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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 September 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 every Interactive Data File required to be submitted 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 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 x	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 November 1, 2018 was 5,674,220

ONCONOVA THERAPEUTICS, INC.

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FOR THE QUARTER ENDED SEPTEMBER 30, 2018

All common stock, equity, share and per share amounts have been retroactively adjusted to reflect a one-for-fifteen reverse stock split which was effective September 25, 2018.

PART I — FINANCIAL INFORMATION

Item 1. Financial Statements

Onconova Therapeutics, Inc.
Condensed Consolidated Balance Sheets

	September 30, 2018 (unaudited)	December 31, 2017
Assets		
Current assets:		
Cash and cash equivalents	$ 22,384,000	$ 4,024,000
Receivables	24,000	59,000
Prepaid expenses and other current assets	696,000	820,000
Total current assets	23,104,000	4,903,000
Property and equipment, net	20,000	64,000
Other non-current assets	12,000	12,000
Total assets	$ 23,136,000	$ 4,979,000
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable	$ 4,264,000	$ 6,186,000
Accrued expenses and other current liabilities	3,488,000	3,335,000
Deferred revenue	455,000	455,000
Total current liabilities	8,207,000	9,976,000
Warrant liability	319,000	1,773,000
Deferred revenue, non-current	3,750,000	4,091,000
Total liabilities	12,276,000	15,840,000
Commitments and contingencies		
Stockholders' equity:		
Preferred stock, $0.01 par value, 5,000,000 authorized at September 30, 2018 and December 31, 2017, none issued and outstanding at September 30, 2018 and December 31, 2017	—	—
Common stock, $0.01 par value, 250,000,000 and 25,000,000 authorized at September 30, 2018 and December 31, 2017, 5,674,220 and 718,078 shares issued and outstanding at September 30, 2018 and December 31, 2017	57,000	8,000
Additional paid in capital	387,055,000	350,614,000
Accumulated other comprehensive income	(7,000)	3,000
Accumulated deficit	(376,245,000)	(362,316,000)
Total Onconova Therapeutics, Inc. stockholders' equity (deficit)	10,860,000	(11,691,000)
Non-controlling interest	—	830,000
Total stockholders' equity (deficit)	10,860,000	(10,861,000)
Total liabilities and stockholders' equity (deficit)	$ 23,136,000	$ 4,979,000

See accompanying notes to condensed consolidated financial statements.

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

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
Revenue	$ 120,000	$ 110,000	$ 1,169,000	$ 644,000
Operating expenses:				
General and administrative	1,729,000	1,728,000	5,672,000	5,623,000
Research and development	3,985,000	5,141,000	12,632,000	14,641,000
Total operating expenses	5,714,000	6,869,000	18,304,000	20,264,000
Loss from operations	(5,594,000)	(6,759,000)	(17,135,000)	(19,620,000)
Gain on dissolution of GBO	—	—	693,000	—
Change in fair value of warrant liability	129,000	(210,000)	1,454,000	1,716,000
Other income, net	117,000	8,000	229,000	19,000
Net loss	(5,348,000)	(6,961,000)	(14,759,000)	(17,885,000)
Net loss attributable to non-controlling interest	—	—	(163,000)	—
Net loss attributable to Onconova Therapeutics, Inc.	$ (5,348,000)	$ (6,961,000)	$ (14,922,000)	$ (17,885,000)
Net loss per share, basic and diluted	$ (0.94)	$ (10.60)	$ (4.14)	$ (31.37)
Basic and diluted weighted average shares outstanding	5,674,125	656,744	3,601,679	570,123

See accompanying notes to condensed consolidated financial statements.

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

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
Net loss	$ (5,348,000)	$ (6,961,000)	$ (14,759,000)	$ (17,885,000)
Other comprehensive income (loss), before tax:				
Foreign currency translation adjustments, net	(2,000)	9,000	(10,000)	30,000
Other comprehensive income (loss), net of tax	(2,000)	9,000	(10,000)	30,000
Comprehensive loss	(5,350,000)	(6,952,000)	(14,769,000)	(17,855,000)
Comprehensive loss attributable to non-controlling interest	—	—	(163,000)	—
Comprehensive loss attributable to Onconova Therapeutics, Inc.	$ (5,350,000)	$ (6,952,000)	$ (14,932,000)	$ (17,855,000)

See accompanying notes to condensed consolidated financial statements.

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

	Stockholders' Equity (Deficit)						
	Common Stock		Additional Paid in Capital	Accumulated deficit	Accumulated other comprehensive income (loss)	Non-controlling interest	Total
	Shares	Amount					
Balance at December 31, 2017	718,078	$ 8,000	$ 350,614,000	$ (362,316,000)	$ 3,000	$ 830,000	$ (10,861,000)
Net loss	—	—	—	(14,922,000)	—	163,000	(14,759,000)
Other comprehensive loss	—	—	—	—	(10,000)	—	(10,000)
Stock-based compensation	—	—	833,000	—	—	—	833,000
Dissolution of GBO	—	—	—	993,000	—	(993,000)	—
Shares issued in connection with reverse stock split	101	—	—	—	—	—	—
Issuance of common stock and pre-funded warrants, net	4,215,581	42,000	35,026,000	—	—	—	35,068,000
Issuance of common stock upon exercise of warrants	740,460	7,000	582,000	—	—	—	589,000
Balance at September 30, 2018	5,674,220	$ 57,000	$ 387,055,000	$ (376,245,000)	$ (7,000)	$ —	$ 10,860,000

See accompanying notes to condensed consolidated financial statements.

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

	Nine Months ended September 30,	
	2018	2017
Operating activities:		
Net loss	$ (14,759,000)	$ (17,885,000)
Adjustment to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization	44,000	69,000
Change in fair value of warrant liabilities	(1,454,000)	(1,716,000)
Stock compensation expense	833,000	1,333,000
Gain on dissolution of GBO	(693,000)	—
Changes in assets and liabilities:		
Receivables	35,000	(26,000)
Prepaid expenses and other current assets	124,000	588,000
Accounts payable	(1,229,000)	113,000
Accrued expenses and other current liabilities	153,000	(1,283,000)
Deferred revenue	(341,000)	(340,000)
Net cash used in operating activities	(17,287,000)	(19,147,000)
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	(10,000)	30,000
Net increase (decrease) in cash and cash equivalents	18,360,000	(13,800,000)
Cash and cash equivalents at beginning of period	4,024,000	21,400,000
Cash and cash equivalents at end of period	$ 22,384,000	$ 7,600,000

See accompanying notes to condensed consolidated financial statements.

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

1. Nature of Business

Reverse Stock Split

All common stock, equity, share and per share amounts in the financial statements and notes have been retroactively adjusted to reflect a one-for-fifteen reverse stock split which was effective September 25, 2018.

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.

On September 25, 2018, the Company amended its certificate of incorporation to effect a one-for-fifteen reverse stock split of its common stock.

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

Liquidity

The Company has incurred recurring operating losses since inception. For the nine months ended September 30, 2018, the Company incurred a net loss of $14,759,000 and as of September 30, 2018 the Company had generated an accumulated deficit of $376,245,000. 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 September 30, 2018, the Company had cash and cash equivalents of $22,384,000. The Company will require substantial additional financing to fund its ongoing clinical trials and operations, and to continue to execute its strategy. These conditions raise substantial doubt about the Company's ability to continue as a going concern within one year after the date that the financial statements are issued.

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 39,611 shares of Common Stock, at a price of $2,250.00 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 165,079 shares of Common Stock. On May 17, 2017, the Company sold an additional 24,239 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 61,333 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 467,000 shares of common stock, pre-funded warrants to purchase 196,167 share of common stock, and preferred stock warrants to purchase shares of Series A convertible preferred stock convertible into 696,325 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 3,694,118 shares of common stock, pre-funded warrants to purchase 815,686 shares of common stock, and preferred stock warrants to purchase shares of Series B convertible preferred stock convertible into 4,509,804 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. Accordingly, management has concluded that substantial doubt exists with respect to the Company's ability to continue as a going concern within one year after the date that these financial statements are issued.

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 September 30, 2018, the condensed consolidated statements of operations and comprehensive loss for the three and nine months ended September 30, 2018 and 2017, the consolidated statement of stockholders' (deficit) equity for the nine months ended September 30, 2018 and the condensed consolidated statements of cash flows for the nine months ended September 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 September 30, 2018, the results of its operations for the three and nine months ended September 30, 2018 and 2017, and its cash flows for the nine months ended September 30, 2018 and 2017. The financial data and other information disclosed in these notes related to the three and nine months ended September 30, 2018 and 2017 are unaudited. The results for the three and nine months ended September 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.

Certain prior year amounts have been reclassified to conform to current period presentation. All common stock, equity, share and per share amounts in the financial statements and notes have been retroactively adjusted to reflect a one-for-fifteen reverse stock split which was effective September 25, 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.

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

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 from third parties 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.

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.

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 currently reviewing its leases and evaluating the impact of the adoption of the standard on its consolidated financial statements.

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 nine months ended September 30, 2018 and 2017 was from its license and collaboration agreements with SymBio, HanX and Pint (See Note 10).

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2018	2017	2018	2017
Symbio				
Upfront license fee recognition over time	$ 114,000	$ 110,000	$ 341,000	$ 337,000
Supplies	6,000	—	59,000	307,000
Hanx				
Upfront license payment regognized at a point in time	—	—	450,000	—
Pint				
Upfront license payment recognized at a point it time	—	—	319,000	—
	$ 120,000	$ 110,000	$ 1,169,000	$ 644,000

Deferred revenue is as follows:

	Symbio Upfront Payment
Deferred balance at December 31, 2017	$ 4,546,000
Recognition to revenue	341,000
Deferred balance at September 30, 2018	$ 4,205,000

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

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 September 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):

	September 30,	
	2018	2017
Warrants	5,725,506	219,651
Stock options	332,918	60,492
	6,058,424	280,143

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 nine months ended September 30, 2018 is as follows:

Description	Classification	Exercise Price	Expiration Date	Balance Decemeber 31, 2017	Warrants Issued	Warrants Exercised	Warrants Expired	Balance September 30, 2018
Non-tradable warrants	Liability	$ 172.50	July 2021	6,456	—	—	—	6,456
Tradable warrants	Liability	$ 73.80	July 2021	212,801	—	—	—	212,801
Non-tradable pre-funded warrants	Equity	$ 0.15	July 2023	394	—	—	—	394
Non-tradable warrants	Equity	$ 6.69375	*	—	663,167	—	—	663,167
Non-tradable warrants	Equity	$ 7.96875	*	—	33,158	—	—	33,158
Non-tradable warrants	Equity	$ 14.10	March 2021	—	5,000	—	—	5,000
Non-tradable warrants	Equity	$ 21.15	March 2021	—	8,333	—	—	8,333
Non-tradable warrants	Equity	$ 7.7895	June 2021	—	15,000	—	—	15,000
Non-tradable pre-funded warrants	Equity	$ 0.15	none	—	196,167	(110,000)	—	86,167
Non-tradable warrants	Equity	$ 6.375	**	—	4,509,804	(76,842)	—	4,432,962
Non-tradable pre-funded warrants	Equity	$ 0.15	none	—	815,686	(553,618)	—	262,068
				219,651	6,246,315	(740,460)	—	5,725,506

* 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.

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

6. Balance Sheet Detail

Prepaid expenses and other current assets:

	September 30, 2018	December 31, 2017
Research and development	$ 335,000	$ 514,000
Manufacturing	81,000	48,000
Insurance	177,000	181,000
Other	103,000	77,000
	$ 696,000	$ 820,000

Property and equipment:

	September 30, 2018	December 31, 2017
Property and equipment	$ 2,228,000	$ 2,228,000
Accumulated depreciation	(2,208,000)	(2,164,000)
	$ 20,000	$ 64,000

Accrued expenses and other current liabilities:

	September 30, 2018	December 31, 2017
Research and development	$ 2,102,000	$ 1,912,000
Employee compensation	1,195,000	1,258,000
Professional fees	191,000	165,000
	$ 3,488,000	$ 3,335,000

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

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 12,912 shares of Common Stock, at a purchase price of $142.50 per share and warrants to purchase up to 6,456 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 239,986 shares of Common Stock, 212,801 Tradable Warrants and 43,760 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 $73.80 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 $184.50 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 September 30, 2018.

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

Risk-free interest rate	2.88%
Expected volatility	78.94%
Expected term	2.78 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.

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 September 30, 2018 and December 31, 2017:

	Fair Value Measurement as of:							
	September 30, 2018				December 31, 2017			
	Level 1	Level 2	Level 3	Balance	Level 1	Level 2	Level 3	Balance
Tradable warrants liability	$ 318,000	$ —	$ —	$ 318,000	$ 1,755,000	$ —	$ —	$ 1,755,000
Non-tradable warrants liability	—	—	1,000	1,000	—	—	18,000	18,000
Total	$ 318,000	$ —	$ 1,000	$ 319,000	$ 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 nine months ended September 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
Change in fair value upon re-measurement	—
Balance at September 30, 2018	$ 1,000

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

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 40,719 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) 13,333 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 402,354, which is equal to the sum of (i) 400,000 shares of the Company's common stock, plus (ii) 2,354 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 September 30, 2018, there were 141,006 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 September 30, 2018 and 2017:

	Three Months ended September 30,		Nine Months ended September 30,	
	2018	2017	2018	2017
General and administrative	$ 159,000	$ 250,000	$ 420,000	$ 769,000
Research and development	136,000	181,000	363,000	563,000
	$ 295,000	$ 431,000	$ 783,000	$ 1,332,000

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 September 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	3,842	59,666	$ 855.30	6.72	$ 0
Authorized	413,333	—			
Granted	(283,405)	283,405	$ 8.01		
Exercised	—	—	$ —		
Forfeitures	10,153	(10,153)	$ 916.15		
Cancelled	(2,917)				
Balance, September 30, 2018	141,006	332,918	$ 87.52	9.33	$ 0
Vested or expected to vest, September 30, 2018		321,163	$ 540.62	6.94	$ 0
Exercisable at September 30, 2018		48,677	$ 540.62	6.94	$ 0

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

Exercise Price	Shares	Exercisable
$6.90 – $7.05	261,350	—
$16.35 – $97.50	50,901	28,948
$222.00 - $225.00	1,952	1,503
$348.00 – $597.00	4,962	4,539
$651.00 – $1,129.50	5,659	5,593
$1,992.00 - $2,268.00	7,738	7,738
$4,156.50 - $4,371.00	356	356
	332,918	48,677

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.

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

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 September 30, 2018, there was $1,767,000 of unrecognized compensation expense related to the unvested stock options issued from April 24, 2013 through September 30, 2018, which is expected to be recognized over a weighted-average period of approximately 2.39 years.

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

	Nine Months ended September 30,	
	2018	2017
Risk-free interest rate	2.86%	2.03%
Expected volatility	79.13%	79.06%
Expected term	5.92 years	6.00 years
Expected dividend yield	0%	0%
Weighted average grant date fair value	$ 5.31	$ 26.55

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.

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

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 September 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.

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

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.

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

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.

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

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 54,463 shares of common stock for $1,250,000. The total amount of the premium was $319,000 and this amount was allocated to the license.

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

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.

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

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 collaboration 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, resulting therefrom. Payments to Mount Sinai under this research agreement for the three months ended September 30, 2018 and 2017 were $88,000 and $88,000, respectively, and for the nine months ended September 30, 2018 and 2017 were $263,000 and $263,000, respectively. At September 30, 2018 and December 31, 2017, the Company had $88,000 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 September 30, 2018 and 2017 were $33,000 and $33,000, respectively, and for the nine months ended September 30, 2018 and 2017 were $99,000 and $99,000, respectively. At September 30, 2018 and December 31, 2017, the Company had $33,000 and $33,000, respectively, payable under this agreement.

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

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 5,645 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 666 shares of Common Stock on any business day, increasing to up to 1,666 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 $233.40. 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 1,333 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.

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 1,367 shares for net proceeds of approximately $64,000. 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 165,079 shares of Common Stock, at a price to the public of $31.50 per share. Pursuant to the underwriting agreement, the Company granted Laidlaw a 45-day option to purchase up to an additional 24,239 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 24,239 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 61,333 shares of the Company's common stock at a price of $22.50 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 380,500 shares of the Company's common stock and pre-funded warrants (the "February 2018 Pre-Funded Warrants") to purchase an aggregate of 196,167 shares of common stock. Each share of common stock or February 2018 Pre-Funded Warrant, as applicable, was sold as a unit with a warrant to purchase Series A Preferred Stock which is convertible to common stock (the "February 2018 Preferred Stock Warrants"). Each February 2018 Preferred Stock Warrant is for one-fifteenth of a share of common stock, on an as converted basis. The combined public offering price was $15.15 per common stock unit or $15.00 per February 2018 Pre-Funded Warrant unit.

The Company also granted HCW a 30-day option to purchase up to 86,500 additional shares of common stock at a purchase price of $15.00 per share and February 2018 Preferred Stock Warrants to purchase shares of Series A Preferred Stock convertible into 86,500 shares of common stock at a purchase price of $0.15 per February 2018 Preferred Stock Warrant, less the underwriting discounts and commissions. Prior to closing, HCW exercised this option in full.

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 shares of common stock or February 2018 Pre-Funded Warrants, as applicable, and the accompanying February 2018 Preferred Stock Warrants could only be purchased together as a unit in the offering but were issued as separate securities.

The February 2018 Pre-Funded Warrants are exercisable immediately at an exercise price of $0.15 per share, may be exercised until they are exercised in full, and may be exercised on a cashless basis in certain circumstances specified therein.

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 for Series A Preferred Stock at an exercise price of $15.15 per common share, on an as converted basis 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.

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 shares of Series A Preferred Stock, which are convertible into 33,158 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 $18.9375 per share of common stock, on an as converted basis. On September 24, 2018, in exchange for HCW agreement to provide shareholder advisory services to the Company for a period of three months starting on September 24, 2018, the Company repriced these warrants to an exercise price per share equal to $7.96875 per share of common stock, on an as converted basis.

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 3,105,882 shares of the Company's common stock and pre-funded warrants (the "May 2018 Pre-Funded Warrants") to purchase an aggregate of 815,686 shares of common stock. Each share of common stock or May 2018 Pre-Funded Warrant, as applicable, was sold as a unit with a warrant to purchase Series B Preferred Stock which is convertible to common stock (the "May 2018 Preferred Stock Warrants"). Each May 2018 Preferred Stock Warrant is for one-fifteenth of a share of common stock, on an as converted basis. The combined public offering price was $6.375 per common stock unit or $6.225 per May 2018 Pre-Funded Warrant unit.

The Company also granted HCW a 30-day option to purchase up to 588,235 additional shares of common stock at a purchase price of $6.225 per share and May 2018 Preferred Stock Warrants to purchase shares of Series B Preferred Stock convertible into 588,235 shares of common stock at a purchase price of $0.15 per May 2018 Preferred Stock Warrant, less the underwriting discounts and commissions. Prior to closing, HCW exercised this option in full.

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 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.

The May 2018 Pre-Funded Warrants are exercisable immediately at an exercise price of $0.15 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 for Series B Preferred Stock at an exercise price of $6.375 per common share, on an as converted basis 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.

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

13. Securities Registrations and Sales Agreements (continued)

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 $15.15 per share of common stock, on as converted basis to $6.69375 per share of common stock, on as converted basis, when the April 2018 Offering closed on May 1, 2018.

14. Subsequent Event

In October 2018, the Company was issued a new patent for rigosertib which extended protection into 2037. Previously, the Company had patent protection through 2027. The Symbio agreement (see Note 10) provides that the term of the agreement in a country is until the later of the expiration of marketing exclusivity in the country, 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.

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.

All common stock, equity, share and per share amounts have been retroactively adjusted to reflect a one-for-fifteen reverse stock split which was effective September 25, 2018.

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.

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 has been 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 $14.8 million and $17.9 million for the nine months ended September 30, 2018 and 2017, respectively. As of September 30, 2018, we had an accumulated deficit of $376.2 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 September 30, 2018, we had $22.4 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 1,367 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 165,079 shares of common stock. In May 2017, we sold an additional 24,239 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 61,333 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 467,000 shares of common stock, pre-funded warrants to purchase 196,167 shares of common stock, and preferred stock warrants to purchase shares of Series A convertible preferred stock convertible into 696,325 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 3,694,118 shares of common stock, pre-funded warrants to purchase 815,686 shares of common stock, and preferred stock warrants to purchase shares of Series B convertible preferred stock convertible into 4,509,804 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.

On September 25, 2018, we amended our certificate of incorporation to effect a one-for-fifteen reverse stock split of our common stock.

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	Determine target patient population in 2019	> 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, a new pivotal trial referred to as INSPIRE is on-going to study what we believe is a more homogenous population in higher-risk MDS.

During 2014 and 2015, we held meetings with the U.S. Food and Drug Administration ("FDA"), European Medicines Agency ("EMA"), and several European national regulatory authorities to discuss and seek guidance on a path for approval of rigosertib IV in higher-risk MDS patients whose disease had failed HMA therapy. After discussions with the FDA and EMA, we refined our patient eligibility criteria by defining what we believe to be a more homogenous 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. Currently, the INSPIRE study has open more than 140 trial sites in 22 countries across four continents, including more than 20 sites open in Japan by our partner, SymBio Pharmaceuticals. The selection of countries and trial sites is carefully undertaken to ensure availability of appropriate patients meeting eligibility criteria. Since these criteria are purposely designed to be narrow and selective, extensive site screening and education is integral to our plan. At launch, the INSPIRE trial was expected to enroll 225 patients and the outcome is measured by overall survival.

The INSPIRE trial included a pre-planned interim analysis triggered by 88 events (deaths), which occurred in December 2017. The statistical analysis plan ("SAP") for the INSPIRE trial featured an adaptive trial design, permitting several options following the interim analysis, which included continuation of the trial as planned, discontinuation of the trial for futility or safety, trial expansion using pre-planned sample size re-estimation, and trial continuation for only the pre-defined treatment subgroup of patients classified as VHR based on the IPSS-R.

After review of the interim data, in January 2018 the Independent Data Monitoring Committee ("DMC") recommended continuation of the trial with a one-time expansion in enrollment, using a pre-planned sample size re-estimation, consistent with the SAP. As recommended by the DMC, the expanded INSPIRE study will continue to enroll eligible patients based on the current trial criteria of the overall ITT population and will increase enrollment by adding 135 patients to the original target to reach a total expected enrollment of 360 patients, with the aim of increasing the power of the trial. The targeted number of death events required for analyzing the results of the trial was increased from 176 to 288 events. Due to the adaptive trial design and the DMC's assessment of the interim data, the INSPIRE trial will continue to analyze both the ITT and the VHR population for the primary endpoint of overall survival. The design of the trial with the expanded study enrollment will be identical to the current study design and will include the sequential analysis of the overall survival endpoint in the ITT population and if required the pre-specified VHR subgroup. The Company remains blinded to the specific interim analysis results. Following the interim analysis, we have expanded the INSPIRE Phase 3 trial at new sites in previously participating countries and anticipate expanding into new geographical regions. We continue to evaluate potential new sites and countries to enhance enrollment, while adhering to the stringent entry criteria to ensure that only appropriate patients are enrolled. 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).

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 $\geq$ 10% of patients with MDS/AML (n=54) receiving rigosertib oral and azacitidine were nausea (41%), fatigue (39%), diarrhea (37%), constipation (37%) and dysuria (28%). The most common serious AEs were pneumonia (11%) and febrile neutropenia (7%). The most common AEs leading to discontinuation were AML (4%) and pneumonia (4%).

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

Following an end of Phase 2 meeting with the Food and Drug Administration (FDA) in September 2016, we began development of a Phase 3 protocol. The Phase 3 trial will be designed as a global 1:1 randomized, placebo-controlled trial of rigosertib oral plus azacitidine compared to azacitidine plus oral placebo. Based on the results of the Phase 1/2 Study, 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 proposed 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. Presentation of updated efficacy and safety data from rigosertib/azacitidine combination Phase 2 studies in MDS will be presented at the 60th American Society of Hematology (ASH) Annual Meeting & Exposition in December 2018.

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 the ASH Annual Meeting & Exposition in December 2018. 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 minimize 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.

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

In addition, pre-clinical studies are being conducted at the University of California San Francisco and funded through the Leukemia Lymphoma Society. While the NCI will conduct a trial for RASopathy related cancers in pediatric patients, 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 as a single agent or in combination with an existing approved therapy, possibly an immuno-oncology agent, in solid tumors where Ras mutations are frequently found, such as lung cancer or melanoma.

Briciclib

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

Recilisib

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

Preclinical Product Candidates

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

Positive preclinical data was announced at the American Association for Cancer Research (AACR) annual meeting, which took place April 1-5, 2017 in Washington, DC, for ON 123300, a first-in-class dual inhibitor of CDK4/6 + ARK5, and for ON 150030, a novel Type 1 inhibitor of FLT3 and Src 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. Filing of an IND is expected in the first half of 2019.

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.

Some of our studies are ongoing and results may change as data becomes available.

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.

Results of Operations

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

	Three Months ended September 30, 2018	2017	Change
Revenue	$ 120,000	$ 110,000	$ 10,000
Operating expenses:			
General and administrative	1,729,000	1,728,000	(1,000)
Research and development	3,985,000	5,141,000	1,156,000
Total operating expenses	5,714,000	6,869,000	1,155,000
Loss from operations	(5,594,000)	(6,759,000)	1,165,000
Gain on dissolution of GBO	—	—	—
Change in fair value of warrant liability	129,000	(210,000)	339,000
Other income (expense), net	117,000	8,000	109,000
Net loss	$ (5,348,000)	$ (6,961,000)	$ 1,613,000

Revenues

Revenues increased by $10,000, or 9%, for the three months ended September 30, 2018 when compared to the same period in 2017 as a result of slightly higher clinical supply revenue from SymBio in the 2018 period.

General and administrative expenses

General and administrative expenses increased by $1,000, or 0.1%, at $1.7 million for the three months ended September 30, 2018 and September 30, 2017. The increase was attributable to an increase in personnel related costs and franchise taxes, partially offset by a decrease in stock compensation expense due to the completion of vesting of 2013 grants in the 2017 period and lower grant date fair values for grants in the more recent past.

Research and development expenses

Research and development expenses decreased by $1.2 million, or 23%, to $3.9 million for the three months ended September 30, 2018 from $5.1 million for the three months ended September 30, 2017. This decrease was caused primarily by $0.9 lower expenses on INSPIRE and the 09-08 combination study. The decrease was also caused by lower manufacturing expenses of $0.1 million related to the timing of drug substance and drug product manufacturing, and lower consulting expenses of $0.2 million in the 2018 period.

Change in fair value of warrant liability

The fair value of the warrant liability decreased $0.1 million for the three months ended September 30, 2018, compared to an increase of $0.2 million for the three months ended September 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 $109,000 for the three months ended September 30, 2018 compared to the three months ended September 30, 2017, due primarily to higher interest income related to higher cash balances in the 2018 period.

Comparison of the Nine Months Ended September 30, 2018 and 2017

	Nine Months ended September 30,		
	2018	2017	Change
Revenue	$ 1,169,000	$ 644,000	$ 525,000
Operating expenses:			
General and administrative	5,672,000	5,623,000	(49,000)
Research and development	12,632,000	14,641,000	2,009,000
Total operating expenses	18,304,000	20,264,000	1,960,000
Loss from operations	(17,135,000)	(19,620,000)	2,485,000
Gain on dissolution of GBO	693,000	—	693,000
Change in fair value of warrant liability	1,454,000	1,716,000	(262,000)
Other income (expense), net	229,000	19,000	210,000
Net loss	$ (14,759,000)	$ (17,885,000)	$ 3,126,000

Revenues

Revenues increased by $0.5 million for the nine months ended September 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 increased by $49,000 or 0.9%, to $5.7 million for the nine months ended September 30, 2018 from $5.6 million for the nine months ended September 30, 2017. Increases of $0.2 million of personnel costs related to higher bonus expense and $0.3 million in higher investor outreach costs were offset by $0.4 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 in the more recent past.

Research and development expenses

Research and development expenses decreased by $2.0 million, or 14%, to $12.6 million for the nine months ended September 30, 2018 from $14.6 million for the nine months ended September 30, 2017. This decrease was caused by a decrease of $1.5 million in clinical and consulting expenses, including $1.2 million lower expenses on INSPIRE, and $0.4 million less consulting expense, partially offset by $0.1 million of higher expenses in the 09-08 combination expansion study in the 2018 period. The decrease was also caused by $0.9 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 in the more recent past. 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 $1.5 million for the nine months ended September 30, 2018 compared to $1.7 million for the nine months ended September 30, 2017. The change in the fair value of the warrant liability in 2018 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 $0.2 million for the nine months ended September 30, 2018 compared to the nine months ended September 30, 2017 due primarily to higher interest income related to higher cash balances in the 2018 period and less foreign exchange loss.

Financial Condition

Total assets increased $18.2 million, or approximately 365%, from $5 million at December 31, 2017 to $23.1 million at September 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 $17.3 million was used in operations during the period. Total liabilities decreased from $15.8 million at December 31, 2017 to $12.3 million at September 30, 2018, a decrease of $3.6 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 $10.9 million at September 30, 2018, an increase of $21.7 million, or approximately 200%, primarily due to the stock offerings completed in the 2018 period, partially offset by a net loss of $14.8 million for the nine months ended September 30, 2018.

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 $14.8 million and $17.9 million for the nine months ended September 30, 2018 and 2017, respectively. Our operating activities used $17.3 million and $19.1 million of net cash during the nine months ended September 30, 2018 and 2017, respectively. At September 30, 2018, we had an accumulated deficit of $376.2 million, working capital of $14.9 million, and cash and cash equivalents of $22.4 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 nine months ended September 30, 2018 and 2017:

	Nine Months ended September 30,	
	2018	2017
Net cash (used in) provided by:		
Operating activities	$ (17,287,000)	$ (19,147,000)
Investing activities	—	—
Financing activities	35,657,000	5,317,000
Effect of foreign currency translation	(10,000)	30,000
Net increase (decrease) in cash and cash equivalents	$ 18,360,000	$ (13,800,000)

Net cash used in operating activities

Net cash used in operating activities was $17.3 million for the nine months ended September 30, 2018 and consisted primarily of a net loss of $14.8 million, including a favorable change in fair value of warrant liability of $1.5 million, partially offset by $0.9 million of noncash stock-based compensation and depreciation expense. Changes in operating assets and liabilities resulted in a net decrease in cash of $1.3 million. Significant changes in operating assets and liabilities included a decrease in receivables, prepaid expenses and other current assets of $0.2 million as a result of the recovery of prepayments of fees to our vendors relating to clinical trial contracts. Accounts payable and accrued liabilities decreased by $1.1 million as a result of the timing of receipt and payment of vendor invoices. Deferred revenue decreased $0.3 million due to recognition of the unamortized portion of the upfront payment under our collaboration agreement with SymBio.

Net cash used in operating activities was $19.1 million for the nine months ended September 30, 2017 and consisted primarily of a net loss of $17.9 million, including a favorable change in fair value of warrant liability of $1.7 million, partially offset by $1.4 million of noncash stock-based compensation and depreciation expense. Changes in operating assets and liabilities resulted in a net increase in cash of $0.9 million. Significant changes in operating assets and liabilities included a decrease in prepaid expenses and other current assets of $0.6 million as a result of the recognition of expense for clinical and manufacturing activities and insurance expense. Accounts payable and accrued liabilities decreased by $1.2 million as a result of the timing of receipt and payment of vendor invoices, primarily related to our INSPIRE trial. Deferred revenue decreased $0.3 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 nine months ended September 30, 2018 or 2017.

Net cash provided by financing activities

Net cash provided by financing activities for the nine months ended September 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 nine months ended September 30, 2017 was $5.3 million resulting from the issuance of common stock in April, 2017.

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" previously disclosed in our most recent annual report on Form 10-K and quarterly reports on Form 10-Q.

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.

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 September 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 September 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 September 30, 2018 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

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

There are no material changes from our risk factors previously disclosed in our annual report on Form 10-K filed with the SEC on March 16, 2018.

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

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 shares of Series A Preferred Stock, which are convertible into 33,158 shares of common stock subject to the terms of the Series A Preferred Stock. These warrants had an exercise price of $18.9375 per share of common stock, on an as converted basis. 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. On September 24, 2018, in exchange for HCW agreement to provide shareholder advisory services to the Company for a period of three months starting on September 24, 2018, the Company repriced these warrants to an exercise price per share equal to $7.96875 per share of common stock, on an as converted basis.

Item 3. Defaults Upon Senior Securities

Not applicable.

Item 4. Mine Safety Disclosures

Not applicable.

Item 5. Other Information

Not applicable.

Item 6. Exhibits

Exhibit Number	Description
3.1	Certificate of Amendment to Tenth Amended and Restated Certificate of Incorporation of Onconova Therapeutics, Inc., as amended (Incorporated by reference to Exhibit 3.1 to the Company's Current Report on Form 8-K filed on September 25, 2018)
4.1	First Amendment to Underwriter Series A Convertible Preferred Stock Purchase Warrant, dated as of September 24, 2018
10.1	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).
10.2	Employment Agreement, effective as of November 5, 2018, by and between the Company and Richard C. Woodman, M.D.
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

EXHIBIT INDEX

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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: November 14, 2018

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

Dated: November 14, 2018

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

Exhibit 4.1

ONCONOVA THERAPEUTICS, INC.

FIRST AMENDMENT TO UNDERWRITER SERIES A CONVERTIBLE PREFERRED STOCK PURCHASE WARRANT

Original Warrant Issuance Date: February 12, 2018

Date of Amendment: September 24, 2018 ("**Amendment Date**")

Reference is made to that certain Underwriter Series A Convertible Preferred Stock Purchase Warrant (the "Warrant") issued by Onconova Therapeutics, Inc. (the "Company") on February 12, 2018 to H.C. Wainwright & Co., LLC ("HCW") as the underwriter for the Company's February 2018 public offering of securities (with respect to 49,737.5 Series A Preferred Stock). All capitalized terms used and not otherwise defined herein have the respective meanings given to them in the Warrant.

1. Amendment. Pursuant to Section 5 (l) of the Warrant, upon receipt of the Holder's written consent required thereunder, and in consideration of good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Company hereby amends the Warrant as follows:

(a) in Section 2(b) of the Warrant, the Exercise Price of $1.2625 per 0.1 of a share of Preferred Stock shall be changed to $0.53125 per 0.1 of a share of Preferred Stock as of the Amendment Date.

2. Governing Law. This First Amendment shall be construed in accordance with, and governed by, the laws of the State of New York, without reference to the application of conflicts of law principles.

3. Miscellaneous. This First Amendment shall be deemed to be part of and incorporated into the Warrant. Except to the extent specifically amended hereby, the provisions of the Warrant shall remain unmodified, and the Warrant are hereby confirmed as being in full force and effect.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK
SIGNATURE PAGES FOLLOW]

IN WITNESS WHEREOF, the Company has caused this First Amendment to Underwriter Series A Convertible Preferred Stock Purchase Warrant to be duly executed as of the Amendment Date set out above.

ONCONOVA THERAPEUTICS, INC.

By: /s/ Ramesh Kumar
Name: Ramesh Kumar
Title: Chief Executive Officer

Exhibit 10.2

ONCONOVA
TARGETING CANCER | PROTECTING HEALTHY CELLS

375 Pheasant Run, Newtown, PA 18940
Phone: 267 759 3680 Fax: 267 759 3681

EMPLOYMENT AGREEMENT

This Employment Agreement (the "Agreement") is effective as of November 5, 2018 (the "Effective Date") between Onconova Therapeutics, Inc., a Delaware corporation (hereinafter the "Company") and Richard Woodman, M.D. (hereinafter "Employee").

WHEREAS, the Company deems it to be in its best interest to secure and retain the services of Employee, and Employee desires to work for 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. Term of Employment. Subject to the terms and conditions of this Agreement, the Company hereby employs Employee, and Employee hereby accepts employment by the Company. The term of this Agreement shall be for a period of two (2) years, commencing on the Effective Date and continuing until the second anniversary of the Effective Date, unless sooner terminated as hereinafter provided or extended by operation of this Section 1 (the "Term"). Notwithstanding the foregoing, the Term will automatically renew for successive one (1) year periods unless the Company or Employee provides written notification to the other party of its desire to terminate this Agreement at least thirty (30) days prior to the expiration of the Term.

2. Duties. Subject to all the terms and conditions hereof, the Company shall employ Employee, and Employee shall serve the Company as, Chief Medical Officer and Senior Vice President, Research and Development. Employee shall report directly to the President of the Company. As Employee's position as Chief Medical Officer and Senior Vice President, Research and Development is a full-time position, Employee agrees to devote Employee's effort of 100% from the Company's Newtown, PA office (with such travel as is necessary for the position), 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 which 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 of Directors of the Company (the "Board"). Notwithstanding the foregoing, Employee may serve on charitable and civic boards, and with the prior consent of the Board, in its sole discretion, on professional and corporate boards, provided such service is permitted under the Company's employment policies and does not violate this Agreement, including the provisions of Sections 5, 6 or 7 below.

3. Compensation and Other Benefits.

(a) Salary. For all services rendered by Employee under this Agreement during the Term, the Company agrees to pay Employee a base salary at an initial annualized rate of Three Hundred Seventy-Five Thousand Dollars ($375,000) (the "Base Salary"), in installments in accordance with the Company's normal payroll cycle.

(b) Annual Bonus. During the Term, 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 Bonus will be contingent upon the successful achievement of performance objectives determined by the President of the Company and the Employee, subject to approval by the Compensation Committee of the Board (the "Compensation Committee"). The amount of the Bonus to be paid, if any, shall be based on achievement of the applicable performance objectives and other performance factors, in the sole discretion of the Compensation Committee, but shall not exceed forty percent (40%) of Employee's Base Salary. 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 within sixty (60) days following the end of such year. For the 2018 calendar year, the Compensation Committee may determine that Employee shall be eligible for a discretionary bonus, based on his contributions to the Company from the Effective Date through December 31, 2018.

(c) Stock Option. Subject to the approval of the Compensation Committee, which has already been obtained contingent on Employee's commencement of employment, Employee will be granted a Nonqualified Stock Option (as defined in the Company's 2018 Omnibus Incentive Compensation Plan) (the "Option"), pursuant to the terms of the Company's 2018 Omnibus Incentive Compensation Plan (the "Plan") and subject to the Company's standard form of Nonqualified Stock Option Award Agreement ("Option Agreement"). The number of shares of Common Stock subject to the Option approved by the Compensation Committee is 20,000 shares. Vesting of the Option will be over four (4) years from the date of grant with twenty-five percent (25%) vesting on the first anniversary of the date of grant and the remainder vesting monthly for three (3) years thereafter. The exercise of the Option shall be subject to the provisions of the Option Agreement and the Plan.

(d) 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.

(e) Vacation and Holidays. During the Term, 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.

(f) Reimbursement of Expenses. 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.

(g) 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.

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 one hundred (100) consecutive days or an aggregate of one hundred twenty (120) days within any twelve (12) month period, with or without reasonable accommodation ("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 Company-sponsored disability insurance policy or program.

(c) Termination for Cause. Employee's employment may be terminated for "Cause," as defined below, at any time upon delivery of written notice to Employee. If Employee's employment is terminated by the Company for Cause during the Term, 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, subject to applicable law, and Employee hereby authorizes the Company to make this setoff.

(d) Termination by the Company without Cause or by Employee for Good Reason. During the Term, the Company may terminate Employee's employment under this Agreement without Cause upon thirty (30) days prior written notice to Employee, or Employee may terminate his employment for Good Reason. Upon such termination either without Cause, or for Good Reason, provided that Employee executes and does not revoke a waiver and release of claims in a form approved by the Company, a form of which is attached hereto as Appendix A (subject to changes recommended by Company counsel to comply with applicable law) (the "Release"), the Company shall:

(i) pay Employee a severance payment equal to six (6) months' of Employee's then current Base Salary, which amount shall be paid over the six (6) month period following the termination date in accordance with the Company's regular payroll practices, commencing on the first payroll date following the termination date (or, if the first payroll date is not practicable, on the second payroll date following the termination date), but in any event, within sixty (60) days following the termination date, and the first payment shall include any unpaid installments from the termination date until the date of the first payment; and

(ii) pay Employee a prorated Bonus (if any) for the fiscal year in which Employee's termination date occurs, which prorated Bonus shall be determined by multiplying the full year Bonus that would otherwise have been payable to Employee, based upon the achievement of the applicable performance goals, as determined by the Compensation Committee, by a fraction, the numerator of which is the number of days during which Employee was employed by the Company in the fiscal year in which the termination date occurs and the denominator of which is 365, and such prorated Bonus, if any, shall be paid at the same time as bonuses are paid to other senior executives of the Company, but not later than sixty (60) days after the end of the fiscal year in which the termination date occurs, and

(iii) to the extent unvested at the time of such termination, if the termination occurs on or after the first anniversary of the date of grant of the Option, the Company shall cause the Option to become fully vested immediately prior to such termination.

In addition, regardless of whether Employee executes or revokes the Release, the Company shall pay Employee the balance of his accrued, but unpaid Base Salary, unreimbursed expenses, and his unused, accrued vacation time through the termination date. Except as provided in this Section 4(d), all other compensation and benefits shall cease as of the date of termination and the Company will have no further liability or obligation by reason of such termination of employment.

(e) Voluntary Resignation. Employee may voluntarily resign from his employment with the Company without Good Reason at any time prior to the expiration of the Term of this Agreement. In the event Employee voluntarily resigns from his employment with the Company without Good Reason, Employee shall provide the Company with 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.

(f) 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 Section 280G of the Internal Revenue Code of 1986, as amended (the "Code") 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 Code 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 to the payments or benefits shall occur in the order that results in the greatest economic present value of all payments actually made to Employee.

(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) 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 to Employee and thirty (30) days' opportunity for Employee to cure such failure, provided that the Company shall not be required to provide notice and opportunity to cure 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, or plea of guilty or *nolo contendere* to, any felony, or any other criminal offense that involves fraud or misrepresentation or any other crime the effect of which is likely to adversely affect the business or reputation of the Company or its affiliates, in any case whether or not relating to his employment; (4) in

accordance with applicable federal, state or local laws, Employee's 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 after written notice thereof by the Company to Employee and thirty (30) days' opportunity for Employee to cure such failure, provided that the Company shall not be required to provide notice and opportunity to cure 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; or (6) any wanton and willful dereliction of duties by Employee after written notice thereof by the Company to Employee and thirty (30) days' opportunity for Employee to cure such alleged dereliction of duties, provided that the Company shall not be required to provide notice and opportunity to cure 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. The existence of any of the foregoing events or conditions shall be determined by the Company in the exercise of its reasonable judgment.

(ii) "Good Reason" shall mean, without Employee's consent: (1) a material reduction in Employee's Base Salary; provided, however, that for purposes of this Agreement, 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 reduction 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) the breach by the Company of any material provision of this Agreement; (3) at any time during the Term 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 (provided, however, that the consummation of a transaction whereby the Company is no longer the highest parent entity of an affiliated group will not by itself constitute such a material adverse change); (4) a material relocation of Employee's principal business location, which, for purposes of this Agreement, means a relocation of Employee's principal business location by more than fifty (50) miles from Employee's then-current business location and (5) the Company's failure to renew this Agreement at the end of any Term, provided that Employee is willing and able to execute a new contract providing terms and conditions substantially similar to those in this Agreement and to continue providing services to the Company in accordance with such terms. None of the foregoing events or conditions will constitute Good Reason unless Employee provides the Company with written objection to the event or condition constituting Good Reason within forty-five (45) days following the occurrence thereof, the Company does not cure the event or condition within thirty (30) days following receipt of such written objection, and Employee resigns his employment within thirty (30) days following the expiration of the Company's cure period.

5. Non-Competition.

(a) For purposes of this Agreement, "Competitor" shall mean any person, company, or entity whose primary business competes directly or indirectly with the Company's rigosertib molecule in all its forms directly focused on myelodysplastic syndromes (MDS), or any clinical or preclinical compounds that are intended for health authority (i.e., U.S. Food & Drug Administration and European Medicines Agency) submission being 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 ("Company Products"). For the avoidance of doubt, a pharmaceutical

company will not be deemed a "Competitor," if Employee's responsibilities with such company are not focused on any Company Products.

(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, 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, if Employee is performing duties for such Competitor which focus on, or compete with, any Company Product. The foregoing shall not limit or restrict Employee in any way from working for any Competitor or any other company, in any capacity, provided he has no responsibility or involvement with any Company Products. In addition, this Agreement 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 three (3) 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. The restriction in this Section 5(c) with respect to employees who were at any time within a period of three (3) months immediately prior to the date of Employee's termination employed by the Company shall not apply to any person that was terminated by 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, but not limited to, 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 B (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 B 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 B 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 ("AAA") 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. 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. The Company shall pay all fees associated with any arbitration pursuant to this Section 9, including but not limited to, the AAA filing fees, case management fees, all arbitrator's fees and expenses, and any other fees, costs and expenses relating to the arbitration pursuant to this Section 9. Each party shall be responsible for its own counsel fees.

10. 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.

11. 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.

12. 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.

13. 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.

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

15. 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. 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.

16. 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 the Release 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 Release 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.

17. 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**.**

18. 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: _____
Steven M. Fruchtman, M.D.
President

Date: _____

By: _____
Richard Woodman, M.D.

Date: _____

APPENDIX A

Form of Release

This Agreement sets forth the terms of your separation of employment with Onconova Therapeutics, Inc. (the "Company"). If you understand and agree with these terms, please sign in the space provided below. If you and the Company sign below, this will be a legally binding document representing the entire agreement between you and the Company regarding the subjects it covers. We will refer to this document as this "Agreement."

Termination Date. Your last day of work with the Company will be .

Consideration. The Company will pay you **[Insert Severance Payments based on Section 4(d) of the Employment Agreement]**, as provided in Section 4(d) of the Employment Agreement between you and the Company, dated October , 2018 (the "Employment Agreement").

Release of Claims. In exchange for the payment(s) described in the Consideration clause above, you hereby waive all claims available under federal, state or local law against the Company and the directors, officers, employees, employee benefit plans and agents of the Company arising out of your employment with the Company or the termination of that employment, including but not limited to all claims arising under the Americans with Disabilities Act, the Civil Rights Act of 1991, the Employee Retirement Income Security Act, the Equal Pay Act, the Genetic Information Non-discrimination Act, the Family and Medical Leave Act, Section 1981 of the United States Code, Title VII of the Civil Rights Act, the Age Discrimination in Employment Act and the Older Workers Benefit Protection Act, and Pennsylvania Human Relations Act, Pennsylvania Equal Pay Law, Pennsylvania Whistleblower Law, if applicable, the Pennsylvania Pregnancy, Childbirth and Childrearing Law, if applicable, New Jersey Law Against Discrimination, New Jersey Equal Pay Act, New Jersey Civil Rights Law, New Jersey Security and Financial Empowerment Act, New Jersey Conscientious Employee Protection Act, New Jersey Family Leave Act, New Jersey Wage and Hour Law, New Jersey WARN Laws, Retaliation provisions of New Jersey Workers' Compensation Law, as well as wrongful termination claims, breach of contract claims, discrimination claims, harassment claims, retaliation claims, whistleblower claims (to the fullest extent they may be released under applicable law), defamation or other tort claims, and claims for attorneys' fees and costs. You are not waiving your right to vested benefits under the written terms of the retirement plan, claims for unemployment or workers' compensation benefits, any medical claim incurred during your employment that is payable under applicable medical plans or an employer-insured liability plan, claims arising after the date on which you sign this Agreement, or claims that are not otherwise waivable under applicable law. You acknowledge that you have not made any claims or allegations related to sexual harassment or sexual abuse and none of the payments set forth in this Agreement are related to sexual harassment or sexual abuse.

Medicare Disclaimer. You represent that you are not a Medicare beneficiary as of the time you enter into this Agreement. To the extent that you are a Medicare beneficiary, you agree to contact a Company Human Resources Representative for further instruction.

Limit on Disclosures. You shall not disclose or cause to be disclosed the terms of this Agreement to any person (other than your spouse or domestic/civil union partner, attorney and tax advisor), except pursuant to a lawful subpoena, as set forth in the Reports to Government Entities clause below or as otherwise permitted by law. This provision is not intended to restrict your legal right to discuss the terms and conditions of your employment.

Reports to Government Entities. Nothing in this Agreement, including the Limit on Disclosures or Release of Claims clause, restricts or prohibits you 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 filing a claim or assisting with an investigation directly with a self-regulatory organization 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, or from making other disclosures that are protected under the whistleblower provisions of state or federal law or regulation. Nor does this Agreement require you to obtain prior authorization from the Company before engaging in any conduct described in this paragraph, or to notify the Company that you have engaged in any such conduct. You acknowledge and agree, however, that, to the maximum extent permitted by law, you are waiving and releasing any claim or right to recover from the Company any monetary damages or any other form of personal relief based on any claim, charge, complaint or action against the Company or any others covered by the Release of Claims. Nothing in this Agreement is intended to or shall prevent, impede or interfere with your non-waivable right to receive and fully retain a monetary award from a government-administered whistleblower award program for providing information directly to a government agency.

Please take notice that federal law provides criminal and civil immunity to federal and state claims for trade secret misappropriation to individuals who disclose trade secrets to their attorneys, courts, or government officials 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.

Nonadmission of Liability. Nothing in this Agreement is an admission of any wrongdoing, liability or unlawful activity by you or by the Company.

No Other Amounts Due. You acknowledge that the Company has paid you all wages, salaries, bonuses, benefits and other amounts earned and accrued, less applicable deductions, and that the Company has no obligation to pay any additional amounts other than the payment(s) described in the Consideration clause of this Agreement.

Restrictive Covenants. For good and valuable consideration, including without limitation the commitments of the Company as set forth in this Agreement, you agree to continue to be bound by Sections 5, 6 and 7 of the Employment Agreement.

Signature. The Company hereby advises you to consult with an attorney prior to signing this Agreement. You acknowledge that you have had a reasonable amount of time (**[21/45]** days) to consider the terms of this Agreement and you sign it with the intent to be legally bound.

Acknowledgment of Voluntariness and Time to Review. You acknowledge that:

- you read this Agreement and you understand it;
- you are signing this Agreement voluntarily in order to release your claims against the Company in exchange for payment that is greater than you would otherwise have received;
- you are signing this Agreement after the date of your separation from the Company and you were offered at least **[21/45]** days to consider your choice to sign this Agreement;
- the Company advises you to consult with an attorney;
- you know that you can revoke this Agreement within seven days of signing it and that the Agreement does not become effective until that seven-day period has passed. To revoke, contact **[Insert name or title and address and/or email address]**; and
- you agree that changes to this Agreement before its execution, whether material or immaterial, do not restart your time to review this Agreement.

Employee: _____ Date: _____
Richard Woodman, M.D.

Company: _____ Date: _____
Name:
Title:

APPENDIX B

TO: Steven M. Fruchtman, M.D.

FROM: **Richard Woodman, M.D.**

DATE:

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:

o 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: November 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: November 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 September 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: November 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 September 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: November 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.