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UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, DC 20549

FORM 10-Q

(Mark One)

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

For the quarterly period ended September 30, 2022

Or

☐ **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.)
12 Penns Trail, 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. ☒ Yes ☐ 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). ☒ Yes ☐ 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.

Large accelerated filer	☐	Accelerated filer	☐
Non-accelerated filer	☒	Smaller reporting company	☒
		Emerging growth company	☐

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

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

The number of outstanding shares of the registrant's Common Stock, par value $0.01 per share, as of November 1, 2022 was 20,925,992.

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, par value $.01 per share	ONTX	The Nasdaq Stock Market LLC

ONCONOVA THERAPEUTICS, INC.

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FOR THE QUARTER ENDED SEPTEMBER 30, 2022

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 May 20, 2021.

PART I — FINANCIAL INFORMATION

Item 1. Financial Statements

Onconova Therapeutics, Inc.
Condensed Consolidated Balance Sheets

	September 30, 2022	December 31, 2021
Assets	(unaudited)	
Current assets:		
Cash and cash equivalents	$ 42,613,000	$ 55,070,000
Receivables	28,000	28,000
Prepaid expenses and other current assets	1,110,000	332,000
Total current assets	43,751,000	55,430,000
Property and equipment, net	28,000	38,000
Other non-current assets	1,000	10,000
Total assets	$ 43,780,000	$ 55,478,000
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable	$ 3,760,000	$ 2,757,000
Accrued expenses and other current liabilities	3,350,000	3,132,000
Deferred revenue	226,000	226,000
Total current liabilities	7,336,000	6,115,000
Deferred revenue, non-current	3,073,000	3,243,000
Total liabilities	10,409,000	9,358,000
Commitments and contingencies		
Stockholders' equity:		
Preferred stock, $0.01 par value, 5,000,000 shares authorized, none issued and outstanding at September 30, 2022 and December 31, 2021	—	—
Common stock, $0.01 par value, 125,000,000 shares authorized, 20,925,992 and 20,895,563 shares issued and outstanding at September 30, 2022 and December 31, 2021	209,000	209,000
Additional paid in capital	491,486,000	490,644,000
Accumulated deficit	(458,263,000)	(444,719,000)
Accumulated other comprehensive loss	(61,000)	(14,000)
Total stockholders' equity	33,371,000	46,120,000
Total liabilities and stockholders' equity	$ 43,780,000	$ 55,478,000

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,	
	2022	2021	2022	2021
Revenue	$ 57,000	$ 57,000	$ 170,000	$ 170,000
Operating expenses:				
General and administrative	2,105,000	2,284,000	6,430,000	7,351,000
Research and development	3,593,000	1,763,000	7,633,000	5,552,000
Total operating expenses	5,698,000	4,047,000	14,063,000	12,903,000
Loss from operations	(5,641,000)	(3,990,000)	(13,893,000)	(12,733,000)
Change in fair value of warrant liability	—	530,000	—	321,000
Other income, net	243,000	7,000	349,000	13,000
Net loss	$ (5,398,000)	$ (3,453,000)	$ (13,544,000)	$ (12,399,000)
Net loss per share, basic and diluted	$ (0.26)	$ (0.22)	$ (0.65)	$ (0.80)
Basic and diluted weighted average shares outstanding	20,915,408	15,979,180	20,902,251	15,463,720

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,	
	2022	2021	2022	2021
Net loss	$ (5,398,000)	$ (3,453,000)	$ (13,544,000)	$ (12,399,000)
Other comprehensive (loss) income, net of tax:				
Foreign currency translation adjustments, net	(20,000)	(8,000)	(47,000)	(20,000)
Other comprehensive (loss) income, net of tax	(20,000)	(8,000)	(47,000)	(20,000)
Comprehensive loss	$ (5,418,000)	$ (3,461,000)	$ (13,591,000)	$ (12,419,000)

See accompanying notes to condensed consolidated financial statements.

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

	Three Month Periods Ended September 30, 2022 and 2021					
	Common Stock		Additional Paid in Capital	Accumulated deficit	Accumulated other comprehensive (loss) income	Total
	Shares	Amount				
Balance at June 30, 2022	20,895,563	$ 209,000	$ 491,181,000	$ (452,865,000)	$ (41,000)	$ 38,484,000
Net loss	—	—	—	(5,398,000)	—	(5,398,000)
Other comprehensive loss	—	—	—	—	(20,000)	(20,000)
Stock-based compensation	—	—	305,000	—	—	305,000
Shares issued for vested restricted stock units	30,429	—	—	—	—	—
Balance at September 30, 2022	20,925,992	$ 209,000	$ 491,486,000	$ (458,263,000)	$ (61,000)	$ 33,371,000
Balance at June 30, 2021	15,781,040	$ 158,000	$ 470,335,000	$ (437,502,000)	$ 2,000	$ 32,993,000
Net loss	—	—	—	(3,453,000)	—	(3,453,000)
Other comprehensive loss	—	—	—	—	(8,000)	(8,000)
Stock-based compensation	—	—	190,000	—	—	190,000
Issuance of common stock, net	5,109,523	51,000	19,893,000	—	—	19,944,000
Balance at September 30, 2021	20,890,563	$ 209,000	$ 490,418,000	$ (440,955,000)	$ (6,000)	$ 49,666,000

	Nine Month Periods Ended September 30, 2022 and 2021					
	Common Stock		Additional Paid in Capital	Accumulated deficit	Accumulated other comprehensive income (loss)	Total
	Shares	Amount				
Balance at December 31, 2021	20,895,563	$ 209,000	$ 490,644,000	$ (444,719,000)	$ (14,000)	$ 46,120,000
Net loss	—	—	—	(13,544,000)	—	(13,544,000)
Other comprehensive loss	—	—	—	—	(47,000)	(47,000)
Stock-based compensation	—	—	842,000	—	—	842,000
Shares issued for vested restricted stock units	30,429	—	—	—	—	—
Balance at September 30, 2022	20,925,992	$ 209,000	$ 491,486,000	$ (458,263,000)	$ (61,000)	$ 33,371,000
Balance at December 31, 2020	12,396,219	$ 124,000	$ 434,593,000	$ (428,556,000)	$ 14,000	$ 6,175,000
Net loss	—	—	—	(12,399,000)	—	(12,399,000)
Other comprehensive loss	—	—	—	—	(20,000)	(20,000)
Exercise of stock options	4,642	—	24,000	—	—	24,000
Stock-based compensation	—	—	315,000	—	—	315,000
Shares issued in connection with reverse stock split	104	—	—	—	—	—
Issuance of common stock, net	8,329,598	83,000	55,008,000	—	—	55,091,000
Issuance of common stock upon exercise of warrants	160,000	2,000	478,000	—	—	480,000
Balance at September 30, 2021	20,890,563	$ 209,000	$ 490,418,000	$ (440,955,000)	$ (6,000)	$ 49,666,000

See accompanying notes to condensed consolidated financial statements.

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

	Nine Months Ended September 30,	
	2022	2021
Operating activities:		
Net loss	$ (13,544,000)	$ (12,399,000)
Adjustment to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization	10,000	10,000
Change in fair value of warrant liabilities	—	(321,000)
Stock compensation expense	842,000	315,000
Changes in assets and liabilities:		
Receivables	—	8,000
Prepaid expenses and other current assets	(778,000)	193,000
Other assets	9,000	138,000
Accounts payable	1,003,000	(783,000)
Accrued expenses and other current liabilities	218,000	(2,213,000)
Deferred revenue	(170,000)	(170,000)
Net cash used in operating activities	(12,410,000)	(15,222,000)
Financing activities:		
Proceeds from the sale of common stock and warrants, net of costs	—	55,091,000
Proceeds from the exercise of common warrants	—	480,000
Proceeds from the exercise of stock options	—	24,000
Net cash provided by financing activities	—	55,595,000
Effect of foreign currency translation on cash	(47,000)	(20,000)
Net (decrease) increase in cash and cash equivalents	(12,457,000)	40,353,000
Cash and cash equivalents at beginning of period	55,070,000	19,025,000
Cash and cash equivalents at end of period	$ 42,613,000	$ 59,378,000

See accompanying notes to condensed consolidated financial statements.

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

1. Nature of Business

The Company

Onconova Therapeutics, Inc. (the "Company") was incorporated in the State of Delaware on December 22, 1998 and commenced operations on January 1, 1999. The Company's headquarters are located in Newtown, Pennsylvania. The Company is a clinical-stage biopharmaceutical company focused on discovering and developing novel products for patients with cancer. The Company has proprietary molecularly targeted agents designed to disrupt specific cellular pathways that are important for cancer cell proliferation. The Company believes that the product candidates in its pipeline have the potential to be efficacious in a variety of cancers with unmet medical need. The Company has the following two clinical-stage programs: 1. narazaciclib (ON 123300), a multi-targeted kinase inhibitor in solid tumors and hematological malignancies as a single agent or in combination with other anti-cancer therapies; and 2. rigosertib administered alone or in combination for the treatment of solid tumors. During 2012, Onconova Europe GmbH was established as a wholly owned subsidiary of the Company for the purpose of further developing business in Europe.

On May 20, 2021, the Company amended its certificate of incorporation to decrease the number of authorized shares of common stock par value $0.01 per share from 250,000,000 to 125,000,000, and to effect a one-for-fifteen reverse stock split of its common stock. All common stock, equity, share and per share amounts in the financial statements and notes have been retroactively adjusted to reflect this one-for-fifteen reverse stock split.

Liquidity

The Company has incurred recurring operating losses since inception. For the nine months ended September 30, 2022, the Company incurred a net loss of $13,544,000 and as of September 30, 2022 the Company had generated an accumulated deficit of $458,263,000. 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, 2022, the Company had cash and cash equivalents of $42,613,000. The Company will require substantial additional financing to fund its ongoing clinical trials and operations, and to continue to execute its strategy.

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 is exploring 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 believes that its cash and cash equivalents will be sufficient to fund its ongoing trials and business operations for more than twelve months from the date of this filing.

COVID-19

While the Company is not aware of a material impact from the novel coronavirus disease ("COVID-19") pandemic through September 30, 2022, the full extent to which COVID-19 will directly or indirectly impact the Company's business, results of operations and financial condition, including manufacturing, clinical trials and research and development costs, depends on future developments that are uncertain at this time.

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 and its wholly-owned subsidiary, Onconova Europe GmbH. All significant intercompany transactions have been eliminated.

Unaudited Interim Financial Information

The accompanying condensed consolidated balance sheet as of September 30, 2022, the condensed consolidated statements of operations and comprehensive loss for the three and nine months ended September 30, 2022 and 2021, the consolidated statements of stockholders' equity (deficit) for the three and nine months ended September 30, 2022 and 2021 and the condensed consolidated statements of cash flows for the nine months ended September 30, 2022 and 2021 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, 2022, the results of its operations for the three and nine months ended September 30, 2022 and 2021, and its cash flows for the nine months ended September 30, 2022 and 2021. The financial data and other information disclosed in these notes related to the three and nine months ended September 30, 2022 and 2021 are unaudited. The results for the three and nine months ended September 30, 2022 are not necessarily indicative of results to be expected for the year ending December 31, 2022, 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, 2021 included in the Company's annual report on Form 10-K filed with the SEC on March 21, 2022.

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 May 20, 2021.

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.

Significant Accounting Policies

The Company's significant accounting policies are disclosed in the audited consolidated financial statements for the year ended December 31, 2021 included in the Company's annual report on Form 10-K filed with the SEC on March 21, 2022. Since the date of such financial statements, there have been no changes to the Company's significant accounting policies.

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

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.”

Recent Accounting Pronouncements

In June 2016, the FASB issued new guidance on the accounting for credit losses on financial instruments. The guidance was amended in November 2019. The new guidance introduces an expected loss model for estimating credit losses, replacing the incurred loss model. The new guidance also changes the impairment model for available-for-sale debt securities, requiring the use of an allowance to record estimated credit losses (and subsequent recoveries). The guidance is effective for the Company in fiscal years beginning after December 15, 2022, and interim periods within those years, with early adoption permitted. The guidance is not expected to have a material effect on the Company.

3. Revenue

The Company’s revenue during the three and nine months ended September 30, 2022 and 2021 was from its license and collaboration agreement with SymBio.

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2022	2021	2022	2021
Symbio				
Upfront license fee recognition over time	$ 57,000	$ 57,000	$ 170,000	$ 170,000

Deferred revenue is as follows:

	Symbio Upfront Payment
Deferred balance at December 31, 2021	$ 3,469,000
Recognition to revenue	(170,000)
Deferred balance at September 30, 2022	$ 3,299,000

4. Net Loss Per Share of Common Stock

The following potentially dilutive securities outstanding at September 30, 2022 and 2021 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,	
	2022	2021
Warrants	491,586	496,586
Stock options	1,178,498	438,006
	1,670,084	934,592

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

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.

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, 2022 is as follows:

Description	Classification	Exercise Price	Expiration Date	Balance December 31, 2021	Warrants Issued	Warrants Exercised	Warrants Expired	Balance September 30, 2022
Non-tradable pre-funded warrants	Equity	$ 2.25	July 2023	26	—	—	—	26
Non-tradable warrants	Equity	$ 24.00	December 2022	26,189	—	—	—	26,189
Non-tradable pre-funded warrants	Equity	$ 2.25	none	3,522	—	—	—	3,522
Non-tradable warrants	Equity	$ 24.00	December 2022	120,407	—	—	—	120,407
Non-tradable pre-funded warrants	Equity	$ 2.25	none	4,974	—	—	—	4,974
Non-tradable warrants	Equity	$ 30.00	September 2023	7,306	—	—	—	7,306
Non-tradable warrants	Equity	$ 3.00	November 2024	244,500	—	—	—	244,500
Non-tradable warrants	Equity	$ 6.54375	December 2024	16,953	—	—	—	16,953
Non-tradable warrants	Equity	$ 6.75450	December 2024	46,263	—	—	—	46,263
Non-tradable warrants	Equity	$ 6.77850	December 2023	29,968	—	—	—	29,968
				500,108	—	—	—	500,108

6. Balance Sheet Detail

Prepaid expenses and other current assets:

	September 30, 2022	December 31, 2021
Research and development	$ 411,000	$ 15,000
Manufacturing	202,000	29,000
Insurance	194,000	253,000
Other	303,000	35,000
	$ 1,110,000	$ 332,000

Property and equipment:

	September 30, 2022	December 31, 2021
Property and equipment	$ 70,000	$ 70,000
Accumulated depreciation	(42,000)	(32,000)
	$ 28,000	$ 38,000

Accrued expenses and other current liabilities:

	September 30, 2022	December 31, 2021
Research and development	$ 2,122,000	$ 1,759,000
Employee compensation	1,009,000	1,217,000
Professional fees	219,000	156,000
	$ 3,350,000	$ 3,132,000

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

7. Fair Value Measurements

At both September 30, 2022 and December 31, 2021, the Company had no financial assets and liabilities measured at fair value on a recurring basis.

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.

During 2021, the Company had tradable warrants and non-tradable warrants that were classified as liabilities and measured at fair value on a recurring basis. The tradable warrants were listed on the Nasdaq Capital Market. The Company determined that an active and orderly market for the tradable warrants developed and that the Nasdaq Capital Market price was the best indicator of fair value of the warrant liability. The quoted market price was used to determine the fair value. The fair value of the non-tradable warrants was estimated using the Black-Scholes pricing model. All of these tradable and non-tradable warrants expired in July 2021. During the three and nine months ended September 30, 2021, there was a decrease in the fair value of the warrant liability of $530,000 and $321,000, respectively.

8. Stock-Based Compensation

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.

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 26,823.

The 2018 Plan was amended and restated following unanimous approval of the Company's Board of Directors on April 24, 2019 and was approved by the Company's shareholders on June 17, 2019. The amended 2018 Plan (the "Amended Plan") allowed for an additional 39,300 shares of the Company's common stock that may be issued under the Amended Plan with respect to awards made on and after June 17, 2019.

The 2021 Incentive Compensation Plan (the "2021 Plan") was unanimously approved by the Company's shareholders on July 30, 2021. Upon stockholders' approval of the 2021 Plan, no further awards will be made under the amended 2018 Plan. Under the 2021 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 2021 Plan is 1,300,000.

The 2021 Plan was amended and restated following unanimous approval of the Company's Board of Directors on May 23, 2022 and was approved by the Company's shareholders on August 18, 2022. The amended 2021 Plan (the

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

"Amended 2021 Plan") allowed for an additional 2,000,000 shares of the Company's common stock that may be issued under the Amended 2021 Plan with respect to awards made on and after August 18, 2022. At September 30, 2022, there were 1,906,192 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 related to stock options and restricted stock units as follows for the three and nine months ended September 30, 2022 and 2021:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2022	2021	2022	2021
General and administrative	$ 119,000	$ 153,000	$ 377,000	$ 270,000
Research and development	170,000	29,000	448,000	45,000
	$ 289,000	$ 182,000	$ 825,000	$ 315,000

A summary of stock option activity for the nine months ended September 30, 2022 is as follows:

	Options Outstanding			
	Number of Shares	Weighted-Average Exercise Price	Weighted Average Remaining Contractual Term (in years)	Aggregate Intrinsic Value
Balance, December 31, 2021	452,999	$ 20.71	9.42	$ —
Authorized	—			
Granted	824,165	$ 1.55	9.60	—
Exercised	—	$ —	—	$ —
Forfeitures/adjustments	(98,666)	$ 1.19	—	
Balance, September 30, 2022	1,178,498	$ 8.69	9.29	$ —
Exercisable at September 30, 2022	202,690	$ 39.45	8.50	$ —

The Company accounts for all stock-based payments made to employees, non-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.

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, 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, 2022, there was $1,717,000 of unrecognized compensation expense related to the unvested stock options which is expected to be recognized over a weighted-average period of approximately 1.94 years.

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

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

	Nine months ended September 30,	
	2022	2021
Risk-free interest rate	2.45 %	0.89 %
Expected volatility	121.72 %	133.83 %
Expected term	5.70 years	5.93 years
Expected dividend yield	0 %	0 %
Weighted average grant date fair value	$ 1.32	$ 4.59

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.

- 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%.

On August 2, 2021, the compensation committee of the board of directors approved restricted stock unit grants to the Company’s employees (“2021 RSU”). An aggregate of 104,700 service-based RSUs were issued at a grant date fair value of $5.19. The 2021 RSU awards will be settled in stock, vest 33% on each of the first and second anniversary of the date of grant, and vest 34% on the third anniversary of the date of grant. The 2021 RSU awards were granted under the 2021 Plan. During the nine months ended September 30, 2022, there was a vesting event for 30,429 of 2021 RSUs, there was a forfeiture of 13,400 of the 2021 RSUs. There were no expirations or cancelations of the 2021 RSUs during the period. On February 7, 2022, the compensation committee of the board of directors approved restricted stock unit grants to the Companies employees (“2022 RSU”). An aggregate of 148,343 service-based RSUs were issued at a grant date fair value of $1.82. The 2022 RSU awards will be settled in stock, vest 33% on each of the first and second anniversary of the date of grant, and vest 34% on the third anniversary of the date of grant. The 2021 RSU and 2022 RSU awards were granted under the 2021 Plan. During the nine months ended September 30, 2022, there was a forfeiture of 17,633 of the 2022 RSUs, there were no vesting events, expirations, or cancelations of the 2022 RSU during the period. On June 10, 2022, the compensation committee of the board of directors approved restricted stock unit grants to certain of the Company’s employees (“2022 RSU2”). An aggregate of 24,200 service-based RSUs were issued at a grant date fair value of $1.33. The 2022 RSU2 awards will be settled in stock, vest 33% on each of the first and second anniversary of the date of grant, and vest 34% on the third anniversary of the date of grant. During the nine months ended September 30, 2022, there were no vesting events expirations, or cancelations of the 2022 RSU2. At September 30, 2022, the unrecognized compensation cost related to unvested service-based RSUs was $505,000, which will be recognized over the remaining service period.

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

Grants of PSUs and SARs

During 2020 and 2021, the compensation committee of the board of directors and the board approved a cash bonus program of cash-settled stock appreciation right ("SAR") awards to the Company's employees and non-employee directors, and cash-settled performance stock unit ("PSU") awards to the Company's employees. These awards were granted outside of the 2018 Plan and the 2021 Plan. As the Company's stock price has decreased since these awards, their impact on the results of operations and balance sheet of the Company are not material at September 30, 2022.

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, 2022 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.

10. Securities Registrations and Sales Agreements

January 2021 Offering

On January 7, 2021, the Company entered into a purchase agreement with certain institutional and accredited investors for the sale of an aggregate of 1,303,408 shares of the Company's common stock, at a purchase price of $6.675 per share.

Under the purchase agreement, subject to certain exceptions, the Company is prohibited from effecting or entering into an agreement to effect any "variable rate transactions" as defined in the purchase agreement for a period of five years following the closing of the offering.

In connection with the offering, pursuant to the purchase agreement we reimbursed Lincoln Park Capital Fund, LLC, as the lead investor ("Lincoln Park"), an aggregate of $100,000 for expenses incurred in connection with the offering, including any due diligence expenses and legal fees. Furthermore, pursuant to the purchase agreement, we have granted Lincoln Park certain rights to participate at fair value with other investors in up to 50% of the amount of any future offerings of common stock or securities exercisable for or convertible into common stock that the Company seeks to complete within one year after the closing of the offering, other than a firm commitment public offering.

The net proceeds to the Company from the offering, after deducting Lincoln Park's expenses and other estimated offering expenses payable by the Company were approximately $8.5 million.

The shares sold in the offering were offered and sold by the Company directly to the investors, without a placement agent, underwriter, broker or dealer, pursuant to an effective shelf registration statement on Form S-3 (File No. 333-237844) declared effective by the SEC on May 18, 2020, and the base prospectus contained therein. The offering closed on January 11, 2021.

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

February 2021 Offering

On February 10, 2021, the Company entered into an underwriting agreement with Guggenheim Securities, LLC, as representative of several underwriters, for the public offering of 1,666,667 shares of the Company's common stock, at a public offering price of $15.00 per share. Under the terms of the underwriting agreement, the Company granted the underwriters an option, exercisable for 30 days, to purchase up to an additional 250,000 shares of common stock at the same price. The option was exercised prior to closing.

In connection with the offering, the Company paid the underwriters a cash fee equal to 6% of the gross proceeds in the offering and $100,000 in legal fees and expenses.

The net proceeds to the Company from the offering, including exercise of the underwriters' option, were approximately $26.7 million, after deducting fees and estimated offering expenses payable by the Company.

The offering was made pursuant to a registration statement (No. 333-237844) on Form S-3, which was initially filed by the Company with the SEC on April 24, 2020, amended on Form S-3/A that was filed with the SEC on May 15, 2020, and was declared effective by the SEC on May 18, 2020. The offering closed on February 16, 2021.

August 2021 Equity Distribution Agreement

On August 20, 2021, the Company entered into an Equity Distribution Agreement (the "Equity Distribution Agreement") with Piper Sandler & Co. ("Piper Sandler") under which the Company may offer and sell, from time to time at its sole discretion, shares of the Company's common stock, with aggregate gross sales proceeds of up to $25.0 million through an "at the market" equity offering program under which Piper Sandler is the sales agent.

Under the Equity Distribution Agreement, the Company has the right to set the parameters for the sale of shares, including the number of shares to be issued, the time period during which sales are requested to be made, limitations on the number of shares that may be sold in any one trading day and any minimum price below which sales may not be made. Subject to the terms and conditions of the Equity Distribution Agreement, Piper Sandler may sell the shares by methods deemed to be an "at the market" offering as defined in Rule 415 promulgated under the Securities Act of 1933, as amended, including sales made through The Nasdaq Capital Market or any other trading market for our common stock. The Equity Distribution Agreement provides that Piper Sandler is entitled to compensation for its services equal to 3.0% of the gross proceeds of any shares of common stock sold through Piper Sandler under the Equity Distribution Agreement. The Company has no obligation to sell any shares under the Equity Distribution Agreement, and may at any time suspend solicitation and offers under the Equity Distribution Agreement. Through September 30, 2022, the Company sold 109,523 shares under the agreement at a weighted average price of $5.32 per share. Net proceeds after commissions and offering expenses were approximately $0.5 million. There were no shares sold by the Company under the agreement during the nine months ended September 30, 2022.

The shares are issued pursuant to the Company's shelf registration statement on Form S-3 (File No. 333-237844). The Company filed a prospectus supplement, dated August 20, 2021 with the Securities and Exchange Commission in connection with the offer and sale of the shares pursuant to the Equity Distribution Agreement.

September 2021 Offering

On September 23, 2021, the Company entered into an underwriting agreement with Guggenheim Securities, LLC, as representative of several underwriters, for the public offering of 5,000,000 shares of the Company's common stock, at a public offering price of $4.20 per share. Under the terms of the underwriting agreement, the Company granted the underwriters an option, exercisable for 30 days, to purchase up to an additional 750,000 shares of common stock at the same price. The option was not exercised.

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

In connection with the offering, the Company paid the underwriters a cash fee equal to 6% of the gross proceeds in the offering and $100,000 in legal fees and expenses.

The net proceeds to the Company from the offering, including exercise of the underwriters' option, were approximately $19.5 million, after deducting fees and estimated offering expenses payable by the Company.

The offering was made pursuant to a registration statement (No. 333-237844) on Form S-3, which was initially filed by the Company with the SEC on April 24, 2020, amended on Form S-3/A that was filed with the SEC on May 15, 2020, and was declared effective by the SEC on May 18, 2020. The offering closed on September 28, 2021.

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, 2021 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 21, 2022. 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 May 20, 2021.

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 clinical-stage programs, continued product development 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 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 securities on a national securities exchange;
- the potential for third party disputes and litigation;
- the performance of third parties, including contract research organizations ("CROs") and third-party manufacturers; and
- the impact of the novel coronavirus disease, COVID-19, to global economy and capital markets, and to our business and our financial results.

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, 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 products for patients with cancer. We have proprietary molecularly targeted agents designed to disrupt specific cellular pathways that are important for cancer cell proliferation. We believe that the product candidates in our pipeline have the potential to be efficacious in a variety of cancers with unmet medical need. We have the following two clinical-stage programs: 1. narazaciclib (ON 123300), a multi-targeted kinase inhibitor in solid tumors and hematological malignancies as a single agent or in combination with other anti-cancer therapies; and 2. rigosertib administered alone or in combination for the treatment of various cancers. We are currently evaluating potential compounds for in-licensing opportunities.

Our net losses were $13.5 million and $12.4 million for the nine months ended September 30, 2022 and 2021, respectively. As of September 30, 2022, we had an accumulated deficit of $458.3 million. We expect to incur significant expenses and operating losses for the foreseeable future as we continue the development 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, 2022, we had $42.6 million in cash and cash equivalents.

On August 20, 2021, we entered into an at-the-market equity distribution agreement for the sale of up to $25.0 million of common stock. Through September 30, 2022, we sold 109,523 shares under the agreement at a weighted average price of $5.32 per share. Net proceeds after commissions and offering expenses were approximately $0.5 million.

On May 20, 2021, we amended our certificate of incorporation to effect a one-for-fifteen reverse stock split of our common stock. All common stock, equity, share and per share amounts in the financial statements and notes have been retroactively adjusted to reflect the reverse stock split. Also on May 20, 2021, we amended our certificate of incorporation to decrease the number of authorized shares of common stock from 250,000,000 to 125,000,000.

We believe that our cash and cash equivalents of $42.6 million, at September 30, 2022, will be sufficient to fund our operations and ongoing trials into 2024. We do not have a recurring source of revenue to fund our operations and will need to raise additional funds to continue to develop and apply for regulatory approval for our drug candidates.

We are exploring various sources of funding for development and applying for regulatory approval of our research compounds 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 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.

Product Candidates / Compounds

Narazaciclib (ON 123300) — Differentiated Multi-Kinase Inhibitor Targeting CDK4/6

Pursuant to a license agreement with Temple University dated January 1, 1999 as amended March 21, 2013, we licensed compounds including our product candidate narazaciclib from Temple University. Narazaciclib is a multi-targeted kinase inhibitor targeting cyclin-dependent kinases (CDK) 2, 4, 6, and 9, AMPK related protein kinase 5 (ARK5), and colony-stimulating factor 1 receptor (CSF1R) at low nM concentrations as well as other tyrosine kinases believed to drive tumor cell proliferation, survival and metastasis. As an apoptotic and antiproliferative agent, narazaciclib modulates the levels and activities of regulatory proteins of the cell cycle, including cyclin D1 and inhibits retinoblastoma (Rb) protein binding. Narazaciclib inhibits cancer cell growth and suppresses deoxyribonucleic acid (DNA) synthesis by preventing CDK-mediated G1-S phase transition, followed by tumor cell death by induction of mitochondria-mediated apoptosis. We believe, based on data from preclinical studies, that narazaciclib has the potential to overcome the limitations of the current generation of approved cyclin dependent kinase (CDK) 4/6 inhibitors. The below table depicts the half-maximal in vitro inhibitory concentration (IC_{50}) of narazaciclib palbociclib, ribociclib and abemaciclib. IC_{50} is a quantitative measure indicating the concentration of each drug needed to inhibit, in vitro, these

listed kinases by 50%. We believe our CDK inhibitor is differentiated from other agents in the market or in development due to its multi-targeted kinase inhibition profile.

	Narazaciclib	**Palbociclib**	**Ribociclib**	**Abemaciclib**
Sponsor	Onconova	Pfizer	Novartis	Lilly
CDK Family				
CDK4/cyclin D1	2	2	3	0.8
CDK6/cyclin D1	0.6	0.8	6.0	0.6
CDK1/cyclin A	2190	>10,000	>10,000	270
CDK2/cyclin E	69	2300	>10,000	130
CDK9/T1	48	630	390	7
Other Kinases				
CSF1R	0.7	>10,000	>10,000	>10,000
ARK 5/NUAK 1	5	1,400	1,540	773
FLT3	6.0	496	753	72

Source: Reaction Biology 2021

In addition to CDK 4/6, narazaciclib also inhibits ARK5 (NUAK1) with high potency with a 50% inhibitory concentration (IC50) of 4.95 nM (Report EPR-123300-001 and Reddy 2014) while palbociclib, ribociclib, and abemaciclib do not. The equilibrium dissociation constant (Kd) value of narazaciclib binding to ARK5 was found to be 19 nM, while a known NUAK1 specific inhibitor (HTH-015-01) was 790 nM. In addition, using a cellular based assay that measures kinase activity in intact cells, NanoBret technology, it was determined that narazaciclib inhibited ARK5 with an IC50 value of 30 nM, while 2 published inhibitors, HTH-015-01 and WZ4003, had IC50 values of >10,000 nM. ARK5 (also known as NUAK1) is a member of the AMP-activated protein kinase (AMPK) catalytic subunit family and functions as a key regulator of cellular energy homeo-stasis (Lui 2012). ARK5 has been shown to be important in a number of cancer cell regulated survival pathways such as regulating AKT dependent cell survival, cell metabolism through c-MYC activity, tumor cell survival under oxidative stress and tumor cell migration (Faisal, 2020, Lui, 2012, Port, 2018). The combination of CDK and ARK5 inhibitors in the same molecular entity is proposed to have a differentiated effect on cancer cells by simultaneously inhibiting both cell cycle (cytostatic) and cellular metabolism (cytotoxic) pathways through CDK and ARK5, respectively.

Narazaciclib also inhibits CSF1R with IC50 values between 0.7 to 10 nM (Unpublished data and Reddy 2014). The Kd value of narazaciclib binding to CSF1R was determined to be 0.7 nM. In addition, using a cellular based assay that measures kinase activity in intact cells, NanoBret technology, it was determined that narazaciclib inhibited CSF1R with an IC50 value of 0.7 nM. The ability of narazaciclib to bind and inhibit CSF1R at low nanomolar values, in both in vitro and cell-based assays suggests that this compound may have an impact in cancers with a dependence on CSF1R signaling.

In certain in vitro models, the kinase inhibitory profile of narazaciclib had high activity against CDK4, CDK6, ARK5, CSF1R, PDGFRß and PI3K-δ, all of which are associated with the growth, survival and metastasis of human tumor cells (Reddy, 2014). In an in vitro investigation of narazaciclib against a broad spectrum of human tumor cell lines, narazaciclib displayed potent antiproliferative activity, with 50% growth inhibitory concentrations (GI50) ranging from 0.02 µM to 1.5 µM. In these in vitro models, narazaciclib exhibited a broad range of activity against a wide spectrum of cell lines of both hematological origin (lymphoma, leukemia and myeloma) as well as solid tumors derived from multiple organ sites. Studies on drug-resistant human tumor cell lines suggested that narazaciclib is not a multidrug resistance gene (mdr1) substrate and may be active against drug-resistant tumor cell lines (IBv.1 2020; Reddy, 2014). The activity of narazaciclib does not appear to be affected by the overexpression of MDR-1 and induced apoptosis in both ibrutinib-sensitive and ibrutinib-resistant patient derived cells (Divakar, 2016). The ability of narazaciclib to inhibit the CDK4/6/RB1 pathway has also been shown in pre-clinical testing of mantle cell lymphoma (Divakar, 2016), multiple myeloma (Perumal, 2016), various breast cancer subtypes (Reddy 2014) and colorectal cancer (IBv.2 2022).

The effectiveness of first-generation non-selective CDK inhibitors (Selicilib/roscovitine and Alvocidib/ flavopiridol) in early trials was limited due to toxicities (Blachly 2013). Second-generation compounds (palbociclib and

ribociclib) specifically inhibit CDK4 and 6, thereby inhibiting retinoblastoma (RB) protein phosphorylation. Abemaciclib is a multi-targeted kinase CDK4/6 inhibitor with low nano molar activity against CDK4/6. The second generation CDK4/6 inhibitors have substantially improved clinical outcomes for patients with hormonal-receptor (HR) positive metastatic breast cancer (Hortobagyi 2018, Sledge 2017, Finn 2016). Several CDK4/6 inhibitors (palbociclib, ribociclib and abemaciclib) have been approved and are now standard of care either alone (abemaciclib) or in combination with anti-estrogen therapy for patients with HR-positive, HER2-negative metastatic breast cancer. Another CDK4/6 inhibitor has recently been approved, trilaciclib, in the supportive care space, for the prevention of myelosuppression following chemotherapy.

In December 2017, we entered into a license and collaboration agreement with HanX Biopharmaceuticals, Inc. (‘HanX”), a company focused on development of novel oncology products, for the further development, registration and commercialization in China of narazaciclib. Under the terms of the agreement, we received an upfront payment, and will receive regulatory and commercial milestone payments, as well as royalties on any future Chinese sales if the drug is approved. The key feature of the 2017 collaboration was that HanX provided all funding required for the Chinese Investigational New Drug Application (a “IND”) thereby enabling the studies necessary in order to seek IND approval by the National Medical Products Administration (Chinese FDA). In the fourth quarter of 2019, HanX filed an IND with the Chinese FDA which was approved on January 6, 2020. We and HanX also intended for these studies underlying the Chinese IND approval, to meet the US Food and Drug Administration (“FDA”) standards for IND approval. Accordingly, such studies were used by us for an IND filing with the US FDA. In September 2020, a Phase 1 Study with narazaciclib in cancer patients was initiated in China. We maintain global rights to the study and study data outside of China.

In partnership with HanX, a Phase 1 dose escalation study (Study HX301-I-01) for patients with advanced relapsed/refractory cancer has been initiated in China at three sites and the first patient was enrolled on September 15, 2020. In this study HX301 (narazaciclib) is dosed every day for 21 days followed by 7 days off therapy in each 28 -day cycle. In China, the first four dose cohorts have been completed. The fifth cohort is enrolling patients at 200 mg per day.

Our IND submission to the US FDA was submitted in November 2020 and the FDA Study May Proceed letter was issued in December 2020. Enrollment into the complementary US phase 1 study (Study 19-01) commenced in May 2021. The study will assess the safety, tolerability, pharmacokinetics and pharmacodynamics of narazaciclib administered orally at increasing doses starting at 40 mg daily for consecutive 28-day cycles in patients with relapsed/refractory advanced cancer. Enrollment in the fourth dose cohort of the Phase 1 solid tumor study of narazaciclib is complete with no dose limiting toxicities (DLT’s) observed. The fifth dose cohort is currently ongoing.

Collectively, once completed, these two Phase 1 studies are expected to provide preliminary safety data and the recommended Phase 2 dose and schedule for narazaciclib as a single agent.

Retinoblastoma (Rb) protein is a master regulator of cell division and is critical to several cellular processes including senescence, self-renewal, replication and apoptosis (Engel, 2015). It is believed that loss or inactivation of Rb leads to malignant cell formation and occurs in the pathogenesis of some cancers. In a preclinical Retinoblastoma (Rb) positive xenograft model for breast cancer, narazaciclib activity was shown to be similar to palbociclib (Pfizer’s Ibrance ®). Moreover, based on the same preclinical model, narazaciclib 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 ($P< 0.01$) inhibitory effect on neutrophil counts when compared to narazaciclib. These results would need to be replicated in clinical trials.

In vitro studies compared the growth inhibitory activity of narazaciclib and palbociclib in breast cancer RB null cell lines, which demonstrated resistance to palbociclib while maintaining sensitivity towards narazaciclib (IBv.2 2022). Studies using mantle cell lymphoma cells indicated that narazaciclib was able to induce cell death via induction of apoptosis by inhibiting the AKT/PI3K/mTOR pathway while palbociclib treatment was only able to induce cell cycle arrest due to the inhibition of CDK4/6 (Divakar, 2016). Narazaciclib treatment was associated with the presence of several apoptotic markers (PARP, caspase 3, caspase 7 and caspase 9) and narazaciclib (but not palbociclib) led to the generation of apoptotic cells. Overall, apoptosis following narazaciclib exposure has been observed in the following cell

lines: breast cancer (IBv.2 2022, Reddy, 2014), mantle cell lymphoma (Divakar, 2016), multiple myeloma (Perumal, 2016) and colorectal cancer (IBv.2 2022).

In addition to CDK4/6 and PI3 Kinase pathways, narazaciclib inhibits several other kinases in vitro including ARK5 (NUAK1) (IC50 of 4.95 nM) (IBv.2 2022, Reddy, 2014) while palbociclib does not. ARK5 is a member of the AMP - activated protein kinase (AMPK) family and is thought to function as a key regulator of cellular energy homeo-stasis (Liu, 2012) and is important in a number of cancer cell survival pathways. Overexpression of ARK5 is associated with poor prognosis in hepatocellular cancer (Cui, 2013), ovarian cancer (Phippen, 2016), colorectal cancer (Port, 2018) and glioblastoma (Lu, 2013). ARK5 is involved in the increased invasiveness, migration and metastatic potential of breast cancer cells (Chang, 2012), colorectal cancer (Kusakai, 2004), gastric cancer (Chen, 2017), and multiple myeloma (Suzuki et al., 2005). Narazaciclib inhibits ARK5 which may result in down regulation of the mTOR/MYC/RB1 pathways leading to cell cycle arrest and apoptosis.

Because ARK5 activity is now recognized as a component in promoting cancer cell migration and invasion (Kusaki, 2004) the effect of narazaciclib treatment may have an impact on cell migration and metastasis. In certain in vitro models, narazaciclib was able to inhibit the percent migration of U87 cells in a concentration- dependent manner. The time and concentrations that were tested did not result in cell death but did inhibit cell division at the higher concentrations (IBv.2 2022). The ability of narazaciclib to inhibit cell migration was compared to palbociclib using a wound healing model. Triple negative cancer cell migration was inhibited for 72 hours in the presence of narazaciclib but not in the presence of palbociclib (IBv.2 2022).

The pathogenesis and progression of a number of cancers, including breast and multiple myeloma, is linked to C-Myc (Li, 2003) which was dependent on ARK5 activity (Liu, 2012) and calcium dependent metabolism (Monteverde, 2018). The inhibition of ARK5 has been shown to be lethal in MYC overexpressing tumors (Liu, 2012, Perumal, 2016) and targeting ARK5 in the inhibitory profile of narazaciclib has the potential to overcome the emergence of resistance to CDK4/6 inhibitors due to the loss of retinoblastoma function and C-Myc overexpression. Preclinical studies with tumor cell lines suggest that several malignancies including HR-positive breast cancer, colorectal carcinoma, hepatocellular carcinoma, mantle cell lymphoma and multiple myeloma, may be clinically responsive to narazaciclib exposure (Reddy, 2014, Divakar, 2016, Perumal, 2016). Furthermore, narazaciclib has been tested in four murine xenograft models (breast cancer, colorectal cancer, mantle cell lymphoma and multiple myeloma) and was found to have on-target activity and be non-toxic to the animals (Reddy, 2014; Divakar, 2016; Perumal, 2016; and IBv.2 2022).

CSF1R is in the class III kinase receptors that include c-Kit, platelet-derived growth factor receptor (PDGFR) alpha, and FLT3. CSF1R has 2 high affinity binding ligands, colony stimulating factor 1 (CSF-1), also known as macrophage colony-stimulating factor (M-CSF) and interleukin 34 (IL-34). CSF-1 is important for the differentiation and proliferation of myeloid progenitor cells into macrophages, monocytes, dendritic cells, and osteoclasts. Macrophages play an important role in the pathogenesis of not only tumor growth but multiple other diseases such as inflammatory diseases and bone metabolism. High levels of CSF-1 are critical for the recruitment of tumor associated macrophages (TAMs), predominantly the immunosuppressive phenotype (M2). They are the main inflammatory immune cells in the tumor microenvironment and are involved in tumor immunosuppression, angiogenesis, invasion, and metastasis.

Overexpression of CSF-1 or CSF1R is associated with tumor aggressiveness and poor prognosis. Inhibiting the signaling pathway of CSF1R provides a method to reduce the number of M2 macrophages/TAMs within the tumor microenvironment and thus improve anti-tumor immunological therapy. Recent studies have found that CSF-1/CSF1R axis blockade can improve the efficiency of immune checkpoint inhibitors, especially programmed death-ligand 1 inhibitors.

Cancer cells can lose RB function through mutation and become resistant or insensitive to palbociclib. Generally, second generation agents have not been shown to be suitable for single agent therapy and must typically be used in combination with hormonal therapy in the treatment of HR+/HER2- mBC. In addition, the rate of disease progression that occurs, especially in patients with visceral disease (Hortobagyi 2018), may benefit from the novel inhibitory effects of narazaciclib. This hypothesis needs to be proven in a clinical trial.

Unfortunately, several mechanisms of acquired resistance are emerging with the approved CDK4/6 inhibitors leading to progression in patients with HR+/HER2- mBC (Spring, 2019; Knudsen, 2020). Therefore, the unmet medical need supports development of the next (third) generation CDK4/6 inhibitors in advanced HR+/HER- mBC. The inhibitory effect of narazaciclib may provide a therapeutic strategy to optimize efficacy of CDK 4/6 inhibition and reduce the emergence of resistance and/or provide clinical benefit for patients with progression on palbociclib, ribociclib and/or abemaciclib.

We believe narazaciclib has a favorable kinase inhibitory profile in comparison to the approved CDK4/6 inhibitors (palbociclib, ribociclib, and abemaciclib) and may result in both tumorigenic and safety benefits (Perumal, 2016, Divakar, 2016).

Based on data from continuous dosing studies in rats and monkeys the safety profile of narazaciclib is anticipated to be better than the approved CDK4/6 inhibitors with myelosuppression and gastrointestinal toxicity being most common. Management of these adverse events is expected to follow that used for the approved CDK 4/6 inhibitors. We believe that the proposed mechanism of action of narazaciclib, the unmet medical need of the advanced cancers potentially targeted by narazaciclib and the anticipated safety profile of narazaciclib as seen in pre-clinical studies, support conducting clinical studies.

Clinical development of narazaciclib for breast cancer as well as other solid tumors and hematological malignancies in clinical trials is warranted based on the preclinical in vitro studies as well as the xenograft models. Onconova plans to advance testing whether narazaciclib will demonstrate activity and/or safety in patients with advanced malignancies.

As previously mentioned, CDK 4/6 inhibitors have been added to aromatase inhibitors and SERDs to enhance anti-tumor activities in HR+, HER2- metastatic breast cancer. Mirza and colleagues presented the results of the randomized phase 2 study NSGO-PALEO / ENGOT-EN3 trial at ESMO 2020 and reported that palbociclib and letrozole yielded meaningful PFS benefit in women with ER+ recurrent endometrial cancer (Mirza et al. 2020).

Endometrial carcinoma (EC) is the most common gynecological malignancy (American Cancer Society 2021). Endometrioid endometrial carcinoma (EEC), the most common subtype of EC, accounts for approximately 75% of cases. In the US, approximately 65,950 new endometrial cancers and uterine sarcomas and approximately 12,550 deaths are expected in 2022, and the incidence and mortality have been increasing (American Cancer Society 2022). Low-grade (Grade 1 or 2) EECs (LGEECs) have ≥95% (Grade 1) or 50% to 94% (Grade 2) cancer tissue forming glands. Treatment includes surgery, radiotherapy, and/or systemic therapy. Systemic therapy is typically chemotherapy and/or hormonal therapy, and typical regimens include paclitaxel/carboplatin with letrozole maintenance; paclitaxel/carboplatin/bevacizumab with bevacizumab maintenance; or letrozole, anastrozole, or exemestane (NCCN 2022). Overall, 5-year disease-free survival and 5-year survival are high, 81.7% and 83.1%, respectively (Gottwald 2010), but for recurrent or metastatic disease morbidity and mortality are high.

In the NSGO-PALEO / ENGOT-EN3 trial presented by Mirza at ESMO 2020 participants were randomized to letrozole 2.5 mg orally D1-28 with either palbociclib 125 mg or placebo orally d1–21 in a 28-d cycle until disease progression. PFS was significantly improved with letrozole and palbociclib compared to the placebo arm (median PFS 8.3 vs. 3.0 months, HR 0.56, 95% CI 0.32 to 0.98, p=0.04). Disease control rate at 24 weeks was also improved (63.6% vs. 37.8%). This data has been reinforced by phase 2 data presented with ribociclib and letrozole as well as abemaciclib and letrozole in this patient population.

Onconova will initiate a multi-center Phase 1/2a trial evaluating its multi-kinase inhibitor, narazaciclib, in combination with letrozole as a second- or third-line therapy for the treatment of recurrent metastatic low-grade endometrioid endometrial cancer (LGEEC) in 1Q23. Both narazaciclib and letrozole will be administered orally with a continuous daily dosing schedule in the trial, which will begin with a Phase 1 dose escalation phase before moving to a Phase 2 expansion cohort designed to enroll approximately 30 patients.

Oral Rigosertib and PD-1 Combination in KRAS-Mutated Cancers

We are currently supporting investigator-initiated studies (ISS) that are exploring the use of rigosertib for cancers driven by mutated Ras genes including a Phase 1/2a study of rigosertib in combination with a PD-1 inhibitor for patients with progressive K-Ras mutated non-small cell lung cancer (NSCLC). The NSCLC study is open and continues to enroll patients. The objectives of this study are to identify the recommended Phase 2 dose (RP2D) for future studies and characterize the safety profile of the combination treatment. Final results of the Phase 1 portion of the study are expected in late 2022. On June 28, 2021, we announced an update regarding this NSCLC study, with an expansion of the trial underway at the highest dose in the current protocol. To date, one patient with a dose limiting toxicity of hyponatremia has been observed. Continued dose escalation is being considered as we believe the maximum tolerated dose has not been reached. In addition, preliminary efficacy data support the preclinical observation of rigosertib augmenting the response to checkpoint inhibition (CPI) in patients who had previously failed all standard of care treatment, including CPI. Interim data presented at the 3rd Annual RAS Targeted Drug Development Summit (September 21-23, 2021), demonstrated two partial responses and one stable disease out of seven evaluable patients, or a clinical benefit rate of 43% (3/7). The three patients with clinical benefit harbored different KRAS mutations; suggesting that patients with a variety of KRAS mutations may have the potential to respond to the novel combination including rigosertib. A more recent update was presented at the European Society of Medical Oncology (ESMO) meeting in September 2022. Updated data presented at the ESMO Annual Congress showed an early and encouraging signal of efficacy in the trial's extensively pre-treated population, with one complete response, two partial responses, and one instance of stable disease achieved in fourteen evaluable patients. These responses were achieved in patients with three distinct KRAS mutations who had failed prior checkpoint inhibitor therapy, thereby confirming rigosertib's KRAS-agnostic mechanism of action and potential to synergize with anti-PD-1 agents. We anticipate reporting additional data from this trial in 1H23, which will be key to informing our next steps in this program." We believe this supports further investigation of rigosertib in combination with CPI in KRAS mutated NSCLC.

On June 17, 2021, we announced a publication in Molecular Cancer (Yan, C., Saleh, N., Yang, J. *et al.* Novel induction of CD40 expression by tumor cells with RAS/RAF/PI3K pathway inhibition augments response to checkpoint blockade. *Mol Cancer* **20,** 85; 2021) which demonstrated that rigosertib synergistically combined with CPI improved tumor growth inhibition and survival in a murine melanoma model that did not respond to CPI alone. It was postulated that rigosertib's anti-cancer activity was due to its ability to reverse immunosuppressive tumor microenvironments. We believe this pre-clinical data support the clinical evaluation of rigosertib in combination with a CPI in metastatic melanoma that has progressed on CPI therapy and we expect an ISS for continued development in the area will be open for enrollment.

Rigosertib as monotherapy

Based on rigosertib's activity against another important cell cycle pathway, PLK-1 (Antanasova, 2019), a Phase 1b/2 ISS with rigosertib monotherapy in patients with advanced squamous cell carcinoma associated with recessive dystrophic epidermolysis bullosa (RDEB-SCC) is enrolling patients. As we disclosed in December 2021 early preliminary data from an investigator-initiated Phase 2 open label trial of rigosertib monotherapy in advanced squamous cell carcinoma complicating recessive dystrophic epidermolysis bullosa (RDEB- SCC) were presented at the Austrian Society of Dermatology and Venerology Annual Conference 2021, which took place from November 25 – 27, 2021 and more recently at the World Congress on Rare Skin Diseases which took place in Paris, June 7-9, 2022.

RDEB is an ultra-rare condition with high unmet medical need caused by a lack of type VII collagen protein expression. Type VII collagen protein is responsible for anchoring the skin's inner layer to its outer layer, and its absence leads to extreme skin fragility and chronic wound formation in RDEB patients. Over time, many of these patients develop squamous cell carcinomas (SCCs) that typically arise in areas of chronic skin wounding and inflammation. Preclinical investigations demonstrated overexpression of polo like kinase 1 (PLK1) in RDEB-associated SCC tumor cells. These tumors show a highly aggressive, early metastasizing course, making them the primary cause of death for these patients, with a cumulative risk of death of 70% and 78.7% by age 45 and 55, respectively (Mellerio, 2016), (Fine, 2016). These neoplasms show limited response rates of mostly short duration to conventional chemo- and radiotherapy as well as targeted therapy with epidermal growth factor and tyrosine kinase inhibitors (Mellerio, 2016), (Stratigos, 2020).

Data from the recent presentations are from a patient with a history of multiple, unresectable SCCs that were unresponsive to prior treatments including cemiplimab. Results showed that intravenously administered rigosertib had an acceptable safety profile and that the patient experienced sustained clinical and histological complete remission of all lesions without signs of metastatic disease following 13 treatment cycles. The patient remains in complete remission and on drug, and the trial remains ongoing. A second patient was enrolled, however, the patient was removed from the study by the Principal Investigator due to noncompliance. A third patient was recently enrolled.

Though the trial's currently available safety and efficacy data are from only a single patient, the investigators believe they represent an encouraging finding that warrants further study. In addition, the investigators and we believe the data generated in preclinical models that suggest rigosertib's activity against PLK1 have now been preliminarily supported in the clinic and suggest that rigosertib may play a role in other more common cancers driven by PLK1.

Rare Disease Program in "RASopathies"

Based on the mechanism of action data published in the journal Cell in 2016, we initiated a collaborative development program focusing on a group of rare diseases with a well- defined molecular basis in expression or defects involving the Ras effector pathways. Since RASopathies are rare congenital diseases affecting young children, we embarked on a multifaceted collaborative program involving patient advocacy, government and academic organizations. RASopathies are usually caused by germline mutations in genes that alter the RAS subfamily and mitogen-activated protein kinases (MAPK) that control signal transduction and are among the most common genetic syndromes. Together, this group of diseases can impact more than 1 in 1,000 individuals, according to RASopathies.Net.

The NCI has conducted preclinical studies with cell lines from two pediatric solid tumors (rhabdomyosarcoma and neuroblastoma), including xenograft models. For both tumor cell lines, in vitro rigosertib exposure was associated with reduced cell viability associated with destabilization of microtubules, mitotic arrest and apoptosis. In a rhabdomyosarcoma xenograft model, rigosertib treatment delayed time to tumor progression and prolonged survival in the animals treated with rigosertib. (Kowalczyk, 2020).

Preclinical studies with rigosertib are also being conducted in cardiomyopathies which are seen in children with RASopathies.

Critical Accounting Policies 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. There have been no significant changes in our critical accounting policies and estimates as discussed in our annual report on Form 10-K filed with the SEC on March 21, 2022.

The full extent to which COVID-19 will directly or indirectly impact our business, results of operations and financial condition, including expenses and manufacturing, clinical trials and research and development costs, depends on future developments that are uncertain at this time.

Results of Operations

Comparison of the Three Months Ended September 30, 2022 and 2021

	Three Months Ended September 30,		
	2022	2021	Change
Revenue	$ 57,000	$ 57,000	$ —
Operating expenses:			
General and administrative	2,105,000	2,284,000	179,000
Research and development	3,593,000	1,763,000	(1,830,000)
Total operating expenses	5,698,000	4,047,000	(1,651,000)
Loss from operations	(5,641,000)	(3,990,000)	(1,651,000)
Change in fair value of warrant liability	—	530,000	(530,000)
Other income, net	243,000	7,000	236,000
Net loss	$ (5,398,000)	$ (3,453,000)	$ (1,945,000)

Revenues

Revenues for 2022 were consistent with 2021, and were due to the recognition of deferred revenue from our collaboration with SymBio.

General and administrative expenses

General and administrative expenses decreased $0.2 million, or 8%, to $2.1 million for the three months ended September 30, 2022 from $2.3 million for the three months ended September 30, 2021. This decrease was caused by a $0.1 million decrease in facilities and related cost, a $0.1 million decrease in commercial spending in the 2022 period, and a $0.1 million decrease in personnel related costs and stock compensation expense. The decreases were partially offset by a $0.1 million increase in investor relations, proxy solicitation, and fees related to our special meeting by proxy in the third quarter of 2022.

The details of our general and administrative expenses are:

	Three Months Ended September 30,	
	2022	2021
Professional & consulting fees	$ 363,000	$ 287,000
Stock based compensation	119,000	153,000
Personnel related	673,000	707,000
Commercial	—	101,000
Public company costs	586,000	515,000
Insurance & other	364,000	521,000
	$ 2,105,000	$ 2,284,000

Research and development expenses

Research and development expenses increased by $1.8 million, or 104%, to $3.6 million for the three months ended September 30, 2022 from $1.8 million for the three months ended September 30, 2021. This increase was caused primarily by a $1.9 million increase in manufacturing costs related to the timing of narazaciclib drug substance and drug product manufacturing and $0.1 million higher stock compensation expense during the 2022 period. These increases were partially offset by a $0.3 million decrease in preclinical and clinical development expenses in the 2022 period.

The details of our research and development expenses are:

	Three Months Ended September 30,	
	2022	2021
Preclinical & clinical development	$ 491,000	$ 727,000
Personnel related	545,000	397,000
Manufacturing, formulation & development	2,147,000	260,000
Stock based compensation	170,000	29,000
Consulting fees	240,000	350,000
	$ 3,593,000	$ 1,763,000

Change in fair value of warrant liability

The fair value of the warrant liability was $0 during the third quarter of 2022, following the expiration of the underlying tradable warrants in 2021. The change in the fair value of the warrant liability was $0.5 million during the three months ended September 30, 2021 based on the change in market value of the tradable warrants in the 2021 period.

Other income, net

Other income, net, was income of $243,000 and $7,000 for the three months ended September 30, 2022 and 2021, respectively. The change of $236,000 was due to $22,000 higher foreign currency exchange gain and $215,000 higher interest income in the 2022 period.

Comparison of the Nine Months Ended September 30, 2022 and 2021

	Nine Months Ended September 30, 2022	2021	Change
Revenue	$ 170,000	$ 170,000	$ —
Operating expenses:			
General and administrative	6,430,000	7,351,000	921,000
Research and development	7,633,000	5,552,000	(2,081,000)
Total operating expenses	14,063,000	12,903,000	(1,160,000)
Loss from operations	(13,893,000)	(12,733,000)	(1,160,000)
Change in fair value of warrant liability	—	321,000	(321,000)
Other income, net	349,000	13,000	336,000
Net loss	$ (13,544,000)	$ (12,399,000)	$ (1,145,000)

Revenues

Revenues for 2022 were consistent with 2021, and were due to the recognition of deferred revenue from our collaboration with SymBio.

General and administrative expenses

General and administrative expenses decreased $0.9 million, or 13% to $6.4 million for the nine months ended September 30, 2022, from $7.3 million for the nine months ended September 30, 2021. This decrease was caused by a $1.2 million decrease in investor relations, proxy solicitation, and fees related to our special meeting by proxy in 2021 which did not occur in 2022. This decrease was partially offset by a $0.2 million increase in payroll expenses and bonus accruals in the 2022 period and $0.1 million higher stock compensation expense in the 2022 period.

The details of our general and administrative expenses are:

	Nine Months Ended September 30, 2022	2021
Professional & consulting fees	$ 1,255,000	$ 1,227,000
Stock based compensation	377,000	272,000
Personnel related	2,591,000	2,282,000
Commercial	—	101,000
Public company costs	1,149,000	2,370,000
Insurance & other	1,058,000	1,099,000
	$ 6,430,000	$ 7,351,000

Research and development expenses

Research and development expenses increased by $2.1 million, or 38%, to $7.6 million for the nine months ended September 30, 2022 from $5.6 million for the nine months ended September 30, 2021. This increase was caused primarily by $2.2 million higher manufacturing costs related to narazaciclib drug substance and drug product manufacturing and $0.7 million higher stock based compensation and personnel expenses in the 2022 period. These increases were partially offset by a $0.8 million decrease in clinical development and consulting expenses on the INSPIRE program in the 2022 period.

The details of our research and development expenses are:

	Nine Months Ended September 30,	
	2022	2021
Preclinical & clinical development	$ 1,302,000	$ 1,887,000
Personnel related	1,772,000	1,515,000
Manufacturing, formulation & development	3,168,000	968,000
Stock based compensation	448,000	45,000
Consulting fees	943,000	1,137,000
	$ 7,633,000	$ 5,552,000

Change in fair value of warrant liability

The fair value of the warrant liability was reduced to $0 during the third quarter of 2021, following the expiration of the underlying tradable warrants. The change in the fair value of the warrant liability was an increase of $0.3 million during the nine months ended September 30, 2021 based on the change in market value of the tradable warrants in the 2021 period.

Other income, net

Other income, net, was $349,000 and $13,000 for the nine months ended September 30, 2022 and 2021, respectively. The change of $336,000 was due primarily to $42,000 higher foreign currency exchange gain and $296,000 higher interest income in the 2022 period.

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 $13.5 million and $12.4 million for the nine months ended September 30, 2022 and 2021, respectively. Our operating activities used $12.4 million and $15.2 million of net cash during the nine months ended September 30, 2022 and 2021, respectively. At September 30, 2022, we had an accumulated deficit of $458.3 million, working capital of $36.4 million, and cash and cash equivalents of $42.6 million. We believe that our cash and cash equivalents as of September 30, 2022, will be sufficient to fund our operations and ongoing trials into 2024.

Cash Flows

The following table summarizes our cash flows for the nine months ended September 30, 2022 and 2021:

	Nine Months Ended September 30,	
	2022	2021
Net cash (used in) provided by:		
Operating activities	$ (12,410,000)	$ (15,222,000)
Investing activities	—	—
Financing activities	—	55,595,000
Effect of foreign currency translation	(47,000)	(20,000)
Net increase (decrease) in cash and cash equivalents	$ (12,457,000)	$ 40,353,000

Net cash used in operating activities

Net cash used in operating activities was $12.4 million for the nine months ended September 30, 2022 and consisted primarily of a net loss of $13.5 million, including $0.8 million of noncash stock-based compensation expense. Changes in operating assets and liabilities resulted in a net increase in cash of $0.3 million. Significant changes in operating assets and liabilities included an increase in prepaid expenses and other current assets of $0.8 million, an increase in accounts payable of $1.0 million and an increase in accrued liabilities of $0.2 million due to timing of

invoices and payments to our vendors, and a decrease in deferred revenue of $0.2 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 $15.2 million for the nine months ended September 30, 2021 and consisted primarily of a net loss of $12.4 million, including a decrease in the fair value of warrant liability of $0.3 million, and $0.3 million of both noncash stock-based compensation and depreciation expense. Changes in operating assets and liabilities resulted in a net decrease in cash of $2.8 million. Significant changes in operating assets and liabilities included a decrease in prepaid expenses and other current assets of $0.2 million, a decrease in accounts payable and accrued liabilities of $3.0 million due to timing of invoices and payments to our vendors, and a decrease in deferred revenue of $0.2 million due to recognition of the unamortized portion of the upfront payment under our collaboration agreement with SymBio.

Net cash provided by financing activities

There were no cash flows from financing activities during the nine months ended September 30, 2022. Net cash provided by financing activities was $55.6 million for the nine months ended September 30, 2021 resulting from proceeds received from the sales of common stock and the exercise of warrants.

Material Cash Requirements

We believe that our cash and cash equivalents of $42.6 million at September 30, 2022, will be sufficient to fund our operations and ongoing trials into 2024. 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 net cash expended in 2022 to be slightly higher than 2021. We expect clinical trial costs to increase as we focus on our earlier clinical stage compound, narazaciclib, and increased headcount in our clinical and regulatory groups. We would also expect an increase in costs for any completed potential in-licensing, the timing of which would be determined by the timing of any potential in-licensing. We enter into contracts in the normal course of business with third-party contract organizations for clinical trials, preclinical studies, manufacturing and other services and products for operating purposes. These contracts generally provide for termination following a certain period after notice and therefore we believe that, currently, our non-cancelable obligations under these agreements are not material.

For additional risks, please see “Risk Factors” in Part II of this report and previously disclosed in our most recent annual report on Form 10-K.

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, 2022. 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, 2022, 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, 2022 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

In addition to the following risk factor, you should carefully consider the risk factors discussed in Part I, "Item 1A. Risk Factors" in our Annual Report on Form 10-K filed with the SEC on March 21, 2022 which could materially affect our business, financial condition or future results. The following risk factor and the risks described in our Annual Report on Form 10-K are not the only risks we face. Additional risks and uncertainties not currently known to us or that we currently deem to be immaterial also may materially adversely affect our business, financial condition and/or operating results.

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

We are required to meet certain qualitative and financial tests to maintain the listing of our securities on The Nasdaq Capital Market. As of November 4, 2022, we were not in compliance with the Nasdaq continued listing requirements related to minimum bid price.

On November 7, 2022, we received a letter from The Nasdaq Capital Market ("Nasdaq") indicating that we failed to comply with the minimum bid price requirement of Nasdaq Listing Rule 5550(a)(2). Nasdaq Listing Rule 5550(a) (2) requires that companies listed on Nasdaq maintain a minimum closing bid price of at least $1.00 per share.

Under Nasdaq Listing Rule 5810(c)(3)(A), we have a 180 calendar day grace period, or until May 8, 2023, to regain compliance by meeting the continued listing standard. The continued listing standard will be met if the Company's common stock has a minimum closing bid price of at least $1.00 per share for a minimum of ten consecutive business days during the 180 calendar day grace period.

If we are not in compliance by May 8, 2023, we may be afforded a second 180 calendar day period to regain compliance. To qualify, we would be required to meet the continued listing requirement for market value of publicly held shares and all other initial listing standards for The Nasdaq Capital Market, except for the minimum bid price

requirement. In addition, we would be required to notify Nasdaq of our intention to cure the minimum bid price deficiency during the second compliance period, by effecting a reverse stock split, if necessary.

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

We intend to monitor the closing bid price of the Company's common stock and consider our available options to resolve the noncompliance with the minimum bid price requirement.

There can be no assurance that we will be able to regain compliance with the minimum bid price requirement or will otherwise be in compliance with other Nasdaq listing criteria.

If we are unable to maintain compliance with the continued listing requirements of the Nasdaq Capital Market, our Common Stock could be delisted, making it could be more difficult to buy or sell our securities and to obtain accurate quotations, and the price of our securities could suffer a material decline. Delisting could also impair our ability to raise capital.

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

Not applicable.

Item 3. Defaults Upon Senior Securities

Not applicable.

Item 4. Mine Safety Disclosures

Not applicable.

Item 5. Other Information

Notice of Delisting or Failure to Satisfy a Continuing Listing Rule or Standard; Transfer of Listing.

On November 7, 2022, the Company received a letter from The Nasdaq Capital Market ("Nasdaq") indicating that the Company has failed to comply with the minimum bid price requirement of Nasdaq Listing Rule 5550(a)(2). Nasdaq Listing Rule 5550(a) (2) requires that companies listed on Nasdaq maintain a minimum closing bid price of at least $1.00 per share.

Under Nasdaq Listing Rule 5810(c)(3)(A), the Company has a 180 calendar day grace period, or until May 8, 2023, to regain compliance by meeting the continued listing standard. The continued listing standard will be met if the Company's common stock has a minimum closing bid price of at least $1.00 per share for a minimum of ten consecutive business days during the 180 calendar day grace period.

If the Company is not in compliance by May 8, 2023, the Company may be afforded a second 180 calendar day period to regain compliance. To qualify, the Company would be required to meet the continued listing requirement for market value of publicly held shares and all other initial listing standards for The Nasdaq Capital Market, except for the minimum bid price requirement. In addition, the Company would be required to notify Nasdaq of its intention to cure the minimum bid price deficiency during the second compliance period, by effecting a reverse stock split, if necessary.

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

The Company intends to monitor the closing bid price of the Company's common stock and consider its available options to resolve the noncompliance with the minimum bid price requirement.

There can be no assurance that the Company will be able to regain compliance with the minimum bid price requirement or will otherwise be in compliance with other Nasdaq listing criteria.

Item 6. Exhibits

EXHIBIT INDEX

Exhibit Number	Description
10.1	Onconova Therapeutics, Inc. 2021 Incentive Compensation Plan, as Amended and Restated, as approved by stockholders
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 – The instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document
101.SCH	XBRL Taxonomy Extension Schema Document
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document
101.LAB	XBRL Taxonomy Extension Labels Linkbase Document
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document
104	Cover Page Interactive Data File (formatted as Inline XBRL and contained in Exhibit 101)

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, 2022

/s/ STEVEN M. FRUCHTMAN, M. D.
Steven M. Fruchtman, M.D.
President and Chief Executive Officer
(*Principal Executive Officer*)

Dated: November 14, 2022

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

ONCONOVA THERAPEUTICS, INC.

2021 INCENTIVE COMPENSATION PLAN

(As amended and restated, effective on the Restatement Effective Date)

The purpose of the Onconova Therapeutics, Inc. 2021 Incentive Compensation Plan (the "Plan") is to provide employees of Onconova Therapeutics, Inc. (the "Company") and its subsidiaries, certain consultants and advisors who perform services for the Company or its subsidiaries**,** and non-employee members of the Board of Directors of the Company with the opportunity to receive grants of incentive stock options, nonqualified stock options, stock appreciation rights, stock awards, stock units and other stock-based awards.

The Plan was originally effective as of the Original Effective Date and is hereby amended and restated effective as of the Restatement Effective Date. The Plan is a successor to the Onconova Therapeutics, Inc. 2018 Omnibus Incentive Compensation Plan, as amended and restated (the "2018 Plan"), which was a successor to the Onconova Therapeutics, Inc. 2013 Equity Incentive Plan (together with the 2018 Plan, the "Prior Plans"). No additional grants have been or will be made under the 2018 Plan on and after the Original Effective Date. Outstanding grants under the Prior Plans shall continue in effect according to their terms, and the shares with respect to outstanding grants under the applicable Prior Plan shall be issued or transferred under the applicable Prior Plan.

The Company believes that the Plan will encourage the participants to contribute materially to the growth of the Company, thereby benefitting the Company's stockholders, and will align the economic interests of the participants with those of the stockholders.

Section 1. Definitions

The following terms shall have the meanings set forth below for purposes of the Plan:

(a) "2018 Plan" shall have the meaning given to it in the preamble.

(b) "Award" shall mean an Option, SAR, Stock Award, Stock Unit or Other Stock-Based Award granted under the Plan.

(c) "Award Agreement" shall mean the written agreement that sets forth the terms and conditions of an Award, including all amendments thereto.

(d) "Board" shall mean the Board of Directors of the Company.

(e) "Cause" shall have the meaning given to that term in any written employment agreement, offer letter, consulting agreement or severance agreement between the Employer and the Participant, or if no such agreement exists or if such term is not defined therein, and unless otherwise defined in the Award Agreement, "Cause" shall mean a finding by the Committee of conduct involving one or more of the following: (i) the substantial and continuing failure of the Participant, after notice thereof, to render services to the Company or its subsidiaries in accordance with the terms or requirements of his or her employment, engagement as a Non-Employee Director or a Key Advisor; (ii) disloyalty, gross negligence, willful misconduct, dishonesty or breach of fiduciary duty to the Company or a Subsidiary; (iii) the commission of an act of embezzlement or fraud; (iv) deliberate disregard of the rules or policies of the Company or a Subsidiary which results in direct or indirect loss, damage or injury to the Company or a Subsidiary; (v) the unauthorized disclosure of any trade secret or confidential information of the Company or a Subsidiary; or (vi) the Participant's breach of any written non-competition, non-solicitation, invention assignment or confidentiality agreement between the Participant and the Company or any of its subsidiaries.

(f) "CEO" shall mean the Chief Executive Officer of the Company.

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

(i) the acquisition, directly or indirectly, by a "person" (within the meaning of Section 13(d)(3) of the Exchange Act) (a "Person") of beneficial ownership (within the meaning of Rule 13d-3 promulgated under the Exchange Act) of more than 50% of the combined voting power of the voting

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

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

(iii) the consummation of a reorganization, merger or consolidation of the Company, other than a reorganization, merger or consolidation, which would result in the Voting Securities outstanding immediately prior to the transaction continuing to represent (whether by remaining outstanding or by being converted to voting securities of the surviving entity) 65% or more of the Voting Securities or the voting power of the voting securities of such surviving entity outstanding immediately after such transaction; or

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

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

Notwithstanding the foregoing, if an Award constitutes deferred compensation subject to section 409A of the Code and the Award provides for payment upon a Change in Control, then, for purposes of such payment provisions, no Change in Control shall be deemed to have occurred upon an event described in items (i) – (v**)** above unless the event would also constitute a change in ownership or effective control of, or a change in the ownership of a substantial portion of the assets of, the Company under section 409A of the Code.

(h) "Code" shall mean the Internal Revenue Code of 1986, as amended, and the regulations promulgated thereunder.

(i) "Committee" shall mean the Compensation Committee of the Board or another committee appointed by the Board to administer the Plan. The Committee shall also consist of directors who are "non-employee directors" as defined under Rule 16b-3 promulgated under the Exchange Act and "independent directors," as determined in accordance with the independence standards established by the stock exchange on which the Common Stock is at the time primarily traded.

(j) "Common Stock" shall mean common stock of the Company.

(k) "Company" shall mean Onconova Therapeutics, Inc. (as defined in the preamble) and shall include its successors.

(l) "Disability" or "Disabled" shall mean, unless otherwise set forth in the Award Agreement, a Participant's becoming disabled within the meaning of the Employer's long-term disability plan applicable

to the Participant, or, if there is no such plan, a physical or mental condition that prevents the Participant from performing the essential functions of the Participant's position (with or without reasonable accommodation) for a period of six consecutive months.

(m) "Dividend Equivalent" shall mean an amount determined by multiplying the number of shares of Common Stock subject to a Stock Unit or Other Stock-Based Award by the per-share cash dividend paid by the Company on its outstanding Common Stock, or the per-share Fair Market Value of any dividend paid on its outstanding Common Stock in consideration other than cash. If interest is credited on accumulated divided equivalents, the term "Dividend Equivalent" shall include the accrued interest.

(n) "Employee" shall mean an employee of the Employer (including an officer or director who is also an employee), but excluding any person who is classified by the Employer as a "contractor" or "consultant," no matter how characterized by the Internal Revenue Service, other governmental agency or a court. Any change of characterization of an individual by the Internal Revenue Service or any court or government agency shall have no effect upon the classification of an individual as an Employee for purposes of this Plan, unless the Committee determines otherwise.

(o) "Employed by, or providing service to, the Employer" shall mean employment or service as an Employee, Key Advisor or member of the Board (so that, for purposes of exercising Options and SARs and satisfying conditions with respect to Stock Awards, Stock Units and Other Stock-Based Awards, a Participant shall not be considered to have terminated employment or service until the Participant ceases to be an Employee, Key Advisor and member of the Board), unless the Committee determines otherwise. If a Participant's relationship is with a subsidiary of the Company and that entity ceases to be a subsidiary of the Company, the Participant will be deemed to cease employment or service when the entity ceases to be a subsidiary of the Company, unless the Participant transfers employment or service to an Employer.

(p) "Employer" shall mean the Company and its subsidiaries.

(q) "Exchange Act" shall mean the Securities Exchange Act of 1934, as amended.

(r) "Exercise Price" shall mean the per share price at which shares of Common Stock may be purchased under an Option, as designated by the Committee.

(s) "Fair Market Value" shall mean:

(i) If the Common Stock is publicly traded, the Fair Market Value per share shall be determined as follows: (A) if the principal trading market for the Common Stock is a national securities exchange, the closing sales price during regular trading hours on the relevant date or, if there were no trades on that date, the latest preceding date upon which a sale was reported, or (B) if the Common Stock is not principally traded on any such exchange, the last reported sale price of a share of Common Stock during regular trading hours on the relevant date, as reported by the OTC Bulletin Board.

(ii) If the Common Stock is not publicly traded or, if publicly traded, is not subject to reported transactions as set forth above, the Fair Market Value per share shall be determined by the Committee through any reasonable valuation method authorized under the Code.

(t) "Incentive Stock Option" shall mean an Option that is intended to meet the requirements of an incentive stock option under section 422 of the Code.

(u) "Key Advisor" shall mean a consultant or advisor of the Employer.

(v) "Non-Employee Director" shall mean a member of the Board who is not an Employee.

(w) "Nonqualified Stock Option" shall mean an Option that is not intended to be taxed as an incentive stock option under section 422 of the Code.

(x) "Option" shall mean an option to purchase shares of Common Stock, as described in Section 6.

(y) "Original Effective Date" shall mean July 30, 2021.

(z) "Other Stock-Based Award" shall mean any Award based on, measured by or payable in Common Stock (other than an Option, Stock Unit, Stock Award, or SAR), as described in Section 10.

(aa) "Participant" shall mean an Employee, Key Advisor or Non-Employee Director designated by the Committee to participate in the Plan.

(bb) "Performance Objectives" shall mean the performance objectives established in the sole discretion of the Committee for Participants who are eligible to receive Awards under the Plan. Performance Objectives may be described in terms of Company-wide objectives or objectives that are related to the performance of the individual Participant or the subsidiary, division, department or function within the Company or one of its subsidiaries in which the Participant is employed. Performance Objectives may be measured on an absolute or relative basis. Relative performance may be measured by a group of peer companies or by a financial market index. Any Performance Objectives may include: specified levels of or increases in the Company's, a division's or a subsidiary's return on capital, equity or assets; earnings measures/ratios (on a gross, net, pre-tax or post-tax basis), including basic earnings per share, diluted earnings per share, total earnings, operating earnings, earnings growth, earnings before interest and taxes and earnings before interest, taxes, depreciation and amortization; net economic profit (which is operating earnings minus a charge to capital); net income; operating income; sales; sales growth; gross margin; direct margin; costs; stock price (including but not limited to growth measures and total stockholder return); operating profit; per period or cumulative cash flow (including but not limited to operating cash flow and free cash flow) or cash flow return on investment (which equals net cash flow divided by total capital); inventory turns; financial return ratios; market share; balance sheet measurements such as receivable turnover; improvement in or attainment of expense levels; improvement in or attainment of working capital levels; debt reduction; strategic innovation; customer or employee satisfaction; the consummation of one or more acquisitions of a certain size as measured by one or more of the financial criteria listed above; individual objectives; regulatory body approval for commercialization of a product; implementation or completion of critical projects (including, but not limited to, milestones such as clinical trial enrollment targets, commencement of phases of clinical trials and completion of phases of clinical trials); and any combination of the foregoing.

(cc) "Plan" shall mean this Onconova Therapeutics, Inc. 2021 Incentive Compensation Plan, as amended and restated as of the Restatement Effective Date and as may be in effect from time to time.

(dd) "Prior Plans" shall have the meaning given to the term in the preamble.

(ee) "Restatement Effective Date" shall mean July 21, 2022 or such later date that stockholder approval of the Plan as herein amended and restated is received.

(ff) "Restriction Period" shall have the meaning given that term in Section 7(a).

(gg) "SAR" shall mean a stock appreciation right, as described in Section 9.

(hh) "Stock Award" shall mean an award of Common Stock, as described in Section 7.

(ii) "Stock Unit" shall mean an award of a phantom unit representing a share of Common Stock, as described in Section 8.

(jj) "Substitute Awards" shall have the meaning given that term in Section 4(c).

Section 2. Administration

(a) Committee. The Plan shall be administered and interpreted by the Committee. The Committee may delegate authority to one or more subcommittees, as it deems appropriate. Subject to compliance with applicable law and the applicable stock exchange rules, the Board, in its discretion, may perform any action of the Committee hereunder. To the extent that the Board, the Committee, a subcommittee or the CEO, as described below, administers the Plan, references in the Plan to the "Committee" shall be deemed to refer to the Board, the Committee or such subcommittee or the CEO.

(b) Delegation to CEO. Subject to compliance with applicable law and applicable stock exchange requirements, the Committee may delegate all or part of its authority and power to the CEO, as it deems appropriate, with respect to Awards to Employees or Key Advisors who are not executive officers or directors under section 16 of the Exchange Act.

(c) Committee Authority. The Committee shall have the sole authority to (i) determine the individuals to whom Awards shall be made under the Plan, (ii) determine the type, size, terms and conditions

of the Awards to be made to each such individual, (iii) determine the time when the Awards will be made and the duration of any applicable exercise or restriction period, including the criteria for exercisability and the acceleration of exercisability, (v) amend the terms of any previously issued Award, subject to the provisions of Section 17 below, and (vi) deal with any other matters arising under the Plan.

(d) Committee Determinations. The Committee shall have full power and express discretionary authority to administer and interpret the Plan, to make factual determinations and to adopt or amend such rules, regulations, agreements and instruments for implementing the Plan and for the conduct of its business as it deems necessary or advisable, in its sole discretion. The Committee's interpretations of the Plan and all determinations made by the Committee pursuant to the powers vested in it hereunder shall be conclusive and binding on all persons having any interest in the Plan or in any awards granted hereunder. All powers of the Committee shall be executed in its sole discretion, in the best interest of the Company, not as a fiduciary, and in keeping with the objectives of the Plan and need not be uniform as to similarly situated individuals.

(e) Indemnification. No member of the Committee or the Board, and no employee of the Company shall be liable for any act or failure to act with respect to the Plan, except in circumstances involving his or her bad faith or willful misconduct, or for any act or failure to act hereunder by any other member of the Committee or employee or by any agent to whom duties in connection with the administration of this Plan have been delegated. The Company shall indemnify members of the Committee and the Board and any agent of the Committee or the Board who is an employee of the Company or a subsidiary against any and all liabilities or expenses to which they may be subjected by reason of any act or failure to act with respect to their duties on behalf of the Plan, except in circumstances involving such person's bad faith or willful misconduct.

Section 3. Awards

(a) General. Awards under the Plan may consist of Options as described in Section 6, Stock Awards as described in Section 7, Stock Units as described in Section 8, SARs as described in Section 9 and Other Stock-Based Awards as described in Section 10. All Awards shall be subject to the terms and conditions set forth herein and to such other terms and conditions consistent with this Plan as the Committee deems appropriate and as are specified in writing by the Committee to the individual in the Award Agreement. All Awards shall be made conditional upon the Participant's acknowledgement, in writing or by acceptance of the Award, that all decisions and determinations of the Committee shall be final and binding on the Participant, his or her beneficiaries and any other person having or claiming an interest under such Award. Awards under a particular Section of the Plan need not be uniform as among the Participants. Notwithstanding anything to the contrary herein, any dividends or Dividend Equivalents granted in connection with Awards under the Plan shall vest and be paid only if and to the extent the underlying Awards vest and are paid.

(b) Minimum Vesting. Awards granted under the Plan shall include regular vesting schedules that provide that no portion of an Award will vest earlier than one year from the date of grant. However, subject to adjustments made in accordance with Section 4(e) below, up to five percent (5%) of the shares of Common Stock subject to the aggregate share reserve set forth in Section 4(a) as of the Restatement Effective Date may be granted without regard to this minimum vesting requirement.

Section 4. Shares Subject to the Plan

(a) Shares Authorized. Subject to adjustment as described below in Sections 4(b) and 4(e), the maximum aggregate number of shares of Common Stock that may be issued or transferred under the Plan with respect to Awards made under the Plan on and after the Restatement Effective Date shall be 2,000,000 shares of Common Stock. In addition, any shares of Common Stock that remained available for Awards under the Plan as of the Restatement Effective Date and any shares of Common Stock subject to outstanding Awards granted under the Plan and awards granted under the Prior Plans as of the Restatement Effective Date that are payable in shares and that terminate, expire, or are cancelled, forfeited, exchanged or surrendered without having been exercised, vested or paid in shares, on or after the Restatement Effective Date, subject to adjustment as provided in Section 3(e) below, may be issued with respect to Awards under this Plan. The

aggregate number of shares of Common Stock that may be issued or transferred under the Plan pursuant to Incentive Stock Options granted on and after the Restatement Effective Date shall not exceed 2,000,000 shares of Common Stock.

(b) Source of Shares; Share Counting. Shares issued or transferred under the Plan may be authorized but unissued shares of Common Stock or reacquired shares of Common Stock, including shares purchased by the Company on the open market for purposes of the Plan. If and to the extent Options or SARs granted under the Plan or options granted under the Prior Plans terminate, expire or are canceled, forfeited, exchanged or surrendered without having been exercised, or if any Stock Awards, Stock Units, or Other Stock-Based Awards are forfeited, terminated or otherwise not paid in full, the shares subject to such Awards shall again be available for purposes of the Plan. Shares surrendered in payment of the Exercise Price of an Option (including an option granted under the Prior Plans that is exercised on or after the Original Effective Date) shall not be available for re-issuance under the Plan. Shares of Common Stock withheld or surrendered for payment of taxes with respect to Awards (including options granted under the Prior Plans) shall not be available for re-issuance under the Plan. If SARs are granted, the full number of shares subject to the SARs shall be considered issued under the Plan, without regard to the number of shares issued upon exercise of the SARs. To the extent any Awards are paid in cash, and not in shares of Common Stock, any shares previously subject to such Awards shall again be available for issuance or transfer under the Plan. For the avoidance of doubt, if shares are repurchased by the Company on the open market with the proceeds of the Exercise Price of Options (including options granted under the Prior Plans), such shares may not again be made available for issuance under the Plan.

(c) Substitute Awards. Shares issued or transferred under Awards made pursuant to an assumption, substitution or exchange for previously granted awards of a company acquired by the Company in a transaction ("Substitute Awards") shall not reduce the number of shares of Common Stock available under the Plan and available shares under a stockholder approved plan of an acquired company (as appropriately adjusted to reflect the transaction) may be used for Awards under the Plan and shall not reduce the Plan's share reserve (subject to applicable stock exchange listing and Code requirements).

(d) Individual Non-Employee Director Limit. Subject to adjustment as described below in Section 4(e), the maximum aggregate grant date value of shares of Common Stock subject to Awards granted to any Non-Employee Director during any calendar year for services rendered as a Non-Employee Director, taken together with any cash fees earned by such Non-Employee Director for services rendered as a Non-Employee Director during the calendar year, shall not exceed $300,000 in total value. For purposes of the limits set forth in this Section 4(d), the value of such Awards shall be calculated based on the grant date fair value of such Awards for financial reporting purposes.

(e) Adjustments. If there is any change in the number or kind of shares of Common Stock outstanding by reason of (i) a stock dividend, spinoff, recapitalization, stock split, reverse stock split or combination or exchange of shares, (ii) a merger, reorganization or consolidation, (iii) a reclassification or change in par value, or (iv) any other unusual or infrequently occurring event affecting the outstanding Common Stock as a class without the Company's receipt of consideration, or if the value of outstanding shares of Common Stock is substantially reduced as a result of a spinoff or the Company's payment of an extraordinary dividend or distribution, the maximum number and kind of shares of Common Stock available for issuance under the Plan, the maximum number and kind of shares of Common Stock for which any individual may receive Awards in any year, the kind and number of shares covered by outstanding Awards, the kind and number of shares issued and to be issued under the Plan, and the price per share or the applicable market value of such Awards shall be equitably adjusted by the Committee to reflect any increase or decrease in the number of, or change in the kind or value of, the issued shares of Common Stock to preclude, to the extent practicable, the enlargement or dilution of rights and benefits under the Plan and such outstanding Awards; provided, however, that any fractional shares resulting from such adjustment shall be eliminated. In addition, in the event of a Change in Control, the provisions of Section 12 of the Plan shall apply. Any adjustments to outstanding Awards shall be consistent with section 409A or 424 of the Code, to the extent applicable. Subject to Section 17(b) below, the adjustments of Awards under this Section 4(e) shall include adjustment of shares, Exercise Price of Options, base amount of SARs, Performance Objectives or other terms and conditions, as the Committee deems appropriate. The Committee shall have the sole discretion and authority to determine what appropriate adjustments shall be made and any adjustments determined by the Committee shall be final, binding and conclusive.

Section 5. Eligibility for Participation

(a) Eligible Persons. All Employees and Non-Employee Directors shall be eligible to participate in the Plan. Key Advisors shall be eligible to participate in the Plan if the Key Advisors render bona fide services to the Employer, the services are not in connection with the offer and sale of securities in a capital-raising transaction and the Key Advisors do not directly or indirectly promote or maintain a market for the Company's securities.

(b) Selection of Participants. The Committee shall select the Employees, Non-Employee Directors and Key Advisors to receive Awards and shall determine the number of shares of Common Stock subject to a particular Award in such manner as the Committee determines.

Section 6. Options

The Committee may grant Options to an Employee, Non-Employee Director or Key Advisor upon such terms as the Committee deems appropriate. The following provisions are applicable to Options:

(a) Number of Shares. The Committee shall determine the number of shares of Common Stock that will be subject to each Award of Options to Employees, Non-Employee Directors and Key Advisors.

(b) Type of Option and Exercise Price.

(i) The Committee may grant Incentive Stock Options or Nonqualified Stock Options or any combination of the two, all in accordance with the terms and conditions set forth herein. Incentive Stock Options may be granted only to employees of the Company or its parent or subsidiary corporations, as defined in section 424 of the Code. Nonqualified Stock Options may be granted to Employees, Non-Employee Directors and Key Advisors.

(ii) The Exercise Price of Common Stock subject to an Option shall be determined by the Committee and shall be equal to or greater than the Fair Market Value of a share of Common Stock on the date the Option is granted. However, an Incentive Stock Option may not be granted to an Employee who, at the time of grant, owns stock possessing more than 10% of the total combined voting power of all classes of stock of the Company, or any parent or subsidiary corporation of the Company, as defined in section 424 of the Code, unless the Exercise Price per share is not less than 110% of the Fair Market Value of a share of Common Stock on the date of grant.

(c) Option Term. The Committee shall determine the term of each Option. The term of any Option shall not exceed ten years from the date of grant. However, an Incentive Stock Option that is granted to an Employee who, at the time of grant, owns stock possessing more than 10% of the total combined voting power of all classes of stock of the Company, or any parent or subsidiary corporation of the Company, as defined in section 424 of the Code, may not have a term that exceeds five years from the date of grant. Notwithstanding the foregoing, in the event that on the last business day of the term of an Option (other than an Incentive Stock Option), the exercise of the Option is prohibited by applicable law, including a prohibition on purchases or sales of Common Stock under the Company's insider trading policy, the term of the Option shall be extended for a period of 30 days following the end of the legal prohibition, unless the Committee determines otherwise.

(d) Exercisability of Options. Subject to Section 3(b), Options shall become exercisable in accordance with such terms and conditions, consistent with the Plan, as may be determined by the Committee and specified in the Award Agreement. Subject to the limitations set forth in Section 12, the Committee may accelerate the exercisability of any or all outstanding Options at any time for any reason.

(e) Awards to Non-Exempt Employees. Notwithstanding the foregoing, Options granted to persons who are non-exempt employees under the Fair Labor Standards Act of 1938, as amended, may not be exercisable for at least six months after the date of grant (except that such Options may become exercisable, as determined by the Committee, upon the Participant's death, Disability or retirement, or upon a Change in Control or other circumstances permitted by applicable regulations).

(f) Termination of Employment or Service. Except as provided in the Award Agreement, an Option may only be exercised while the Participant is employed by, or providing services to, the Employer. The

Committee shall determine in the Award Agreement under what circumstances and during what time periods a Participant may exercise an Option after termination of employment or service.

(g) Exercise of Options. A Participant may exercise an Option that has become exercisable, in whole or in part, by delivering a notice of exercise to the Company. The Participant shall pay the Exercise Price for an Option as specified by the Committee (i) in cash or by check, (ii) unless the Committee determines otherwise, by delivering shares of Common Stock owned by the Participant and having a Fair Market Value on the date of exercise at least equal to the Exercise Price or by attestation (on a form prescribed by the Committee) to ownership of shares of Common Stock having a Fair Market Value on the date of exercise at least equal to the Exercise Price, (iii) by payment through a broker in accordance with procedures permitted by Regulation T of the Federal Reserve Board, (iv) if permitted by the Committee, by withholding shares of Common Stock subject to the exercisable Option, which have a Fair Market Value on the date of exercise equal to the Exercise Price, or (v) by such other method as the Committee may approve. Shares of Common Stock used to exercise an Option shall have been held by the Participant for the requisite period of time necessary to avoid adverse accounting consequences to the Company with respect to the Option. Payment for the shares to be issued or transferred pursuant to the Option, and any required withholding taxes, must be received by the Company by the time specified by the Committee depending on the type of payment being made, but in all cases prior to the issuance or transfer of such shares.

(h) Limits on Incentive Stock Options. Each Incentive Stock Option shall provide that, if the aggregate Fair Market Value of the Common Stock on the date of the grant with respect to which Incentive Stock Options are exercisable for the first time by a Participant during any calendar year, under the Plan or any other stock option plan of the Company or a parent or subsidiary, exceeds $100,000, then the Option, as to the excess, shall be treated as a Nonqualified Stock Option.

Section 7. Stock Awards

The Committee may issue or transfer shares of Common Stock to an Employee, Non-Employee Director or Key Advisor under a Stock Award, upon such terms as the Committee deems appropriate. The following provisions are applicable to Stock Awards:

(a) General Requirements. Shares of Common Stock issued pursuant to Stock Awards may be issued for consideration or for no consideration, and subject to restrictions or no restrictions, as determined by the Committee. Subject to Section 3(b), the Committee may, but shall not be required to, establish conditions under which restrictions on Stock Awards shall lapse over a period of time or according to such other criteria as the Committee deems appropriate, including, without limitation, restrictions based upon the achievement of specific Performance Objectives. The period of time during which the Stock Awards will remain subject to restrictions will be designated in the Award Agreement as the "Restriction Period."

(b) Number of Shares. The Committee shall determine the number of shares of Common Stock to be issued or transferred pursuant to a Stock Award and the restrictions applicable to such shares.

(c) Requirement of Employment or Service. If the Participant ceases to be employed by, or provide service to, the Employer during a period designated in the Award Agreement as the Restriction Period, or if other specified conditions are not met, the Stock Award shall terminate as to all shares covered by the Award as to which the restrictions have not lapsed, and those shares of Common Stock must be immediately returned to the Company. Subject to the limitations set forth in Section 12, the Committee may, however, provide for complete or partial exceptions to this requirement as it deems appropriate.

(d) Restrictions on Transfer and Legend on Stock Certificate. During the Restriction Period, a Participant may not sell, assign, transfer, pledge or otherwise dispose of the shares of a Stock Award except under Section 15 below. Unless otherwise determined by the Committee, the Company will retain possession of certificates for shares of Stock Awards until all restrictions on such shares have lapsed. Each certificate for a Stock Award, unless held by the Company, shall contain a legend giving appropriate notice of the restrictions in the Award. The Participant shall be entitled to have the legend removed from the stock certificate covering the shares subject to restrictions when all restrictions on such shares have lapsed. The Committee may determine that the Company will not issue certificates for Stock Awards until all restrictions on such shares have lapsed.

(e) Right to Vote and to Receive Dividends. Unless the Committee determines otherwise, during the Restriction Period, the Participant shall have the right to vote shares of Stock Awards and to receive any dividends or other distributions paid on such shares, subject to any restrictions deemed appropriate by the Committee, including, without limitation, the achievement of specific Performance Objectives; provided, however, that dividends shall vest and be paid only if and to the extent that the underlying Stock Award vests and is paid.

(f) Lapse of Restrictions. All restrictions imposed on Stock Awards shall lapse upon the expiration of the applicable Restriction Period and the satisfaction of all conditions, if any, imposed by the Committee. The Committee may determine, as to any or all Stock Awards, that the restrictions shall lapse without regard to any Restriction Period.

Section 8. Stock Units

The Committee may grant Stock Units, each of which shall represent one hypothetical share of Common Stock, to an Employee, Non-Employee Director or Key Advisor upon such terms and conditions as the Committee deems appropriate. The following provisions are applicable to Stock Units:

(a) Crediting of Units. Each Stock Unit shall represent the right of the Participant to receive a share of Common Stock or an amount of cash based on the value of a share of Common Stock, if and when specified conditions are met. All Stock Units shall be credited to bookkeeping accounts established on the Company's records for purposes of the Plan.

(b) Terms of Stock Units. Subject to Section 3(b), the Committee may grant Stock Units that vest and are payable if specified Performance Objectives or other conditions are met, or under other circumstances. Stock Units may be paid at the end of a specified performance period or other period, or payment may be deferred to a date authorized by the Committee. Subject to the limitations set forth in Section 12, the Committee may accelerate vesting or payment, as to any or all Stock Units at any time for any reason, provided such acceleration complies with section 409A of the Code. The Committee shall determine the number of Stock Units to be granted and the requirements applicable to such Stock Units.

(c) Requirement of Employment or Service. If the Participant ceases to be employed by, or provide service to, the Employer prior to the vesting of Stock Units, or if other conditions established by the Committee are not met, the Participant's Stock Units shall be forfeited. The Committee may, however, provide for complete or partial exceptions to this requirement as it deems appropriate.

(d) Payment With Respect to Stock Units. Payments with respect to Stock Units shall be made in cash, Common Stock or any combination of the foregoing, as the Committee shall determine.

Section 9. Stock Appreciation Rights

The Committee may grant SARs to an Employee, Non-Employee Director or Key Advisor separately or in tandem with any Option. The following provisions are applicable to SARs:

(a) General Requirements. The Committee may grant SARs to an Employee, Non-Employee Director or Key Advisor separately or in tandem with any Option (for all or a portion of the applicable Option). Tandem SARs may be granted either at the time the Option is granted or at any time thereafter while the Option remains outstanding; provided, however, that, in the case of an Incentive Stock Option, SARs may be granted only at the time of the grant of the Incentive Stock Option. The Committee shall establish the base amount of the SAR at the time the SAR is granted. The base amount of each SAR shall be equal to or greater than the Fair Market Value of a share of Common Stock as of the date of grant of the SAR. The term of any SAR shall not exceed ten years from the date of grant. Notwithstanding the foregoing, in the event that on the last business day of the term of a SAR, the exercise of the SAR is prohibited by applicable law, including a prohibition on purchases or sales of Common Stock under the Company's insider trading policy, the term shall be extended for a period of 30 days following the end of the legal prohibition, unless the Committee determines otherwise.

(b) Tandem SARs. In the case of tandem SARs, the number of SARs granted to a Participant that shall be exercisable during a specified period shall not exceed the number of shares of Common Stock that the Participant may purchase upon the exercise of the related Option during such period. Upon the exercise

of an Option, the SARs relating to the Common Stock covered by such Option shall terminate. Upon the exercise of SARs, the related Option shall terminate to the extent of an equal number of shares of Common Stock.

(c) Exercisability. Subject to Section 3(b), an SAR shall be exercisable during the period specified by the Committee in the Award Agreement and shall be subject to such vesting and other restrictions as may be specified in the Award Agreement. Subject to the limitations set forth in Section 12, the Committee may accelerate the exercisability of any or all outstanding SARs at any time for any reason. SARs may only be exercised while the Participant is employed by, or providing service to, the Employer or during the applicable period after termination of employment or service as specified by the Committee. A tandem SAR shall be exercisable only during the period when the Option to which it is related is also exercisable.

(d) Grants to Non-Exempt Employees. Notwithstanding the foregoing, SARs granted to persons who are non-exempt employees under the Fair Labor Standards Act of 1938, as amended, may not be exercisable for at least six months after the date of grant (except that such SARs may become exercisable, as determined by the Committee, upon the Participant's death, Disability or retirement, or upon a Change in Control or other circumstances permitted by applicable regulations).

(e) Value of SARs. When a Participant exercises SARs, the Participant shall receive in settlement of such SARs an amount equal to the value of the stock appreciation for the number of SARs exercised. The stock appreciation for an SAR is the amount by which the Fair Market Value of the underlying Common Stock on the date of exercise of the SAR exceeds the base amount of the SAR as described in subsection (a).

(f) Form of Payment. The appreciation in an SAR shall be paid in shares of Common Stock, cash or any combination of the foregoing, as the Committee shall determine. For purposes of calculating the number of shares of Common Stock to be received, shares of Common Stock shall be valued at their Fair Market Value on the date of exercise of the SAR.

Section 10. Other Stock-Based Awards

The Committee may grant Other Stock-Based Awards, which are awards (other than those described in Sections 6, 7, 8 and 9 of the Plan) that are based on or measured by Common Stock, to any Employee, Non-Employee Director or Key Advisor, on such terms and conditions as the Committee shall determine. Subject to Section 3(b), Other Stock-Based Awards may be awarded subject to the achievement of Performance Objectives or other criteria or other conditions and may be payable in cash, Common Stock or any combination of the foregoing, as the Committee shall determine.

Section 11. Dividend Equivalents

The Committee may grant Dividend Equivalents in connection with Stock Units or Other Stock-Based Awards. Subject to Section 3(b), Dividend Equivalents may be payable in cash or shares of Common Stock, and upon such terms and conditions as the Committee shall determine; provided that Dividend Equivalents shall vest and be paid only if and to the extent the underlying Stock Units or Other Stock-Based Awards vest and are paid. For the avoidance of doubt, no dividends or Dividend Equivalents will be granted in connection with Options or SARs.

Section 12. Consequences of a Change in Control

(a) Assumption of Outstanding Awards. Upon a Change in Control where the Company is not the surviving corporation (or survives only as a subsidiary of another corporation), all outstanding Awards that are not exercised or paid at the time of the Change in Control shall be assumed by, or replaced with grants that have comparable terms by, the surviving corporation (or a parent or subsidiary of the surviving corporation). In the event that the surviving corporation (or a parent or subsidiary of the surviving corporation) does not assume or replace Awards with grants that have comparable terms, outstanding Options and SARs shall automatically accelerate and become fully exercisable and the restrictions and conditions on outstanding Stock Awards, Stock Units, Other Stock-Based Awards and Dividend Equivalents shall immediately lapse, provided that if the vesting of any such Awards is based, in whole or in part, on performance, such Awards shall vest based on the greater of (i) actual performance as of the Change in

Control or (ii) target performance, pro-rated based on the period elapsed between the beginning of the applicable performance period and the date of the Change in Control. After a Change in Control, references to the "Company" as they relate to employment matters shall include the successor employer in the transaction, subject to applicable law.

(b) Vesting Upon Certain Terminations of Employment. At the Committee's discretion, if Awards are assumed by, or replaced with grants that have comparable terms by, the surviving corporation (or a parent or subsidiary of the surviving corporation) and if a Participant incurs an involuntary termination of employment or service on or after a Change in Control, the Participant's outstanding Awards may become vested, in whole or in part, as of the date of such termination; provided that if the vesting of any such Awards is based, in whole or in part, on performance, such Awards shall vest only based on the greater of (i) actual performance as of the date of Change in Control or (ii) target performance, pro-rated based on the period elapsed between the beginning of the applicable performance period and the date of the termination.

(c) Other Alternatives. In the event of a Change in Control, if any outstanding Awards are not assumed by, or replaced with grants that have comparable terms by, the surviving corporation (or a parent or subsidiary of the surviving corporation), the Committee may take any of the following actions with respect to any or all outstanding Awards, without the consent of any Participant: (i) the Committee may determine that Participants shall receive a payment in settlement of outstanding Stock Units, Other Stock-Based Awards or Dividend Equivalents, in such amount and form as may be determined by the Committee; (ii) the Committee may require that Participants surrender their outstanding Options and SARs in exchange for a payment by the Company, in cash or Common Stock as determined by the Committee, in an amount equal to the amount, if any, by which the then Fair Market Value of the shares of Common Stock subject to the Participant's unexercised Options and SARs exceeds the Option Exercise Price or SAR base amount, and (iii) after giving Participants an opportunity to exercise all of their outstanding Options and SARs, the Committee may terminate any or all unexercised Options and SARs at such time as the Committee deems appropriate. Such surrender, termination or payment shall take place as of the date of the Change in Control or such other date as the Committee may specify. Without limiting the foregoing, if the per share Fair Market Value of the Common Stock does not exceed the per share Option Exercise Price or SAR base amount, as applicable, the Company shall not be required to make any payment to the Participant upon surrender of the Option or SAR.

Section 13. Deferrals

The Committee may permit or require a Participant to defer receipt of the payment of cash or the delivery of shares that would otherwise be due to such Participant in connection with any Award. If any such deferral election is permitted or required, the Committee shall establish rules and procedures for such deferrals and may provide for interest or other earnings to be paid on such deferrals. The rules and procedures for any such deferrals shall be consistent with applicable requirements of section 409A of the Code.

Section 14. Withholding of Taxes

(a) Required Withholding. All Awards under the Plan shall be subject to applicable United States federal (including FICA), state and local, foreign country or other tax withholding requirements. The Employer may require that the Participant or other person receiving Awards or exercising Awards pay to the Employer an amount sufficient to satisfy such tax withholding requirements with respect to such Awards, or the Employer may deduct from other wages and compensation paid by the Employer the amount of any withholding taxes due with respect to such Awards.

(b) Share Withholding. The Committee may permit or require the Employer's tax withholding obligation with respect to Awards paid in Common Stock to be satisfied by having shares withheld up to an amount that does not exceed the Participant's applicable withholding tax rate for United States federal (including FICA), state and local, foreign country or other tax liabilities. The Committee may, in its discretion, and subject to such rules as the Committee may adopt, allow Participants to elect to have such share withholding applied to all or a portion of the tax withholding obligation arising in connection with any particular Award. Unless the Committee determines otherwise, share withholding for taxes shall not exceed the Participant's minimum applicable tax withholding amount.

Section 15. Transferability of Awards

(a) Nontransferability of Awards. Except as described in subsection (b) below, only the Participant may exercise rights under an Award during the Participant's lifetime. A Participant may not transfer those

rights except (i) by will or by the laws of descent and distribution or (ii) with respect to Awards other than Incentive Stock Options, pursuant to a domestic relations order. When a Participant dies, the personal representative or other person entitled to succeed to the rights of the Participant may exercise such rights. Any such successor must furnish proof satisfactory to the Company of his or her right to receive the Award under the Participant's will or under the applicable laws of descent and distribution.

(b) Transfer of Nonqualified Stock Options. Notwithstanding the foregoing, the Committee may provide, in an Award Agreement, that a Participant may transfer Nonqualified Stock Options to family members, or one or more trusts or other entities for the benefit of or owned by family members, consistent with the applicable securities laws, according to such terms as the Committee may determine; provided that the Participant receives no consideration for the transfer of an Option and the transferred Option shall continue to be subject to the same terms and conditions as were applicable to the Option immediately before the transfer.

Section 16. Requirements for Issuance or Transfer of Shares

No Common Stock shall be issued or transferred in connection with any Award hereunder unless and until all legal requirements applicable to the issuance or transfer of such Common Stock have been complied with to the satisfaction of the Committee. The Committee shall have the right to condition any Award on the Participant's undertaking in writing to comply with such restrictions on his or her subsequent disposition of the shares of Common Stock as the Committee shall deem necessary or advisable, and certificates representing such shares may be legended to reflect any such restrictions. Certificates representing shares of Common Stock issued or transferred under the Plan may be subject to such stop-transfer orders and other restrictions as the Committee deems appropriate to comply with applicable laws, regulations and interpretations, including any requirement that a legend be placed thereon.

Section 17. Amendment and Termination of the Plan

(a) Amendment. The Board may amend or terminate the Plan at any time; provided, however, that the Board shall not amend the Plan without stockholder approval if such approval is required in order to comply with the Code or other applicable law, or to comply with applicable stock exchange requirements.

(b) No Repricing of Options or SARs. Except in connection with a corporate transaction involving the Company (including, without limitation, any stock dividend, distribution (whether in the form of cash, Common Stock, other securities or property), stock split, extraordinary cash dividend, recapitalization, change in control, reorganization, merger, consolidation, split-up, spin-off, combination, repurchase or exchange of shares of Common Stock or other securities, or similar transactions), the Company may not, without obtaining stockholder approval, (i) amend the terms of outstanding Options or SARs to reduce the Exercise Price of such outstanding Options or base price of such SARs, (ii) cancel outstanding Options or SARs in exchange for Options or SARs with an Exercise Price or base price, as applicable, that is less than the Exercise Price or base price of the original Options or SARs or (iii) cancel outstanding Options or SARs with an Exercise Price or base price, as applicable, above the current stock price in exchange for cash or other securities.

(c) Termination of Plan. The Plan shall terminate on the day immediately preceding the tenth anniversary of its Restatement Effective Date, unless the Plan is terminated earlier by the Board or is extended by the Board with the approval of the stockholders.

(d) Termination and Amendment of Outstanding Awards. A termination or amendment of the Plan that occurs after an Award is made shall not materially impair the rights of a Participant unless the Participant consents or unless the Committee acts under Section 18(f) below. The termination of the Plan shall not impair the power and authority of the Committee with respect to an outstanding Award. Whether or not the Plan has terminated, an outstanding Award may be terminated or amended under Section 18(f) below or may be amended by agreement of the Company and the Participant consistent with the Plan, provided that the Participant's consent is not required if any termination or amendment to the Participant's outstanding Award does not materially impair the rights or materially increase the obligations of the Participant.

Section 18. Miscellaneous

(a) Awards in Connection with Corporate Transactions and Otherwise. Nothing contained in the Plan shall be construed to (i) limit the right of the Committee to make Awards under the Plan in connection

with the acquisition, by purchase, lease, merger, consolidation or otherwise, of the business or assets of any corporation, firm or association, including Awards to employees thereof who become Employees, or (ii) limit the right of the Company to grant stock options or make other awards outside of the Plan. The Committee may make a Substitute Award to an employee of another corporation who becomes an Employee by reason of a corporate merger, consolidation, acquisition of stock or property, reorganization or liquidation involving the Company, in substitution for a stock option or stock award granted by such corporation. Notwithstanding anything in the Plan to the contrary, the Committee may establish such terms and conditions of the new Substitute Awards as it deems appropriate, including setting the Exercise Price of Options or the base price of SARs at a price necessary to retain for the Participant the same economic value as the prior options or rights.

(b) Governing Document. The Plan shall be the controlling document. No other statements, representations, explanatory materials or examples, oral or written, may amend the Plan in any manner. The Plan shall be binding upon and enforceable against the Company and its successors and assigns.

(c) Funding of the Plan. The Plan shall be unfunded. The Company shall not be required to establish any special or separate fund or to make any other segregation of assets to assure the payment of any Awards under the Plan.

(d) Rights of Participants. Nothing in the Plan shall entitle any Employee, Non-Employee Director, Key Advisor or other person to any claim or right to receive an Award under the Plan. Neither the Plan nor any action taken hereunder shall be construed as giving any individual any rights to be retained by or in the employ of the Employer or any other employment rights.

(e) No Fractional Shares. No fractional shares of Common Stock shall be issued or delivered pursuant to the Plan or any Award. Except as otherwise provided under the Plan, the Committee shall determine whether cash, other awards or other property shall be issued or paid in lieu of such fractional shares or whether such fractional shares or any rights thereto shall be forfeited or otherwise eliminated.

(f) Compliance with Law.

(i) The Plan, the exercise of Options and SARs and the obligations of the Company to issue or transfer shares of Common Stock under Awards shall be subject to all applicable laws and regulations, and to approvals by any governmental or regulatory agency as may be required. With respect to persons subject to section 16 of the Exchange Act, it is the intent of the Company that the Plan and all transactions under the Plan comply with all applicable provisions of Rule 16b-3 or its successors under the Exchange Act. In addition, it is the intent of the Company that Incentive Stock Options comply with the applicable provisions of section 422 of the Code, and that, to the extent applicable, Awards comply with the requirements of section 409A of the Code. To the extent that any legal requirement of section 16 of the Exchange Act or section 422, or 409A of the Code as set forth in the Plan ceases to be required under section 16 of the Exchange Act or section 422 or 409A of the Code, that Plan provision shall cease to apply. The Committee may revoke any Award if it is contrary to law or modify an Award to bring it into compliance with any valid and mandatory government regulation. The Committee may also adopt rules regarding the withholding of taxes on payments to Participants. The Committee may, in its sole discretion, agree to limit its authority under this Section.

(ii) The Plan is intended to comply with the requirements of section 409A of the Code, to the extent applicable. Each Award shall be construed and administered such that the Award either (A) qualifies for an exemption from the requirements of section 409A of the Code or (B) satisfies the requirements of section 409A of the Code. If an Award is subject to section 409A of the Code, (I) distributions shall only be made in a manner and upon an event permitted under section 409A of the Code, (II) payments to be made upon a termination of employment or service shall only be made upon a “separation from service” under section 409A of the Code, (III) unless the Award specifies otherwise, each installment payment shall be treated as a separate payment for purposes of section 409A of the Code, and (IV) in no event shall a Participant, directly or indirectly, designate the calendar year in which a distribution is made except in accordance with section 409A of the Code.

(iii) Any Award that is subject to section 409A of the Code and that is to be distributed to a Key Employee (as defined below) upon separation from service shall be administered so that any distribution

with respect to such Award shall be postponed for six months following the date of the Participant's separation from service, if required by section 409A of the Code. If a distribution is delayed pursuant to section 409A of the Code, the distribution shall be paid within 15 days after the end of the six-month period. If the Participant dies during such six-month period, any postponed amounts shall be paid within 90 days of the Participant's death. The determination of Key Employees, including the number and identity of persons considered Key Employees and the identification date, shall be made by the Committee or its delegate each year in accordance with section 416(i) of the Code and the "specified employee" requirements of section 409A of the Code.

(iv) Notwithstanding anything in the Plan or any Award agreement to the contrary, each Participant shall be solely responsible for the tax consequences of Awards under the Plan, and in no event shall the Company or any subsidiary or affiliate of the Company have any responsibility or liability if an Award does not meet any applicable requirements of section 409A of the Code. Although the Company intends to administer the Plan to prevent taxation under section 409A of the Code, the Company does not represent or warrant that the Plan or any Award complies with any provision of federal, state, local or other tax law.

(g) Establishment of Subplans. The Board may from time to time establish one or more sub-plans under the Plan for purposes of satisfying applicable blue sky, securities or tax laws of various jurisdictions. The Board shall establish such sub-plans by adopting supplements to the Plan setting forth (i) such limitations on the Committee's discretion under the Plan as the Board deems necessary or desirable and (ii) such additional terms and conditions not otherwise inconsistent with the Plan as the Board shall deem necessary or desirable. All supplements adopted by the Board shall be deemed to be part of the Plan, but each supplement shall apply only to Participants within the affected jurisdiction and the Employer shall not be required to provide copies of any supplement to Participants in any jurisdiction that is not affected.

(h) Clawback Rights. Subject to the requirements of applicable law, the Committee may provide in any Award Agreement that, if a Participant breaches any restrictive covenant agreement between the Participant and the Employer (which may be set forth in any Award Agreement) or otherwise engages in activities that constitute Cause either while employed by, or providing service to, the Employer or within the applicable period of time thereafter, all Awards held by the Participant shall terminate, and the Company may rescind any exercise of an Option or SAR and the vesting of any other Award and delivery of shares upon such exercise or vesting (including pursuant to dividends and Dividend Equivalents), as applicable on such terms as the Committee shall determine, including the right to require that in the event of any such rescission, (i) the Participant shall return to the Company the shares received upon the exercise of any Option or SAR and/or the vesting and payment of any other Award (including pursuant to dividends and Dividend Equivalents) or, (ii) if the Participant no longer owns the shares, the Participant shall pay to the Company the amount of any gain realized or payment received as a result of any sale or other disposition of the shares (or, in the event the Participant transfers the shares by gift or otherwise without consideration, the Fair Market Value of the shares on the date of the breach of the restrictive covenant agreement or activity constituting Cause), net of the price originally paid by the Participant for the shares. Payment by the Participant shall be made in such manner and on such terms and conditions as may be required by the Committee. The Employer shall be entitled to set off against the amount of any such payment any amounts otherwise owed to the Participant by the Employer. In addition, all Awards under the Plan shall be subject to any applicable clawback or recoupment policies, share trading policies and other policies that may be implemented by the Board from time to time.

(i) Governing Law. The validity, construction, interpretation and effect of the Plan and Award Agreements issued under the Plan shall be governed and construed by and determined in accordance with the laws of the State of Delaware, without giving effect to the conflict of laws provisions thereof.

Exhibit 31.1

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

I, Steven Fruchtman, 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, 2022

/s/ Steven M. Fruchtman, M.D.
Steven M. Fruchtman, M.D.
President and 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, 2022

/s/ Mark Guerin

Mark Guerin
Chief Operating Officer & 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, 2022, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Steven Fruchtman, President and 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, 2022

/s/ Steven M. Fruchtman, M.D.
Steven M. Fruchtman, M.D.
President and 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, 2022, 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, 2022

/s/ Mark Guerin
Mark Guerin
Chief Operating Officer & 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.