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UNITED STATES SECURITIES AND EXCHANGE COMMISSION

WASHINGTON, DC 20549

FORM 10-Q

(Mark One)

x QUARTERLY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the quarterly period ended June 30, 2018

Or

o TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

Commission file number: 001-36020

Onconova Therapeutics, Inc.

(Exact name of registrant as specified in its charter)

Delaware	**22-3627252**
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)
375 Pheasant Run, Newtown, PA	**18940**
(Address of principal executive offices)	(Zip Code)

Registrant's telephone number, including area code: **(267) 759-3680**

Indicate by check mark whether the registrant: (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. x Yes o No

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). x Yes o No

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

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

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. o

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act). o Yes x No

The number of outstanding shares of the registrant's Common Stock, par value $0.01 per share, as of August 1, 2018 was 85,111,774.

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ONCONOVA THERAPEUTICS, INC.

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FOR THE QUARTER ENDED JUNE 30, 2018

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PART I — FINANCIAL INFORMATION

Item 1. Financial Statements

Onconova Therapeutics, Inc.
Condensed Consolidated Balance Sheets

	June 30, 2018 (unaudited)	December 31, 2017
Assets		
Current assets:		
Cash and cash equivalents	$ 29,540,000	$ 4,024,000
Receivables	72,000	59,000
Prepaid expenses and other current assets	545,000	820,000
Total current assets	30,157,000	4,903,000
Property and equipment, net	34,000	64,000
Other non-current assets	12,000	12,000
Total assets	$ 30,203,000	$ 4,979,000
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable	$ 5,949,000	$ 6,186,000
Accrued expenses and other current liabilities	3,572,000	3,335,000
Deferred revenue	455,000	455,000
Total current liabilities	9,976,000	9,976,000
Warrant liability	448,000	1,773,000
Deferred revenue, non-current	3,864,000	4,091,000
Total liabilities	14,288,000	15,840,000
Commitments and contingencies		
Stockholders' equity:		
Preferred stock, $0.01 par value, 5,000,000 authorized at June 30, 2018 and December 31, 2017, none issued and outstanding at June 30, 2018 and December 31, 2017	—	—
Common stock, $0.01 par value, 250,000,000 and 25,000,000 authorized at June 30, 2018 and December 31, 2017, 85,111,774 and 10,771,163 shares issued and outstanding at June 30, 2018 and December 31, 2017	851,000	108,000
Additional paid in capital	385,966,000	350,514,000
Accumulated other comprehensive income	(5,000)	3,000
Accumulated deficit	(370,897,000)	(362,316,000)
Total Onconova Therapeutics, Inc. stockholders' equity (deficit)	15,915,000	(11,691,000)
Non-controlling interest	—	830,000
Total stockholders' equity (deficit)	15,915,000	(10,861,000)
Total liabilities and stockholders' equity (deficit)	$ 30,203,000	$ 4,979,000

See accompanying notes to condensed consolidated financial statements.

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Onconova Therapeutics, Inc.
Condensed Consolidated Statements of Operations (unaudited)

	Three Months Ended June 30,		Six Months Ended June 30,	
	2018	2017	2018	2017
Revenue	$ 485,000	$ 324,000	$ 1,049,000	$ 534,000
Operating expenses:				
General and administrative	2,054,000	1,779,000	3,943,000	3,895,000
Research and development	4,070,000	4,614,000	8,647,000	9,500,000
Total operating expenses	6,124,000	6,393,000	12,590,000	13,395,000
Loss from operations	(5,639,000)	(6,069,000)	(11,541,000)	(12,861,000)
Gain on dissolution of GBO	693,000	—	693,000	—
Change in fair value of warrant liability	513,000	3,474,000	1,325,000	1,925,000
Other income, net	112,000	11,000	112,000	11,000
Net loss	(4,321,000)	(2,584,000)	(9,411,000)	(10,925,000)
Net loss attributable to non-controlling interest	(163,000)	—	(163,000)	—
Net loss attributable to Onconova Therapeutics, Inc.	$ (4,484,000)	$ (2,584,000)	$ (9,574,000)	$ (10,925,000)
Net loss per share, basic and diluted	$ (0.07)	$ (0.29)	$ (0.25)	$ (1.38)
Basic and diluted weighted average shares outstanding	61,056,072	8,999,125	38,224,211	7,891,408

See accompanying notes to condensed consolidated financial statements.

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Onconova Therapeutics, Inc.
Condensed Consolidated Statements of Comprehensive Loss (unaudited)

	Three Months Ended June 30,		Six Months Ended June 30,	
	2018	2017	2018	2017
Net loss	$ (4,321,000)	$ (2,584,000)	$ (9,411,000)	$ (10,925,000)
Other comprehensive income (loss), before tax:				
Foreign currency translation adjustments, net	(16,000)	16,000	(8,000)	21,000
Other comprehensive income (loss), net of tax	(16,000)	16,000	(8,000)	21,000
Comprehensive loss	(4,337,000)	(2,568,000)	(9,419,000)	(10,904,000)
Comprehensive loss attributable to non-controlling interest	(163,000)	—	(163,000)	—
Comprehensive loss attributable to Onconova Therapeutics, Inc.	$ (4,500,000)	$ (2,568,000)	$ (9,582,000)	$ (10,904,000)

See accompanying notes to condensed consolidated financial statements.

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Onconova Therapeutics, Inc.
Consolidated Statement of Stockholders' (Deficit) Equity (unaudited)

	Common Stock		Additional Paid in Capital	Accumulated deficit	Accumulated other comprehensive income (loss)	Non-controlling interest	Total
	Shares	Amount					
Balance at December 31, 2017	10,771,163	$ 108,000	$ 350,514,000	$ (362,316,000)	$ 3,000	$ 830,000	$ (10,861,000)
Net loss	—	—	—	(9,574,000)	—	163,000	(9,411,000)
Other comprehensive loss	—	—	—	—	(8,000)	—	(8,000)
Stock-based compensation	—	—	538,000	—	—	—	538,000
Dissolution of GBO	—	—	—	993,000	—	(993,000)	—
Issuance of common stock and pre-funded warrants, net	63,233,708	632,000	34,436,000	—	—	—	35,068,000
Issuance of common stock upon exercise of warrants	11,106,903	111,000	478,000	—	—	—	589,000
Balance at June 30, 2018	85,111,774	$ 851,000	$ 385,966,000	$ (370,897,000)	$ (5,000)	$ —	$ 15,915,000

See accompanying notes to condensed consolidated financial statements.

Onconova Therapeutics, Inc.
Condensed Consolidated Statements of Cash Flows (unaudited)

	Six Months ended June 30,	
	2018	2017
Operating activities:		
Net loss	$ (9,411,000)	$ (10,925,000)
Adjustment to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization	30,000	47,000
Loss on asset disposal	—	—
Change in fair value of warrant liabilities	(1,325,000)	(1,925,000)
Stock compensation expense	538,000	902,000
Gain on dissolution of GBO	(693,000)	—
Changes in assets and liabilities:		
Receivables	(13,000)	(202,000)
Prepaid expenses and other current assets	275,000	877,000
Accounts payable	456,000	358,000
Accrued expenses and other current liabilities	237,000	(654,000)
Deferred revenue	(227,000)	(227,000)
Net cash used in operating activities	(10,133,000)	(11,749,000)
Investing activities:		
Net cash provided by investing activities	—	—
Financing activities:		
Proceeds from the sale of common stock and warrants, net of costs	35,068,000	5,317,000
Proceeds from the exercise of warrants	589,000	—
Net cash provided by financing activities	35,657,000	5,317,000
Effect of foreign currency translation on cash	(8,000)	21,000
Net increase (decrease) in cash and cash equivalents	25,516,000	(6,411,000)
Cash and cash equivalents at beginning of period	4,024,000	21,400,000
Cash and cash equivalents at end of period	$ 29,540,000	$ 14,989,000

See accompanying notes to condensed consolidated financial statements.

Onconova Therapeutics, Inc.
Notes to Condensed Consolidated Financial Statements
(Unaudited)

1. Nature of Business

The Company

Onconova Therapeutics, Inc. (the "Company") was incorporated in the State of Delaware on December 22, 1998 and commenced operations on January 1, 1999. The Company's headquarters are located in Newtown, Pennsylvania. The Company is a clinical-stage biopharmaceutical company focused on discovering and developing novel small molecule product candidates primarily to treat cancer. Using its proprietary chemistry platform, the Company has created an extensive library of targeted anti-cancer agents designed to work against specific cellular pathways that are important to cancer cells. The Company believes that the product candidates in its pipeline have the potential to be efficacious in a variety of cancers. The Company has three clinical-stage product candidates and several preclinical programs. In 2011, the Company entered into a license agreement, as subsequently amended, with SymBio Pharmaceuticals Limited ("SymBio"), which grants SymBio certain rights to commercialize rigosertib in Japan and Korea. On March 2, 2018, the Company entered into a License, Development and Commercialization Agreement with Pint International SA (which, together with its affiliate Pint Pharma GmbH, are collectively referred to as "Pint"). Under the terms of the agreement, the Company 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 containing rigosertib in all uses of rigosertib in certain Latin America countries. In 2012, the Company entered into a development and license agreement with Baxter Healthcare SA, the predecessor in interest to Baxalta GmbH (together with its affiliates, "Baxalta"), pursuant to which the Company granted an exclusive, royalty-bearing license for the research, development, commercialization and manufacture (in specified instances) of rigosertib in all therapeutic indications in Europe. The Baxalta agreement terminated effective August 30, 2016, at which time the rights the Company licensed to Baxalta reverted to the Company at no cost. The Company has retained development and commercialization rights to rigosertib in the rest of the world, including the United States. During 2012, Onconova Europe GmbH was established as a wholly owned subsidiary of the Company for the purpose of further developing business in Europe. In December 2017, the Company entered into a license and collaboration agreement with HanX Biopharmaceuticals, Inc. ("HanX"), a company focused on development of novel oncology products, for the further development, registration and commercialization of ON 123300 in Greater China. ON 123300 is a preclinical compound which the Company believes has the potential to overcome the limitations of current generation CDK 4/6 inhibitors. The key feature of the collaboration is that HanX will provide all funding required for future Chinese IND enabling studies necessary for filing an IND with the Chinese Food and Drug Administration. The studies would be conducted to meet the Good Laboratory Practice ("GLP") requirements of the FDA such that the Company could simultaneously file an IND with the US FDA. The Company and HanX will oversee the IND enabling studies. The Company will maintain global rights to ON 123300 outside of China. In April 2013, GBO, LLC, a Delaware limited liability company, ("GBO") was formed pursuant to an agreement with GVK Biosciences Private Limited, a private limited company located in India, ("GVK") to collaborate and develop two programs using the Company's technology platform. The two preclinical programs sublicensed to GBO were not developed to clinical stage as initially hoped, and GBO was dissolved in June 2018.

On March 21, 2018, the Company amended its certificate of incorporation to increase the number of authorized shares of common stock par value $0.01 per share from 25,000,000 to 100,000,000. On June 7, 2018, the Company amended its certificate of incorporation again to increase the number of authorized shares of common stock, par value $0.01 per share, from 100,000,000 to 250,000,000.

At the Company's Annual Meeting of Stockholders on June 27, 2018, the Company's stockholders approved a proposal to amend the Company's Tenth Amended and Restated Certificate of Incorporation, as amended, to effect a reverse stock split of its common stock, par value $0.01 per share, at a ratio of between 1 for 5 and 1 for 15, with the Company's Board of Directors having the sole discretion to effect the reverse stock split at any time within 90 days after the Annual Meeting, to fix the specific ratio for the reverse stock split so long as it is within the range approved by the stockholders, and to abandon the amendment prior to its effectiveness. The Board of Directors has not set an effective date or ratio for the reverse split.

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Onconova Therapeutics, Inc.
Notes to Condensed Consolidated Financial Statements
(Unaudited)

Liquidity

The Company has incurred recurring operating losses since inception. For the six months ended June 30, 2018, the Company incurred a net loss of $9,411,000 and as of June 30, 2018 the Company had generated an accumulated deficit of $370,897,000. The Company anticipates operating losses to continue for the foreseeable future due to, among other things, costs related to research, development of its product candidates and its preclinical programs, strategic alliances and its administrative organization. At June 30, 2018, the Company had cash and cash equivalents of $29,540,000. The Company will require substantial additional financing to fund its ongoing clinical trials and operations, and to continue to execute its strategy.

From its inception through July 2013, the Company raised capital through the private issuance of preferred stock. On July 30, 2013, the Company completed its initial public offering (the "IPO") of 594,167 shares of Common Stock, at a price of $150.00 per share. The Company received net proceeds of $79,811,000 from the sale, net of underwriting discounts and commissions and other estimated offering expenses. Immediately prior to the consummation of the IPO, all outstanding shares of preferred stock automatically converted into shares of Common Stock at the applicable conversion ratio then in effect. From the IPO through December 31, 2016, the Company closed on several offerings which included Common Stock and warrants. Total net proceeds from these offerings was approximately $24.9 million.

On April 26, 2017 the Company closed on an underwritten public offering of 2,476,190 shares of Common Stock. On May 17, 2017, the Company sold an additional 363,580 shares as a result of the underwriter's exercise of its over-allotment option. Net proceeds from these transactions were approximately $5.3 million. (See Note 13)

On November 14, 2017 the Company closed on a registered direct offering to select accredited investors of 920,000 shares of common stock. Net proceeds were approximately $1.1 million. (See Note 13)

On February 12, 2018 the Company closed on an offering of units of common stock and warrants. The Company issued 7,005,000 shares of common stock, pre-funded warrants to purchase 2,942,500 share of common stock, and preferred stock warrants to purchase 1,044,487.5 shares of Series A convertible preferred stock. Each share of Series A convertible preferred stock is convertible into ten shares of common stock. Net proceeds were approximately $8.7 million. (See Note 13)

On May 1, 2018 the Company closed on an offering of units of common stock and warrants. The Company issued 55,411,763 shares of common stock, pre-funded warrants to purchase 12,235,295 shares of common stock, and preferred stock warrants to purchase 1,691,176.450 shares of Series B convertible preferred stock. Each share of Series B convertible preferred stock is convertible into 40 shares of common stock. Net proceeds were approximately $25.6 million. (See Note 13)

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. The Company continues to explore various dilutive and non-dilutive sources of funding, including equity financings, strategic alliances, business development and other sources. The future success of the Company is dependent upon its ability to obtain additional funding. There can be no assurance, however, that the Company will be successful in obtaining such funding in sufficient amounts, on terms acceptable to the Company, or at all. The Company currently anticipates that current cash and cash equivalents will be sufficient to meet its anticipated cash requirements into the fourth quarter of 2019.

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Onconova Therapeutics, Inc.
Notes to Condensed Consolidated Financial Statements (Continued)
(Unaudited)

2. Summary of Significant Accounting Policies

Basis of Presentation

The condensed consolidated financial statements are prepared in conformity with accounting principles generally accepted in the United States ("GAAP") for interim financial information. Certain information and footnotes normally included in financial statements prepared in accordance with GAAP have been condensed or omitted pursuant to the rules and regulations of the Securities and Exchange Commission (the "SEC"). The financial statements

include the consolidated accounts of the Company, its wholly-owned subsidiary, Onconova Europe GmbH, and GBO. All significant intercompany transactions have been eliminated.

Unaudited Interim Financial Information

The accompanying condensed consolidated balance sheet as of June 30, 2018, the condensed consolidated statements of operations and comprehensive loss for the three and six months ended June 30, 2018 and 2017, the consolidated statement of stockholders' (deficit) equity for the six months ended June 30, 2018 and the condensed consolidated statements of cash flows for the six months ended June 30, 2018 and 2017 are unaudited. The interim unaudited condensed consolidated financial statements have been prepared on the same basis as the annual audited consolidated financial statements and, in the opinion of management, reflect all adjustments, which include only normal recurring adjustments, necessary for the fair statement of the Company's financial position as of June 30, 2018, the results of its operations for the three and six months ended June 30, 2018 and 2017, and its cash flows for the six months ended June 30, 2018 and 2017. The financial data and other information disclosed in these notes related to the three and six months ended June 30, 2018 and 2017 are unaudited. The results for the three and six months ended June 30, 2018 are not necessarily indicative of results to be expected for the year ending December 31, 2018, any other interim periods, or any future year or period. These unaudited condensed consolidated financial statements should be read in conjunction with the audited consolidated financial statements and the notes thereto for the year ended December 31, 2017 included in the Company's annual report on Form 10-K filed with the SEC on March 16, 2018.

Segment Information

Operating segments are defined as components of an enterprise about which separate discrete information is available for evaluation by the chief operating decision maker, or decision-making group, in deciding how to allocate resources and in assessing performance. The Company views its operations and manages its business in one segment, which is the identification and development of oncology therapeutics.

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2. Summary of Significant Accounting Policies (Continued)

Significant Accounting Policies

The Company's significant accounting policies are disclosed in the audited consolidated financial statements for the year ended December 31, 2017 included in the Company's annual report on Form 10-K filed with the SEC on March 16, 2018. Since the date of such financial statements, there have been no changes to the Company's significant accounting policies.

Fair Value Measurements

The carrying amounts reported in the accompanying consolidated financial statements for cash and cash equivalents, accounts payable, and accrued liabilities approximate their respective fair values because of the short-term nature of these accounts. The fair value of the warrant liability is discussed in Note 7, "Fair Value Measurements."

Revenue Recognition

The Company recognizes revenue in accordance with Accounting Standards Codification Topic 606, *Revenue from Contracts with Customers* (ASC 606), which the Company adopted effective January 1, 2018 using the modified retrospective method. There was no material impact to our financial position and results of operations as a result of the adoption. The Company applies ASC 606 to all contracts with customers, except for contracts that are within the scope of other standards, such as leases, insurance, collaboration arrangements and financial instruments. In accordance with ASC 606, the Company recognizes revenue when its customer obtains control of promised goods or services, in an amount that reflects the consideration which the Company expects to receive in exchange for those goods or services. To determine revenue recognition for arrangements that the Company determines are within the scope of ASC 606, the Company performs the following five steps: (i) identify the contract(s) with a customer; (ii) identify the performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligations in the contract; and (v) recognize revenue when (or as) the Company satisfies a performance obligation. The Company only applies the five-step model to contracts when it is probable that it will collect the consideration it is entitled to in exchange for the goods and services it transfers to the customer. At contract inception, the Company assesses the goods or services promised within each contract that falls under the scope of ASC 606, determines those that are performance obligations and assesses whether each promised good or service is distinct. The Company then recognizes as revenue the amount of the transaction price that is allocated to the respective performance obligation when (or as) the performance obligation is satisfied.

The Company derives revenue from collaboration and licensing agreements and from the sale of products associated with material transfer, collaboration and supply agreements.

License, Collaboration and Other Revenues

The Company enters into licensing and collaboration agreements, under which it licenses certain of its product candidates' rights to third parties. The Company recognizes revenue related to these agreements in accordance with ASC 606. The terms of these arrangements typically include payment of one or more of the following: non-refundable, up-front license fees; development, regulatory and commercial milestone payments; and royalties on net sales of the licensed product.

In determining the appropriate amount of revenue to be recognized as it fulfills its obligation under each of its agreements, the Company performs the five steps described above. As part of the accounting for these arrangements, the Company must develop assumptions that require judgment to determine the stand-alone selling price, which may include forecasted revenues, development timelines, reimbursement of personnel costs, discount rates and probabilities of technical and regulatory success.

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Onconova Therapeutics, Inc.
Notes to Condensed Consolidated Financial Statements (Continued)
(Unaudited)

2. Summary of Significant Accounting Policies (Continued)

Licensing of Intellectual Property: If the license to the Company's intellectual property is determined to be distinct from the other performance obligations identified in the arrangement, the Company recognizes revenue from non-refundable, up-front fees allocated to the license when the license is transferred to the licensee and the licensee is able to use and benefit from the license. For licenses that are bundled with other performance obligations, the Company utilizes judgment to assess the nature of the combined performance obligation to determine whether the combined performance obligation is satisfied over time or at a point in time and, if over time, the appropriate method of measuring progress for purposes of recognizing revenue from non-refundable, up-front-fees. The Company evaluates the measure of progress each reporting period, and, if necessary, adjusts the measure of performance and related revenue recognition.

Milestone Payments: At the inception of each arrangement that includes development milestone payments, the Company evaluates whether the milestones are considered probable of being reached and estimates the amount to be included in the transaction price using the most likely amount method. If it is probable that a significant revenue reversal will not occur, the associated milestone value is included in the transaction price. Milestone payments that are not within the control of the Company or the licensees, such as regulatory approvals, are not considered probable of being achieved until those approvals are received. The transaction price is then allocated to each performance obligation on a relative stand-alone selling price basis, for which the Company recognizes revenue as or when the performance obligations under the contract are satisfied. At the end of each subsequent reporting period, the Company re-evaluates the probability of achievement of such development milestones and any related constraint and, if necessary, adjusts its estimate of the overall transaction price. Any such adjustments are recorded on a cumulative catch-up basis, which would affect revenues and earnings in their period of adjustment.

Manufacturing supply services. Arrangements that include a promise for future supply of drug substance or drug product for either clinical development or commercial supply at the customer's discretion are generally considered as options. The Company assesses if these options provide material rights to the licensee and if so, they are accounted for as separate performance obligations. If the Company is entitled to additional payments when the customer exercises these options, any additional payments are recorded when the customer obtains control of the goods, which is upon shipment.

Royalties: For arrangements that include sales-based royalties, including milestone payments based on the level of sales, and for which the license is deemed to be the predominant item to which royalties relate, the Company recognizes revenue at the later of (i) when the related sales occur, or (ii) when the performance obligation to which some of all of the royalty has been allocated has been satisfied (or partially satisfied). To date, the Company has not recognized any royalty revenue from its license agreements.

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Onconova Therapeutics, Inc.
Notes to Condensed Consolidated Financial Statements (Continued)
(Unaudited)

2. Summary of Significant Accounting Policies (Continued)

Recent Accounting Pronouncements

In February 2016, the FASB issued guidance which supersedes much of the current guidance for leases. The new standard requires lessees to recognize a right-of-use asset and a lease liability on their balance sheets for all the leases with terms greater than twelve months. Based on certain criteria, leases will be classified as either financing or operating, with classification affecting the pattern of expense recognition in the income statement. For leases with a term of twelve months or less, a lessee is permitted to make an accounting policy election by class of underlying asset not to recognize lease assets and lease liabilities. If a lessee makes this election, it should recognize lease expense for such leases generally on a straight-line basis over the lease term. The guidance is effective for fiscal years beginning after December 15, 2018, and interim periods within those years, with early adoption permitted. In transition, lessees and lessors are required to recognize and measure leases at the beginning of the earliest period presented using a modified retrospective approach. The modified retrospective approach includes a number of optional practical expedients primarily focused on leases that commenced before the effective date of the new guidance, including continuing to account for leases that commence before the effective date in accordance with previous guidance, unless the lease is modified. The Company is evaluating the impact of the adoption of the standard on its consolidated financial statements.

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Onconova Therapeutics, Inc.
Notes to Condensed Consolidated Financial Statements (Continued)
(Unaudited)

2. Summary of Significant Accounting Policies (Continued)

In November 2016, the FASB issued guidance requiring that amounts generally described as restricted cash and restricted cash equivalents be included with cash and cash equivalents when reconciling the beginning-of-period and end-of-period total amounts shown on the statement of cash flows. The guidance is effective for interim and annual periods beginning in 2018 and should be applied using a retrospective transition method to each period presented. Early adoption is permitted. The Company adopted this guidance effective December 31, 2017. Restricted Cash was $50,000 at December 31 2017, 2016 and 2015. The adoption did not have a material impact on the Company's consolidated financial statements and related disclosures.

3. Revenue

The Company's revenue during the three and six months ended June 30, 2018 and 2017 was from its license and collaboration agreements with SymBio, HanX and Pint (See Note 10).

	Three Months Ended June 30,		Six Months Ended June 30,	
	2018	2017	2018	2017
Symbio				
Upfront license fee recognition over time	$ 113,000	$ 113,000	$ 227,000	$ 227,000
Supplies	53,000	211,000	53,000	307,000
Hanx				
Upfront license payment	—	—	450,000	—
Pint				
Upfront license payment	319,000	—	319,000	—
	$ 485,000	$ 324,000	$ 1,049,000	$ 534,000

Deferred revenue is as follows:

	Symbio Upfront Payment
Deferred balance at December 31, 2017	$ 4,546,000
Recognition to revenue	227,000
Deferred balance at June 30, 2018	$ 4,319,000

See Note 10, "License and Collaboration Agreements," for a further discussion of the agreements with SymBio and HanX.

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Onconova Therapeutics, Inc.
Notes to Condensed Consolidated Financial Statements (Continued)
(Unaudited)

4. Net Loss Per Share of Common Stock

The following potentially dilutive securities outstanding at June 30, 2018 and 2017 have been excluded from the computation of diluted weighted average shares outstanding, as they would be antidilutive (reflects the number of common shares as if the dilutive securities had been converted to common stock):

	June 30,	
	2018	2017
Warrants	85,882,596	3,294,771
Stock options	1,089,821	921,320
	86,972,417	4,216,091

5. Warrants

Common Stock warrants are accounted for in accordance with applicable accounting guidance provided in ASC Topic 815, *Derivatives and Hedging — Contracts in Entity's Own Equity* (ASC Topic 815), as either derivative liabilities or as equity instruments depending on the specific terms of the warrant agreement. Some of the Company's warrants are classified as liabilities because in certain circumstances they could require cash settlement.

Warrants outstanding and warrant activity (reflects the number of common shares as if the warrants were converted to common stock) for the six months ended June 30, 2018 is as follows:

Description	Classification	Exercise Price	Expiration Date	Balance Decemeber 31, 2017	Warrants Issued	Warrants Exercised	Warrants Expired	Balance June 30, 2018
Non-tradable warrants	Liability	$ 11.50	July 2021	96,842	—	—	—	96,842
Tradable warrants	Liability	$ 4.92	July 2021	3,192,022	—	—	—	3,192,022
Non-tradable pre-funded warrants	Equity	$ 0.01	July 2023	5,907	—	—	—	5,907
Non-tradable warrants	Equity	$ 0.45	*	—	9,947,500	—	—	9,947,500
Non-tradable warrants	Equity	$ 1.2625	*	—	497,375	—	—	497,375
Non-tradable warrants	Equity	$ 0.94	March 2021	—	75,000	—	—	75,000
Non-tradable warrants	Equity	$ 1.41	March 2021	—	125,000	—	—	125,000
Non-tradable warrants	Equity	$ 0.5193	June 2021	—	225,000	—	—	225,000
Non-tradable pre-funded warrants	Equity	$ 0.01	none	—	2,942,500	(1,650,000)	—	1,292,500
Non-tradable warrants	Equity	$ 0.425	**	—	67,647,058	(1,152,638)	—	66,494,420

Non-tradable pre-funded warrants	Equity	$	0.01	none	—	12,235,295	(8,304,265)	—	3,931,030
					3,294,771	93,694,728	(11,106,903)	—	85,882,596

* These preferred stock warrants expire on the earlier of (A) the one-month anniversary of the date on which the Company publically releases topline results of the INSPIRE Pivotal phase 3 that compare the overall survival (OS) of patients in the rigosertib group vs the Physician's Choice group, in all patients and in a subgroup of patients with IPSS-R very high risk and (B) December 31, 2019. These preferred stock warrants may be exercised on a cashless basis in certain circumstances specified therein.

** These preferred stock warrants expire on the 18-month anniversary of June 8, 2018, the date on which the Company publicly announced through the filing of a Current Report on Form 8-K that a Certificate of Amendment to the Company's Tenth Amended and Restated Certificate of Incorporation, as amended, to increase the number of authorized shares of common stock from 100,000,000 to 250,000,000, was filed with the Secretary of State of the State of Delaware. These preferred stock warrants may be exercised on a cashless basis in certain circumstances specified therein.

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Onconova Therapeutics, Inc.
Notes to Condensed Consolidated Financial Statements (Continued)
(Unaudited)

6. Balance Sheet Detail

Prepaid expenses and other current assets:

	June 30, 2018	December 31, 2017
Research and development	$ 333,000	$ 514,000
Manufacturing	69,000	48,000
Insurance	60,000	181,000
Other	83,000	77,000
	$ 545,000	$ 820,000

Property and equipment:

	June 30, 2018	December 31, 2017
Property and equipment	$ 2,228,000	$ 2,228,000
Accumulated depreciation	(2,194,000)	(2,164,000)
	$ 34,000	$ 64,000

Accrued expenses and other current liabilities:

	June 30, 2018	December 31, 2017
Research and development	$ 2,117,000	$ 1,912,000
Employee compensation	1,299,000	1,258,000
Professional fees	156,000	165,000
Other	—	—
	$ 3,572,000	$ 3,335,000

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Onconova Therapeutics, Inc.
Notes to Condensed Consolidated Financial Statements (Continued)
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7. Fair Value Measurements

Fair value is defined as the exchange price that would be received for an asset or paid to transfer a liability (an exit price) in the principal or most advantageous market for the asset or liability in an orderly transaction between market participants on the measurement date.

The Company utilizes a valuation hierarchy for disclosure of the inputs to the valuations used to measure fair value. This hierarchy prioritizes the inputs into three broad levels as follows. Level 1 inputs are quoted prices (unadjusted) in active markets for identical assets or liabilities. Level 2 inputs are quoted prices for similar assets and liabilities in active markets or inputs that are observable for the asset or liability, either directly or indirectly through market corroboration, for substantially the full term of the financial instrument. Level 3 inputs are unobservable inputs based on the Company's own assumptions used to measure assets and liabilities at fair value. A financial asset or liability's classification within the hierarchy is determined based on the lowest level input that is significant to the fair value measurement.

On January 5, 2016, the Company entered into a securities purchase agreement (the "Securities Purchase Agreement") with an institutional investor providing for the issuance and sale by the Company of 193,684 shares of Common Stock, at a purchase price of $9.50 per share and warrants to purchase up to 96,842 shares of Common Stock (the "Warrants") for aggregate gross proceeds of $1,840,000 (see Note 13). The Company has classified the warrants as a liability (see Note 5). The fair value was estimated using the Black-Scholes pricing model.

On July 29, 2016 the Company closed on a Rights Offering, issuing 3,599,786 shares of Common Stock, 3,192,022 Tradable Warrants and 656,400 Pre-Funded Warrants. The Tradable Warrants are exercisable for a period of five years for one share of Common Stock at an exercise price of $4.92 per share. After the one-year anniversary of issuance, the Company may redeem the Tradable Warrants for $0.001 per Tradable Warrant if the volume weighted average price of its Common Stock is above $12.30 for each of 10 consecutive trading days (see Note 13). The Company has classified the Tradable Warrants as a liability (see Note 5). The Tradable Warrants have been listed on the NASDAQ Capital Market since issuance and the Company regularly monitors the trading activity. During the period from issuance on July 29, 2016 through March 31, 2017 the Company determined that trading volume was insufficient to use the NASDAQ Capital Market value to determine the fair value of the warrant liability. The fair value was estimated using the Black-Scholes pricing model. During the quarter ended June 30, 2017, the Company determined that an active and orderly market for the Tradable Warrants had developed and that the NASDAQ Capital Market price was the best indicator of fair value of the warrant liability. Consequently, the Company changed its valuation technique from the Black-Scholes pricing model to the quoted market price, effective April 1, 2017. The change in valuation technique resulted in a reclassification of the liability within the valuation hierarchy from Level 3 to Level 1. The quoted market price was used to determine the fair value at December 31, 2017 and June 30, 2018.

The Company estimated the fair value of the non-tradable warrant liability at June 30, 2018, using the Black-Scholes option pricing model with the following weighted-average assumptions:

Risk-free interest rate	2.63%
Expected volatility	82.18%
Expected term	3.04 years
Expected dividend yield	0%

Expected volatility is based on the historical volatility of the Company's Common Stock since its IPO in July 2013.

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Onconova Therapeutics, Inc.
Notes to Condensed Consolidated Financial Statements (Continued)
(Unaudited)

7. Fair Value Measurements (Continued)

The following fair value hierarchy table presents information about the Company's financial assets and liabilities measured at fair value on a recurring basis as of June 30, 2018 and December 31, 2017:

	Fair Value Measurement as of:							
	June 30, 2018				December 31, 2017			
	Level 1	Level 2	Level 3	Balance	Level 1	Level 2	Level 3	Balance
Tradable warrants liability	$ 447,000	$ —	$ —	$ 447,000	$ 1,755,000	$ —	$ —	$ 1,755,000
Non-tradable warrants liability	—	—	1,000	1,000	—	—	18,000	18,000
Total	$ 447,000	$ —	$ 1,000	$ 448,000	$ 1,755,000	$ —	$ 18,000	$ 1,773,000

The following table presents a reconciliation of the Company's liabilities measured at fair value on a recurring basis using significant unobservable inputs (Level 3) for the six months ended June 30, 2018:

	Warrant Liability
Balance at December 31, 2017	$ 18,000
Change in fair value upon re-measurement	(14,000)
Balance at March 31, 2018	4,000
Change in fair value upon re-measurement	(3,000)
Balance at June 30, 2018	$ 1,000

There were no transfers between Level 1 and Level 2 in any of the periods reported.

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Onconova Therapeutics, Inc.
Notes to Condensed Consolidated Financial Statements (Continued)
(Unaudited)

8. Stock-Based Compensation

The 2007 Equity Compensation Plan as amended (the "2007 Plan"), amended, restated and renamed the Company's 1999 Stock Based Compensation Plan (the "1999 Plan"), which provided for the granting of incentive and nonqualified stock options and restricted stock to its employees, directors and consultants at the discretion of the board of directors.

The 2013 Equity Compensation Plan (the "2013 Plan"), amended, restated and renamed the 2007 Plan. Under the 2013 Plan, the Company may grant incentive stock options, non-statutory stock options, stock appreciation rights, restricted stock, restricted stock units, deferred share awards, performance awards and other equity-based awards to employees, directors and consultants. The Company initially reserved 610,783 shares of Common Stock for

issuance, subject to adjustment as set forth in the 2013 Plan. The 2013 Plan included an evergreen provision, pursuant to which the maximum aggregate number of shares that may be issued under the 2013 Plan is increased on the first day of each fiscal year by the lesser of (a) a number of shares equal to four percent (4%) of the issued and outstanding Common Stock of the Company, without duplication, (b) 200,000 shares and (c) such lesser number as determined by the Company's board of directors, subject to specified limitations.

The 2018 Omnibus Incentive Compensation Plan (the "2018 Plan") was unanimously approved by the Company's Board of Directors on May 24, 2018 and was approved by the Company's stockholders on June 27, 2018. The 2018 Plan replaces the 2013 Plan. Upon stockholders' approval of the 2018 Plan, no further awards will be made under the 2013 Plan. Awards granted under the 2013 Plan will continue in effect in accordance with the terms of the applicable award agreement and the terms of the 2013 Plan in effect when the awards were granted.

Under the 2018 Plan, the Company may grant incentive stock options, non-qualified stock options, stock awards, stock units, stock appreciation rights and other stock-based awards to employees, non-employee directors and consultants, and advisors. The maximum aggregate number of shares of the Company's common stock that may be issued under the 2018 Plan is 6,035,316, which is equal to the sum of (i) 6,000,000 shares of the Company's common stock, plus (ii) 35,316 shares, which is the number of shares of the Company common stock reserved for issuance under the 2013 Plan that remained available as of the effective date of the 2018 Plan. In addition, the number of shares of common stock subject to outstanding awards under the 2013 Plan that terminate, expire, or are cancelled, forfeited, exchanged, or surrendered without having been exercised, vested, or paid in shares under the 2013 Plan after the effective date of the 2018 Plan will be available for issuance under the 2018 Plan. At June 30, 2018, there were 6,035,316 shares available for future issuance.

Stock-based compensation expense includes stock options granted to employees and non-employees and has been reported in the Company's statements of operations and comprehensive loss in either research and development expenses or general and administrative expenses depending on the function performed by the optionee. No net tax benefits related to the stock-based compensation costs have been recognized since the Company's inception. The Company recognized stock-based compensation expense as follows for the three and six months ended June 30, 2018 and 2017:

	Three Months ended June 30,		Six Months ended June 30,	
	2018	2017	2018	2017
General and administrative	$ 102,000	$ 254,000	$ 261,000	$ 519,000
Research and development	108,000	190,000	227,000	383,000
	$ 210,000	$ 444,000	$ 488,000	$ 902,000

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Onconova Therapeutics, Inc.
Notes to Condensed Consolidated Financial Statements (Continued)
(Unaudited)

8. Stock-Based Compensation (Continued)

A summary of stock option activity for the six months ended June 30, 2018 is as follows:

		Options Outstanding			
	Shares Available for Grant	Number of Shares	Weighted-Average Exercise Price	Weighted Average Remaining Contractual Term (in years)	Aggregate Intrinsic Value
Balance, December 31, 2017	57,632	894,996	$ 57.02	6.72	$ 0
Authorized	6,200,000	—			
Granted	(330,849)	330,849	$ 1.41		
Exercised	—	—	$ —		
Forfeitures	136,024	(136,024)	$ 64.87		
Cancelled	(27,491)				
Balance, June 30, 2018	6,035,316	1,089,821	$ 25.52	7.76	$ 0
Vested or expected to vest, June 30, 2018		1,073,203	$ 38.46	7.09	$ 0
Exercisable at June 30, 2018		687,976	$ 38.46	7.09	$ 0

Information with respect to stock options outstanding and exercisable at June 30, 2018 is as follows:

Exercise Price	Shares	Exercisable
$1.09 - $6.50	775,169	395,005
$14.80 - $15.00	29,615	21,144
$23.20 - $39.80	75,194	63,734
$43.40 - $75.30	85,695	83,945
$132.80 - $151.20	118,798	118,798
$277.10 - $291.40	5,350	5,350
	1,089,821	687,976

Options granted after April 23, 2013

The Company accounts for all stock-based payments made after April 23, 2013 to employees and directors using an option pricing model for estimating fair value. Accordingly, stock-based compensation expense is measured based on the estimated fair value of the awards on the date of grant, net of forfeitures. Compensation expense is recognized for the portion that is ultimately expected to vest over the period during which the recipient renders the required services to the Company using the straight-line single option method. In accordance with authoritative guidance, the fair value of non-employee stock-based awards is re-measured as the awards vest, and the resulting increase in fair value, if any, is recognized as expense in the period the related services are rendered.

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Onconova Therapeutics, Inc.
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8. Stock-Based Compensation (Continued)

The Company uses the Black-Scholes option-pricing model to estimate the fair value of stock options at the grant date. The Black-Scholes model requires the Company to make certain estimates and assumptions, including estimating the fair value of the Company's Common Stock, assumptions related to the expected price volatility of the Common Stock, the period during which the options will be outstanding, the rate of return on risk-free investments and the expected dividend yield for the Company's stock.

As of June 30, 2018, there was $820,000 of unrecognized compensation expense related to the unvested stock options issued from April 24, 2013 through June 30, 2018, which is expected to be recognized over a weighted-average period of approximately 1.70 years.

The weighted-average assumptions underlying the Black-Scholes calculation of grant date fair value include the following:

	Six Months ended June 30,	
	2018	2017
Risk-free interest rate	2.60%	2.03%
Expected volatility	74.13%	79.11%
Expected term	5.78 years	6.00 years
Expected dividend yield	0%	0%
Weighted average grant date fair value	$ 0.84	$ 1.78

The weighted-average valuation assumptions were determined as follows:

- Risk-free interest rate: The Company based the risk-free interest rate on the interest rate payable on U.S. Treasury securities in effect at the time of grant for a period that is commensurate with the assumed expected option term.
- Expected term of options: Due to its lack of sufficient historical data, the Company estimates the expected life of its employee stock options using the "simplified" method, as prescribed in Staff Accounting Bulletin (SAB) No. 107, whereby the expected life equals the arithmetic average of the vesting term and the original contractual term of the option.
- Expected stock price volatility: Expected volatility is based on the historical volatility of the Company's Common Stock since its IPO in July 2013.
- Expected annual dividend yield: The Company has never paid, and does not expect to pay, dividends in the foreseeable future. Accordingly, the Company assumed an expected dividend yield of 0.0%.
- Estimated forfeiture rate: The Company's estimated annual forfeiture rate on stock option grants was 4.14% in 2018 and 2017, based on the historical forfeiture experience.

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Onconova Therapeutics, Inc.
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9. Research Agreements

The Company has entered into various licensing and right-to-sublicense agreements with educational institutions for the exclusive use of patents and patent applications, as well as any patents that may develop from research being conducted by such educational institutions in the field of anticancer therapy, genes and proteins. Results from this research have been licensed to the Company pursuant to these agreements. Under one of these agreements with Temple University ("Temple"), the Company is required to make annual maintenance payments to Temple and royalty payments based upon a percentage of sales generated from any products covered by the licensed patents, with minimum specified royalty payments. As no sales had been generated through June 30, 2018 under the licensed patents, the Company has not incurred any royalty expenses related to this agreement. In addition, the Company is required to pay Temple a percentage of any sublicensing fees received by the Company.

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Onconova Therapeutics, Inc.
Notes to Condensed Consolidated Financial Statements (Continued)
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10. License and Collaboration Agreements

SymBio Agreement

In July 2011, the Company entered into a license agreement with SymBio, which has been subsequently amended, granting SymBio an exclusive, royalty-bearing license for the development and commercialization of rigosertib in Japan and Korea. Under the SymBio license agreement, SymBio is obligated to use commercially reasonable efforts to develop and obtain market approval for rigosertib inside the licensed territory and the Company has similar obligations outside of the licensed territory. The Company has also entered into an agreement with SymBio providing for it to supply SymBio with development-stage product. Under the SymBio license agreement, the Company also agreed to supply commercial product to SymBio under specified terms that will be included in a commercial supply agreement to be negotiated prior to the first commercial sale of rigosertib. The supply of development-stage product and the supply of commercial product will be at the Company's cost plus a defined profit margin. Sales of development-stage product have been de minimis. The Company has additionally granted SymBio a right of first negotiation to license or obtain the rights to develop and commercialize compounds having a chemical structure similar to rigosertib in the licensed territory.

Under the terms of the SymBio license agreement, the Company received an upfront payment of $7,500,000 in 2011. The Company is eligible to receive milestone payments of up to an aggregate of $22,000,000 from SymBio upon the achievement of specified development and regulatory milestones for specified indications. Of the regulatory milestones, $5,000,000 is due upon receipt of marketing approval in the United States for rigosertib IV in higher-risk MDS patients, $3,000,000 is due upon receipt of marketing approval in Japan for rigosertib IV in higher-risk MDS patients, $5,000,000 is due upon receipt of marketing approval in the United States for rigosertib oral in lower-risk MDS patients, and $5,000,000 is due upon receipt of marketing approval in Japan for rigosertib oral in lower-risk MDS patients. Furthermore, upon receipt of marketing approval in the United States and Japan for an additional specified indication of rigosertib, which the Company is currently not pursuing, an aggregate of $4,000,000 would be due. In addition to these pre-commercial milestones, the Company is eligible to receive tiered milestone payments based upon annual net sales of rigosertib by SymBio of up to an aggregate of $30,000,000.

Further, under the terms of the SymBio license agreement, SymBio will make royalty payments to the Company at percentage rates ranging from the mid-teens to 20% based on net sales of rigosertib by SymBio.

Royalties will be payable under the SymBio agreement on a country-by-country basis in the licensed territory, until the later of the expiration of marketing exclusivity in those countries, a specified period of time after first commercial sale of rigosertib in such country, or the expiration of all valid claims of the licensed patents covering rigosertib or the manufacture or use of rigosertib in such country. If no valid claim exists covering the composition of matter of rigosertib or the use of or treatment with rigosertib in a particular country before the expiration of the royalty term, and specified competing products achieve a specified market share percentage in such country, SymBio's obligation to pay the Company royalties will continue at a reduced royalty rate until the end of the royalty term. In addition, the applicable royalties payable to the Company may be reduced if SymBio is required to pay royalties to third-parties for licenses to intellectual property rights necessary to develop, use, manufacture or commercialize rigosertib in the licensed territory. The license agreement with SymBio will remain in effect until the expiration of the royalty term. However, the SymBio license agreement may be terminated earlier due to the uncured material breach or bankruptcy of a party, or force majeure. If SymBio terminates the license agreement in these circumstances, its licenses to rigosertib will survive, subject to SymBio's milestone and royalty obligations, which SymBio may elect to defer and offset against any damages that may be determined to be due from the Company. In addition, the Company may terminate the license agreement in the event that SymBio brings a challenge against it in relation to the licensed patents, and SymBio may terminate the license agreement without cause by providing the Company with written notice within a specified period of time in advance of termination.

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10. License and Collaboration Agreements (Continued)

The Company assessed the SymBio arrangement in accordance with ASC 606 and determined that its performance obligations under the SymBio agreement include the exclusive, royalty-bearing, sublicensable license to rigosertib, the research and development services to be provided by the Company and its obligation to serve on a joint committee. The Company concluded that the license was not distinct since it was of no benefit to SymBio without the ongoing research and development services and that, as such, the license and the research and development services should be bundled as a single performance obligation. Since the provision of the license and research and development services are considered a single performance obligation, the $7,500,000 upfront payment is being recognized as revenue ratably through December 2027, the expected period over which the Company expects the research and development services to be performed as the services are performed.

SymBio's purchases of rigosertib as development-stage product or for commercial requirements represent options under the agreement and revenues are therefore recognized when control of the product is transferred, which is typically when shipped. If SymBio orders the supplies from the Company, the Company expects the pricing for this supply to equal its third-party manufacturing cost plus a pre-negotiated percentage, which will not result in a significant incremental discount to market rates. In January 2018, the agreement was amended to provide SymBio a discount of 35% on future purchases, limited to a cumulative total amount of $300,000.

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10. License and Collaboration Agreements (Continued)

HanX Agreement

In December 2017, the Company entered into a license and collaboration agreement with HanX Biopharmaceuticals, Inc. ("HanX"), a company focused on development of novel oncology products, for the further development, registration and commercialization of ON 123300 in Greater China. ON 123300 is a preclinical compound which the Company believes has the potential to overcome the limitations of current generation CDK 4/6 inhibitors. The key feature of the collaboration is that HanX will provide all funding required for future Chinese IND enabling studies necessary for filing an IND with the Chinese Food and Drug Administration. The studies would be conducted to meet the Good Laboratory Practice ("GLP") requirements of the FDA such that the Company could simultaneously file an IND with the US FDA. The Company and HanX will oversee the IND enabling studies. The Company will maintain global rights to ON 12330 outside of China.

Pursuant to the agreement, the Company received a $450,000 upfront payment on April 11, 2018. If the compound receives regulatory approval and is commercialized, the Company would receive regulatory and commercial milestone payments, as well as royalties on sales in the Greater China territory.

The Company assessed the HanX arrangement for revenue recognition in accordance with ASC 606 and determined that the license was distinct and that control of the license had been transferred during the first quarter of 2018. As such, the Company recognized the $450,000 allocated to the license in the quarter ended March 31, 2018.

Pint Agreement

On March 2, 2018, the Company entered into a License, Development and Commercialization Agreement (the "License Agreement") and a Securities Purchase Agreement (the "Securities Purchase Agreement") with Pint.

Under the terms of the License Agreement, the Company 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 in humans in Latin American 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).

Pint agreed to make an upfront equity investment in the Company's common stock. In addition, the Company could receive up to $41.5 million in additional regulatory, development and sales-based milestone payments, an additional equity investment, as well as tiered, double digit royalties based on net aggregate net sales in the Territory. Pint and the Company have also agreed to enter into a supply agreement providing for Pint purchasing rigosertib and the Product from the Company within 90 days of the FDA approval of an a New Drug Application ("NDA") for the Product.

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 certain 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.

Under the terms of the Securities Purchase Agreement, Pint agreed to make an upfront equity investment in the Company at a specified premium to the Company's share price. Pursuant to the Securities Purchase Agreement, closing of the upfront equity investment occurred on April 4, 2018 and Pint purchased 816,945 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.

10. License and Collaboration Agreements (Continued)

In addition, under the Securities Purchase Agreement, if the FDA approves the NDA for the Product, Pint will reimburse the Company for certain research and development expenses. Half of the reimbursement amount will be paid in cash, the other half of the amount will be by an equity investment at a premium to the average of the volume weighted average price of common stock for the ten consecutive trading days ended on the day the FDA approves the NDA.

Pursuant to the Securities Purchase Agreement, the common stock purchased by Pint is subject to certain lock-up restrictions and Pint is entitled to certain registration and participation rights.

The Company assessed the Pint arrangement for revenue recognition in accordance with ASC 606 and determined that the license was distinct and that control of the license had been transferred during the second quarter of 2018. As such, the Company recognized the $319,000 allocated to the license in the quarter ended June 30, 2018.

11. Preclinical Collaboration

In December 2012, the Company agreed to form GBO, an entity owned by the Company and GVK. The purpose of GBO was to collaborate on and develop two programs through filing of an investigational new drug application and/or conducting proof of concept studies using the Company's technology platform.

During 2013, GVK made an initial capital contribution of $500,000 in exchange for a 10% interest in GBO, and the Company made an initial capital contribution of a sublicense to all the intellectual property controlled by the Company related to the two specified programs in exchange for a 90% interest. Under the terms of the agreement, GVK made additional capital contributions. The GVK percentage interest in GBO could have changed from the initial 10% to up to 50%, depending on the amount of its total capital contributions. During November 2014, GVK made an additional capital contribution of $500,000 which increased its interest in GBO to 17.5%. The Company evaluated its variable interests in GBO on a quarterly basis and determined that it was the primary beneficiary.

GVK had operational control of GBO and the Company had strategic and scientific control. The two preclinical programs sublicensed to GBO were not developed to clinical stage as initially hoped, and GBO was dissolved in June 2018. The dissolution resulted in a gain of $693,000 to the Company, primarily as a result of forgiveness of GBO payables to GVK. Upon consolidation of GBO, the $693,000 gain and $(163,000) non-controlling interest portion were recorded by the Company in the quarter ended June 30, 2018.

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Onconova Therapeutics, Inc.
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12. Related-Party Transactions

The Company has entered into a research agreement, as subsequently amended, with the Mount Sinai School of Medicine ("Mount Sinai"), with which a member of its board of directors and a stockholder is affiliated. Mount Sinai is undertaking research on behalf of the Company on the terms set forth in the agreements. Mount Sinai, in connection with the Company, will prepare applications for patents generated from the research. Results from all projects will belong exclusively to Mount Sinai, but the Company will have an exclusive option to license any inventions. Payments to Mount Sinai under this research agreement for the three months ended June 30, 2018 and 2017 were $88,000 and $88,000, respectively, and for the six months ended June 30, 2018 and 2017 were $175,000 and $175,000, respectively. At June 30, 2018 and December 31, 2017, the Company had $614,000 and $526,000, respectively, payable to Mount Sinai under this agreement.

The Company has entered into a consulting agreement with a member of its board of directors, who is also a significant stockholder of the Company. The board member provides consulting services to the Company on the terms set forth in the agreement. Payments to this board member for the three months ended June 30, 2018 and 2017 were $33,000 and $33,000, respectively, and for the six months ended June 30, 2018 and 2017 were $66,000 and $66,000, respectively. At June 30, 2018 and December 31, 2017, the Company had $33,000 and $33,000, respectively, payable under this agreement.

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Onconova Therapeutics, Inc.
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13. Securities Registrations and Sales Agreements

On October 8, 2015, the Company entered into a Purchase Agreement, and a registration rights agreement with Lincoln Park. A registration statement (Form S-1 No. 333-207533), relating to the shares, which was filed with the SEC became effective on November 3, 2015.

Subject to the terms and conditions of the purchase agreement, including the effectiveness of a registration statement covering the resale of the shares, the Company may sell additional shares of its Common Stock, having an aggregate offering price of up to $15,000,000 to Lincoln Park from time to time until December 1, 2018.

Upon execution of the Lincoln Park purchase agreement, Lincoln Park made an initial purchase of 84,676 shares of the Company's Common Stock for $1,500,000. Subject to the terms and conditions of the purchase agreement, including the effectiveness of a registration statement covering the resale of the shares, the Company has the right to sell to and Lincoln Park is obligated to purchase up to an additional $15,000,000 of shares of Common Stock, subject to certain limitations, from time to time until December 1, 2018. The Company may direct Lincoln Park, at its sole discretion and subject to certain conditions, to purchase up to 10,000 shares of Common Stock on any business day, increasing to up to 25,000 shares depending upon the closing sale price of the Common Stock (such purchases, "Regular Purchases"). However, in no event shall a Regular Purchase be more than $1,000,000. The purchase price of shares of Common Stock related to the future funding will be based on the prevailing market prices of such shares at the time of sales. In addition, the Company may direct Lincoln Park to purchase additional amounts as accelerated purchases if on the date of a Regular Purchase the closing sale price of the Common Stock is not below the threshold price as set forth in the Purchase Agreement. The Company's sales of shares of Common Stock to Lincoln Park under the Purchase Agreement were limited to no more than the number of shares that would result in the beneficial ownership by Lincoln Park and its affiliates, at any single point in time, of more than 4.99% of the then-outstanding shares of the Common Stock, which limit increased to 9.99% on May 1, 2016.

Pursuant to the terms of the Lincoln Park purchase agreement and to comply with the listing rules of the NASDAQ Stock Market, the number of shares issued to Lincoln Park thereunder shall not exceed 19.99% of the Company's shares outstanding on October 8, 2015 unless the approval of the Company's stockholders is obtained. This limitation shall not apply if the average price paid for all shares issued and sold under the purchase agreement is equal to or greater than $15.56. The Company is not required or permitted to issue any shares of Common Stock under the Lincoln Park purchase agreement if such issuance would breach the Company's obligations under the listing rules of the NASDAQ Stock Market.

As consideration for entering into the purchase agreement, the Company issued to Lincoln Park 20,000 shares of Common Stock. Lincoln Park represented to the Company, among other things, that it was an "accredited investor" (as such term is defined in Rule 501(a) of Regulation D under the Securities Act of 1933, as amended (the "Securities Act"), and the Company sold the securities in reliance upon an exemption from registration contained in Section 4(2) under the Securities Act. The securities sold may not be offered or sold in the United States absent registration or an applicable exemption from registration requirements.

The net proceeds to the Company under the Lincoln Park purchase agreement will depend on the frequency and prices at which the Company may sell shares of Common Stock to Lincoln Park. The Company expects that the proceeds received from the initial purchase and any additional proceeds from future sales to Lincoln Park will be used to fund the development of the Company's clinical and preclinical programs, for other research and development activities and for general corporate purposes.

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Onconova Therapeutics, Inc.
Notes to Condensed Consolidated Financial Statements (Continued)
(Unaudited)

13. Securities Registrations and Sales Agreements (continued)

In December 2016, the Company entered into a sales agreement (the "Sales Agreement") with FBR Capital Markets & Co. ("FBR") to create an at-the-market equity program ("ATM Program") under which the Company from time to time may offer and sell shares of its common stock through FBR. The Shares to be sold under the Sales Agreement were issued and sold pursuant to the Company's shelf registration statement on Form S-3 (File No 333-199219), previously filed with the SEC on October 8, 2014 and declared effective by the SEC on November 20, 2014. A prospectus supplement related to the Company's ATM Program was filed with the SEC on December 5, 2016. Sales under the Sales Agreement were 12,764 shares for net proceeds of approximately $40,000. The Sales Agreement was terminated effective April 19, 2017.

On April 20, 2017, the Company entered into an underwriting agreement with Laidlaw & Company (UK) Ltd. ("Laidlaw"), with respect to the issuance and sale in an underwritten public offering by the Company of 2,476,190 shares of Common Stock, at a price to the public of $2.10 per share. Pursuant to the underwriting agreement, the Company granted Laidlaw a 45-day option to purchase up to an additional 363,580 shares. The underwriting agreement contained customary representations, warranties and agreements by the Company, customary conditions to closing, indemnification obligations of the Company and Laidlaw, including for liabilities under the Securities Act of 1933, as amended (the "Securities Act"), other obligations of the parties and termination provisions. The offering closed on April 26, 2017 and the proceeds to the Company, net of expenses, were approximately $4.6 million. On May 12, 2017, Laidlaw exercised their option to purchase 363,580 additional shares. Closing on the additional shares was May 17, 2017 and the proceeds to the Company, net of expenses, were approximately $0.7 million.

On November 9, 2017, the Company entered into a placement agency agreement with Laidlaw relating to the Company's registered direct offering, issuance and sale to select accredited investors of 920,000 shares of the Company's common stock at a price of $1.50 per share on a best efforts basis. These shares are registered under the Securities Act on the Company's Registration Statement on Form S-3 (File No. 333-199219). The offering closed on November 14, 2017. The net proceeds to the Company from the offering, after deducting placement agent fees and other expenses, were approximately $1,082,000. The Company intends to use the net proceeds from this offering to fund the development of its clinical and preclinical programs, for other research and development activities and for general corporate purposes, which may include capital expenditures and funding its working capital needs.

On February 8, 2018, the Company entered into an underwriting agreement (the "February 2018 Underwriting Agreement") with H.C. Wainwright & Co., LLC ("HCW"), relating to the public offering (the "February 2018 Offering") of 5,707,500 shares of the Company's common stock, pre-funded warrants (the "February 2018 Pre-Funded Warrants") to purchase an aggregate of 2,942,500 shares of common stock and preferred stock warrants (the "February 2018 Preferred Stock Warrants") to purchase up to an aggregate of 865,000 shares of the Company's Series A Convertible Preferred Stock, par value $0.01 per share (the "Series A Preferred Stock"). Each share of common stock or February 2018 Pre-Funded Warrant, as applicable, was sold together with a February 2018 Preferred Stock Warrant to purchase a 0.1 share of Series A Preferred Stock at a combined public offering price of $1.01 per share of common stock or $1.00 per February 2018 Pre-Funded Warrant, as applicable, and accompanying February 2018 Preferred Stock Warrant.

The Company also granted HCW a 30-day option to purchase up to 1,297,500 additional shares of common stock at a purchase price of $1.00 per share and February 2018 Preferred Stock Warrants to purchase up to an aggregate of 129,750 shares of Series A Preferred Stock at a purchase price of $0.01 per February 2018 Preferred Stock Warrant, less the underwriting discounts and commissions. Prior to closing, HCW exercised this option in full to purchase 1,297,500 additional shares of common stock and February 2018 Preferred Stock Warrants to purchase 129,750 shares of Series A convertible preferred stock.

The offering closed on February 12, 2018. Net proceeds from the offering were approximately $8.7 million after deducting underwriting discounts and commissions and other estimated offering expenses payable by the Company. The Company intends to use the net proceeds from the offering to fund the development of its clinical and preclinical programs, for other research and development activities and for general corporate purposes, which may include capital expenditures and funding its working capital needs.

The February 2018 Pre-Funded Warrants are exercisable immediately at an exercise price of $0.01 per share, may be exercised until they are exercised in full, and may be exercised on a cashless basis in certain circumstances specified therein.

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Onconova Therapeutics, Inc.
Notes to Condensed Consolidated Financial Statements (Continued)
(Unaudited)

13. Securities Registrations and Sales Agreements (continued)

The February 2018 Preferred Stock Warrants are exercisable immediately at an exercise price of $1.01 per 0.1 share of Series A Preferred Stock and will expire on the earlier of (A) the one-month anniversary of the date on which the Company publically releases topline results of the INSPIRE Pivotal phase 3 that compare the overall survival (OS) of patients in the rigosertib group vs the Physician's Choice group, in all patients and in a subgroup of patients with IPSS-R very high risk and (B) December 31, 2019. The February 2018 Preferred Stock Warrants may be exercised on a cashless basis in certain circumstances specified therein.

Each 0.1 share of Series A Preferred Stock will be convertible into one share of common stock. A holder of Series A Preferred Stock will be prohibited from converting Series A Preferred Stock into shares of common stock if, as a result of such conversion, the holder, together with its affiliates, would own more than 4.99% of the shares of the Company's shares of common stock then issued and outstanding, which may be increased to 9.99% in certain circumstances. Shares of Series A Preferred Stock will generally have no voting rights, except as required by law and except that the consent of holders of a

majority of the outstanding Series A Preferred Stock will be required to (i) alter or change adversely the powers, preferences or rights given to the Series A Preferred Stock or alter or amend the Certificate of Designation of the Series A Preferred Stock, (ii) amend any provision of the Company's certificate of incorporation that would have a materially adverse effect on the rights of the holders of the Series A Preferred Stock, (iii) increase the number of authorized shares of Series A Preferred Stock, or (iv) enter into any agreement with respect to the foregoing. Shares of Series A Preferred Stock will not be entitled to receive any dividends, unless and until specifically declared by the Company's board of directors, and will rank (i) on parity with the Company's common stock on an as-converted basis, (ii) senior to any class or series of the Company's capital stock created thereafter specifically ranking by its terms junior to the Series A Preferred Stock, (iii) on parity to any class or series of the Company's capital stock created thereafter specifically, (iv) ranking by its terms on parity with the Series A Preferred Stock; and (v) junior to any class or series of the Company's capital stock created thereafter specifically ranking by its terms senior to the Series A Preferred Stock.

The exercise price and number of shares of common stock or Series A Preferred Stock issuable upon exercise of the Pre-Funded Warrants or Preferred Stock Warrants, as the case may be, and the conversion price and number of shares of common stock issuable upon the conversion of Series A Preferred Stock, is subject to adjustment in the event of any stock split, reverse stock split, stock dividend, recapitalization, reorganization or similar transaction, as described in the Pre-Funded Warrants, Preferred Stock Warrants and the Certificate of Designation of the Series A Preferred Stock, as applicable. The shares of common stock or Pre-Funded Warrants, as applicable, and the accompanying Preferred Stock Warrants could only be purchased together as a unit in the offering but were issued as separate securities.

HCW acted as sole book-running manager for the offering, which was a firm commitment underwritten public offering pursuant to a registration statement on Form S-1 (Registration No. 333-222374) that was declared effective by the SEC on February 7, 2018. The offering was made only by means of a prospectus forming a part of the effective registration statement. The Company paid HCW a commission equal to 7.0% of the gross proceeds of the offering, a management fee equal to 1.0% of the gross proceeds of the offering and other expenses. As additional compensation, the Company issued warrants to HCW exercisable for 49,737.5 shares of Series A Preferred Stock, which are convertible into 497,375 shares of common stock subject to the terms of the Series A Preferred Stock. These warrants have substantially the same terms as the February 2018 Preferred Stock Warrants except that the exercise price per share is equal to $1.2625 per 0.1 share of Series A Preferred Stock.

Onconova Therapeutics, Inc.
Notes to Condensed Consolidated Financial Statements (Continued)
(Unaudited)

13. Securities Registrations and Sales Agreements (continued)

On April 27, 2018, the Company entered into an underwriting agreement with HCW relating to the public offering (the "April 2018 Offering") of 46,588,234 shares of the Company's common stock, pre-funded warrants (the "May 2018 Pre-Funded Warrants") to purchase an aggregate of 12,235,295 shares of common stock and preferred stock warrants (the "May 2018 Preferred Stock Warrants") to purchase up to an aggregate of 1,470,588.225 shares of the Company's Series B Convertible Preferred Stock, par value $0.01 per share (the "Series B Preferred Stock"). Each share of common stock or April 2018 Pre-Funded Warrant, as applicable, was sold together with a May 2018 Preferred Stock Warrant to purchase a 0.025 share of Series B Preferred Stock at a combined public offering price of $0.425 per share of common stock or $0.415 per May 2018 Pre-Funded Warrant, as applicable, and accompanying May 2018 Preferred Stock Warrant.

The Company also granted HCW a 30-day option to purchase up to 8,823,529 additional shares of common stock at a purchase price of $0.415 per share and May 2018 Preferred Stock Warrants to purchase up to an aggregate of 220,588.225 shares of Series B Preferred Stock at a purchase price of $0.01 per May 2018 Preferred Stock Warrant, less the underwriting discounts and commissions. Prior to closing, HCW exercised this option in full to purchase 8,823,529 additional shares of common stock and May 2018 Preferred Stock Warrants to purchase 220,588.225 shares of Series B convertible preferred stock.

The offering closed on May 1, 2018. Net proceeds from the offering were approximately $25.6 million after deducting underwriting discounts and commissions and other estimated offering expenses payable by the Company. The Company intends to use the net proceeds from the offering to fund the development of its clinical and preclinical programs, for other research and development activities and for general corporate purposes, which may include capital expenditures and funding its working capital needs.

The May 2018 Pre-Funded Warrants are exercisable immediately at an exercise price of $0.01 per share, may be exercised until they are exercised in full, and may be exercised on a cashless basis in certain circumstances.

The May 2018 Preferred Stock Warrants are exercisable immediately at an exercise price of $0.425 per 0.025 share of Series B Preferred Stock (convertible into one share of Common Stock) and will expire on the 18-month anniversary of June 8, 2018, the date on which the Company publicly announced through the filing of a Current Report on Form 8-K that a Certificate of Amendment to the Company's Tenth Amended and Restated Certificate of Incorporation, as amended, to increase the number of authorized shares of common stock from 100,000,000 to 250,000,000, was filed with the Secretary of State of the State of Delaware. The May 2018 Preferred Stock Warrants may be exercised on a cashless basis in certain circumstances.

Each 0.025 share of Series B Preferred Stock will be convertible into one share of common stock. A holder of Series B Preferred Stock will be prohibited from converting Series B Preferred Stock into shares of common stock if, as a result of such conversion, the holder, together with its affiliates, would own more than 4.99% of the shares of the Company's shares of common stock then issued and outstanding, which may be increased to 9.99% in certain circumstances. Shares of Series B Preferred Stock will generally have no voting rights, except as required by law and except that the consent of holders of a majority of the outstanding Series B Preferred Stock will be required to (i) alter or change adversely the powers, preferences or rights given to the Series B Preferred Stock or alter or amend the Certificate of Designation of the Series B Preferred Stock, (ii) amend any provision of the Company's certificate of incorporation that would have a materially adverse effect on the rights of the holders of the Series B Preferred Stock, (iii) increase the number of authorized shares of Series B Preferred Stock, or (iv) enter into any agreement with respect to the foregoing. Shares of Series B Preferred Stock will not be entitled to receive any dividends, unless and until specifically declared by the Company's board of directors, and will rank (i) on parity with the Company's common stock on an as-converted basis, (ii) senior to any class or series of the Company's capital stock created thereafter specifically ranking by its terms junior to the Series B Preferred Stock, (iii) on parity to any class or series of the Company's capital stock created thereafter specifically, (iv) ranking by its terms on parity with the Series B Preferred Stock; and (v) junior to any class or series of the Company's capital stock created thereafter specifically ranking by its terms senior to the Series B Preferred Stock.

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Onconova Therapeutics, Inc.
Notes to Condensed Consolidated Financial Statements (Continued)
(Unaudited)

13. Securities Registrations and Sales Agreements (continued)

The exercise price and number of shares of common stock or Series B Preferred Stock issuable upon exercise of the Pre-Funded Warrants or Preferred Stock Warrants, as the case may be, and the conversion price and number of shares of common stock issuable upon the conversion of Series B Preferred Stock, is subject to adjustment in the event of any stock split, reverse stock split, stock dividend, recapitalization, reorganization or similar transaction, as described in the May 2018 Pre-Funded Warrants, May 2018 Preferred Stock Warrants and the Certificate of Designation of the Series B Preferred Stock, as applicable. The shares of common stock or May 2018 Pre-Funded Warrants, as applicable, and the accompanying May 2018 Preferred Stock Warrants could only be purchased together as a unit in the offering but were issued as separate securities.

HCW acted as sole book-running manager for the offering, which was a firm commitment underwritten public offering pursuant to a registration statement on Form S-1 (Registration No. 333-224315) that was declared effective by the SEC on April 26, 2018. The offering was made only by means of a prospectus forming a part of the effective registration statement. The Company paid HCW a commission equal to 8.0% of the gross proceeds of the offering, a management fee equal to 1.0% of the gross proceeds of the offering and other expenses.

In connection with the February 2018 Offering, the Company agreed to certain restrictions (the "Company Lock-Up") set forth in Section 5(j) of the February 2018 Underwriting Agreement. The Company Lock-Up, among other items, prohibited the Company, during a period of one hundred and thirty-five (135) days from February 8, 2018, without the prior written consent of HCW, from offering or selling any Common Stock or any securities convertible into or exercisable or exchangeable for Common Stock. In order to received HCW's waiver of the Company Lock-Up, in connection with the April 2018 Offering, on April 16, 2018, the Company entered into a Lock-Up Waiver Agreement (the "Lock-Up Waiver Agreement") with HCW and certain holders of the February 2018 Preferred Stock Warrants, pursuant to which (i) HCW waived the Company Lock-Up solely with respect to the April 2018 Offering, and (ii) the Company agreed to reduce the exercise price of the February 2018 Preferred Stock Warrants such that the exercise price of the February 2018 Preferred Stock Warrants shall be equal to 105% of the public offering price of common stock sold in the April 2018 Offering (but only to the extent that such public offering price is lower than the current exercise price of the February 2018 Preferred Stock Warrants) and that such repricing shall be effective concurrently with the closing of the April 2018 Offering. In accordance with the Lock-Up Waiver Agreements, the exercise price of the February 2018 Preferred Stock Warrants was repriced from $1.01 per 0.1 share of Series A Convertible Preferred Stock to $0.44625 per 0.1 share of Series A Convertible Preferred Stock when the April 2018 Offering closed on May 1, 2018.

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Item 2. Management's Discussion and Analysis of Financial Condition and Results of Operations

The following Management's Discussion and Analysis of Financial Condition and Results of Operations should be read in conjunction with interim unaudited condensed consolidated financial statements contained in Part I, Item 1 of this quarterly report, and the audited consolidated financial statements and notes thereto for the year ended December 31, 2017 and the related Management's Discussion and Analysis of Financial Condition and Results of Operations, both of which are contained in our annual report on Form 10-K filed with the SEC on March 16, 2018. As used in this report, unless the context suggests otherwise, "we," "us," "our," "the Company" or "Onconova" refer to Onconova Therapeutics, Inc. and its consolidated subsidiaries.

Cautionary Note Regarding Forward-Looking Statements

This quarterly report on Form 10-Q includes 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 report and include statements regarding our intentions, beliefs, projections, outlook, analyses or current expectations concerning, among other things, our ongoing and planned preclinical development and clinical trials, the timing of and our ability to make regulatory filings and obtain and maintain regulatory approvals for our product candidates, protection of our intellectual property portfolio, the degree of clinical utility of our products, particularly in specific patient populations, our ability to develop commercial and manufacturing functions, expectations regarding clinical trial data, our results of operations, cash needs, financial condition, liquidity, collaborations, partnerships, 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 report, 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 report. In addition, even if our results of operations, financial condition and liquidity, and events in the industry in which we operate are consistent with the forward-looking statements contained in this report, they may not be predictive of results or developments in future periods.

Actual results could differ materially from our forward-looking statements due to a number of factors, including 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 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;
- the success of competing therapies and products that are or become available;
- our ability to maintain the listing of our common stock 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.

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Any forward-looking statements that we make in this report speak only as of the date of such statement, and we undertake no obligation to update such statements to reflect events or circumstances after the date of this report or to reflect the occurrence of unanticipated events. 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" in our most recent annual report on Form 10-K and quarterly reports on Form 10-Q, to better understand significant risks and uncertainties inherent in our business and underlying any forward-looking statements. As a result of these factors, actual results could differ materially and adversely from those anticipated or implied in the forward-looking statements in this report and you should not place undue reliance on any forward-looking statements.

Overview

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

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

Our net losses were $9.4 million and $10.9 million for the six months ended June 30, 2018 and 2017, respectively. As of June 30, 2018, we had an accumulated deficit of $370.9 million. We expect to incur significant expenses and operating losses for the foreseeable future as we continue the development and clinical trials of, and seek regulatory approval for, our product candidates, even if milestones under our license and collaboration agreements may be met. As of June 30, 2018, we had $29.5 million in cash and cash equivalents.

In January 2016, we completed a sale of common stock and warrants for net proceeds of approximately $1.6 million. In July 2016, we completed a rights offering of units of common stock and warrants for net proceeds of $15.8 million. In December 2016, we entered into a sales agreement with FBR Capital Markets & Co. ("FBR") to create an at-the-market equity program under which we from time to time may offer and sell shares of common stock through FBR. Sales under this sales agreement in 2017 were 20,499 shares for net proceeds of approximately $64,000. The sales agreement was terminated effective April 19, 2017. There were no sales of common stock under this program during the year ended December 31, 2016.

In April 2017, we closed on an underwritten public offering of 2,476,190 shares of common stock. In May 2017, we sold an additional 363,580 shares as a result of the underwriter's exercise of its over-allotment option. Net proceeds from these transactions were approximately $5.3 million. In November 2017, we closed on a registered direct offering to select accredited investors of 920,000 shares of common stock. Net proceeds were approximately $1.1 million. In February 2018, we closed on an offering of units of common stock and warrants. We issued 7,005,000 shares of common stock, pre-funded warrants to purchase 2,942,500 shares of common stock, and preferred stock warrants to purchase 1,044,487.5 shares of Series A convertible preferred stock. Each share of Series A convertible preferred stock is convertible into ten shares of common stock. Net proceeds were approximately $8.7 million. In May 2018, we closed on an offering of units of common stock and warrants. We issued 55,411,763 shares of common stock, pre-funded warrants to purchase 12,235,295 share of common stock, and preferred stock warrants to purchase 1,691,176.450 shares of Series B convertible preferred stock. Each share of Series B convertible preferred stock is convertible into forty shares of common stock. Net proceeds were approximately $25.6 million.

On March 21, 2018, we amended our certificate of incorporation to increase the number of authorized shares of common stock from 25,000,000 to 100,000,000. On June 7, 2018, we amended our certificate of incorporation to increase the number of authorized shares of common stock from 100,000,000 to 250,000,000.

At our Annual Meeting of Stockholders on June 27, 2018, our stockholders approved a proposal to amend our Tenth Amended and Restated Certificate of Incorporation, as amended, to effect a reverse stock split of our common stock, par value $0.01 per share, at a ratio of between 1 for 5 and 1 for 15, with our Board of Directors having the sole discretion to effect the reverse stock split at any time within 90 days after the Annual Meeting, to fix the specific ratio for the reverse stock split so long as it is within the range approved by the stockholders, and to abandon the amendment prior to its effectiveness. The Board of Directors has not set an effective date or ratio for the reverse split.

Steven M. Fruchtman, M.D. was appointed as the President of the Company, effective as of June 19, 2018. Dr. Fruchtman will continue to maintain the responsibilities of Chief Medical Officer and/or Vice President, Research and Development until a replacement is hired to assume the duties and responsibilities associated with these roles, as applicable. In connection with Dr. Fruchtman's appointment as the President of the Company, on June 19, 2018, the Company entered into an amended and restated employment agreement with Dr. Fruchtman which supersedes his previous employment agreement entered into on July 1, 2015.

We believe that our cash and cash equivalents will be sufficient to fund our ongoing trials into the fourth quarter of 2019. We do not have a recurring source of revenue to fund our operations and will need to raise additional funds to apply for regulatory approval for our drug candidates; therefore, there is substantial doubt about our ability to continue as a going concern.

We are exploring various sources of funding for development and applying for regulatory approval of rigosertib as well as for our ongoing operations. If we raise additional funds through strategic collaborations and alliances or licensing arrangements with third parties, which may include existing collaboration partners, we may have to relinquish valuable rights to our technologies or product candidates, including rigosertib, or grant licenses on terms that are not favorable to us. There can be no assurance, however, that we will be successful in obtaining such financing in sufficient amounts, on terms acceptable to us, or at all. In addition, there can be no assurance that we will obtain approvals necessary to market our product candidates or achieve profitability or sustainable, positive cash flow. If we are unable to successfully raise sufficient additional capital, through future financings or through strategic and collaborative arrangements, we will not have sufficient cash to fund our ongoing trials and operations.

Rigosertib

Rigosertib is a small molecule that is reported to block 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 malignant conditions. We are party to a collaboration agreement with SymBio, which grants SymBio certain rights to commercialize rigosertib in Japan and Korea. We are party to a license agreement with Pint Pharma International SA ("Pint"), which grants Pint certain rights to commercialize rigosertib in 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. Previously we were a party to a license and development agreement with Baxalta (as defined below), which granted Baxalta certain rights to commercialize rigosertib in Europe. The Baxalta agreement was terminated on August 30, 2016, at which time the European rights reverted to us at no cost.

The table below summarizes our rigosertib clinical stage programs.

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

Rigosertib IV for higher-risk MDS

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

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

Enrollment for the INSPIRE Phase 3 trial for second-line higher-risk MDS patients is highly selective with stringent entry criteria as outlined above. To date, the INSPIRE study has opened more than 180 trial sites in 23 countries across four continents, including more than 30 sites opened 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 at new sites in previously participating countries and expanded into an additional country. 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. We anticipate completion of 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 $\geq$ 10% of patients with MDS/AML (n= 335) receiving rigosertib intravenous (IV) monotherapy were fatigue (33%), nausea (33%), diarrhea (27%), constipation (25%), anaemia (24%) and pyrexia (24%). The most common $\geq$ Grade 3 AEs were anaemia (21%), febrile neutropenia (13%), pneumonia (12%) and thrombocytopenia (11%). The most common serious AEs were febrile neutropenia (10%), pneumonia (9%), and sepsis (7%). The most common AEs leading to discontinuation of IV rigosertib were sepsis and pneumonia (3% each).

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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 2016, 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 Phase 1/2 data from the initial portion of an ongoing rigosertib oral and azacitidine combination trial in higher-risk MDS. 33 of 40 MDS patients enrolled were evaluable for response at the time of the analysis. The median age of patients was 66, with 73% being male. The IPSS-R distribution was: 7.5% Low, 12.5% Intermediate, 37.5% High, 32.5% Very High and 10% unknown. 76% of patients responded per 2006 International Working Group (IWG) criteria. Responses were as follows:

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

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

Safety/Tolerability of the Combination:

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

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

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

While the Phase 3 trial is being designed, we have expanded the Phase 1/2 trial cohort by enrolling 45 additional patients. Under a protocol expansion, we are using the expanded cohorts to explore dose optimization regarding efficacy and safety by increasing the dose of rigosertib oral to a total of 1120 mg in combination with full dose azacitidine and varying the dose administration scheme of rigosertib oral (560 mg before breakfast and 560 mg after lunch or 840 mg before breakfast and 280 mg after lunch) to identify an optimal dose and schedule. During this expansion, we also instituted risk-mitigation strategies, as further described below, in order to address a urinary adverse event of interest, hematuria. After amendments were filed with the regulatory agencies, we started the expansion phase of this trial in the U.S. sites that participated in the initial trial. Since the trial initiation, we have added additional US sites to complete enrollment of the expanded trial. The first patient was enrolled in April 2017 and as of April 2018, complete enrollment of 45 patients was achieved in the expansion trial; and the trial is ongoing.

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

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

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

Hematuria Comparison Between Rigosertib Combination Therapy Parts 1 and 2:

All Patients on Combination Part 1 (Rigosertib 840 mg total & Azacitidine)	42
Patients with hematuria	20(48)%
Patients with grade 1 or 2 hematuria	17(40)%
Patients with grade ≥3 hematuria	5(12)%
All Patients on Combination Part 2 (Rigosertib 1120 mg total & Azacitidine) with risk-mitigation strategies	37
Patients with hematuria	4(11)%
Patients with grade 1 or 2 hematuria	4(11)%
Patients with grade ≥3 hematuria	0(0)%

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

Upon completion of our Phase 1/2 study, we will submit the study results to the applicable regulatory authorities. The final results of this study may differ from the results presented above and the applicable regulatory authorities may not agree with our analyses. The combination trial with azacitidine is expected to advance to a pivotal Phase 3 trial for first-line higher-risk MDS patients in 2019, and we will not commence the Phase 3 trial of oral rigosertib in combination with azacitidine for higher-risk MDS or AML without additional financing.

Rigosertib oral for lower-risk MDS

We are also developing rigosertib oral as a single agent treatment for lower risk MDS. Higher-risk MDS patients suffer from a shortfall in normal circulating blood cells, or cytopenias, as well as elevated levels of cancer cells, or blasts in their bone marrow and sometimes in their peripheral blood with a significant rate of transformation to acute leukemia. Lower-risk MDS patients suffer mainly from cytopenias, that is low levels of red blood cells, white blood

cells or platelets. Thus, lower-risk MDS patients depend on transfusions and growth factors or other therapies to improve their low blood counts; but have a lower rate of acute leukemic transformation.

We have explored single agent rigosertib oral as a treatment for lower-risk MDS in two Phase 2 clinical trials, 09-05 and 09-07. In December 2017, we presented data at the Annual ASH Meeting from the 09-05 Phase 2 trial. This data demonstrated a 44% rate of achieving transfusion independence in the cohort of Lower -risk MDS patients treated with rigosertib oral at a dose of 560 mg BID (1120 mg over 24 hrs) 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 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.

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

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

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

Rare Disease Program in "RASopathies"

Based on the 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 genetic 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 genetic basis in expression or defects involving Ras Effector Pathways. They are usually caused by germline mutations in genes that alter the RAS subfamily and mitogen-activated protein kinases that control signal transduction and are among the most common genetic syndromes. Together, this group of diseases can impact more than 1 in 1000 individuals, according to RASopathiesNet.

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

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

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

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 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.

Bricliclib

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.

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Recilisib

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

Preclinical Product Candidates

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

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

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

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

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

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

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Critical Accounting Policies and Significant Judgments and Estimates

This management's discussion and analysis of our financial condition and results of operations is based on our interim unaudited consolidated financial statements, which have been prepared in accordance with GAAP. The preparation of these financial statements requires us to make estimates and judgments that affect the reported amounts of assets, liabilities, revenues and expenses and the disclosure of contingent assets and liabilities in our consolidated financial statements. On an ongoing basis, we evaluate our estimates and judgments, including those related to accrued expenses, revenue recognition, deferred revenue and stock-based compensation. We base our estimates on historical experience, known trends and events and various other factors that we believe to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions. We believe there have been no significant changes in our critical accounting policies as discussed in our annual report on Form 10-K filed with the SEC on March 16, 2018, with the exception of the adoption of ASC 606, as described further in the footnotes to the quarterly financial information contained in this filing.

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Results of Operations

Comparison of the Three Months Ended June 30, 2018 and 2017

	Three Months ended June 30,		
	2018	2017	Change
Revenue	$ 485,000	$ 324,000	$ 161,000
Operating expenses:			
General and administrative	2,054,000	1,779,000	(275,000)
Research and development	4,070,000	4,614,000	544,000
Total operating expenses	6,124,000	6,393,000	269,000
Loss from operations	(5,639,000)	(6,069,000)	430,000
Gain on dissolution of GBO	693,000	—	693,000
Change in fair value of warrant liability	513,000	3,474,000	—
Other income (expense), net	112,000	11,000	101,000
Net loss	$ (4,321,000)	$ (2,584,000)	$ 1,224,000

Revenues

Revenues increased by $0.2 million, or 50%, for the three months ended June 30, 2018 when compared to the same period in 2017 primarily as a result of revenue recognized in the 2018 period related to the Pint license agreement, partially offset by less clinical supply revenue from SymBio in the 2018 period.

General and administrative expenses

General and administrative expenses increased by $0.3 million, or 15%, to $2.1 million for the three months ended June 30, 2018 from $1.8 million for the three months ended June 30, 2017. The increase was attributable to an increase of $0.2 million in professional and legal expenses and an increase of $0.2 million in investor relations costs following two offerings during the first half of the 2018. These increases were partially offset by lower stock compensation expense of $0.1 million, due to the completion of vesting of 2013 grants in the 2017 period and lower grant date fair values for grants made more recently.

Research and development expenses

Research and development expenses decreased by $0.5 million, or 12%, to $4.1 million for the three months ended June 30, 2018 from $4.6 million for the three months ended June 30, 2017. This decrease was caused primarily by $0.6 million lower expenses on INSPIRE and the 09-08 combination study. The decrease was also caused by lower manufacturing expenses of $0.2 million related to the timing of drug substance and drug product manufacturing, and lower stock compensation expense of $0.1 million, due to the completion of vesting of 2013 grants in the 2017 period and lower grant date fair values for grants made more recently. The decrease in research and development costs was partially offset by $0.4 million higher personnel costs related primarily to higher bonus expense during the 2018 period.

Change in fair value of warrant liability

The fair value of the warrant liability decreased $0.5 million for the three months ended June 30, 2018, compared to a decrease of $3.5 million for the three months ended June 30, 2017. This change was caused by the decrease in the fair market value of the warrants issued in our rights offering in 2016.

Other income (expense), net

Other income (expense), net, increased by $0.8 million for the three months ended June 30, 2018 compared to the three months ended June 30, 2017, due primarily to the gain on dissolution of our GBO preclinical collaboration and higher interest income related to higher cash balances in the 2018 period.

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Comparison of the Six Months Ended June 30, 2018 and 2017

	Six Months ended June 30,		
	2018	2017	Change
Revenue	$ 1,049,000	$ 534,000	$ 515,000
Operating expenses:			
General and administrative	3,943,000	3,895,000	(48,000)
Research and development	8,647,000	9,500,000	853,000
Total operating expenses	12,590,000	13,395,000	805,000
Loss from operations	(11,541,000)	(12,861,000)	1,320,000
Gain on dissolution of GBO	693,000	—	693,000
Change in fair value of warrant liability	1,325,000	1,925,000	(600,000)
Other income (expense), net	112,000	11,000	101,000
Net loss	$ (9,411,000)	$ (10,925,000)	$ 1,514,000

Revenues

Revenues increased by $0.5 million for the six months ended June 30, 2018 when compared to the same period in 2017 primarily as a result the recognition of revenue from license agreements with HanX and Pint during the 2018 period, partially offset by less clinical supply revenue from SymBio in the 2018 period.

General and administrative expenses

General and administrative expenses were approximately the same for the six months ended June 30, 2018 as for the six months ended June 30, 2017 at $3.9 million. Increases of $0.1 million of personnel costs related to higher bonus expense and $0.2 million in higher investor outreach costs were offset by

$0.3 million lower stock compensation expense due to the completion of vesting of 2013 grants in the 2017 period and lower grant date fair value for grants made more recently.

Research and development expenses

Research and development expenses decreased by $0.9 million, or 9%, to $8.6 million for the six months ended June 30, 2018 from $9.5 million for the six months ended June 30, 2017. This decrease was caused by a decrease of $0.5 million in clinical and consulting expenses, comprised of $0.9 million lower expenses on INSPIRE partially offset by $0.4 million of higher expenses in the 09-08 combination expansion study. The decrease was also caused by $0.8 million lower manufacturing costs due to timing of drug substance and drug product manufacturing, and lower stock compensation expense of $0.2 million, due to the completion of vesting of 2013 grants in the 2017 period and lower grant date fair values for grants made more recently. These decreases were partially offset by $0.6 million of higher personnel costs related to higher bonus expense.

Change in fair value of warrant liability

The change in fair value of the warrant liability was $1.3 million for the six months ended June 30, 2018 compared to $1.9 million for the six months ended June 30, 2017. The change in the fair value of the warrant liability in 2017 was caused by caused by the decrease in the fair market value of the warrants issued in our rights offering in 2016.

Other income (expense), net

Other income (expense), net, increased by $0.8 million for the six months ended June 30, 2018 compared to the six months ended June 30, 2017 due primarily to the gain on dissolution of our GBO preclinical collaboration and higher interest income related to higher cash balances in the 2018 period.

Financial Condition

Total assets increased $25.2 million, or approximately 507%, from $5 million at December 31, 2017 to $30.2 million at June 30, 2018. The increase in total assets was due primarily to stock offerings completed in February and April, 2018 totaling net proceeds of approximately $34.3 million. This increase in assets was partially offset by a decrease in cash as approximately $10 million was used in operations during the period. Total liabilities decreased from $15.8 million at December 31, 2017 to $14.3 million at June 30, 2018, a decrease of $1.6 million, primarily as a result of the decrease in the warrant liability since December 31, 2017, a reduction in accounts payable and accrued expenses, and our recognition of deferred revenue under our SymBio agreement. Total stockholders' equity increased from a stockholders' deficit of $10.9 million at December 31, 2017 to stockholders' equity of $15.9 million at June 30, 2018, an increase of $26.8 million, or approximately 247%, primarily due to the stock offerings completed in the 2018 period, partially offset by a net loss of $9.6 million for the six months ended June 30, 2018.

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Liquidity and Capital Resources

Since our inception, we have incurred net losses and experienced negative cash flows from our operations. We incurred net losses of $9.4 million and $10.9 million for the six months ended June 30, 2018 and 2017, respectively. Our operating activities used $10.1 million and $11.7 million of net cash during the six months ended June 30, 2018 and 2017, respectively. At June 30, 2018, we had an accumulated deficit of $370.9 million, working capital of $20.2 million, and cash and cash equivalents of $29.5 million. We believe that our cash and cash equivalents will be sufficient to fund our ongoing trials and operations into the fourth quarter of 2019.

Cash Flows

The following table summarizes our cash flows for the six months ended June 30, 2018 and 2017:

	Six Months ended June 30,	
	2018	2017
Net cash (used in) provided by:		
Operating activities	$ (10,133,000)	$ (11,749,000)
Investing activities	—	—
Financing activities	35,657,000	5,317,000
Effect of foreign currency translation	(8,000)	21,000
Net decrease in cash and cash equivalents	$ 25,516,000	$ (6,411,000)

Net cash used in operating activities

Net cash used in operating activities was $10.1 million for the six months ended June 30, 2018 and consisted primarily of a net loss of $9.4 million, including a favorable change in fair value of warrant liability of $1.3 million, partially offset by $0.6 million of noncash stock-based compensation and depreciation expense. Changes in operating assets and liabilities resulted in a net increase in cash of $0.7 million. Significant changes in operating assets and liabilities included a decrease in prepaid expenses and other current assets of $0.3 million as a result of prepayments of fees to our vendors relating to clinical trial contracts. Accounts payable and accrued liabilities increased by $0.7 million as a result of the timing of receipt and payment of vendor invoices and the write-off of liabilities of our GBO preclinical collaboration. Deferred revenue decreased $0.2 million due to recognition of the unamortized portion of the upfront payment under our collaboration agreement with SymBio.

Net cash provided by investing activities

There was no net cash provided by or used in investing activities for the six months ended June 30, 2018 or 2017.

Net cash provided by financing activities

Net cash provided by financing activities for the six months ended June 30, 2017 was $35.7 million, which resulted from the proceeds received from the sale of common stock and exercise of warrants. Net cash provided by financing activities for the six months ended June 30, 2017 was $5.3 million resulting from the issuance of common stock in April, 2017.

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Operating and Capital Expenditure Requirements

We believe that our cash and cash equivalents will be sufficient to fund our ongoing trials and operations into the fourth quarter of 2019. We are exploring various dilutive and non-dilutive sources of funding, including equity and debt financings, strategic alliances, business development and other sources. If we are unable to obtain additional funding, we may not be able to continue as a going concern and may be forced to curtail all of our activities and, ultimately, potentially cease operations. If we are unable to raise sufficient additional funding, we will not have sufficient cash flows and liquidity to fund our planned business operations, and may be forced to limit many, if not all, of our programs and consider other means of creating value for our stockholders, such as licensing to others the development and commercialization of products that we consider valuable and would otherwise likely develop ourselves. Even if we are able to raise additional capital, such financings may only be available on unattractive terms, or could result in significant dilution of stockholders' interests. The consolidated financial statements do not include any adjustments relating to recoverability and classification of recorded asset amounts or the amounts and classification of liabilities that might be necessary should we be unable to continue in existence.

We have not achieved profitability since our inception and we expect to continue to incur net losses for the foreseeable future. We expect our net cash expenditures in 2018 to be comparable to 2017. We will incur substantial costs beyond the present and planned clinical trials in order to file a New Drug Application (NDA) for rigosertib. The nature, design, size and cost of further studies will depend in large part on the outcome of preceding studies and discussions with regulators.

For additional risks, please see "Risk Factors" in this 10-Q and previously disclosed in our annual report on Form 10-K filed with the SEC on March 16, 2018.

Item 3. Quantitative and Qualitative Disclosures About Market Risk

As a smaller reporting company, the Company is not required to provide the information otherwise required by this Item.

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Item 4. Controls and Procedures

Managements' Evaluation of our Disclosure Controls and Procedures

Our management, with the participation of our principal executive and principal financial officers, evaluated the effectiveness of our disclosure controls and procedures as of June 30, 2018. The term "disclosure controls and procedures," as defined in Rules 13a-15(e) and 15d-15(e) promulgated under the Securities Exchange Act of 1934, as amended (the "Exchange Act"), means controls and other procedures of a company that are designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the SEC's rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is accumulated and communicated to the company's management, including its principal executive and principal financial officers, as appropriate to allow timely decisions regarding required disclosure. Based on the evaluation of our disclosure controls and procedures as of June 30, 2018, our principal executive and principal financial officers concluded that, as of such date, our disclosure controls and procedures were effective.

Changes in Internal Control Over Financial Reporting

Our management, with the participation of our principal executive and principal financial officers, evaluated any changes in our internal control over financial reporting (as such term is defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) that occurred during our most recently completed fiscal quarter. Based on that evaluation, our principal executive and principal financial officers concluded that no change in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) occurred during the fiscal quarter ended June 30, 2018 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

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PART II — OTHER INFORMATION

Item 1. Legal Proceedings

We are not party to any pending material legal proceedings and are not aware of any such proceedings contemplated by governmental authorities.

Item 1A. Risk Factors

The following risk factor should be read in conjunction with the "Risk Factors" previously disclosed in our annual report on Form 10-K filed with the SEC on March 16, 2018.

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

On May 7, 2018, the Company received a letter from The Nasdaq Stock Market LLC ("Nasdaq") indicating that the Company has failed to comply with the minimum bid price requirement of Nasdaq Listing Rule 5550(a)(2). Nasdaq Listing Rule 5550(a) (2) requires that companies listed on the Nasdaq Capital Market maintain a minimum closing bid price of at least $1.00 per share.

Under Nasdaq Listing Rule 5810(c)(3)(A), the Company has a 180 calendar day grace period, or until November 5, 2018, to regain compliance by meeting the continued listing standard. The continued listing standard will be met if the Company's common stock has a minimum closing bid price of at least $1.00 per share for a minimum of ten consecutive business days during the 180 calendar day grace period.

If the Company is not in compliance by November 5, 2018, the Company may be afforded a second 180 calendar day period to regain compliance. To qualify, the Company would be required to meet the continued listing requirement for market value of publicly held shares and all other initial listing standards for The Nasdaq Capital Market, except for the minimum bid price requirement. In addition, the Company would be required to notify Nasdaq of its intention to cure the minimum bid price deficiency during the second compliance period, by effecting a reverse stock split, if necessary.

At the Company's Annual Meeting of Stockholders on June 27, 2018, the Company's stockholders approved a proposal to amend the Company's Tenth Amended and Restated Certificate of Incorporation, as amended, to effect a reverse stock split of its common stock, par value $0.01 per share, at a ratio of between 1 for 5 and 1 for 15, with the Company's Board of Directors having the sole discretion to effect the reverse stock split at any time within 90 days after the Annual Meeting, to fix the specific ratio for the reverse stock split so long as it is within the range approved by the stockholders, and to abandon the amendment prior to its effectiveness.

If the Company does not regain compliance within the allotted compliance period(s), including any extensions that may be granted by Nasdaq, Nasdaq will provide notice that the Company's common stock will be subject to delisting. At that time, the Company may appeal the Nasdaq Staff's determination to a Hearings Panel.

The Company intends to monitor the closing bid price of the Company's common stock and consider its available options to resolve the noncompliance with the minimum bid price requirement. No determination regarding the Company's response has been made at this time. There can be no assurance however that the Company will be able to regain compliance with the minimum bid price requirement or will otherwise be in compliance with other Nasdaq listing criteria. If the Company's securities are delisted, it could be more difficult to buy or sell the Company's securities and to obtain accurate quotations, and the price of the Company's securities could suffer a material decline. Delisting could also impair the Company's liquidity and ability to raise capital.

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Item 2. Unregistered Sales of Equity Securities and Use of Proceeds

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

On March 26, 2018, the Company agreed to issue to World Wide Holdings, LLC d/b/a Invictus Resources ("Invictus"), in connection with that certain Master Services Agreement between the Company and Invictus, warrants for Common Stock. The warrants issuable as of March 26, 2018 are exercisable for (i) 75,000 shares of common stock at a price of $0.94 per share of Common Stock and (ii) 125,000 shares of common stock at a price of $1.41 per share of common stock. On June 13, 2018, in consideration of an extension of services by Invictus, the Company issued additional warrants to Invictus, exercisable for 225,000 shares of common stock at a price of $0.52 per share. The sale of such securities to Invictus was not registered under the Securities Act because it was made in a transaction exempt from registration under Section 4(a)(2) of the Securities Act and/or Rule 506 promulgated thereunder..

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

Item 3. Defaults Upon Senior Securities

Not applicable.

Item 4. Mine Safety Disclosures

Not applicable.

Item 5. Other Information

Not applicable.

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Item 6. Exhibits

Exhibit Number	Description
3.1	Certificate of Designation of Series B Convertible Preferred Stock (Incorporated by reference to Exhibit 3.1 to the Company's Current Report on Form 8-K filed on April 30, 2018).
3.2	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)
4.1	Form of Preferred Stock Warrant issued as of May 1, 2018 (Incorporated by reference to Exhibit 4.1 to the Company's Current Report on Form 8-K filed on April 30, 2018).
4.3	Form of Pre-Funded Warrant issued as of May 1, 2018 (Incorporated by reference to Exhibit 4.2 to the Company's Current Report on Form 8-K filed on Aril 30, 2018).
10.1	Form of Lock-Up Waiver Agreement, dated as of April 16, 2018, by and among the Company, H.C. Wainwright & Co., LLC and each of the warrantholders identified on the signature pages thereto (Incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on Aril 30, 2018).
10.2	Amended and Restated Employment Agreement, effective as of June 19, 2018, by and between the Company and Steven M. Fruchtman, M.D.
10.3	Onconova Therapeutics, Inc. 2018 Omnibus Incentive Compensation Plan, as approved by the stockholders (Incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on June 29, 2018).
10.4	Form of Nonqualified Stock Option Award Agreement under the Onconova Therapeutics, Inc. 2018 Omnibus Incentive Compensation Plan (Incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed on July 30, 2018).
31.1	Rule 13a-14(a)/15d-14(a) Certifications of Principal Executive Officer
31.2	Rule 13a-14(a)/15d-14(a) Certifications of Principal Financial Officer
32.1	Section 1350 Certifications of Principal Executive Officer
32.2	Section 1350 Certifications of Principal Financial Officer
101.INS	XBRL Instance
101.SCH	XBRL Taxonomy Extension Schema Document
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF	XBRL Taxonomy Extension Calculation Linkbase Document
101.LAB	XBRL Taxonomy Extension Labels Linkbase Document
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document

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101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF	XBRL Taxonomy Extension Calculation Linkbase Document
101.LAB	XBRL Taxonomy Extension Labels Linkbase Document
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned thereunto duly authorized.

ONCONOVA THERAPEUTICS, INC.

Dated: August 14, 2018

/s/ RAMESH KUMAR, Ph.D.
Ramesh Kumar, Ph.D.
Chief Executive Officer
(*Principal Executive Officer*)

Dated: August14, 2018

/s/ MARK GUERIN
Mark Guerin
Chief Financial Officer
(*Principal Financial Officer*)

AMENDED AND RESTATED EMPLOYMENT AGREEMENT

This Amended and Restated Employment Agreement (the "Agreement") is effective as of June 19, 2018 (the "Effective Date") between Onconova Therapeutics, Inc., a Delaware corporation (the "Company") and Steven Fruchtman, M.D. ("Employee").

WHEREAS, Employee is currently employed by the Company pursuant to the terms of an Amended and Restated Employment Agreement dated July 1, 2015 (the "Prior Agreement"); and

WHEREAS, the Company desires to continue to employ Employee and Employee desires to continue to be so employed by the Company upon the terms and conditions hereinafter set forth.

NOW, THEREFORE, in consideration of the mutual promises and undertakings herein contained, and intending to be legally bound hereby, the parties hereto agree as follows:

1. Duration of Agreement. This Agreement is effective on the date set forth above and has no specific expiration date. Unless terminated or amended in writing by the parties, this Agreement will govern Employee's continued employment by the Company until that employment ceases in accordance with Section 4 hereof.

2. Duties. Subject to all the terms and conditions hereof, the Company shall employ Employee, and Employee shall serve the Company as President. Employee, as President, will be invited to attend all meetings, other than non-management executive sessions, of the Board of Directors of the Company (the "Board"). Until a permanent replacement is hired to assume Employee's duties and responsibilities as Chief Medical Officer and/or Senior Vice President, Research and Development, or an interim replacement is hired who, following a period of time, and based on performance, assumes the responsibilities of Chief Medical Officer and/or Vice President, Research & Development, Employee also shall continue to maintain the responsibilities of Chief Medical Officer and Vice President, Research and Development, as applicable, and provide sufficient guidance to any such interim replacement in his role as President. Employee will seek to transfer the role of Vice President, Research and Development in a commercially reasonable manner subsequent to approval of this Agreement. Employee shall report directly to the Chief Executive Officer of the Company. As Employee's position is a full-time position, Employee agrees to devote Employee's effort of 100% from the Company's Newtown, Pennsylvania office or from offsite, as appropriate, to this position and to the promotion of the business and interests of the Company. Employee will not render any professional services or engage in any activity that might be competitive with, adverse to the best interest of, or create the appearance of a conflict of interest with the Company. Employee agrees to abide by the policies, rules and regulations of the Company as they may be amended from time to time. Employee may not engage in outside employment or consulting without first obtaining prior express permission from the Board.

3. Compensation and Other Benefits.

(a) Salary. For all services rendered by Employee under this Agreement, the Company agrees to pay Employee a base salary at an initial annualized rate of

Five Hundred and Ten Thousand Dollars ($510,000) (the "Base Salary"), in installments in accordance with the Company's normal payroll cycle.

(b) Annual Bonus. During the term of this Agreement, in addition to his other remuneration, Employee shall be eligible to receive an annual bonus (the "Bonus"), based on the performance of Employee and the Company. The determination of such performance and the amount of the Bonus, if any, shall be at the sole discretion of the Compensation Committee (the "Compensation Committee") of the Board but shall not exceed fifty percent (50%) of Employee's Base Salary (the "Target Bonus"). In the event that Employee has earned a Bonus for a particular year, such Bonus shall be paid to Employee in the form of cash, stock options, shares of the Company's common stock ("Common Stock"), or a combination thereof, at the Compensation Committee's discretion between January 1 and March 15 of the year following the end of such year.

(c) Equity Awards. Subject to approval of the Onconova Therapeutics, Inc. 2018 Omnibus Incentive Compensation Plan (the "Plan") by the Company's stockholders, which is expected to occur on June 27, 2018, the Company will grant Employee a stock option to purchase 300,000 shares of Common Stock pursuant to the terms of the Plan and the Company's standard form of stock option grant agreement evidencing the terms and conditions of the grant ("Initial Option"). The number of shares of Common Stock subject to the Initial Option will be proportionately adjusted if a reverse stock split of the Common Stock is effected before the date the Initial Option is granted. In addition, during the term of this Agreement, Employee shall be eligible to receive an annual option award under the Plan (or its successor), based on the performance of Employee and the Company. The determination of such performance and the number of shares subject to any such stock option shall be at the sole discretion of the Compensation Committee.

(d) Signing Bonus. The Company shall pay Employee a signing bonus in the aggregate amount of Two Hundred Thousand Dollars ($200,000) (the "Signing Bonus"). The Signing Bonus will be paid in a lump sum immediately upon execution of this Agreement. Employee will be required to repay the full amount of the Signing Bonus if, prior to the first anniversary of the Effective Date, Employee's employment terminates for any reason other than (i) by Employee in accordance with 4(d) below, (ii) by the Company without Cause (as defined below), (iii) by Employee for Good Reason (as defined below), (iv) upon the Employee's death or (v) by the Company due to Employee's Disability (as defined below).

(e) Employee Benefits. During the term of this Agreement, Employee shall be entitled to participate in any employee benefit plans or programs of the Company that are made generally available from time to time by the Company to similarly situated employees, including but not limited to health insurance, a flexible spending account, and 401(k) participation. Nothing in this Agreement shall preclude the Company or any affiliate of the Company from terminating or amending any employee benefit plan or program from time to time after the Effective Date.

(f) Vacation and Holidays. During Employee's employment hereunder, Employee shall be entitled each year to four (4) weeks of vacation, and to those

holidays observed by the Company. Vacation shall be taken by Employee at such time or times as are mutually convenient to Employee and the Company.

(g) Reimbursement of Expenses. The Company shall provide or reimburse Employee for a smart phone to use for Company business. In addition, the Company shall reimburse Employee for all reasonable expenses incurred by Employee in connection with his employment hereunder provided, however, that such expenses were incurred in conformance with the policies of the Company, as established from time to time, and that Employee submits detailed vouchers and other records reasonably required by the Company in support of the amount and nature of such expense. Expenses for a car service or a rented car from and to the Princeton Junction or Hamilton train stations to the Onconova Office will be reimbursed or provided.

(h) Taxes and Withholding. All compensation payable and other benefits provided under this Agreement shall be subject to customary and legally required withholding for income, F.I.C.A., and other employment taxes. Employee shall bear all expense of, and be solely responsible for, all federal, state and local taxes due with respect to any payment received under this Agreement.

(i) Attorneys' Fees. The Company shall pay or reimburse Employee up to $10,000 for reasonable attorneys' fees incurred by Employee in connection with the review, negotiation and documentation of this Agreement, within thirty (30) days following presentation of appropriate receipts for such fees.

4. Termination of Employment.

(a) Death of Employee. If Employee dies during the term of this Agreement, this Agreement shall terminate immediately and the Company shall pay to Employee's then-current spouse, if she survives him, or if not, to his estate, the balance of his accrued and unpaid Base Salary, unreimbursed expenses, and his unused accrued vacation time through the termination date.

(b) Disability of Employee. If Employee is unable to perform his full-time regular duties by reason of incapacity, either physical or mental, for a period of twelve (12) consecutive weeks or ninety (90) days within any twelve (12) month period ("Disability"), the Company shall have the right to terminate Employee's employment upon written notice to Employee. If the Company decides to terminate Employee's employment under this Section 4(b), the Company shall pay to Employee only the balance of his accrued and unpaid Base Salary, unreimbursed expenses, and his unused, accrued vacation time through the termination date. If the Company decides not to terminate Employee's employment as allowed under this Section, the Company shall have the option of reducing the Base Salary thereafter payable to Employee by the amount of payment Employee receives pursuant to any disability insurance policy or program.

(c) Termination for Cause. If Employee's employment is terminated by the Company for "Cause," as defined below, the Company shall pay Employee only the balance of his accrued, but unpaid Base Salary, unreimbursed expenses, and his unused, accrued

vacation time through the termination date**.** The Company shall have the right to set off any amounts due to Employee by any amounts owed by Employee to the Company at the time Employee's employment terminates, and Employee hereby authorizes the Company to make this setoff. Employee's employment may be terminated for "Cause" at any time upon delivery of written notice to Employee.

(d) Management Change. In the event that the Company appoints a new Chief Executive Officer other than Employee at any time during the term of this Agreement and Employee voluntarily resigns within three (3) months following such appointment upon not less than thirty (30) days' notice to the Company, the Company shall:

(i) pay to Employee the balance of his accrued, but unpaid Base Salary, unreimbursed expenses, and his unused, accrued vacation time through the termination date;

(ii) pay to Employee monthly severance payments equal to one-twelfth of Employee's then current Base Salary, which severance payments shall be paid for the duration of the Severance Period (as defined below), in accordance with the Company's usual payroll practices, commencing within sixty (60) days following the termination date, subject to the six (6) month delay set forth in Section 17(b) below, and the first payment shall include any unpaid installments from the termination date until the first payment date; and

(iii) cause any outstanding unvested options to purchase shares of Common Stock of the Company previously awarded to Employee to become fully vested as of the date of his termination of employment pursuant to this Section 4(d).

(e) Termination by the Company without Cause or by Employee for Good Reason. If Employee's employment by the Company ceases due to a termination by the Company without Cause or a resignation by Employee for Good Reason, the Company shall:

(i) pay to Employee the balance of his accrued, but unpaid Base Salary, unreimbursed expenses, and his unused, accrued vacation time through the termination date;

(ii) to the extent then approved, accrued and unpaid, pay to Employee the annual Bonus (if any) with respect to the fiscal year ended immediately prior to the cessation of Employee's employment, which such Bonus shall be paid at the time such Bonus would have otherwise been paid absent Employee's cessation of employment;

(iii) pay to Employee,

(1) in the event Employee's employment by the Company ceases due to a termination by the Company without Cause or by Employee for Good Reason other than during the Change in Control Protection Period (as defined below), monthly severance payments equal to one-twelfth of the sum of (A) Employee's then current Base Salary, and (B) an amount equal to the Target Bonus for the fiscal year during which Employee's employment by the Company ceases, as determined in good faith by the Compensation Committee, which severance payments shall be paid for the duration of the Severance Period in

accordance with the Company's usual payroll practices, commencing within sixty (60) days following the termination date, subject to the six (6) month delay set forth in Section 17(b) below, and the first payment shall include any unpaid installments from the termination date until the first payment date; or

(2) in the event Employee's employment by the Company ceases due to a termination by the Company without Cause or by Employee for Good Reason during the Change in Control Protection Period, a severance payment amount equal to (A) the sum of Employee's then current Base Salary plus (B) an amount equal to the Target Bonus for the fiscal year during which Employee's employment by the Company ceases, as determined in good faith by the Compensation Committee, in a lump sum payment within sixty (60) days following the termination date; subject to the six (6) month delay set forth in Section 17(b) below, provided that such payment shall be made in installments as set forth in Section 4(e)(iii)(1) above if the Change in Control is not a "change in control event" as defined under Section 409A of the Internal Revenue Code of 1986, as amended (the "Code");

(iv) cause any outstanding unvested options to purchase shares of Common Stock of the Company previously awarded to Employee to become fully vested as of the date of his termination of employment pursuant to this Section 4(e); and

(v) if Employee validly elects to receive continuation coverage under the Company's group health plan pursuant to the Consolidated Omnibus Budget Reconciliation Act of 1985 ("COBRA"), reimburse Employee for a portion of the applicable premium payable for such COBRA continuation coverage for the duration of the Severance Period in an amount equal to the employer's portion of such premiums at the rate in effect on Employee's termination date; *provided*, *however*, that if the Company determines that it cannot continue to provide Employee with such benefit (either pursuant to the terms of the applicable group health plan, as a result of applicable law, or otherwise), the Company shall make supplemental monthly severance payments to Employee in an amount equal to the monthly amount the Company would have otherwise reimbursed to Employee for his participation in such group health plan for the duration of the Severance Period.

Except as otherwise provided in this Section 4, all compensation and benefits will cease at the time of Employee's cessation of employment and the Company will have no further liability or obligation by reason of such cessation of employment. The payments and benefits set forth in Sections 4(d)(ii) and (iii) and 4(e)(iii), (iv) and (v) shall only be paid if Employee signs and does not revoke a release and waiver of claims in a form approved by the Company.

(f) Voluntary Resignation. Employee may voluntarily resign from his employment with the Company at any time. In the event Employee voluntarily resigns from his employment with the Company (other than in accordance with Section 4(d)), Employee shall provide the Company with at least thirty (30) days' notice of his intent to resign. The Company shall pay Employee only the balance of his accrued, but unpaid Base Salary, unreimbursed expenses, and his unused, accrued vacation time through Employee's last day of work.

(g) Definitions. For purposes of this Agreement:

(i) "Cause" shall mean the occurrence of any of the following events: (1) any gross failure on the part of Employee (other than by reason of Disability as provided in Section 4(b)) to faithfully and professionally carry out his duties or to comply with any other material provision of this Agreement, which failure continues after written notice thereof by the Company, provided that the Company shall not be required to provide such notice in the event that such failure (A) is not susceptible to remedy or (B) relates to the same type of acts or omissions as to which such notice has been given on a prior occasion; (2) Employee's dishonesty (which shall include without limitation any misuse or misappropriation of the Company's assets), or other willful misconduct (including without limitation any conduct on the part of Employee intended to or likely to injure the business of the Company); (3) Employee's conviction for any felony or for any other crime involving moral turpitude, whether or not relating to his employment; (4) in accordance with applicable federal, state or local laws, Employee's insobriety or use of illegal drugs, chemicals or controlled substances either (A) in the course of performing his duties and responsibilities under this Agreement, or (B) otherwise affecting the ability of Employee to perform the same; (5) Employee's failure to comply with a lawful written direction of the Company; or (6) any wanton and willful dereliction of duties by Employee. The existence of any of the foregoing events or conditions shall be determined by the Company in the exercise of its reasonable judgment.

(ii) "Change in Control" shall be deemed to have occurred if:

(1) the acquisition, directly or indirectly, by a "person" (within the meaning of Section 13(d)(3) of the Securities Exchange Act of 1934, as amended) (a "Person") of beneficial ownership (within the meaning of Rule 13d-3 promulgated under the Securities Exchange Act of 1934, as amended) of more than 50% of the combined voting power of the voting securities of the Company entitled to vote generally in the election of directors (the "Voting Securities"); provided, however, that the following acquisitions of Voting Securities shall not constitute a Change in Control: (A) any acquisition by or from the Company or any of its subsidiaries, or by any employee benefit plan (or related trust) sponsored or maintained by the Company or any of its subsidiaries, (B) any acquisition by any underwriter in any firm commitment underwriting of securities to be issued by the Company, or (C) any acquisition by any corporation (or other entity) if, immediately following such acquisition, 50% or more of the then outstanding shares of common stock (or other equity unit) of such corporation (or other entity) and the combined voting power of the then outstanding voting securities of such corporation (or other entity), are beneficially owned, directly or indirectly, by all or substantially all of the individuals or entities who, immediately prior to such acquisition, were the beneficial owners of the then outstanding shares of Common Stock and the Voting Securities in substantially the same proportions, respectively, as their ownership immediately prior to the acquisition of the shares of Common Stock and Voting Securities; or

(2) the consummation of the sale or other disposition of all or substantially all of the assets of the Company, other than to a wholly-owned subsidiary of the Company or to a holding company of which the Company is a direct or indirect wholly owned subsidiary prior to such transaction; or

(3) the consummation of a reorganization, merger or consolidation of the Company, other than a reorganization, merger or consolidation, which

would result in the Voting Securities outstanding immediately prior to the transaction continuing to represent (whether by remaining outstanding or by being converted to voting securities of the surviving entity) 65% or more of the Voting Securities or the voting power of the voting securities of such surviving entity outstanding immediately after such transaction; or

(4) the consummation of a plan of complete liquidation of the Company; or

(5) the following individuals cease for any reason to constitute a majority of the Board: individuals who, as of the effective date of the Plan, constitute the Board and any new director (other than a director whose initial assumption of office is in connection with an actual or threatened election contest, including, but not limited to, a consent solicitation relating to the election of directors of the Company) whose appointment or election by the Board or nomination for election by the Company's stockholders was approved and recommended by a vote of at least two-thirds of the directors then still in office who either were directors on the effective date of the Plan or whose appointment, election or nomination for election was previously so approved or recommended.

(iii) "Change in Control Protection Period" shall mean the twelve (12) month period following a Change in Control.

(iv) "Good Reason" shall mean: (1) the breach by the Company of any material provision of this Agreement (provided, however, that a reduction in Employee's Base Salary by less than twenty percent (20%) in and for any twelve (12) month period shall not be a material breach by the Company if it is made in connection with a reduction in base salaries imposed on a majority of other senior executives of the Company and Employee's Base Salary is not reduced by a percentage that is greater than the percentage by which the base salary of a majority of other senior executives of the Company is reduced in and for that same twelve (12) month period); (2) a relocation of Employee's principal business location to a location more than fifty (50) miles from Employee's then-current business location; or (3) at any time there occurs any of the following which results in a material adverse change in Employee's duties, position, or compensation without the express prior written consent of Employee: (A) the sale or transfer, whether in one transaction or in a series of transactions, of substantially all of the assets of the Company; (B) the merger or consolidation of the Company with or into any other person or entity under circumstances where the Company is not the surviving entity in such merger or where persons having control of the Company immediately prior to the transaction are not in control of the Company immediately after the transaction. None of the foregoing events or conditions will constitute Good Reason unless Employee provides the Company with written objection to the event or condition within thirty (30) days following the occurrence thereof, the Company does not cure the event or condition within thirty (30) days of receiving that written objection, and Employee resigns his employment within thirty (30) days following the expiration of that cure period.

(v) "Severance Period" shall mean (i) the seven (7) month period immediately following the date Employee's employment with the Company ceases due to a termination by Employee in accordance with Section 4(d), (ii) the nine (9) month period immediately following the date Employee's employment with the Company ceases due to a

termination by the Company without Cause or by Employee for Good Reason other than during the Change in Control Protection Period or (iii) the twelve (12) month period immediately following the date Employee's employment with the Company ceases due to a termination by the Company without Cause or by Employee for Good Reason during the Change in Control Protection Period.

(h) Code Section 280G. It is the intention of Employee and of the Company that no payments by the Company to or for the benefit of Employee under this Agreement or any other agreement or plan, if any, pursuant to which Employee is entitled to receive payments or benefits shall be nondeductible to the Company by reason of the operation of Code Section 280G relating to parachute payments or any like statutory or regulatory provision. Accordingly, and notwithstanding any other provision of this Agreement or any such agreement or plan, if by reason of the operation of said Section 280G or any like statutory or regulatory provision, any such payments exceed the amount which can be deducted by the Company, such payments shall be reduced to the maximum amount which can be deducted by the Company. The Company shall make all reasonable efforts to avoid rendering such payments or benefits nondeductible. To the extent that payments exceeding such maximum deductible amount have been made to or for the benefit of Employee, such excess payments shall be refunded to the Company with interest thereon at the applicable Federal rate determined under Code Section 1274(d), compounded annually, or at such other rate as may be required in order that no such payments shall be nondeductible to the Company by reason of the operation of said Code Section 280G or any like statutory or regulatory provision. To the extent any such reduction in payments is necessary, any amounts subject to Code Section 409A will be reduced first, then to the extent any remaining reduction is necessary such further reduction shall occur to the payments or benefits in the order that results in the greatest economic present value of all payments actually made to Employee.

5. Non-Competition.

(a) For purposes of this Agreement, "Competitor" shall mean any person, company, or entity whose primary business at the time is, or whose then-current business plan contemplates engaging in activities which may be, competitive with products and services that were or were being designed, conceived, marketed, sold, distributed and/or developed by the Company during Employee's employment by the Company or at the time of termination of Employee's employment by the Company. For sake of clarity this would include products that would compete directly or indirectly with the Company's rigosertib molecule in all its forms directly focused on myelodysplastic syndrome (MDS).

(b) Employee agrees that so long as he is employed by the Company, and for a period of twelve (12) months after the termination of his employment for any reason whatsoever, he will not, directly or indirectly, whether for compensation or not, own, manage, operate, join, control, work for, or participate in, or be connected as a stockholder, officer, employee, partner, creditor, guarantor, advisor or otherwise, with a Competitor. The foregoing shall not be construed, however, as preventing Employee from investing his assets in such form or manner as will not require services on the part of Employee in the operations of the businesses in which such investments are made, provided that any such business is publicly owned and the interest of Employee therein is solely that of an investor owning not more than five percent (5%)

of the outstanding equity securities of any such business. Should Employee breach the provisions of this Section, the Company shall, in addition to any equitable or legal relief to which it is otherwise entitled, be entitled to cease all payments and benefits under the terms of this Agreement and shall be entitled to pursue all remedies it might have including, but not limited to, those contained in this Agreement.

(c) For the period of twelve (12) months after the termination of this Agreement for any reason whatsoever, Employee shall not hire, retain or engage as a director, officer, employee, agent or in any other capacity any person or persons who are employed by the Company or who were at any time (within a period of six (6) months immediately prior to the date of Employee's termination) employed by the Company or otherwise interfere with the relationship between such persons and the Company.

(d) If the period of time or area herein specified should be adjudged unreasonable in any court proceeding, then the period of time shall be reduced by such number of months or the area shall be reduced by elimination of such portion thereof as deemed unreasonable, so that this covenant may be enforced during such period of time and in such area as is adjudged to be reasonable.

6. Confidential Information.

(a) Subject to Section 6(f), at all times during Employee's employment and thereafter, Employee will hold in strictest confidence and will not disclose, use, lecture upon or publish any of the Company's Proprietary Information (defined below), except as such use may be required in connection with Employee's work for the Company, or unless an officer of the Company expressly authorizes such disclosure in writing. Employee will obtain Company's written approval before publishing or submitting for publication any material (written, verbal, or otherwise) that relates to Employee's work for Company and/or incorporates any Proprietary Information. Employee hereby assigns to the Company any rights Employee may have or acquire in such Proprietary Information and recognizes that all Proprietary Information shall be the sole property of the Company and its assigns.

(b) The term "Proprietary Information" shall mean any and all confidential and/or proprietary knowledge, data or information of the Company, whether acquired by Employee while employed by the Company, during Employee's prior service as a consultant to the Company, or otherwise. By way of illustration but not limitation, "Proprietary Information" includes but is not limited to (i) trade secrets, inventions, mask works, ideas, methods, processes, formulas, chemical structures and methods for chemical synthesis, structure-activity relationships, assay methodologies, characteristics, equipment and equipment designs, results, formulations and biological, pharmacological, toxicological and clinical data, physical, chemical or biological materials, source and object codes, data, programs, other works of authorship, know-how, improvements, discoveries, developments, compilations, shop practices, supplier lists, designs and techniques (hereinafter collectively referred to as "Inventions"); and (ii) information regarding plans for research, development, new products, marketing and selling, business plans, budgets and unpublished financial statements, licenses, prices and costs, suppliers and customers; and (iii) information regarding the skills and compensation of other employees of the Company. Notwithstanding the foregoing, it is understood that, at all times,

Employee is free to use information which is generally known in the trade or industry, which is not gained as a result of a breach of this Agreement, and which is acquired as a result of Employee's own skill, knowledge, know-how and experience.

(c) Employee understands, in addition, that the Company has received and in the future will receive from third parties confidential or proprietary information ("Third Party Information") subject to a duty on the Company's part to maintain the confidentiality of such information and to use it only for certain limited purposes. Subject to Section 6(f), during the period of Employee's employment and thereafter, Employee will hold Third Party Information in the strictest confidence and will not disclose to anyone (other than Company personnel who need to know such information in connection with their work for the Company) or use, except in connection with Employee's work for the Company, Third Party Information unless expressly authorized by an officer of the Company in writing.

(d) During Employee's employment by the Company, Employee will not improperly use or disclose any confidential information or trade secrets, if any, of any of his former employers or any other person to whom Employee has an obligation of confidentiality, and Employee will not bring onto the premises of the Company any unpublished documents or any property belonging to any former employer or any other person to whom Employee has an obligation of confidentiality, unless such action is consented to in writing by all persons to whom the relevant obligation of confidentiality is owed. Employee shall not work on Company projects on the grounds of, or using the equipment of, any third party, unless such work is agreed to by the Company in writing.

(e) Upon termination of his employment, Employee shall return to the Company all Proprietary Information in any tangible form in his possession, including copies thereof.

(f) Nothing in this Agreement shall prohibit or restrict Employee from initiating communications directly with, responding to any inquiries from, providing testimony before, providing confidential information to, reporting possible violations of law or regulation to, or from filing a claim or assisting with an investigation directly with a self-regulatory authority or a government agency or entity, including the U.S. Equal Employment Opportunity Commission, the Department of Labor, the National Labor Relations Board, the Department of Justice, the Securities and Exchange Commission, Congress, and any agency Inspector General (collectively, the "Regulators"), or from making other disclosures that are protected under the whistleblower provisions of state or federal law or regulation. Employee does not need the prior authorization of the Company to engage in such communications, respond to such inquiries, provide confidential information or documents to the Regulators, or make any such reports or disclosures to the Regulators. Employee is not required to notify the Company that Employee has engaged in such communications with the Regulators. If Employee is required by law to disclose Proprietary Information, other than to Regulators as described above, Employee shall give prompt written notice to the Company so as to permit the Company to protect its interests in confidentiality to the extent possible. Federal law provides criminal and civil immunity to federal and state claims for trade secret misappropriation to individuals who disclose a trade secret to their attorney, a court, or a government official in certain, confidential circumstances that are set forth at 18 U.S.C. §§ 1833(b)(1) and 1833(b)(2), related to the reporting or

investigation of a suspected violation of the law, or in connection with a lawsuit for retaliation for reporting a suspected violation of the law.

7. Company Right to Inventions.

(a) Inventions, if any, patented or unpatented, which Employee made prior to the commencement of Employee's employment with the Company are excluded from the scope of this Agreement. To preclude any possible uncertainty, Employee has provided on Appendix A (Previous Inventions) attached hereto a complete list of all Inventions that Employee has, alone or jointly with others, conceived, developed or reduced to practice or caused to be conceived, developed or reduced to practice prior to the commencement of Employee's employment with the Company, that Employee considers to be Employee's property or the property of third parties, and that Employee wishes to have excluded from the scope of this Agreement (collectively referred to as "Prior Inventions"). If disclosure of any such Prior Invention would cause Employee to violate any prior confidentiality agreement, Employee understands that Employee shall not list such Prior Inventions in Appendix A but shall only disclose a cursory name for each such invention (bearing in mind that where necessary the naming shall not be so specific as to violate the confidentiality obligation), a listing of the party(ies) to whom the invention belongs, and the fact that full disclosure as to such invention has not been made for that reason. Space is provided on Appendix A for this purpose. Notwithstanding the foregoing, Employee agrees that Employee will not incorporate, or permit to be incorporated, Prior Inventions in any Company Inventions without the Company's prior written consent and, furthermore, Employee shall not incorporate a Prior Invention into a Company product, process or machine without having the ability to make the grant set forth in the foregoing. If, in the course of Employee's employment with the Company, Employee incorporates a Prior Invention into a Company product, process or machine, the Company is hereby granted and shall have a nonexclusive, royalty-free, irrevocable, perpetual, worldwide license (with rights to sublicense through multiple tiers of sublicensees) to make, have made, modify, use, import, sell and offer to sell such Prior Invention.

(b) Employee agrees to assign and hereby does assign to the Company all of Employee's right, title and interest in and to any and all Inventions, whether or not patentable or registerable under patent, intellectual property, copyright or similar statutes, made or conceived or reduced to practice or learned by Employee, either alone or jointly with others, during the period of Employee's employment with the Company, including in the future (e.g., when any such Inventions are first reduced to practice or a description thereof first fixed in a tangible medium, as applicable). Inventions assigned to the Company pursuant to this Section 7(b) are hereinafter referred to as "Company Inventions."

(c) During the period of Employee's employment, Employee will promptly disclose to the Company fully and in writing all Inventions authored, conceived or reduced to practice by Employee, either alone or jointly with others. In addition, Employee will promptly disclose to the Company all patent applications filed by Employee or on Employee's behalf during Employee's employment and within one (1) year after termination of employment. At the time of each such disclosure, Employee will advise the Company in writing of any Inventions that Employee believes qualify for exclusion from Employee's obligation to

assign hereunder; and Employee will at that time provide to the Company in writing all evidence necessary to substantiate that belief.

(d) Employee acknowledges that all original works of authorship which are made by Employee (solely or jointly with others) within the scope of Employee's employment and which are protectable by copyright are "works made for hire," pursuant to United States Copyright Act (17 U.S.C. § 101).

(e) Employee will assist the Company in every proper way to obtain, and from time to time enforce, United States and foreign trade secret, patent, copyright, mask work and other intellectual property rights ("Proprietary Rights") relating to Company Inventions in any and all countries. To that end, Employee will execute, verify and deliver such documents and perform such other acts (including appearances as a witness) as the Company may reasonably request for use in applying for, obtaining, perfecting, evidencing, sustaining and enforcing such Proprietary Rights and the assignment thereof. In addition, Employee will execute, verify and deliver assignments of such Proprietary Rights to the Company, its successor in interest, or its designee. Employee's obligation to assist the Company with respect to Proprietary Rights relating to such Company Inventions in any and all countries shall continue beyond the termination of Employee's employment.

In the event the Company is unable for any reason, after reasonable effort, to secure Employee's signature on any document needed in connection with the actions specified in this Section 7(e), Employee hereby irrevocably designates and appoints the Company and its duly authorized officers and agents as Employee's agent and attorney-in-fact, which appointment is coupled with an interest, to act for and on Employee's behalf to execute, verify and file any such documents and to do all other lawfully permitted acts to further the purposes of the preceding paragraph with the same legal force and effect as if executed by Employee.

(f) Employee agrees to keep and maintain adequate and current records (in the form of notes, sketches, drawings and in any other form that may be required by the Company) of all Proprietary Information developed by Employee and all Inventions made by Employee during the period of Employee's employment at the Company, which records shall be available to and remain the sole property of the Company at all times.

(g) Employee represents that Employee's performance of all the terms of this Agreement and as an employee of the Company does not and will not breach any agreement to keep in confidence information acquired by Employee in confidence or in trust prior to Employee's employment by the Company. Employee has not entered into, and Employee agrees that he will not enter into, any agreement either written or oral in conflict herewith.

8. Remedies. Because Employee's services are personal and unique and because Employee may have access to and become acquainted with the Proprietary Information of the Company, the Company shall have the right to enforce this Agreement and any of its provisions by injunction, or other equitable relief, without bond (if allowed by applicable law), and without prejudice to any other rights and remedies that the Company may have for a breach of this Agreement. In the event that Employee performs services for other entities while

employed by the Company or leaves the employ of the Company, Employee hereby consents to the notification of Employee's new employer of Employee's rights and obligations under this Agreement.

9. Arbitration. Any and all disputes between the parties (except actions to enforce the provisions of Sections 5, 6 or 7 of this Agreement), arising under or relating to this Agreement or any other dispute arising between the parties, including claims arising under any employment discrimination laws, shall be adjudicated and resolved exclusively through binding arbitration before the American Arbitration Association pursuant to the

American Arbitration Association's then-in-effect National Rules for the Resolution of Employment Disputes (hereafter "Rules"). The initiation and conduct of any arbitration hereunder shall be in accordance with the Rules and each side shall bear its own costs and counsel fees in such arbitration. Any arbitration hereunder shall be conducted in Philadelphia, Pennsylvania, and any arbitration award shall be final and binding on the Parties. The arbitrator shall have no authority to depart from, modify, or add to the written terms of this Agreement. The arbitration provisions of this Section 9 shall be interpreted according to, and governed by, the Federal Arbitration Act, 9 U.S.C. § 1 *et seq.*, and any action pursuant to such Act to enforce any rights hereunder shall be brought exclusively in the United States District Court for the Eastern District of Pennsylvania. The parties consent to the jurisdiction of (and the laying of venue in) such court.

10. General Indemnification. In the event the Employee is made, or threatened to be made, a party to any legal action or proceeding, whether civil or criminal, including any governmental or regulatory proceedings or investigations, by reason of the fact that the Employee is or was a director or officer of the Company or its affiliates, Employee shall be indemnified by the Company, and the Company shall pay Employee's related expenses when and as incurred, to the fullest extent permitted by the laws of the state of Delaware and the Company's articles of incorporation and bylaws. During Employee's employment with the Company and its affiliates and after termination of employment for any reason, the Company shall cover Employee under the Company's directors and officers insurance applicable to other officers and directors.

11. Severability. The terms of this Agreement and each Section hereof shall be considered severable and the invalidity or unenforceability of any part thereof shall not affect the validity or enforceability of the remaining portions or provisions hereof.

12. Notices. Any notice required or permitted to be given under this Agreement shall be sufficient, if in writing and delivered by registered or certified mail or overnight delivery service to his residence in the case of Employee, or to its principal office in the case of the Company.

13. Assignment. The rights and obligations of the Company under this Agreement shall inure to the benefit of and be binding upon its successors and assigns. Neither this Agreement nor any rights or interests herein or created hereby may be assigned or otherwise transferred voluntarily or involuntarily by Employee.

14. Waiver. The waiver by the Company or Employee of a breach of any provision of this Agreement by the other shall not operate or be construed as a waiver of any subsequent breach.

15. Applicable Law. This Agreement shall be interpreted and construed under the laws of the Commonwealth of Pennsylvania.

16. Entire Agreement; Prior Agreements. This instrument contains the entire agreement of the parties with respect to the subject matter hereof and supersedes any and all prior or contemporaneous agreements, oral or written, concerning the subject matter contained herein, including without limitation any prior agreements between the Company and Employee (including without limitation the Prior Agreement). It may not be changed or altered, except by an agreement in writing signed by the party against whom enforcement of any waiver, change, modification, extension or discharge is sought.

17. Code Section 409A.

(a) Notwithstanding anything herein to the contrary, this Agreement is intended to be interpreted and applied so that the payments and benefits set forth herein shall either be exempt from the requirements of Code Section 409A or shall comply with the requirements of Code Section 409A and, accordingly, to the maximum extent permitted, this Agreement shall be interpreted to be exempt from or in compliance with Code Section 409A. The parties hereto agree that the payments and benefits set forth herein comply with or are exempt from the requirements of Code Section 409A and agree not to take any position, and to cause their affiliates, successors and assigns not to take any position, inconsistent with such interpretation for any reporting purposes, whether internal or external.

(b) Notwithstanding anything in this Agreement or elsewhere to the contrary, a termination of employment shall not be deemed to have occurred for purposes of any provision of this Agreement providing for the payment of any amounts or benefits that constitute "non-qualified deferred compensation" within the meaning of Code Section 409A upon or following a termination of Employee's employment unless such termination is also a "separation from service" within the meaning of Code Section 409A and, for purposes of any such provision of this Agreement, references to a "termination," "termination of employment" or like terms shall mean "separation from service" and the date of such separation from service shall be treated as the date of termination for purposes of any such payment or benefits. Notwithstanding any other provision of this Agreement to the contrary, if Employee is a "specified employee" within the meaning of Code Section 409A and the regulations issued thereunder, and a payment or benefit provided for in this Agreement would be subject to additional tax under Code Section 409A if such payment or benefit is paid within six (6) months after Employee's "separation from service" (within the meaning of Code Section 409A), then such payment or benefit required under this Agreement shall not be paid (or commence) during the six-month period immediately following Employee's separation from service except as provided in the immediately following sentence. In such an event, any payments or benefits that would otherwise have been made or provided during such six-month period and which would have incurred such additional tax under Code Section 409A shall instead be paid to Employee in a lump-sum cash payment on the earlier of (i) the first regular payroll date of the seventh month

following Employee's separation from service or (ii) the 10th business day following Employee's death.

(c) It is intended that each installment of any severance payments and benefits provided under this Agreement shall be treated as a separate "payment" for purposes of Code Section 409A. Neither Employee nor the Company shall have the right to accelerate or defer the delivery of any such payments or benefits except to the extent specifically permitted or required by Code Section 409A. All reimbursements and in-kind benefits provided under this Agreement shall be made or provided in accordance with the requirements of Code Section 409A to the extent that such reimbursements or in-kind benefits are subject to Code Section 409A, including, where applicable, the requirements that (i) the amount of expenses eligible for reimbursement during a calendar year may not affect the expenses eligible for reimbursement in any other calendar year, (ii) the reimbursement of an eligible expense shall be made promptly and in all cases on or before the last day of the calendar year following the year in which the expense is incurred and (iii) the right to reimbursement

is not subject to set off or liquidation or exchange for any other benefit. Notwithstanding anything contained herein to the contrary, if the period in which any general waiver and release of claims may be executed overlaps two calendar years (regardless of when such release is actually executed), then, to the extent required by Code Section 409A, any payments that are subject to such general waiver and release of claims that would otherwise be made in such first calendar year shall instead be withheld and paid on the first normal payment date in the second calendar year with all remaining payments to be paid as if such delay had not occurred.

18. Recoupment Policy. Employee agrees that Employee will be subject to any compensation claw back, recoupment and anti-hedging policies that may be applicable to Employee as an executive of the Company, as in effect from time to time and as approved by the Board or a duly authorized committee thereof.

19. Counterparts. This Amendment may be executed in one or more counterparts, each of which shall for all purposes be deemed to be an original and all of which shall constitute the same instrument. Any and all counterparts may be executed by facsimile.

[*signature page follows*]

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the day and year first above written.

ONCONOVA THERAPEUTICS, INC.

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

STEVEN FRUCHTMAN, M.D.

/s/ Steven Fruchtman

APPENDIX A

TO: Ramesh Kumar, Ph.D.

FROM: Steven Fruchtman, M.D.

DATE: July 1, 2015

SUBJECT: PREVIOUS INVENTIONS

1. Except as listed in Section 2 below, the following is a complete list of all inventions or improvements relevant to the subject matter of my employment by Onconova Therapeutics, Inc. (the "Company") that have been made or conceived or first reduced to practice by me alone or jointly with others prior to my engagement by the Company:

x No inventions or improvements.

o See below:

o Additional sheet(s) attached.

2. Due to a prior confidentiality agreement, I cannot complete the disclosure under Section 1 above with respect to inventions or improvements generally listed below, the proprietary rights and duty of confidentiality with respect to which I owe to the following party(ies):

INVENTION OR IMPROVEMENT	PARTY(IES)	RELATIONSHIP
1.		
2.		
3.		
4.		
5.		
6.		

o Additional sheet(s) attached.

Exhibit 31.1

CERTIFICATION OF PRINCIPAL EXECUTIVE OFFICER PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Ramesh Kumar, certify that:

1. I have reviewed this quarterly report on Form 10-Q of Onconova Therapeutics, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

(a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

(b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

(c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

(d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

(a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

(b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Dated: August 14, 2018

/s/ Ramesh Kumar, Ph.D.
Ramesh Kumar, Ph.D.
Chief Executive Officer
(Principal Executive Officer)

Exhibit 31.2

CERTIFICATION OF PRINCIPAL FINANCIAL OFFICER PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Mark Guerin, certify that:

1. I have reviewed this quarterly report on Form 10-Q of Onconova Therapeutics, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

(a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

(b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

(c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

(d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

(a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

(b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Dated: August 14, 2018

/s/ Mark Guerin

Mark Guerin
Chief Financial Officer
(Principal Financial Officer)

Exhibit 32.1

CERTIFICATION OF PRINCIPAL EXECUTIVE OFFICER
PURSUANT TO 18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Quarterly Report of Onconova Therapeutics, Inc. (the "Company") on Form 10-Q for the period ended June 30, 2018, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Ramesh Kumar, Chief Executive Officer of the Company, certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that to my knowledge:

1. The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

2. That information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Dated: August 14, 2018

/s/ Ramesh Kumar, Ph.D
Ramesh Kumar, Ph.D.
Chief Executive Officer
(*Principal Executive Officer*)

The foregoing certification is being furnished solely to accompany the Report pursuant to 18 U.S.C. § 1350, and is not being filed for purposes of Section 18 of the Securities Exchange Act of 1934, as amended, and is not to be incorporated by reference into any filing of the Company, whether made before or after the date hereof, regardless of any general incorporation language in such filing.

Exhibit 32.2

CERTIFICATION OF PRINCIPAL FINANCIAL OFFICER
PURSUANT TO 18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Quarterly Report of Onconova Therapeutics, Inc. (the "Company") on Form 10-Q for the period ended June 30, 2018, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Mark Guerin, Chief Financial Officer of the Company, certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that to my knowledge:

1. The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

2. That information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Dated: August 14, 2018

/s/ Mark Guerin
Mark Guerin
Chief Financial Officer
(Principal Financial Officer)

The foregoing certification is being furnished solely to accompany the Report pursuant to 18 U.S.C. § 1350, and is not being filed for purposes of Section 18 of the Securities Exchange Act of 1934, as amended, and is not to be incorporated by reference into any filing of the Company, whether made before or after the date hereof, regardless of any general incorporation language in such filing.