sum of the number of shares of Common Stock (excluding any treasury shares of the Corporation) issued and outstanding.

f) Notice to the Holders.

i) Adjustment to Conversion Price. Whenever the Conversion Price is adjusted pursuant to any provision of this Section 7, the Corporation shall promptly deliver to each Holder by facsimile or email a notice setting forth the Conversion Price after such adjustment and setting forth a brief statement of the facts requiring such adjustment.

ii) Notice to Allow Conversion by Holder. If (A) the Corporation shall declare a dividend (or any other distribution in whatever form) on the Common Stock, (B) the Corporation shall declare a special nonrecurring cash dividend on or a redemption of the Common Stock, (C) the Corporation shall authorize the granting to all holders of the Common Stock of rights or warrants to subscribe for or purchase any shares of capital stock of any class or of any rights, (D) the approval of any stockholders of the Corporation shall be required in connection with any reclassification of the Common Stock, any consolidation or merger to which the Corporation is a party, any sale or transfer of all or substantially all of the assets of the Corporation, or any compulsory share exchange whereby the Common Stock is converted into other securities, cash or property or (E) the Corporation shall authorize the voluntary or involuntary dissolution, liquidation or winding up of the affairs of the Corporation, then, in each case, the Corporation shall cause to be filed at each office or agency maintained for the purpose of conversion of this Preferred Stock, and shall cause to be delivered by facsimile or email to each Holder at its last facsimile or email address as it

shall appear upon the stock books of the Corporation, at least twenty (20) calendar days prior to the applicable record or effective date hereinafter specified, a notice stating (x) the date on which a record is to be taken for the purpose of such dividend, distribution, redemption, rights or warrants, or if a record is not to be taken, the date as of which the holders of the Common Stock of record to be entitled to such dividend, distributions, redemption, rights or warrants are to be determined or (y) the date on which such reclassification, consolidation, merger, sale, transfer or share exchange is expected to become effective or close, and the date as of which it is expected that holders of the Common Stock of record shall be entitled to exchange their shares of the Common Stock for securities, cash or other property deliverable upon such reclassification, consolidation, merger, sale, transfer or share exchange, provided that the failure to deliver such notice or any defect therein or in the delivery thereof shall not affect the validity of the corporate action required to be specified in such notice. To the extent that any notice provided hereunder constitutes, or contains, material, non-public information regarding the Corporation or any of the Subsidiaries, the Corporation shall simultaneously file such notice with the Commission pursuant to a Current Report on Form 8-K. The Holder shall remain entitled to convert the Conversion Amount of this Preferred Stock (or any part hereof) during the 20-day period commencing on the date of such notice through the effective date of the event triggering such notice except as may otherwise be expressly set forth herein.

Section 8. Miscellaneous.

a) Notices. Any and all notices or other communications or deliveries to be provided by the Holders hereunder including, without limitation, any Notice of Conversion, shall be in writing and delivered personally, by facsimile or email, or sent by a nationally recognized overnight courier service, addressed to the Corporation, at the address set forth above Attention: Chief Executive Officer, facsimile number (484) 713-6001, e-mail address: rkumar@onconova.us, or such other facsimile number, e-mail address or address as the Corporation may specify for such purposes by notice to the Holders delivered in accordance with this Section 8. Any and all notices or other communications or deliveries to be provided by the Corporation hereunder shall be in writing and delivered personally, by facsimile or email, or sent by a nationally recognized overnight courier service addressed to each Holder at the facsimile number, email address or address of such Holder appearing on the books of the Corporation. Any notice or other communication or deliveries hereunder shall be deemed given and effective on the earliest of (i) the date of transmission, if such notice or communication is delivered via facsimile at the facsimile number or via email at the email address set forth in this Section prior to 5:30 p.m. (New York City time) on any date, (ii) the next Trading Day after the date of transmission, if such notice or communication is delivered via facsimile at the facsimile number or via email at the email address set forth in this Section on a day that is not a Trading Day or later than 5:30 p.m. (New York City time) on any Trading Day, (iii) the second Trading Day following the date of mailing, if sent by U.S. nationally recognized overnight courier service, or (iv) upon actual receipt by the party to whom such notice is required to be given.

b) Absolute Obligation. Except as expressly provided herein, no provision of this Certificate of Designation shall alter or impair the obligation of the Corporation, which is absolute and unconditional, to pay liquidated damages and accrued dividends, as applicable, on the shares of Preferred Stock at the time, place, and rate, and in the coin or currency, herein prescribed.

c) Lost or Mutilated Preferred Stock Certificate. If a Holder's Preferred Stock certificate shall be mutilated, lost, stolen or destroyed, the Corporation shall execute and deliver, in exchange and substitution for and upon cancellation of a mutilated certificate, or in lieu of or in substitution for a lost, stolen or destroyed certificate, a new certificate for the shares of Preferred Stock so mutilated, lost, stolen or destroyed, but only upon receipt of evidence of such loss, theft or destruction of such certificate, and of the ownership hereof reasonably satisfactory to the Corporation.

d) Governing Law. All questions concerning the construction, validity, enforcement and interpretation of this Certificate of Designation shall be governed by and construed and enforced in accordance with the internal laws of the State of Delaware, without regard to the principles of conflict of laws thereof. Each party agrees that all legal proceedings concerning the interpretation, enforcement and defense of the transactions contemplated by any of the Transaction Documents (whether brought against a party hereto or its respective Affiliates, directors, officers, shareholders, employees or agents) shall be commenced in the state and federal courts sitting in the City of New York, Borough of Manhattan (the "New York Courts"). The Corporation and each Holder hereby irrevocably submits to the exclusive jurisdiction of the New York Courts for the adjudication of any dispute hereunder or in connection herewith or with any transaction contemplated hereby or discussed herein (including with respect to the enforcement of any of the Transaction Documents), and hereby irrevocably waives, and agrees not to assert in any suit, action or proceeding, any claim that it is not personally subject to the jurisdiction of such New York Courts, or such New York Courts are improper or inconvenient venue for such proceeding. The Corporation and each Holder hereby irrevocably waives personal service of process and consents to process being served in any such suit, action or proceeding by mailing a copy thereof via registered or certified mail or overnight delivery (with evidence of delivery) to such

9

party at the address in effect for notices to it under this Certificate of Designation and agrees that such service shall constitute good and sufficient service of process and notice thereof. Nothing contained herein shall be deemed to limit in any way any right to serve process in any other manner permitted by applicable law. The Corporation and each Holder hereby irrevocably waives, to the fullest extent permitted by applicable law, any and all right to trial by jury in any legal proceeding arising out of or relating to this Certificate of Designation or the transactions contemplated hereby. If any party shall commence an action or proceeding to enforce any provisions of this Certificate of Designation, then the prevailing party in such action or proceeding shall be reimbursed by the other party for its attorneys' fees and other costs and expenses incurred in the investigation, preparation and prosecution of such action or proceeding.

e) Waiver. Any waiver by the Corporation or a Holder of a breach of any provision of this Certificate of Designation shall not operate as or be construed to be a waiver of any other breach of such provision or of any breach of any other provision of this Certificate of Designation or a waiver by any other Holders. The failure of the Corporation or a Holder to insist upon strict adherence to any term of this Certificate of Designation on one or more occasions shall not be considered a waiver or deprive that party (or any other Holder) of the right thereafter to insist upon strict adherence to that term or any other term of this Certificate of Designation on any other occasion. Any waiver by the Corporation or a Holder must be in writing.

f) Severability. If any provision of this Certificate of Designation is invalid, illegal or unenforceable, the balance of this Certificate of Designation shall remain in effect, and if any provision is inapplicable to any Person or circumstance, it shall nevertheless remain applicable to all other Persons and circumstances. If it shall be found that any interest or other amount deemed interest due hereunder violates the applicable law governing usury, the applicable rate of interest due hereunder shall automatically be lowered to equal the maximum rate of interest permitted under applicable law.

g) Next Business Day. Whenever any payment or other obligation hereunder shall be due on a day other than a Business Day, such payment shall be made on the next succeeding Business Day.

h) Headings. The headings contained herein are for convenience only, do not constitute a part of this Certificate of Designation and shall not be deemed to limit or affect any of the provisions hereof.

i) Status of Converted or Redeemed Preferred Stock. If any shares of Preferred Stock shall be converted, redeemed or reacquired by the Corporation, such shares shall resume the status of authorized but unissued shares of preferred stock and shall no longer be designated as Series B Convertible Preferred Stock.

10

RESOLVED, FURTHER, that the Chairman, the president or any vice-president, and the secretary or any assistant secretary, of the Corporation be and they hereby are authorized and directed to prepare and file this Certificate of Designation of Preferences, Rights and Limitations in accordance with the foregoing resolution and the provisions of Delaware law.

Name: Ramesh Kumar, Ph.D.
Title: President and Chief Executive Officer

ANNEX A

NOTICE OF CONVERSION

(TO BE EXECUTED BY THE REGISTERED HOLDER IN ORDER TO CONVERT SHARES OF PREFERRED STOCK)

The undersigned hereby elects to convert the number of shares of Series B Convertible Preferred Stock indicated below into shares of common stock, par value \$0.01 per share (the "Common Stock"), of Onconova Therapeutics, Inc., a Delaware corporation (the "Corporation"), according to the conditions hereof, as of the date written below. If shares of Common Stock are to be issued in the name of a Person other than the undersigned, the undersigned will pay all transfer taxes payable with respect thereto. No fee will be charged to the Holders for any conversion, except for any such transfer taxes.

Conversion calculations:

Date to Effect Conversion:

Number of shares of Preferred Stock owned prior to Conversion:

Number of shares of Preferred Stock to be Converted:

Stated Value of shares of Preferred Stock to be Converted:

Number of shares of Common Stock to be Issued:

Applicable Conversion Price:

Number of shares of Preferred Stock subsequent to Conversion:

Address for Delivery:

or

DWAC Instructions:

Broker no:

Account no:

[HOLDER]

By: _____
Name:
Title:

Morgan Lewis

April 26, 2018

Onconova Therapeutics, Inc.
375 Pheasant Run
Newtown, PA 18940

Re: Onconova Therapeutics, Inc., Registration Statement on Form S-1

Ladies and Gentlemen:

We have acted as counsel to Onconova Therapeutics, Inc., a Delaware corporation (the "Company"), in connection with its filing of a Registration Statement on Form S-1, Commission File 333-224315 (the "Initial Registration Statement") under the Securities Act of 1933, as amended (the "Act"), with the Securities and Exchange Commission (the "Commission") on April 17, 2018, as amended by Amendment No. 1 to the Initial Registration Statement ("Amendment No. 1") the Company filed with the Commission on April 25, 2018, by Amendment No. 2 to the Initial Registration Statement ("Amendment No. 2") the Company filed with the Commission on April 25, 2018 and by Amendment No. 3 to the Initial Registration Statement ("Amendment No. 3" and the Initial Registration Statement, as amended by Amendment No. 1, Amendment No. 2 Amendment No. 3, the "Registration Statement") the Company filed with the Commission on the date hereof. The Registration Statement relates to the proposed offering and sale of up to \$28,750,000 worth of securities consisting of (A) units (the "Units") each consisting of a share of the common stock of the Company, par value \$0.01 (the "Common Stock") and a warrant (each, a "Preferred Stock Warrant" and, collectively, the "Preferred Stock Warrants") to purchase 0.025 of a share of series B convertible preferred stock of the Company, par value \$0.01 (the "Series B Preferred Stock"); and (B) pre-funded units (the "Pre-Funded Units"), each consisting of a pre-funded warrant to purchase one share of Common Stock (each, a "Pre-Funded Common Warrant" and collectively, the "Pre-Funded Common Warrants") and one Preferred Stock Warrant. The shares of Common Stock, which include the shares of Common Stock being issued as part of the Units and issuable from time to time upon the exercise of the Pre-Funded Common Warrants (collectively, the "Shares") and up to \$28,750,000 aggregate offering price of shares of Series B Preferred Stock issuable from time to time upon the exercise of the Preferred Stock Warrants (the "Preferred Shares") are being registered pursuant to the Registration Statement. The Units, Preferred Stock Warrants, Pre-Funded Units, Pre-Funded Common Warrants, Underwriter Warrants, the Shares, and the Preferred Shares are collectively referred to herein as the "Securities"). This opinion letter is furnished to you at your request to enable you to fulfill the requirements of Item 601(b)(5) of Regulation S-K, 17 C.F.R. § 229.601(b)(5), in connection with the Registration Statement.

In connection with this opinion letter, we have examined the Registration Statement and originals, or copies certified or otherwise identified to our satisfaction, of the Company's Tenth Amended and Restated Certificate of Incorporation, as amended, and the Company's Amended and Restated Bylaws and such other documents, records and instruments as we have deemed appropriate for purposes of the opinion set forth herein.

We have assumed the genuineness of all signatures, the legal capacity of all natural persons, the authenticity of the documents submitted to us as originals, the conformity with the originals of all documents submitted to us as certified, facsimile, or photostatic copies and the authenticity of the originals of all documents submitted to us as copies.

Based upon, subject to and limited by the foregoing, we are of the opinion that following (i) execution and delivery by the Company of the Underwriting Agreement (the "Agreement"), with H.C. Wainwright Co., LLC ("HCW"), (ii) effectiveness of the Registration Statement, (iii) issuance of the Securities pursuant to the terms of the Agreement, and (iv) receipt by the Company of the consideration for the Securities, as applicable:

- (a) The Securities will be duly authorized for issuance and, when issued, delivered and paid for in accordance with the terms of the Agreement, will be validly issued, fully paid and nonassessable;
- (b) The Preferred Stock Warrants and Pre-Funded Common Warrants will be duly authorized for issuance and, when issued and sold in accordance with the Agreement and duly executed and delivered by the Company to the purchasers thereof against payment therefor, will constitute valid and legally binding obligations of the Company enforceable against the Company in accordance with their terms;
- (c) The Shares will be duly authorized and when issued and paid for in accordance with the provisions of the Units and Pre-Funded Common Warrants, as applicable, will be validly issued and be fully paid and nonassessable.

The opinion expressed in paragraph (b) above with respect to the valid and binding nature of obligations may be limited by bankruptcy, insolvency, reorganization, receivership, moratorium or other laws affecting creditors' rights (including, without limitation, the effect of statutory and other law regarding fraudulent conveyances, fraudulent transfers and preferential transfers) and by the exercise of judicial discretion and the application of principles of equity, good faith, fair dealing, reasonableness, conscionability and materiality (regardless of whether the Preferred Stock Warrants and Pre-Funded Common Warrants, as applicable, are considered in a proceeding in equity or at law).

The opinions expressed herein are limited to Delaware General Corporation Law.

We hereby consent to the use of this opinion as Exhibit 5.1 to the Registration Statement and any post-effective amendment to the Registration Statement, and to the reference to us under the caption "Legal Matters" in the prospectus included in the Registration Statement. In giving such consent, we do not hereby admit that we are acting within the category of persons whose consent is required under Section 7 of the Act or the rules or regulations of the Commission thereunder.

Very truly yours,

/s/ Morgan, Lewis & Bockius LLP



Consent of Independent Registered Public Accounting Firm

We consent to the reference to our firm under the caption “Experts” in Amendment No. 3 to the Registration Statement on Form S-1 and related Prospectus of Onconova Therapeutics, Inc. for the registration of up to \$57,500,000 of securities, and to the incorporation by reference therein of our report dated March 16, 2018, with respect to the consolidated financial statements of Onconova Therapeutics, Inc. included in its Annual Report (Form 10-K) for the year ended December 31, 2017, filed with the Securities and Exchange Commission.

/s/ Ernst & Young LLP

Philadelphia, Pennsylvania
April 26, 2018
