Onconova Therapeutics, Inc.
Form S-3
April 05, 2019

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As filed with the Securities and Exchange Commission on April 5, 2019

Registration No. 333-

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM S-3

REGISTRATION STATEMENT
UNDER
THE SECURITIES ACT OF 1933

Onconova Therapeutics, Inc.

(Exact name of registrant as specified in charter)

Delaware	**22-3627252**
(State or other jurisdiction of incorporation or organization)	(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)

Steven M. Fruchtman, M.D.
President and Chief Executive Officer
Onconova Therapeutics, Inc.
375 Pheasant Run
Newtown, PA 18940
(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
(215) 963-5000

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. o

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. ý

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

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

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. o

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. o

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.

Large accelerated filer o	Accelerated filer o	Non-accelerated filer ý	Smaller reporting company ý
			Emerging growth company o

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. o

CALCULATION OF REGISTRATION FEE

Title of Each Class of Securities to be Registered	Amount to be Registered	Proposed Maximum Offering Price Per Share	Proposed Maximum Aggregate Offering Price	Amount of Registration Fee
Common Stock, par value $0.01 per share	54,463(1)	$3.25(2)	$177,005(2)	$21.46

(1) Pursuant to Rule 416 under the Securities Act, the shares of common stock, par value $0.01 per share ("Common Stock") being registered hereunder include such indeterminate number of shares of Common Stock as may be issuable with respect to the shares of Common Stock being registered hereunder as a result of stock splits, stock dividends or in connection with a stock combination, recapitalization, merger, consolidation or otherwise.

(2) Estimated solely for the purpose of calculating the registration fee, pursuant to Rule 457(c) under the Securities Act, based on the average of the high and low prices reported for the shares of Common Stock as reported on the Nasdaq Capital Market on April 1, 2019.

The registrant hereby amends this registration statement on such date or dates as may be necessary to delay its effective date until the registrant shall file a further amendment that specifically states that this registration statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act 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.

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

SUBJECT TO COMPLETION, DATED APRIL 5, 2019

PROSPECTUS

Onconova Therapeutics, Inc.

54,463 Shares

Common Stock

The selling stockholder named in this prospectus under the heading "Selling Stockholder" may offer and sell up to an aggregate of 54,463 shares of our common stock, par value $0.01 per share ("Common Stock"), from time to time. We will not receive any of the proceeds from the sale of the Common Stock by the selling stockholder.

The securities may be offered and sold by the selling stockholder from time to time at fixed prices, at market prices or at negotiated prices, and may be offered and sold to or through one or more underwriters, dealers or agents or directly to purchasers on a continuous or delayed basis. See "Plan of Distribution."

Our Common Stock is currently listed on the Nasdaq Capital Market under the symbol "ONTX." On April 4, 2019, the last reported sale price of our Common Stock on the Nasdaq Capital Market was $3.72 per share.

You should read this prospectus and any supplement carefully before you purchase any of our securities. You should rely only on the information contained or incorporated by reference in this prospectus. We have not authorized any other person to provide you with different information.

Investing in these securities involves risks, including those set forth in the "Risk Factors" section of the prospectus and of our most recent Annual Report on Form 10-K filed with the Securities and Exchange Commission (the "SEC"), 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.

Neither the SEC nor any state securities commission has approved or disapproved of these securities or determined if this prospectus is truthful and complete. Any representation to the contrary is a criminal offense.

This prospectus is dated , 2019.

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ABOUT THIS PROSPECTUS

This prospectus is part of a registration statement that we filed with the SEC. The selling stockholder named in this prospectus may from time to time offer and sell up to an aggregate 54,463 shares of our Common Stock in one or more offerings. This prospectus provides you with a general description of the securities that the selling stockholder may offer and sell. You should carefully read this prospectus, together with the more detailed information regarding our company and our Common Stock that appear elsewhere in this prospectus and any applicable prospectus supplement, together with the additional information (including our financial statements and notes to those statements) that we incorporate in this prospectus by reference (which we describe under the heading "Incorporation of Information By Reference") before investing in any of the securities offered.

We have filed or incorporated by reference exhibits to the registration statement of which this prospectus forms a part. You should read the exhibits carefully for provisions that may be important to you.

Neither we nor any selling stockholder has authorized any dealer, salesman or other person to give any information or to make any representation other than those contained or incorporated by reference in this prospectus and any accompanying supplement to this prospectus. You should not assume that the information in this prospectus or any prospectus accompanying supplement is accurate as of any date other than the date on the front of those documents or that any document incorporated by reference is accurate as of any date other than its filing date. You must not rely upon any information or representation not contained or incorporated by reference in this prospectus or any accompanying prospectus supplement. This prospectus and any accompanying supplement to this prospectus do not constitute an offer to sell or the solicitation of an offer to buy any securities other than the registered securities to which they relate, nor do this prospectus and any accompanying supplement to this prospectus constitute an offer to sell or the solicitation of an offer to buy securities in any jurisdiction to any person to whom it is unlawful to make such offer or solicitation in such jurisdiction.

WHERE YOU CAN FIND MORE INFORMATION

We file annual, quarterly and current reports, proxy statements and other information with the SEC. The SEC maintains an Internet website at http://www.sec.gov that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC. Our SEC filings are accessible through the Internet at that website. Our SEC reports and amendments to those reports are also available for download, free of charge, as soon as reasonably practicable after these reports are filed with the SEC, at our website at www.onconova.com. The content contained in, or that can be accessed through, our website is not a part of this prospectus.

Unless the context indicates otherwise, as used in this prospectus, the terms "Onconova," "Onconova Therapeutics," "Company," "we," "us" and "our" refer to Onconova Therapeutics, Inc. and its consolidated subsidiaries.

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INCORPORATION OF INFORMATION 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, 2018 that we filed with the SEC on April 1, 2019;

Our Current Report on Form 8-K filed with the SEC on January 15, 2019;

The description of our 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;

All documents filed by us with the SEC pursuant to Sections 13(a), 13(c), 14 or 15(d) of the Securities Exchange Act of 1934, as amended (the "Exchange Act") after the date of the initial filing of the registration statement of which this prospectus is a part and prior to the effectiveness of such registration statement; 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 stop offering the securities under this prospectus.

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 Hutchison.

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.

CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus and the documents incorporated by reference herein contain, and any prospectus supplement may contain, forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended (the "Securities Act"), and Section 21E of the Exchange Act. All statements, other than statements of historical facts, included or incorporated in this prospectus or any prospectus supplement 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,

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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;
- 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;

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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 ("CROs") 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.

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 set forth in the "Risk Factors" section of our Annual Report on Form 10-K, as filed with the SEC April 1, 2019 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 any applicable prospectus supplement. You should also carefully consider any other information we include or incorporate by reference in this prospectus. Any such risk could cause our business, financial condition or operating results to suffer. The market price of our 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.

ONCONOVA THERAPEUTICS, INC.

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-

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stage product candidates (one of which has been studied for treatment of acute radiation syndromes) and a preclinical program. 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"). The Company has and may continue to delay, scale-back, or eliminate certain of its research and development activities and other aspects of its operations until such time as the Company is successful in securing additional funding.

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 completion of enrollment of the INSPIRE trial in the second half of 2019.

Our net loss were $20.4 million and $24.1 million for the years ended December 31, 2018 and 2017, respectively. As of December 31, 2018, we had an accumulated deficit of $381.9 million.

Myelodysplastic Syndromes

MDS is a group of blood disorders that affect bone marrow function. MDS typically affects older patients. In MDS, the bone marrow cells appear dysplastic, and their capacity to produce cells is defective. Therefore, blood cells do not develop normally, such that too few healthy blood cells are released into the blood stream, leading to low blood cell counts, or cytopenias. Thus, many patients with MDS require frequent blood transfusions. In most cases, the disease worsens and the patient develops progressive bone marrow failure. In advanced stages of the disease, immature blood cells, or blasts, leave the bone marrow and enter the blood stream, leading to acute myelogenous leukemia ("AML"), which occurs in approximately one-third of patients with MDS.

Based on Surveillance Epidemiology and End Results (SEER) data from the National Cancer Institute, a marketing analytics firm has estimated the 2016 incidence of MDS to be approximately 17,390 cases and the prevalence of MDS to be approximately 61,690 cases in the United States. We believe that the actual incidence numbers may be higher, due to underdiagnosing and underreporting of new cases of MDS to centralized cancer registries, and that the incidence of MDS in the United States is likely to increase, due to an aging population, improved disease awareness and diagnostic precision, and an increase in the number of cases of secondary, often chemotherapy-induced, MDS.

MDS is typically diagnosed using routine blood tests or by observing a combination of certain symptoms, such as shortness of breath, weakness, easy bruising or bleeding, or fever with frequent infections. A diagnosis of MDS is confirmed by evaluating a bone marrow biopsy/aspirate showing dysplastic changes, and, in more advanced cases, the presence of excess blasts, meaning that blasts account for more than 5% of the total number of nucleated cells in the bone marrow. Several classification systems have been developed to gauge the severity of disease and help determine prognosis and treatment strategy. Two standard classification systems can be used, the French-American-British morphological classification system as modified by the World Health Organization, or WHO, and the recently revised International Prognostic Scoring System ("IPSS-R") to estimate anticipated survival for patients with MDS based on marrow function and marrow cytogenetics. IPSS-R ranks the severity of chromosome abnormalities, severity of cytopenias, and percentage of bone marrow blasts observed at diagnosis to calculate a five-level risk score: Very Low, Low, Intermediate, High and Very High. MDS patients are generally classified using IPSS-R in order to assess the risk of dying or having their disease progress to AML.

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Treating Myelodysplastic Syndromes

We believe that most higher-risk and some lower-risk MDS patients in the United States are treated with azacitidine or decitabine, the two approved HMAs for treatment of MDS. A provider of information services and technology for the healthcare industry estimates that in the year ended June 2012, approximately 12,500 MDS patients in the United States received treatment with HMAs.

A significant number of higher-risk MDS patients fail or cannot tolerate treatment with azacitidine or decitabine, which represent the current standard of care for higher-risk MDS patients, and almost all patients who initially respond to therapy eventually progress. Median survival time of higher-risk MDS patients who have failed HMAs is less than one year. Accordingly, we believe that a new therapy that would extend survival in these patients would represent a major contribution in the treatment of MDS.

Allogeneic peripheral blood stem cell or bone marrow transplantation is a potentially curative therapy for MDS. However, since most patients with MDS are elderly and therefore ineligible for transplantation due to the arduous nature of the procedure, this option is generally considered only for the small proportion of younger MDS patients.

HMAs are believed to inhibit the methylation of DNA. Methylation is a biochemical process involving the addition of a methyl group to DNA and plays an important role in gene expression during cell division and differentiation. Hypomethylation may also restore normal function to genes that are critical for differentiation and proliferation. By contrast, rigosertib is designed to block multiple oncogenic pathways through a RAS mimetic mechanism and/or interfering with RAS function. Because we believe rigosertib has a mechanism of action that is different from HMAs, it may be active in patients who have failed treatment with those drugs. Furthermore, rigosertib's distinct potential mechanism of action has been shown to combine well with approved HMAs and preclinical studies testing the combination of rigosertib with azacitidine have demonstrated synergy between the two agents. Based on these studies and our current understanding of the potential mechanism of action of rigosertib, we believe that rigosertib also has the potential to be developed in combination with azacitidine for first line or second line MDS patients and for patients with AML who are not candidates for standard induction chemotherapy; or second-line AML who have failed induction chemotherapy.

Lower-risk MDS patients are those categorized as Very Low, Low or possibly Intermediate risk by the IPSS-R scoring system, with transfusion-dependent anemia. The subset of del(5q) cytogenetic abnormality patients are generally treated with lenalidomide (Revlimid®). For all other lower-risk MDS patients, supportive care employing blood products, such as red blood cell and platelet transfusions, and erythroid stimulating agents, is the mainstay of therapy. Frequent transfusions introduce many risks, including iron overload, blood borne infections and immune-related reactions. We believe that an oral therapeutic agent that could lower or eliminate the need for transfusions over an extended period of time for the lower-risk population as a whole and would fulfill a significant unmet medical need for this patient population.

Our Product Candidates

Rigosertib

Rigosertib is a small molecule which 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 are party to a collaboration agreement with

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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, which grants Pint Pharma International SA certain rights to commercialize rigosertib in certain countries 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.

The table below summarizes our rigosertib clinical stage programs.

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

Rigosertib IV for higher-risk MDS

We are developing the IV formulation 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, a new pivotal trial referred to as INSPIRE is on-going to study what we believe is a more homogenous population in higher-risk MDS.

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 higher-risk 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 ("VHR") 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.

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Enrollment for the INSPIRE Phase 3 trial for second-line higher-risk MDS patients is highly selective with stringent entry criteria as outlined above. The INSPIRE study currently has more than 140 trial sites in 22 countries across four continents open, including sites open in Japan by our partner, SymBio Pharmaceuticals. 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, 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 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 expected enrollment of 360 patients, with the aim of increasing the power of the trial. The targeted number of death events required for analyzing the results of the trial was increased from 176 to 288 events. Due to the adaptive trial design and the DMC's assessment of the interim data, 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. Following the interim analysis, we have expanded the INSPIRE Phase 3 trial to new sites in previously participating countries and anticipate expanding the study into new geographical regions. We continue to evaluate potential new sites and countries to enhance enrollment, while adhering to the stringent entry criteria to ensure that only appropriate patients are enrolled. During March 2019, we passed 75 percent completion of enrollment and we anticipate completion of enrollment for the INSPIRE trial in the second half of 2019.

Safety and Tolerability of rigosertib in MDS and other hematologic malignancies

A comprehensive analysis of rigosertib 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 > 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 > 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).

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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 2018, at the American Society of Hematology (ASH) Annual Meeting and in June 2017, at the Congress of the European Hematology Association Meeting (EHA), we presented results from a Phase 1/2, multi-institutional trial of data from the initial portion of an ongoing rigosertib oral and azacitidine combination trial in higher-risk MDS. 55 of 74 HR-MDS patients enrolled and treated with ≥ 840 mg/day oral rigosertib were evaluable for response at the time of the analysis. An Overall Response Rate (ORR) of 90% and Complete Remission (CR) rate (primary endpoint) of 34% was reported in this multi-institutional Phase 1/2 study in HMA naïve patients. HMA naïve patients are patients that had not previously received either azacitidine or decitabine). Such patients were not necessarily treatment naïve patents in that they may have received other therapies used for MDS. An ORR of 54% and CR/Partial Response (PR) of 8% in HMA failed patients was also reported.

The median age of patients was 69, with 59% being male and 41% being female.. 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=55)	**No prior HMA (N-29-0)**	**Prior HMA (failures) (N=26)**
Complete remission (CR)	11(20%)	10(34%)	1(4%)
Marrow CR + hematologic improvement	10(18%)	5(17%)	5(19%)
Marrow CR alone	13(24%)	8(28%)	5(19%)
Hematologic improvement alone	5(9%)	3(10%)	2(8%)
Stable disease	10(18%)	3(10%)	7(27%)
Overall IWG response	40(73%)	26(90%)	14(54%)

The median duration of response for patients with HMA naïve MDS was 12.2 months

The median time to initial/best response for HMA naïve patients, was 1 cycle and 4 cycles, respectively

The median duration of response for the HMA failed patients was 10.8 months

The median time to initial/best response for patients with HMA failure MDS, was 2 cycles and 5 cycles of treatment, respectively

Safety/Tolerability of the Combination:

Based upon safety results from a comprehensive analysis of patients receiving oral rigosertib in combination with azacitidine that was presented during ASH in 2018, the combination of rigosertib oral (>840 mg/day) and azacitidine was well tolerated. The most common TEAEs in > 30% of patients with MDS/AML (n=74) receiving rigosertib oral and azacitidine were hematuria (45%), constipation (43%), diarrhea (42%), fatigue (42%), dysuria (38%) , pyrexia(36%), nausea (35%), neutropenia (31%) thrombocytopenia(30%) .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%).

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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. We will not commence the Phase 3 trial without additional financing.

While the Phase 3 trial is being designed, we expanded the Phase 1/2 trial cohort by up to 40 evaluable subjects. Under a protocol expansion, we explored 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 to identify an optimal dose and schedule. 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 since then, more than half of the planned patients have been enrolled in the expansion trial; and the trial is currently closed to new accrual and is continuing.

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.

Rigosertib oral for lower-risk MDS

We have studied 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) two out of three weeks. 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 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

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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

Rigosertib oral as monotherapy was evaluated in 4 Onconova Phase 1 and 2 studies in MDS and other hematologic malignancies. In studies of oral rigosertib as monotherapy for the treatment of MDS and other hematologic malignancies:

Drug-related TEAEs that were ≥ Grade 3 in severity occurred in 21% of patients. The most frequently reported(≥ 2% of patients) drug-related TEAEs that were ≥ Grade 3 were neutropenia (7%); thrombocytopenia and cystitis (3% each); and leukopenia, dysuria, and hematuria (2% each).

Among the 8% of patients with SAEs that were considered drug related, the events were mostly urinary related. The most frequent drug-related SAE was cystitis (3%).

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 have initiated 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 2019. The NCI is carrying out PK/PD and dose escalation studies in preclinical models in preparation for dosing pediatric patients with single agent rigosertib. A clinical trial Phase 1 pediatric protocol has been developed and will be reviewed by the Institutional Review Board of the NCI. Based on NCI guidance, we now expect the first patient to be treated in the first half of 2019.

In addition, pre-clinical studies are being conducted at the University of California San Francisco and funded through the Leukemia Lymphoma Society. While the NCI will conduct a trial for RASopathy related cancers in pediatric patients, we will focus on Juvenile Myelomonocytic Leukemia (JMML), a well-described RASopathy affecting children which is incurable without an allogenic hematopoietic stem cell transplant.

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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. Based on the mechanism of action of rigosertib, we are exploring studying rigosertib as a single agent or in combination with an existing approved therapy, possibly an immuno-oncology agent, in solid tumors where Ras mutations are frequently found, such as lung cancer or melanoma.

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

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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.

We have initiated IND directed activities, with our partner HanX, which includes manufacturing of API and Clinical Trial Material (CTM) under cGMP; and the GLP toxicological studies. We anticipate filing an IND with the US FDA by the end of H1 of 2019.

CORPORATE INFORMATION

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.

USE OF PROCEEDS

We will not receive any proceeds from the sale of shares of our Common Stock by the selling stockholder named in this prospectus.

DESCRIPTION OF CAPITAL STOCK

Our authorized capital stock consists of 250,000,000 shares of Common Stock and 5,000,000 shares of preferred stock, par value $0.01 per share. As of April 3, 2019, 5,895,004 shares of our 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 our 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 our Common Stock are entitled to one vote for each share on all matters voted on by stockholders, including the election of directors. Holders of our 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 our 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 our 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 our Common Stock are, and any shares of Common Stock that we may issue in the future will be, fully paid and non-assessable.

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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.

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 April 3, 2019, there were no shares of Series A 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 1.5 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 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

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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 Series A Beneficial Ownership Limitation, as described below.

Series A 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 Series A 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 Series A Beneficial Ownership Limitation. The "Series A 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 Series A Beneficial Ownership Limitation; provided, however, that in no event may either the holder Series A Beneficial Ownership Limitation or the affiliate Series A 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 Series A Conversion Shares.

If we fail to timely deliver shares of Common Stock upon conversion of the Series A Preferred Stock (the "Series A 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 Series A Buy-In (defined below) 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 Series A 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 Series A Buy-In payments with respect to the same Series A Conversion Shares.

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Compensation for Series A Buy-In on Failure to Timely Deliver Shares

If we fail to timely deliver the Series A 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 Series A Conversion Shares which the holder anticipated receiving upon such conversion or exercise (a "Series 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 Series A 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 Series A 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

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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 Series A 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 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 Series A 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.

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. 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. As of April 3, 2019, there were no shares of Series B Preferred Stock outstanding.

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

Each 0.375 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.

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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.

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 Series B Beneficial Ownership Limitation, as described below.

Series B 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 Series B 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 Series B Beneficial Ownership Limitation. The "Series B 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 Series B Beneficial Ownership Limitation; provided, however, that in no event may either the holder Series B Beneficial Ownership Limitation or the affiliate Series B 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 "Series B 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

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standard settlement period in effect with respect to trading market on the date notice is delivered), and if the holder has not exercised its Series B Buy-In (as defined below) 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 Series B 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 Series B Buy-In payments with respect to the same Series B Conversion Shares.

Compensation for Series B Buy-In on Failure to Timely Deliver Shares

If we fail to timely deliver the Series B 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 Series B Conversion Shares which the holder anticipated receiving upon such conversion or exercise (a "Series B 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 Series B 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 B Preferred Stock and equivalent number of Series B 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 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

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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 Series B 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 Series B 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 Series B 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.

Options and Warrants

As of April 3, 2019, we had:

- 54,940 shares of Common Stock issuable upon the exercise of stock options outstanding with a weighted average exercise price of approximately $448.27 per share;

- 5,504,722 shares of Common Stock issuable upon the exercise of outstanding or issuable warrants at April 3, 2019 with a weighted average exercise price of approximately $9.11 per share (includes Common Stock issuable for warrants which are exercisable for our Series A or Series B Convertible Preferred Stock, each of which is convertible to Common Stock);

Our tradable warrants are traded on the Nasdaq Capital Market under the symbol "ONTXW."

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

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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 $66^{2}/_{3}\%$ 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;

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

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 Tenth Amended and Restated Certificate of Incorporation, as amended, or our "certificate of incorporation," and our Amended and Restated Bylaws, or our "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 our 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;

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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 and Registrar

The transfer agent and registrar for our Common Stock is Wells Fargo Shareowner Services.

Listing

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

SELLING STOCKHOLDER

The selling stockholder named below may offer to sell from time to time in the future up to an aggregate of 54,463 shares of our Common Stock, which were previously acquired by such stockholder through a private placement transaction which is further described below. In connection with such private placement, the selling stockholder has registration rights with respect to its shares as described further below under the heading "Certain Relationships and Related Party Transactions."

Unless otherwise indicated, the selling stockholder has sole voting and investment power with respect to its shares of Common Stock. All of the information contained in the table below is based solely upon information provided to us by the selling stockholder or otherwise known by us. In addition to the shares offered hereby, the selling stockholder may otherwise beneficially own our shares of Common Stock as a result of, among others, open market purchases, which information is not obtainable by us without undue effort and expense. The selling stockholder may have sold, transferred or otherwise disposed of, or may sell, transfer or otherwise dispose of, at any time or from time to time since the date on which the information regarding the shares beneficially owned was last known by us, all or a portion of the shares beneficially owned in transactions exempt from the registration requirements of the Securities Act.

Information concerning the selling stockholder may change from time to time and any changed information will be set forth in supplements to this prospectus, if and when necessary. The selling stockholder may offer all, some or none of their shares of Common Stock. We cannot advise you as to whether the selling stockholder will in fact sell any or all of such shares of Common Stock.

The number of shares outstanding and the percentages of beneficial ownership are based on 5,895,004 shares of our Common Stock outstanding as of April 3, 2019.

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For the purposes of the following table, the number of shares of our Common Stock beneficially owned has been determined in accordance with Rule 13d-3 under the Exchange Act, and such information is not necessarily indicative of beneficial ownership for any other purpose. Under Rule 13d-3, beneficial ownership includes any shares as to which the selling stockholder has sole or shared voting power or investment power and also any shares which that selling stockholder has the right to acquire within 60 days of the date of this prospectus through the exercise of any stock option.

	Number of Shares Beneficially Owned Prior to the Offering		Number of Shares Offered	Number of Shares Beneficially Owned After the Offering(1)	
Name of Selling Stockholder	Number	Percentage		Number	Percentage
Pint Pharma GmbH	54,463	*	54,463	0	0

*
Represents less than 1%.

(1)
Assumes that all shares registered hereunder will be sold by the selling stockholder and that the selling stockholder does not acquire any additional shares.

Certain Relationships and Related Party Transactions

In March 2018, we entered into a License, Development and Commercialization Agreement (the "License Agreement") with Pint International SA (which, together with its affiliate Pint Pharma GmbH, are collectively referred to as "Pint"). Under the terms of the License Agreement, we granted Pint an exclusive, royalty-bearing license, with the right to sublicense, under certain Company patent rights and know-how to develop and commercialize any pharmaceutical product (the "Product") containing rigosertib in all uses of rigosertib or the Product in humans (the "Field") in Latin America countries (the "Territory," including Argentina, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, French Guiana, British Guiana, Suriname, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela). We retain the right to develop and commercialize pharmaceutical products containing rigosertib worldwide except for the sale of the Product in the Field in the Territory.

Pint has agreed to make an upfront equity investment and a subsequent equity investment in our Common Stock. In addition, we could receive up to $41.5 million in additional regulatory, development and sales-based milestone payments as well as tiered, double digit royalties based on net aggregate net sales in the Territory. Pint also has agreed to purchase rigosertib and the Product exclusively from us in accordance with a supply and quality agreement between the parties.

Under the terms of the Securities Purchase Agreement, Pint made an upfront equity investment in the Company at a specified premium to our share price. Closing of the upfront equity investment occurred on April 4, 2018, whereby Pint purchased 54,463 shares of Common Stock for $1,250,000. The total amount of the premium was $319,000 and this amount was allocated to the license.

Pint may terminate the License Agreement in whole (but not in part) at any time upon 45 days' prior written notice. The License Agreement also contains customary provisions for termination by either party in the event of breach of the License Agreement by the other party, subject to a cure period, or bankruptcy of the other party.

Pursuant to the Securities Purchase Agreement, Pint has been granted registration rights with respect to the shares of Common Stock as further described below.

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Registration Rights

Pursuant to the Securities Purchase Agreement, if Pint owns shares which are Registrable Securities (as defined in the Securities Purchase Agreement) on April 4, 2019 or the day that is ten calendar days following the closing date of Pint's purchase of additional shares of Common Stock upon our achievement of the Research and Development Event (as defined in the License Agreement), we are required to file a registration statement to register the resale of the applicable unregistered Registrable Securities on a registration statement on Form S-3 (or such other form appropriate for such purpose if we do not meet the eligibility requirements for use of Form S-3) under the Securities Act and use reasonable best efforts to have such registration statement declared effective and maintain the effectiveness of such registration statement for a period ending on the date Pint no longer holds Registrable Securities.

We will pay all expenses, other than the fees and disbursements of counsel for Pint, incurred in connection with registrations, filings or qualifications relating to the resale registration statement, including all registration, filing and qualification fees; printers' and accounting fees; fees and disbursements of our counsel; and the reasonable fees and disbursements. Pint will pay the fees and disbursements of its counsel.

PLAN OF DISTRIBUTION

The Common Stock offered by this prospectus is being offered by Pint, the selling stockholder. The Common Stock may be sold or distributed from time to time by the selling stockholder directly to one or more purchasers or through brokers, dealers, or underwriters who may act solely as agents at market prices prevailing at the time of sale, at prices related to the prevailing market prices, at negotiated prices, or at fixed prices, which may be changed. The sale of the Common Stock offered by this prospectus may be effected in one or more of the following methods:

ordinary brokers' transactions;

transactions involving cross or block trades;

through brokers, dealers, or underwriters who may act solely as agents;

in other ways not involving market makers or established business markets, including direct sales to purchasers or sales effected through agents;

in privately negotiated transactions; or

any combination of the foregoing.

The selling stockholder may also sell shares of common stock under Rule 144 promulgated under the Securities Act, if available, rather than under this prospectus. In addition, the selling stockholder may transfer the shares of common stock by other means not described in this prospectus.

Brokers, dealers, underwriters, or agents participating in the distribution of the shares as agents may receive compensation in the form of commissions, discounts, or concessions from the selling stockholder and/or purchasers of the common stock for whom the broker-dealers may act as agent.

The selling stockholder is an "underwriter" within the meaning of the Securities Act.

Neither we nor Pint can presently estimate the amount of compensation that any agent will receive. We know of no existing arrangements between Pint, any other stockholder, broker, dealer, underwriter, or agent relating to the sale or distribution of the shares offered by this prospectus. At the time a particular offer of shares is made, a prospectus supplement, if required, will be distributed that will set forth the names of any agents, underwriters, or dealers and any compensation from the selling stockholder, and any other required information.

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We have agreed to indemnify Pint and certain other persons against certain liabilities in connection with the offering of shares of Common Stock offered hereby, including liabilities arising under the Securities Act or, if such indemnity is unavailable, to contribute amounts required to be paid in respect of such liabilities. Pint has agreed to indemnify us against liabilities under the Securities Act that may arise from certain written information furnished to us by Pint specifically for use in this prospectus or, if such indemnity is unavailable, to contribute amounts required to be paid in respect of such liabilities.

Insofar as indemnification for liabilities arising under the Securities Act may be permitted to our directors, officers, and controlling persons, we have been advised that in the opinion of the SEC this indemnification is against public policy as expressed in the Securities Act and is therefore, unenforceable.

Pursuant to the Securities Purchase Agreement, the selling stockholder has agreed that it and persons acting on its behalf will not to engage in any direct or indirect short sales of our Common Stock.

We have advised Pint that while it is engaged in a distribution of the shares included in this prospectus it is required to comply with Regulation M promulgated under the Securities Exchange Act of 1934, as amended. With certain exceptions, Regulation M precludes the selling stockholder, any affiliated purchasers, and any broker-dealer or other person who participates in the distribution from bidding for or purchasing, or attempting to induce any person to bid for or purchase any security which is the subject of the distribution until the entire distribution is complete. Regulation M also prohibits any bids or purchases made in order to stabilize the price of a security in connection with the distribution of that security. All of the foregoing may affect the marketability of the shares offered in this prospectus.

We may suspend the sale of shares by Pint pursuant to this prospectus for certain periods of time for certain reasons, including if the prospectus is required to be supplemented or amended to include additional material information.

This offering will terminate on the earlier of (i) date that all shares purchased by Pint under the Securities Purchase Agreement have been sold by Pint or (ii) the date that all shares purchased by Pint under the Securities Purchase Agreement are no longer Registrable Securities.

EXPERTS

The consolidated financial statements of Onconova Therapeutics, Inc. appearing in our Annual Report (Form 10-K) for the year ended December 31, 2018 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.

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PART II

Information Not Required in Prospectus

Item 14. Other Expenses of Issuance and Distribution

The following table sets forth the expenses (other than underwriting discounts and commissions) to be incurred by us in connection with the registration, issuance and distribution of the securities described in this registration statement being registered hereby.

SEC registration fee	$	21.46
Legal fees and expenses	$	15,000
Accounting fees and expenses	$	7,500
Transfer agent and miscellaneous expenses	$	2,000
Total	$	24,521.46

Item 15. 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 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;

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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 16. Exhibits

A list of exhibits filed herewith is contained in the exhibit index that immediately precedes such exhibits and is incorporated herein by reference.

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;

(ii) To reflect in the prospectus any facts or events arising after the effective date of the registration statement (or the most recent post-effective amendment thereof) which, individually or in the aggregate, represent a fundamental change in the information set forth in 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 SEC pursuant to Rule 424(b) if, in the aggregate, the changes in volume and price represent no more than 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 the registration statement or any material change to such information in the registration statement;

provided, however, that paragraphs (i), (ii) and (iii) do not apply if the information required to be included in a post-effective amendment by those paragraphs is contained in reports filed with or furnished to the SEC 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.

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(2) That, for the purpose of determining any liability under the Securities Act, each such post-effective amendment shall be deemed to be a new registration statement relating to the securities offered 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 under the Securities Act to any purchaser:

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

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

(5) That, for purposes of determining any liability under the Securities Act, each filing of the registrant's annual report pursuant to Section 13(a) or 15(d) of the Exchange Act (and, where applicable, each filing of an employee benefit plan's annual report pursuant to Section 15(d) of the Exchange Act) 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.

(6) Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers and controlling persons of the registrant pursuant to the foregoing provisions, or otherwise, the registrant has been advised that in the opinion of the SEC 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.

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EXHIBIT INDEX

Exhibit No.	Description of Exhibit
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 3.2 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 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*)
3.5	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 June 8, 2018*)
3.6	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 September 25, 2018)*
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+	License, Development and Commercialization Agreement, dated as of March 2, 2018, by and between Onconova Therapeutics, Inc. and Pint International SA (*Incorporated by reference to Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q filed on May 15, 2018*)
4.3	Securities Purchase Agreement, dated as of March 2, 2018, by and between Onconova Therapeutics, Inc. and Pint Pharma GmbH (*Incorporated by reference to Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q filed on May 15, 2018*)
5.1*	Opinion of Morgan, Lewis & Bockius LLP
23.1*	Consent of Ernst & Young LLP
23.3*	Consent of Morgan, Lewis & Bockius LLP (*included in the opinion filed as Exhibit 5.1*)
24.1*	Power of attorney (included on the signature page of this registration statement)

* Filed herewith.

\+ Confidential treatment has been requested with respect to certain portions of this exhibit. Omitted portions have been filed separately with the SEC.

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SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, as amended, the registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-3 and has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized, in Newtown, Pennsylvania on April 5, 2019.

Onconova Therapeutics, Inc.
By: /s/ STEVEN M. FRUCHTMAN, M.D.

Name: Steven M. Fruchtman, M.D.
Title: *President and Chief Executive Officer*

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS, that the undersigned officers and directors of Onconova Therapeutics, Inc., a Delaware corporation (the "Corporation"), hereby constitute and appoint each of Steven M. Fruchtman, M.D., Mark Guerin and Avi Oler the true and lawful agents and attorneys-in-fact of the undersigned with full power and authority in said agents and attorneys-in-fact, and in any one or more of them, to sign for the undersigned and in their respective names as an officer/director of the Corporation, any and all amendments (including post-effective amendments) to this registration statement on Form S-3 (or any other registration statement for the same offering that is to be effective upon filing pursuant to Rule 462(b) under the Securities Act) and to file the same, with all exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, and with full power of substitution, hereby ratifying and confirming all that each of said attorneys-in-fact, or his substitute or substitutes, may do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Act of 1933, as amended, this registration statement has been signed by the following persons in the capacities indicated on April 5, 2019.

Name	Title
/s/ STEVEN M. FRUCHTMAN, M.D. Steven M. Fruchtman, M.D.	Director, President and Chief Executive Officer (Principal Executive Officer)
/s/ MARK GUERIN Mark Guerin	Chief Financial Officer (Principal Financial Officer and Principal Accounting Officer)
/s/ MICHAEL B. HOFFMAN Michael B. Hoffman	Chairman, Board of Directors
/s/ JEROME E. GROOPMAN, M.D. Jerome E. Groopman, M.D.	Director
/s/ JAMES J. MARINO James J. Marino	Director

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Name	Title
/s/ VIREN MEHTA, PHARM.D Viren Mehta, Pharm.D	Director
/s/ E. PREMKUMAR REDDY, PH.D E. Premkumar Reddy, Ph.D	Director
/s/ JACK E. STOVER Jack E. Stover	Director