UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, DC 20549

Form 10-Q

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

For the quarterly period ended December 31, 2019

OR

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

For the transition period from _____ to _____

Commission File Number 001-35996

Organovo Holdings, Inc.
(Exact name of registrant as specified in its charter)

Delaware	**27-1488943**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification No.)**
440 Stevens Ave, Suite 200, Solana Beach, CA 92075	**(858) 224-1000**
(Address of principal executive offices and zip code)	**(Registrant's telephone number, including area code)**

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

Title of each class	Trading symbol	Name of Each Exchange on which registered
Common Stock, $0.001 par value	**ONVO**	**The Nasdaq Stock Market LLC** (Nasdaq Capital Market)

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 Exchange Act). Yes ☐ No ☒

As of February 1, 2020, a total of 130,497,563 shares of the registrant's Common Stock, $0.001 par value, were outstanding.

ORGANOVO HOLDINGS, INC.

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PART I—FINANCIAL INFORMATION

ITEM 1. FINANCIAL STATEMENTS

Organovo Holdings, Inc.
Condensed Consolidated Balance Sheets
(in thousands except for share and per share data)

	December 31, 2019 (Unaudited)	March 31, 2019
Assets		
Current Assets		
Cash and cash equivalents	$ 30,467	$ 36,477
Accounts receivable	165	503
Grant receivable	—	55
Inventory, net	—	490
Prepaid expenses and other current assets	474	1,049
Total current assets	31,106	38,574
Fixed assets, net	—	1,832
Restricted cash	79	79
Other assets, net	127	138
Total assets	$ 31,312	$ 40,623
Liabilities and Stockholders' Equity		
Current Liabilities		
Accounts payable	$ 822	$ 628
Accrued expenses	1,536	2,549
Deferred revenue	—	525
Deferred rent	—	35
Total current liabilities	2,358	3,737
Deferred rent, net of current portion	—	588
Total liabilities	2,358	4,325
Commitments and Contingencies		
Stockholders' Equity		
Common stock, $0.001 par value; 200,000,000 shares authorized, 130,497,563 and 124,015,429 shares issued and outstanding at December 31, 2019 and March 31, 2019, respectively	130	124
Additional paid-in capital	305,566	296,929
Accumulated deficit	(276,742)	(260,755)
Total stockholders' equity	28,954	36,298
Total Liabilities and Stockholders' Equity	$ 31,312	$ 40,623

The accompanying notes are an integral part of these condensed consolidated financial statements.

Organovo Holdings, Inc.
Unaudited Condensed Consolidated Statements of Operations and Other Comprehensive Loss
(in thousands except share and per share data)

	Three Months Ended December 31, 2019	Three Months Ended December 31, 2018	Nine Months Ended December 31, 2019	Nine Months Ended December 31, 2018
Revenues				
Products and services	$ 228	$ 670	$ 2,055	$ 1,709
Collaborations and licenses	70	43	89	128
Grants	—	66	52	574
Total Revenues	298	779	2,196	2,411
Cost of revenues	13	136	328	381
Research and development expenses	145	3,782	5,413	10,348
Selling, general and administrative expenses	5,374	3,387	15,037	11,794
Total costs and expenses	5,532	7,305	20,778	22,523
Loss from Operations	(5,234)	(6,526)	(18,582)	(20,112)
Other Income (Expense)				
Gain (loss) on fixed asset disposals	25	(65)	111	(63)
Gain on lease termination	525	—	525	—
Interest income	127	192	507	526
Other Income (Expense)	1,187	—	1,454	—
Total Other Income	1,864	127	2,597	463
Income Tax Expense	—	—	(2)	(3)
Net Loss	$ (3,370)	$ (6,399)	$ (15,987)	$ (19,652)
Comprehensive Loss	$ (3,370)	$ (6,399)	$ (15,987)	$ (19,652)
Net loss per common share—basic and diluted	$ (0.03)	$ (0.06)	$ (0.12)	$ (0.17)
Weighted average shares used in computing net loss per common share—basic and diluted	130,466,234	116,256,561	129,234,731	113,991,794

The accompanying notes are an integral part of these condensed consolidated financial statements.

Organovo Holdings, Inc.
Unaudited Condensed Consolidated Statements of Stockholders' Equity
(in thousands)

	Three and Nine Months Ended December 31, 2018				
	Common Stock		Additional Paid-in	Accumulated	
	Shares	Amount	Capital	Deficit	Total
Balance at March 31, 2018	**111,033**	**$ 111**	**$ 278,595**	**$ (234,120)**	**$ 44,586**
Issuance of common stock under employee and director stock option, RSU, and purchase plans	200	—	(103)	—	(103)
Issuance of common stock from public offering, net	2,085	2	3,008	—	3,010
Stock-based compensation expense	—	—	1,279	—	1,279
Net loss	—	—	—	(7,416)	(7,416)
Balance at June 30, 2018 (Unaudited)	**113,318**	**$ 113**	**$ 282,779**	**$ (241,536)**	**$ 41,356**
Issuance of common stock under employee and director stock option, RSU, and purchase plans	205	—	3	—	3
Issuance of common stock from public offering, net	1,677	2	2,072	—	2,074
Stock-based compensation expense	—	—	1,274	—	1,274
Net loss	—	—	—	(5,837)	(5,837)
Balance at September 30, 2018 (Unaudited)	**115,200**	**$ 115**	**$ 286,128**	**$ (247,373)**	**$ 38,870**
Stock option exercises	622	1	49	—	50
Issuance of common stock under employee and director stock option, RSU, and purchase plans	149	—	(36)	—	(36)
Issuance of common stock from public offering, net	1,799	2	1,830	—	1,832
Stock-based compensation expense	—	—	1,358	—	1,358
Net loss	—	—	—	(6,399)	(6,399)
Balance at December 31, 2018 (Unaudited)	**117,770**	**$ 118**	**$ 289,329**	**$ (253,772)**	**$ 35,675**

	Three and Nine Months Ended December 31, 2019				
	Common Stock		Additional Paid-in	Accumulated	
	Shares	Amount	Capital	Deficit	Total
Balance at March 31, 2019	**124,015**	**$ 124**	**$ 296,929**	**$ (260,755)**	**$ 36,298**
Issuance of common stock under employee and director stock option, RSU, and purchase plans	177	—	(52)	—	(52)
Issuance of common stock from public offering, net	6,087	6	4,990	—	4,996
Stock-based compensation	—	—	1,220	—	1,220
Net loss	—	—	—	(6,323)	(6,323)
Balance at June 30, 2019 (Unaudited)	**130,279**	**$ 130**	**$ 303,087**	**$ (267,078)**	**$ 36,139**
Issuance of common stock under employee and director stock option, RSU, and purchase plans	156	—	(8)	—	(8)
Stock-based compensation	—	—	1,236	—	1,236
Net loss	—	—	—	(6,294)	(6,294)
Balance at September 30, 2019 (Unaudited)	**130,435**	**$ 130**	**$ 304,315**	**$ (273,372)**	**$ 31,073**
Issuance of common stock under employee and director stock option, RSU, and purchase plans	63	—	(1)	—	(1)
Stock-based compensation	—	—	1,252	—	1,252
Net loss	—	—	—	(3,370)	(3,370)
Balance at December 31, 2019 (Unaudited)	**130,498**	**$ 130**	**$ 305,566**	**$ (276,742)**	**$ 28,954**

The accompanying notes are an integral part of these condensed consolidated financial statements.

Organovo Holdings, Inc.
Unaudited Condensed Consolidated Statements of Cash Flows
(in thousands)

	Nine Months Ended December 31, 2019	Nine Months Ended December 31, 2018
Cash Flows From Operating Activities		
Net loss	$ (15,987)	$ (19,652)
Adjustments to reconcile net loss to net cash used in operating activities:		
(Gain) loss on disposal of fixed assets	(111)	63
Gain on lease termination	(525)	—
Depreciation and amortization	1,136	824
Stock-based compensation	3,708	3,911
Inventory write-off	214	—
Increase (decrease) in cash resulting from changes in:		
Accounts receivable	349	336
Grants receivable	55	21
Inventory	276	(207)
Prepaid expenses and other assets	654	637
Accounts payable	194	183
Accrued expenses	(1,013)	(1,185)
Deferred revenue	(525)	(107)
Deferred rent	—	(122)
Operating lease right-of-use assets and liabilities, net	(98)	—
Net cash used in operating activities	(11,673)	(15,298)
Cash Flows From Investing Activities		
Purchases of fixed assets	—	(37)
Proceeds from disposals of fixed assets	728	3
Net cash provided by (used in) investing activities	728	(34)
Cash Flows From Financing Activities		
Proceeds from issuance of common stock and exercise of warrants, net	4,996	6,916
Employee taxes paid related to net share settlement of equity awards	(61)	(136)
Proceeds from exercise of stock options	—	50
Net cash provided by financing activities	4,935	6,830
Net decrease in cash, cash equivalents, and restricted cash	(6,010)	(8,502)
Cash, cash equivalents, and restricted cash at beginning of period	36,556	43,853
Cash, cash equivalents, and restricted cash at end of period	$ 30,546	$ 35,351
Reconciliation of cash, cash equivalents, and restricted cash to the condensed consolidated balance sheets		
Cash and cash equivalents	$ 30,467	$ 35,224
Restricted cash	79	127
Total cash, cash equivalent and restricted cash	$ 30,546	$ 35,351
Supplemental Disclosure of Cash Flow Information:		
Receivable related to fixed asset sales	$ 11	$ —
Tenant improvements funded by landlord	$ 37	$ —
Assets held for sale	$ 38	$ —
Income taxes paid	$ 2	$ 3

The accompanying notes are an integral part of these condensed consolidated financial statements.

Note 1. Description of Business

Nature of operations

Organovo Holdings, Inc. ("Organovo Holdings," "we," "us," "our," "the Company" and "our Company") is a biotechnology company that has focused on pioneering the development of bioprinted human tissues that emulate human biology and disease. In August 2019, after a rigorous assessment of the Company's lead liver therapeutic tissue program following completion of various preclinical studies, the Company's Board of Directors (the "Board") concluded that the variability of biological performance and related duration of potential benefits presented development challenges and lengthy redevelopment timelines that no longer supported an attractive opportunity for the Company and its stockholders. Furthermore, the Board deemed the stage of development of the Company's other therapeutic pipeline assets, including stem cell based tissue programs, to be too premature to potentially reach IND filing status within an acceptable investment horizon and with the Company's available resources. As a result, the Company suspended all development of its lead program and all other related pipeline development activity and engaged a financial advisory firm to explore its strategic alternatives, including evaluating a range of ways to generate value from the Company's technology platform and intellectual property, its commercial and development capabilities, its listing on the Nasdaq Capital Market, and its remaining financial assets.

On December 13, 2019, the Company and Tarveda Therapeutics, Inc. ("Tarveda"), a privately owned biopharmaceutical company, entered into an Agreement and Plan of Merger and Reorganization, as amended by the First Amendment to Merger Agreement, dated January 26, 2020, and as may be amended from time to time (the "Merger Agreement"). The Merger Agreement provides that, upon the terms and subject to the conditions set forth in the Merger Agreement, Opal Merger Sub, Inc. ("Opal"), a new wholly-owned subsidiary of the Company, will merge with and into Tarveda, with Tarveda as the surviving corporation, becoming a wholly-owned subsidiary of the Company (the "Merger"). As a result of the Merger, each outstanding share of Tarveda capital stock will be converted into the right to receive shares of the Company's common stock. Under the terms of the Merger Agreement, the Company will issue, and Tarveda securityholders will be entitled to receive, in a tax-free exchange, shares of its common stock such that Tarveda securityholders will own approximately 75% of the combined company on a fully diluted basis (as defined in the Merger Agreement) and the Company's securityholders will own approximately 25% of the combined company on a fully diluted basis (as defined in the Merger Agreement). The Merger Agreement provides that the exchange ratio for Tarveda's capital stock are subject to upward and downward adjustment based on the Company's net cash balance at the closing of the Merger. If the Company's net cash balance at the closing of the Merger is below $22 million, the Merger Agreement provides for adjusting the exchange ratio to increase the number of shares of its common stock issued to former Tarveda securityholders. As a result, Tarveda's securityholders may receive additional shares of the Company's common stock as Merger consideration, and consequently the Company's securityholders may be further diluted as a result of the Merger. If the Company's net cash balance at the closing of the Merger is above $22 million, the Merger Agreement provides for adjusting the conversion ratio to decrease the number of shares of its common stock issued to former Tarveda securityholders. Additionally, the Merger Agreement provides for certain adjustments for debt of each of the parties. These percentages are calculated based on other assumptions as well, and, to the extent these assumptions prove to be inaccurate, Tarveda's securityholders may receive a larger or smaller percentage of the combined company's pro forma fully diluted capitalization. If Tarveda's net cash balance at the closing of the Merger is below $15 million, the Company may elect to not consummate the Merger.

The Merger is subject to customary closing conditions, including approval by the Company's stockholders of the issuance of its common stock in the Merger, as well as a reverse stock split of its common shares. The Company anticipates the Merger will be completed in the fiscal fourth quarter of 2020. The Merger Agreement contains certain termination rights for both the Company and Tarveda, and further provides that, upon termination of the Merger Agreement under specified circumstances, either party may be required to pay the other party a termination fee ranging between $1.0 million (plus reimbursement of $0.3 million of expenses) and $2.0 million (plus reimbursement of $0.5 million of expenses), depending on the cause of the termination.

Prior to execution of the Merger Agreement, the Company solicited bids from potential purchasers for its operating assets, which the Company had sought to sell or otherwise dispose of in one or more strategic transactions. In connection with that process, the Company entered into an agreement with LifeNet Health ("LifeNet") on November 7, 2019 to sell certain equipment and inventory of our Samsara Sciences, for $1.5 million in cash. In addition, on January 26, 2020, the Company and Tarveda agreed to amend the Merger Agreement to provide that the Company would be credited with $1.5 million for purposes of calculating the number of shares to be issued to Tarveda stockholders in connection with the Merger if the Company does not sell or transfer its intellectual property and remaining assets prior to the closing of the Merger. The Company's remaining assets following these actions will consist primarily of its cash, cash equivalents, interest receivables, restricted cash and other working capital items related to its corporate administrative function, its intellectual property portfolio, its license and collaboration agreements, its remaining assets, its listing on the Nasdaq Capital Market and the Merger Agreement with Tarveda. In addition, the majority of the Company's employees have been terminated, except for six general and administrative personnel.

As a result of the sale transaction with LifeNet, aside from the maintenance of the Company's intellectual property portfolio, license and collaboration agreements, its remaining assets, and its listing on the Nasdaq Capital Market, all of the Company's business immediately following the Merger will be the business conducted by Tarveda immediately prior to the Merger, if the Merger closes. Accordingly, because of the pending Merger with Tarveda and the action described above, the Company believes its historical operating results are not indicative of future results. The Company cannot assure you that it will close the pending Merger with Tarveda on favorable terms, in a timely manner, or at all.

Except where specifically noted or the context otherwise requires, references to "Organovo Holdings," "the Company," "we," "our," and "us" in these notes to the unaudited condensed consolidated financial statements refers to Organovo Holdings, Inc. and its wholly owned subsidiaries, Organovo, Inc., Samsara Sciences, Inc, and Opal Merger Sub, Inc.

Note 2. Summary of Significant Accounting Policies

Basis of presentation and principles of consolidation

The accompanying unaudited condensed consolidated financial statements have been prepared in accordance with U.S. generally accepted accounting principles ("GAAP") for interim financial information and the instructions to Form 10-Q and Article 10 of Regulation S-X. Accordingly, they do not necessarily include all information and notes required by GAAP for complete financial statements. The condensed consolidated balance sheet at March 31, 2019 is derived from the Company's audited consolidated balance sheet at that date.

The unaudited condensed consolidated financial statements include the accounts of Organovo Holdings and its wholly owned subsidiaries. All material intercompany accounts and transactions have been eliminated in consolidation. In the opinion of management, the unaudited financial information for the interim periods presented reflects all adjustments, which are only normal and recurring, necessary for a fair statement of the Company's financial position, results of operations, stockholders' equity and cash flows. These unaudited condensed consolidated financial statements should be read in conjunction with the audited financial statements and notes included in the Company's Annual Report on Form 10-K for the year ended March 31, 2019, as filed with the Securities and Exchange Commission ("SEC"). Operating results for interim periods are not necessarily indicative of operating results for the Company's fiscal year ending March 31, 2020 (see "Note 1. Description of Business").

Liquidity

As of December 31, 2019, the Company had cash and cash equivalents of approximately $30.5 million and restricted cash of approximately $0.1 million. The restricted cash was pledged as collateral for a letter of credit that the Company is required to maintain as a security deposit under the terms of the lease of its facilities. The Company had an accumulated deficit of approximately $276.7 million at December 31, 2019. The Company also had negative cash flows from operations of approximately $11.7 million during the nine months ended December 31, 2019.

Through December 31, 2019, the Company has financed its operations primarily through the sale of convertible notes, warrants, the private placement of equity securities, the sale of common stock through public and at-the-market ("ATM") offerings, and through revenue derived from product and research service-based agreements, collaborative agreements, licenses, and grants. During the three and nine months ended December 31, 2019, the Company issued 0 and 6,087,382 shares of its common stock through its ATM facility and received net proceeds of approximately $0 and $5.0 million, respectively.

Throughout the strategic alternatives assessment process, the Company has taken steps to manage its resources and extend its cash runway including reducing commercial activities related to its liver tissues, except for sales of primary human cells out of inventory, negotiating an exit from its long-term facility lease, selling various assets, and reducing its workforce to the minimum level necessary to explore and support these strategic alternatives as well as to support the remainder of the Company's on-going business activities and assets, including its intellectual property platform and collaborations with research institutions and universities. As a result, the Company terminated the employment of 52 employees, or 90% of its workforce and recorded a restructuring charge during the nine months ended December 31, 2019 of approximately $2.8 million, primarily related to employee severance and benefits costs, of which $1.7 million was paid out during the fiscal second quarter, $0.9 million was paid out during the fiscal third quarter, and the remainder is anticipated to be paid out during the fiscal fourth quarter.

The Company currently expects further restructuring actions tied to the completion of the Merger with Tarveda, which could lead to an additional $3.5 million of severance and benefits costs that would be incurred and paid upon the closing of the Merger. As a result of the sale of certain non-intellectual property related assets and remaining assets, its future cash requirements will consist primarily of fees associated with the Merger including fees payable to financial advisors, consulting fees, intellectual property, legal and accounting support costs, key employee retention, severance and change of control benefits and ongoing compensation obligations for the six general and administrative personnel that remain with us as of the date the sale transaction is completed. The Company currently anticipates requiring approximately $4.2 million in transaction related costs, to complete the Merger. Absent any further impact from asset sales, additional legal costs, Merger related costs or severance and benefit costs, the Company expects its cash balance to be approximately $29.0 million at the end of its fiscal fourth quarter.

The Company's expenses may exceed its current plans and expectations, and, if the Merger with Tarveda is not completed, it could cause the Company to complete another transaction or wind-down its operations sooner than anticipated. If the Company is unable to successfully complete the Merger with Tarveda or another strategic transaction or secure additional capital on a timely basis and on terms that are acceptable to its stockholders, the Company may elect to cease its operations altogether, in which event the value realized by its stockholders might be significantly less than the $29.0 million of stockholders' equity recorded on the Company's consolidated financial statements as of December 31, 2019.

While the Company believes that it can maintain its current operations for at least the next 12 months, based on its current plans and available resources, the assessment by the Company discussed above with respect to the Merger with Tarveda and other alternatives raises substantial doubt over the Company's ability to successfully finance itself on a long-term basis. The accompanying consolidated financial statements do not include any adjustments that might result from the outcome of this uncertainty.

Use of estimates

The preparation of the financial statements in conformity with accounting principles generally accepted in the United States requires management to make estimates and assumptions that affect certain reported amounts and disclosures. Accordingly, actual results could differ from those estimates. Significant estimates used in preparing the condensed consolidated financial statements include those assumed in revenue recognition, the measurement of operating lease right-of-use assets and lease liabilities, the valuation of stock-based compensation expense, the valuation of impairment of long-lived assets, and the valuation allowance on deferred tax assets. On an ongoing basis, management reviews these estimates and assumptions.

Impairment of long-lived assets

In accordance with ASC 360-10, the Company records an impairment loss on long-lived assets used in operations when events and circumstances indicate that long-lived assets might be impaired and the undiscounted cash flows estimated to be generated by those assets are less than the carrying amounts of those assets (i.e. not able to be recovered). During the second quarter of Fiscal 2020, the Company announced the restructuring of its operations. This event required the reevaluation of the recoverability of the gross carrying value of its long-lived assets. Upon the Company's announcement and at each quarter-end, the Company performed an asset impairment analysis on its long-lived asset group, consisting primarily of licensed intangible assets, computer equipment, and software following the completion of various asset sales prior to December 31, 2019, which concluded that the carrying amount is not recoverable. However, the Company's analysis indicated that carrying amount of the asset group does not exceed its fair value. As such, no impairment loss is required to be recognized. Nonetheless, it is reasonably possible that the impairment analysis may change in the near term resulting in the need to write down those assets to fair value. The Company will continue to monitor assets for impairment.

Revenue recognition

The Company has generated revenues from payments received from research service agreements, product sales, collaborative agreements with partners including pharmaceutical and biotechnology companies and academic institutions, licenses, and grants from the National Institutes of Health ("NIH") and private not-for-profit organizations.

The Company recognizes revenue under Topic 606, *Revenue from Contracts with Customers* ("Topic 606") when (or as) the promised services are transferred to customers in an amount that reflects the consideration to which it expects to be entitled in exchange for those services. To determine revenue recognition for arrangements the Company concludes are within the scope of ASC 606, the Company performs the following five steps: (i) identify the contract(s) with a customer; (ii) identify the performance obligation(s) in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligation(s) in the contract; and (v) recognize revenue when (or as) the performance obligation(s) are satisfied. At contract inception, the Company assesses the goods or services promised within each contract, assesses whether each promised good or service is distinct and identifies those that are performance obligations. The Company recognizes as revenue the amount of the transaction price that is allocated to the respective performance obligation when (or as) the performance obligation is satisfied.

Billings to customers or payments received from customers are included in deferred revenue on the balance sheet until all revenue recognition criteria are met. As of December 31, 2019 and March 31, 2019, the Company had approximately $0 and $525,000, respectively, in deferred revenue related to its research service agreements, collaborative agreements, and licenses within the scope of Topic 606. In the nine months ended December 31, 2019, the Company recognized revenue on approximately $525,000, of which $490,000 related to the expiration of an agreement with a non-refundable up-front fee, that had been recorded as deferred revenue at March 31, 2019.

Service revenues

The Company's service-based business, Organovo, Inc., utilized its NovoGen® bioprinting platform to provide customers access to its highly specialized tissues that model human biology and disease, and to *in vitro* testing services based on that technology. These contracts with customers contained multiple performance obligations including: (i) bioprinting tissues for the customer, (ii) reporting the results of tests performed on the printed tissues pursuant to the agreed upon work plan through exposure of the tissue to various factors (including the customer's proprietary compound), and (iii) delivering specific byproduct study materials, which were satisfied, respectively, at each of the following points in time: (i) upon completion of manufacturing of the bioprinted tissue for the customer, (ii) upon delivery of the report on tests performed on the tissue, and (iii) upon making certain study materials generated from the aforementioned testing process available to the customer. The customer did not have access or control of any performance obligation prior to the point in time of full completion of the corresponding performance satisfying event as defined above. Furthermore, although the service could be customized for each customer, it was not so highly customized as to not have an alternative use either to other customers or to the Company without significant economic consequences or rework. Accordingly, the Company's service-based business utilized point-in-time recognition under Topic 606.

For service contracts, the Company allocated the transaction price to each performance obligation based on the estimated relative standalone selling prices of the promised products or services underlying each performance obligation. If the standalone selling price was not observable through past transactions, the Company estimated the standalone selling price taking into account available information such as market conditions and internally approved pricing guidelines related to the performance obligations. The transaction price for service business contracts was a fixed consideration.

In connection to the Company's decision to pursue its strategic alternatives, the Company reduced commercial activities related to its liver tissues, except for sales of primary human cells out of inventory. The Company is expected to continue to maintain its external research collaborations and its intellectual property portfolio through the closing of the Merger.

Product sales, net

The Company's product-based business, Samsara Sciences, Inc., produced high-quality cell-based products for use in Organovo's 3D tissue manufacturing and for use by life science customers. The Company recognizes product revenue when the performance obligation is satisfied, which is at the point in time the customer obtains control of the Company's product, typically upon delivery. Product revenues are recorded at the transaction price, net of any estimates for variable consideration under Topic 606. The Company's process for estimating variable consideration does not differ materially from its historical practices. Variable consideration is estimated using the expected value method which considers the sum of probability-weighted amounts in a range of possible amounts under the contract. Product revenue reflects the Company's best estimates of the amount of consideration to which it is entitled based on the terms of the individual contracts. Actual amounts of consideration ultimately received may differ from the Company's estimates. If actual results vary materially from the Company's estimates, the Company will adjust these estimates, which will affect revenue from product sales and earnings in the period such estimates are adjusted.

The Company provides no right of return to its customers except in cases where a customer obtains authorization from the Company for the return. To date, there have been no product returns. The Company will continue to assess its estimates of variable consideration as it accumulates additional historical data and adjusts its estimates accordingly.

On November 7, 2019, the Company entered into an agreement to sell substantially all of the Samsara inventory and associated assets for $1.5 million, which was recorded to other income. As a result, the Company will have no further product sales of cells nor tissues beyond what it sold prior to the November 7th sale.

Collaborative research, development, and licenses

The Company has entered into collaborative agreements with partners that typically include one or more of the following: (i) non-exclusive license fees; (ii) non-refundable up-front fees; (iii) payments for reimbursement of research costs; (iv) payments associated with achieving specific development milestones; and (v) royalties based on specified percentages of net product sales, if any. At the initiation of an agreement, the Company has analyzed whether it results in a contract with a customer under Topic 606 or in an arrangement with a collaborator subject to guidance under ASC 808, *Collaborative Arrangements* ("Topic 808").

The Company has considered a variety of factors in determining the appropriate estimates and assumptions under these arrangements, such as whether the elements are distinct performance obligations, whether there are determinable stand-alone prices, and whether any licenses are functional or symbolic. The Company has evaluated each performance obligation to determine if it can be satisfied and recognized as revenue at a point in time or over time. Typically, non-exclusive license fees, non-refundable upfront fees, and funding of research activities have been considered fixed, while milestone payments have been identified as variable consideration which must be evaluated to determine if it has been constrained and, therefore, excluded from the transaction price.

The Company's collaborative agreements that were not completed at the implementation of Topic 606 on April 1, 2018, consisted of research collaboration and limited technology access licenses. These agreements provide the licensee with a non-exclusive, non-transferable, limited, royalty-free technology license, including access to Organovo's proprietary bioprinter platform, training, and continued support by means of consumables and consultation throughout the duration of the contract. The Company has determined that the intellectual property license is not distinct from the continued support promised under the agreement and is therefore a single combined performance obligation. The Company recognized revenue for these combined performance obligations over time for the duration of the license period, as the combined performance obligation would not be fully satisfied until the end of the contract.

For the nine months ended December 31, 2019, all collaborations and licenses revenue was within the scope of Topic 606 and recognized accordingly. As of September 30, 2019, the Company completed its obligations under the existing agreements with respect to receipts of revenue and does not anticipate recording any further revenue. See "Note 4. Collaborative Research, Development, and License Agreements" for more information on the Company's collaborative agreements.

Grant revenue

In July 2017, the NIH awarded the Company a "Research and Development" grant totaling approximately $1,657,000 of funding over three years. The Company has concluded this government grant is not within the scope of Topic 606, as government entities do not meet the definition of a "customer" as defined by Topic 606, as there is not considered to be a transfer of control of goods or services to the government entity funding the grant. Additionally, the Company has concluded this government grant does meet the definition of a contribution and is a non-reciprocal transaction, however, Subtopic 958-605, *Not-for-Profit-Entities-Revenue Recognition* does not apply, as the Company is a business entity and the grant is with a governmental agency.

Revenues from this grant have been based upon internal costs incurred that are specifically covered by the grant, plus an additional rate that provides funding for overhead expenses. Revenue has been recognized as the Company incurs expenses that are related to the grant. The Company believes this policy is consistent with the overarching premise in Topic 606, to ensure that it recognizes revenues to reflect the transfer of promised goods or services to customers in an amount that reflects the consideration to which it expects to be entitled in exchange for those goods or services, even though there is no "exchange" as defined in the ASC. The Company believes the recognition of revenue as costs are incurred and amounts become earned/realizable is analogous to the concept of transfer of control of a service over time under Topic 606.

As of December 31, 2019, the Company has recognized approximately $1.2 million in grant revenue. Revenue recognized under this grant was approximately $0 and $52,000 for the three and nine months ended December 31, 2019, respectively. Revenue recognized under this grant was approximately $66,000 and $574,000 for the three and nine months ended December 31, 2018, respectively.

In connection to the Company's decision to pursue its strategic alternatives, specific to the NIH NASH grant, all internal research activities have been halted, leaving a remaining available balance of approximately $0.5 million that will not be utilized by the Company.

Cost of revenues

The Company reported approximately less than $0.1 million and $0.3 million in cost of revenues for the three and nine months ended December 31, 2019, respectively, which includes an inventory write-off during the fiscal second quarter of approximately $0.2 million consisting of raw materials related to the Company's bioprinting and testing services and is a result of the Company's decision to pursue its strategic alternatives. The Company reported approximately $0.1 million and $0.4 million in cost of revenues for the three and nine months ended December 31, 2018, respectively. Cost of revenues consists of costs related to manufacturing and delivering product and service revenue.

Net loss per share

Basic and diluted net loss per share has been computed using the weighted-average number of shares of common stock outstanding during the period. The weighted-average number of shares used to compute diluted loss per share excludes any assumed exercise of stock options and warrants, shares reserved for purchase under the Company's 2016 Employee Stock Purchase Plan ("ESPP"), the assumed release of restriction of restricted stock units, and shares subject to repurchase as the effect would be anti-dilutive. No dilutive effect was calculated for the three and nine months ended December 31, 2019 or 2018, as the Company reported a net loss for each respective period and the effect would have been anti-dilutive.

Common stock equivalents excluded from computing diluted net loss per share were approximately 16.7 million at December 31, 2019 and 15.6 million at December 31, 2018.

Recent Accounting Pronouncements

From time to time, new accounting pronouncements are issued by the Financial Accounting Standards Board ("FASB") or other standard setting bodies. Unless otherwise stated, the Company believes that the impact of the recently issued accounting pronouncements that are not yet effective will not have a material impact on its consolidated financial position or results of operations upon adoption.

Adoption of New Accounting Pronouncements

In February 2016, the FASB issued Accounting Standards Update ("ASU") 2016-02, Leases ("ASC 842"), which supersedes the lease guidance under ASC 840 – Leases. The new accounting standard requires an entity to recognize right-of-use assets and corresponding lease liabilities on the balance sheet for all leases with terms of more than 12 months and to disclose key information about leasing arrangements. This new guidance became effective for the Company on April 1, 2019. The Company adopted ASC 842 on April 1, 2019 and elected the optional transition method that allows for a cumulative-effect adjustment in the period of adoption and did not require restatement of prior periods. The Company elected the package of practical expedients permitted under the transition guidance, but not the hindsight practical expedient. Please refer to "Note 6. Leases" for more information regarding the Company's adoption of the new lease standard.

In February 2018, the FASB issued ASU No. 2018-02, *Income Statement – Reporting Comprehensive Income* ("Topic 220"), which allows stranded tax effects resulting from the Tax Cuts and Jobs Act to be reclassified from accumulated other comprehensive income to retained earnings. The amendment only relates to the reclassification of the income tax effects of the Tax Cuts and Jobs Act; thus, the underlying guidance relating to the effect of a change in tax laws be included in income from continuing operations is not affected. The amendments in Topic 220 are effective for all entities for fiscal years beginning after December 15, 2018, and interim periods within those fiscal years. This new guidance became effective for the Company on April 1, 2019. The requirements of ASU 2018-02 did not have a significant impact on the Company's financial statements.

In June 2018, the FASB issued ASU No. 2018-07, *Compensation - Stock Compensation: Improvements to Nonemployee Share-Based Payment Accounting*, which aligns the measurement and classification guidance for share-based payment to non-employees with the guidance for share-based payments to employees. Under the new guidance, the measurement period for equity-classified non-employee awards will be fixed at the grant date. This new guidance became effective for the Company on April 1, 2019. The requirements of ASU 2018-07 did not have a significant impact on the Company's financial statements.

Recent Accounting Pronouncements Not Yet Adopted

In November 2018, the FASB issued ASU 2018-18, *Collaborative Arrangements (Topic 808): Clarifying the Interaction between Topic 808 and Topic 606*, which provides guidance on whether certain transactions between collaborative arrangement participants should be accounted for as revenue under Topic 606. The amendments in this update provide more comparability in the presentation of revenue for certain transactions between collaborative arrangement participants. The key improvements to GAAP for collaborative arrangements resulting from this amendment are to (i) clarify that certain transactions between collaborative arrangement participants should be accounted for as revenue under Topic 606 when the collaborative arrangement participant is a customer in the context of a unit-of-account, (ii) add unit-of-account guidance in Topic 808 to align with the guidance in Topic 606, and (iii) require that in a transaction with a collaborative arrangement participant that is not directly related to sales to third parties, presenting the transaction together with revenue recognized under Topic 606 is precluded if the collaborative arrangement participant is not a customer. The amendments in this ASU are effective for all entities for fiscal years beginning after December 15, 2019, and interim periods within those fiscal years with early adoption permitted. This new guidance is effective for us on April 1, 2020. The Company is currently evaluating the impact that this guidance will have on its consolidated financial statements.

Note 3. Stockholders' Equity

Stock-based compensation expense and valuation information

Stock-based awards include stock options and restricted stock units under the 2012 Equity Incentive Plan, as amended ("2012 Plan") and Inducement Awards, performance-based restricted stock units under an Incentive Award Performance-Based Restricted Stock Unit Agreement, and rights to purchase stock under the 2016 Employee Stock Purchase Plan ("ESPP"). The Company calculates the grant date fair value of all stock-based awards in determining the stock-based compensation expense.

Stock-based compensation expense for all stock-based awards consists of the following (in thousands):

	Three Months Ended December 31, 2019	Three Months Ended December 31, 2018	Nine Months Ended December 31, 2019	Nine Months Ended December 31, 2018
Research and development	$ 66	$ 249	$ 240	$ 679
General and administrative	$ 1,186	$ 1,109	$ 3,468	$ 3,232
Total	$ 1,252	$ 1,358	$ 3,708	$ 3,911

The total unrecognized compensation cost related to unvested stock option grants as of December 31, 2019 was approximately $4,855,000 and the weighted average period over which these grants are expected to vest is 2.12 years.

The total unrecognized compensation cost related to unvested restricted stock units (not including performance-based restricted stock units) as of December 31, 2019 was approximately $1,642,000, which will be recognized over a weighted average period of 1.97 years.

The total unrecognized compensation cost related to unvested performance-based restricted stock units as of December 31, 2019 was approximately $2,339,000, which will be recognized over a weighted average period of 1.60 years.

As of December 31, 2019, there are no participants enrolled into the employee stock purchase plan for the current purchase period, beginning September 1, 2019.

The Company uses the Black-Scholes valuation model to calculate the fair value of stock options. Stock-based compensation expense is recognized over the vesting period using the straight-line method. The fair value of stock options was estimated at the grant date using the following weighted average assumptions:

	Three Months Ended December 31, 2019 *	Three Months Ended December 31, 2018	Nine Months Ended December 31, 2019	Nine Months Ended December 31, 2018
Dividend yield	—	—	—	—
Volatility	0.00%	73.07%	84.36%	72.99%
Risk-free interest rate	0.00%	2.79%	1.53%	2.75%
Expected life of options	—	6.00 years	6.00 years	6.00 years
Weighted average grant date fair value	$ —	$ 0.67	$ 0.23	$ 0.84

*No options were granted in the three months ended December 31, 2019.

The assumed dividend yield was based on the Company's expectation of not paying dividends in the foreseeable future. Prior to fiscal year 2020, the Company used a blend of historical volatility and implied volatility of comparable companies. As of April 1, 2019, the Company is using the Company-specific historical volatility rate as it is more reflective of market conditions and a better indicator of expected volatility. The risk-free interest rate assumption was based on U.S. Treasury rates. The weighted average expected life of options was estimated using the average of the contractual term and the weighted average vesting term of the options. Prior to fiscal year 2020, certain options granted to consultants were subject to variable accounting treatment and were required to be revalued until vested. As of April 1, 2019, the measurement and classification of share-based payment to non-employees is consistent with the measurement and classification of share-based payment to employees.

The fair value of each restricted stock unit and performance-based restricted stock unit is recognized as stock-based compensation expense over the vesting term of the award. The fair value is based on the closing stock price on the date of the grant.

The Company uses the Black-Scholes valuation model to calculate the fair value of shares issued pursuant to the Company's ESPP. Stock-based compensation expense is recognized over the purchase period using the straight-line method. The fair value of ESPP shares was estimated at the purchase period commencement date using the following assumptions:

	Three Months Ended December 31, 2019*	Three Months Ended December 31, 2018	Nine Months Ended December 31, 2019*	Nine Months Ended December 31, 2018
Dividend yield	—	—	—	—
Volatility	0.00%	80.23%	43.69%	61.35 - 80.23%
Risk-free interest rate	0.00%	2.29%	2.52%	1.85 - 2.29%
Expected term	—	6 months	6 months	6 months
Grant date fair value	$ —	$ 0.45	$0.29	$0.30 - $0.45

*There are no participants in the ESPP for the current purchase period (beginning September 1, 2019).

The assumed dividend yield was based on the Company's expectation of not paying dividends in the foreseeable future. The Company uses the Company-specific historical volatility rate as the indicator of expected volatility. The risk-free interest rate assumption was based on U.S. Treasury rates. The expected life is the 6-month purchase period.

Preferred stock

The Company is authorized to issue 25,000,000 shares of preferred stock. There are no shares of preferred stock currently outstanding, and the Company has no current plans to issue shares of preferred stock.

Common stock

On June 25, 2019, the Company received a notice letter from the Listing Qualifications Staff of the Nasdaq Stock Market LLC ("Nasdaq") indicating that, based upon the closing bid price of the Company's common stock for the last 30 consecutive business days, the Company no longer meets the requirement to maintain a minimum closing bid price of $1 per share, as set forth in Nasdaq Listing Rule 5450(a)(1). On December 26, 2019, the Company obtained an additional compliance period of 180 calendar days by electing to transfer to The Nasdaq Capital Market. 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. In connection with the Merger with Tarveda, the Company is also seeking to effect a reverse stock split, which would be subject to the prior approval of the Company's stockholders. There can be no assurance that the Company will be able to regain compliance with the minimum bid price requirement or maintain compliance with the other listing requirements necessary to maintain the listing of its common stock on the Nasdaq Capital Market. The Company's failure to regain compliance during this second compliance period could result in delisting and impact our ability to complete the Merger with Tarveda.

The Company has an effective shelf registration statement on Form S-3 (File No. 333-222929) and the related prospectus previously declared effective by the Securities and Exchange Commission (the "SEC") on February 22, 2018 (the "2018 Shelf"), that expires on February 22, 2021, which registered $100,000,000 of common stock, preferred stock, warrants and units, or any combination of the foregoing.

On March 16, 2018, the Company entered into a Sales Agreement ("2018 Sales Agreement") with H.C. Wainwright & Co., LLC and Jones Trading Institutional Services LLC (each an "Agent" and together, the "Agents") and filed a prospectus supplement to the 2018 Shelf, pursuant to which the Company may offer and sell, from time to time through the Agents, shares of its common stock in at-the-market sales transactions having an aggregate offering price of up to $50,000,000 (the "Shares"). Any shares offered and sold will be issued pursuant to the Company's 2018 Shelf.

During the three and nine months ended December 31, 2019, the Company issued 0 and 6,087,382 shares of common stock, respectively, for net proceeds of $0 and $5.0 million in at-the-market offerings under the 2018 Sales Agreement. During the three and nine months ended December 31, 2018, the Company issued 1,798,384 and 5,560,514 shares of common stock, respectively, for net proceeds of approximately $1.9 million and $6.9 million under the 2018 Sales Agreement.

As of December 31, 2019, the Company has sold an aggregate of 17,719,185 shares of common stock in at-the-market offerings under the 2018 Sales Agreement, with gross proceeds of approximately $18.7 million. Based on these sales, the Company cannot raise more than an aggregate of $81.3 million in future offerings under the 2018 Shelf, including the $31.3 million remaining available for future issuance through its at-the-market program under the 2018 Sales Agreement.

On July 26, 2018, the Company filed an amendment to its certificate of incorporation to increase the number of authorized shares of common stock to 200,000,000 shares.

Restricted stock units

A summary of the Company's restricted stock units (not including performance-based restricted stock units) activity from March 31, 2019 through December 31, 2019 is as follows:

	Number of Shares		Weighted Average Price
Unvested at March 31, 2019	2,080,723	$	1.80
Granted	585,926	$	0.97
Vested	(500,666)	$	2.26
Cancelled / forfeited	(1,057,673)	$	1.23
Unvested at December 31, 2019	1,108,310	$	1.70

Performance-based restricted stock units

On April 24, 2017, the Company issued a Performance-Based Restricted Stock Unit Award for 208,822 shares of common stock (the "PBRSU") to its newly hired Chief Executive Officer. The PBRSU was issued outside of the 2012 Plan, in the Inducement Award Agreement, as an "inducement award" within the meaning of Nasdaq Marketplace Rule 5635(c)(4). While outside the Company's 2012 Plan, the terms and conditions of these awards are consistent with awards granted to the Company's executive officers pursuant to the 2012 Plan. On August 23, 2017, the Board of Directors formally approved the vesting criteria for the PBRSU. The vesting of the PBRSU is divided into five separate tranches each with independent vesting criteria. The first four tranches had performance criteria related to annual revenue goals with measurement at the end of fiscal year 2018 (20 percent), fiscal year 2019 (20 percent), fiscal year 2020 (20 percent), and fiscal year 2021 (20 percent). The fifth tranche had a performance metric related to a path to profitability goal measured as Negative Adjusted Earnings Before Interest, Taxes, Depreciation and Amortization ("EBITDA") achievable at any point between the grant date and the end of fiscal year 2020 (20 percent). The number of units that ultimately vest for each tranche will range from 0 percent to 120 percent of the target amount, not to exceed 208,822 in aggregate. On December 12, 2018, the Board of Directors formally approved an amendment to the vesting criteria for the PBRSUs. As of December 12, 2018, 100% of the Negative Adjusted EBITDA tranche, or 41,764 shares had vested and 8,352 units had been forfeited. Based on the amendment to the vesting criteria, the remaining 158,706 units eligible to vest upon future performance were divided into three separate but equal tranches with independent vesting criteria based on the achievement of certain regulatory milestones. As of December 31, 2019, no tranches are expected to vest unless there is a change in control.

Based on the amended PBRSU vesting terms, a Type III modification, the modified grant date fair value of the PBRSUs is $165,000 of which one-third is being recognized over the expected service period of each tranche ending on April 23, 2023. The Company began recording stock-based compensation expense for the initial performance tranches after the August 23, 2017 grant date when the initial financial performance goals were established and approved and has modified its recording of compensation expense in accordance with the amended performance tranches beginning on December 12, 2018.

On July 2, 2019, the Company issued Performance-Based Restricted Stock Unit Awards (the "PBRSU Retention Awards") for an aggregate of 6,027,899 shares of common stock to its management team. The PBRSUs were issued pursuant to the 2012 Plan. The PBRSU Retention Awards will vest in full upon the earlier of the Company's engagement in a pre-IND meeting with the FDA, twenty-four months from the grant date, or a change in control. As of December 31, 2019, all PBRSUs are expected to vest twenty-four months from the grant date.

A summary of the Company's performance-based restricted stock unit activity from March 31, 2019 through December 31, 2019 is as follows:

	Number of Shares		Weighted Average Price
Unvested at March 31, 2019	158,706	$	1.04
Granted	6,027,899	$	0.49
Vested	—	$	—
Cancelled / forfeited	—	$	—
Unvested at December 31, 2019	6,186,605	$	0.50

Stock options

A summary of the Company's stock option activity from March 31, 2019 to December 31, 2019 is as follows:

	Options Outstanding	Weighted Average Exercise Price	Aggregate Intrinsic Value
Outstanding at March 31, 2019	12,039,264	$ 2.24	$ —
Options granted	342,500	$ 0.32	$ —
Options cancelled / forfeited	(3,015,090)	$ 2.68	$ —
Options exercised	—	$ —	$ —
Outstanding at December 31, 2019	9,366,674	$ 2.02	$ 23,322
Vested and Exercisable at December 31, 2019	4,019,674	$ 2.73	$ —

The weighted average remaining contractual term of options exercisable and outstanding at December 31, 2019 was approximately 7.23 years.

Employee Stock Purchase Plan

In June 2016, our Board of Directors adopted, and in August 2016 stockholders subsequently approved, the 2016 Employee Stock Purchase Plan ("ESPP"). The Company reserved 1,500,000 shares of common stock for issuance thereunder. The ESPP permits employees after five months of service to purchase common stock through payroll deductions, limited to 15 percent of each employee's compensation up to $25,000 per employee per year or 10,000 shares per employee per six-month purchase period. Shares under the ESPP are purchased at 85 percent of the fair market value at the lower of (i) the closing price on the first trading day of the six-month purchase period or (ii) the closing price on the last trading day of the six-month purchase period. The initial offering period commenced in September 2016. At December 31, 2019, there were 1,188,718 shares available for purchase under the ESPP.

Warrants

The following table summarizes warrant activity for the nine months ended December 31, 2019:

	Warrants	Weighted Average Exercise Price
Balance at March 31, 2019	145,000	$ 7.11
Granted	—	$ —
Exercised	—	$ —
Cancelled	(145,000)	$ 7.11
Balance at December 31, 2019	—	$ —

There are no warrants outstanding as of December 31, 2019.

Common stock reserved for future issuance

Common stock reserved for future issuance consisted of the following at December 31, 2019:

Common stock options outstanding and reserved under the 2012 Plan	6,547,442
Common stock reserved under the 2012 Plan	10,482,484
Common stock reserved under the 2016 Employee Stock Purchase Plan	1,188,718
Restricted stock units outstanding under the 2012 Plan	987,775
Performance-based restricted stock units outstanding under the 2012 Plan	6,027,899
Common stock options outstanding and reserved under the Incentive Award Agreement	2,819,232
Restricted stock units outstanding under the Incentive Award Agreement	120,535
Performance-based restricted stock units outstanding under the Incentive Award Agreement	158,706
Total at December 31, 2019	28,332,791

Note 4. Collaborative Research, Development, and License Agreements

In December 2016, the Company signed a collaborative non-exclusive research affiliation with a university medical school and a non-profit medical charity, under which the Company received a one-time grant from the charity towards the placement of a NovoGen® Bioprinter at the university for the purpose of developing a kidney organoid for potential therapeutic applications. The Company received up-front payments in January and March 2017, which has been recorded as deferred revenue. Revenue of $0 and $19,000 was recorded under this agreement for the three and nine months ended December 31, 2019, respectively. Revenue of $10,000 and $29,000 was recorded under this agreement for the three and nine months ended December 31, 2018, respectively. The Company completed its obligations under this agreement and does not anticipate recording any further revenue.

In April 2017, the Company signed a collaborative non-exclusive research affiliation with a university, under which the Company received a one-time non-refundable payment toward the placement of a NovoGen® Bioprinter at the university for the purpose of specific research projects mutually agreed upon by the university and the Company in the field of volumetric muscle loss. The Company received an up-front payment in May 2017, which was recorded as deferred revenue. No revenue has been recorded under this agreement for the three and nine months ended December 31, 2019. Revenue of approximately $14,000 and $43,000 has been recorded under this agreement for the three and nine months ended December 31, 2018, respectively. In addition, during April 2017, the Company signed a non-exclusive patent license agreement with the university including an annual fee of $75,000 for each of the two years for the license to the Company patents for research use limited to the field of volumetric muscle loss. The Company received the first annual payment of $75,000 in April 2017 and the second annual payment of $75,000 in May 2018, which were initially recorded as deferred revenue. No revenue has been recorded under this agreement for the three and nine months ended December 31, 2019. Revenue of $18,000 and $56,000 was recorded under this agreement for the three and nine months ended December 31, 2018, respectively. The Company completed its obligations under these agreements with respect to receipts of revenue and does not anticipate recording any further revenue.

Note 5. Commitments and Contingencies

Legal matters

In addition to commitments and obligations in the ordinary course of business, the Company may be subject, from time to time, to various claims and pending and potential legal actions arising out of the normal conduct of its business. On October 10, 2019, a putative class action lawsuit was filed in the U.S. District Court for the District of Delaware against the Company and its board of directors in connection with the annual proxy statement filed by the Company on July 26, 2019. The case is captioned Rianhard v. Crouch., et al., Case No. 19-cv-1922 (D. Del. Oct. 10, 2019) (the “Action”). The complaint alleged that the Schedule 14A proxy statement contained material misrepresentations in connection with the reverse stock split proposal recommended therein and asserted claims for violations of Section 14(a) of the Securities Exchange Act of 1934 and Rule 14a-9 promulgated thereunder, as well as claims for breach of fiduciary duty. On November 25, 2019, the Action was voluntarily dismissed.

On December 31, 2019, the Company received a demand pursuant to Delaware General Corporation Law Section 220 for certain books and records of the Company (the “Demand”). The Company has objected to the Demand and is in discussions with the demanding stockholder to provide certain records.

On January 30, 2020, the Company received a demand letter (the “Letter”) from a purported stockholder alleging that the disclosures in the Form S-4 filed with the SEC on December 23, 2019 violated federal securities laws by failing to disclose certain allegedly material information. The Letter demands, among other things, that the Company make corrective disclosures and reserves the right to pursue legal action. The Company believes the assertions in the Letter are without merit.

The Company assesses contingencies to determine the degree of probability and range of possible loss for potential accrual in its financial statements. Because litigation is inherently unpredictable and unfavorable resolutions could occur, assessing litigation contingencies is subjective and requires judgments about future events. When evaluating contingencies, the Company may be unable to provide a meaningful estimate due to a number of factors, including the procedural status of the matter in question, the presence of complex or novel legal theories, and/or the ongoing discovery and development of information important to the matters. In addition, damage amounts claimed in litigation against it may be unsupported, exaggerated or unrelated to possible outcomes, and as such are not meaningful indicators of its potential liability.

The Company regularly reviews contingencies to determine the adequacy of its accruals and related disclosures. During the period presented, the Company has not recorded any accrual for loss contingencies associated with any claims or legal proceedings; determined that an unfavorable outcome is probable or reasonably possible; or determined that the amount or range of any possible loss is reasonably estimable. However, the outcome of legal proceedings and claims brought against the Company is subject to significant uncertainty. Therefore, although management considers the likelihood of such an outcome to be remote, if one or more of these legal matters were resolved against the Company in a reporting period, the Company’s consolidated financial statements for that reporting period could be materially adversely affected.

Note 6. Leases

Adoption of ASC 842

As of April 1, 2019, the Company adopted ASC 842, which requires lessees to recognize a right-of-use asset (ROU asset) and lease liability for leases with terms of greater than twelve months. ROU assets represent the Company's right to use an underlying asset for the lease term and lease liabilities represent the Company's obligation to make lease payments arising from the lease. The Company implemented this new accounting standard using the modified retrospective method for its existing leases, which did not cause any adjustments to prior year financial statements. The Company elected the package of practical expedients available for existing contracts, which allowed it to carry forward its historical assessments of whether contracts are or contain leases and the classification of its existing operating leases. Additionally, the Company elected the practical expedient to treat lease and non-lease components as a single lease component.

At the time of adoption, the Company leased property and equipment under operating leases, specifically its office building and various copier machines. The Company also had a short-term lease (lease term is less than 12 months), which is not required to be recorded on the balance sheet under ASC 842. Instead, under ASC 842, the Company elected the accounting policy for short term leases to recognize lease payments as an expense on a straight-line basis over the lease term. Upon adoption of ASC 842, the Company recognized ROU assets and corresponding lease liabilities based on the present value of remaining lease payments over the lease terms. ROU assets were measured as lease liabilities plus prepaid rent less any deferred rent. As interest rates were not implicitly stated in the respective lease agreements, nor were they readily determinable, the Company used its incremental borrowing rate as the discount rate when measuring lease liabilities. As a result, the Company recorded ROU assets and lease liabilities of $4.5 million and $5.0 million, respectively. The Company also classified deferred rent of $0.6 million as an offset to the Company's ROU asset upon adoption.

The impact of the adoption of ASC 842 on the consolidated balance sheet as of April 1, 2019 is as follows (in thousands):

	ASC 840 March 31, 2019	Impact of Adoption	ASC 842 April 1, 2019
Deferred Rent	$ 35	$ (35)	$ —
Deferred Rent, net of current portion	$ 588	$ (588)	$ —
Prepaid Rent	$ 88	$ (88)	$ —
Operating right-of-use assets	$ —	$ 4,451	$ 4,451
Operating lease liability	$ —	$ 1,038	$ 1,038
Operating lease liability, net of current portion	$ —	$ 3,948	$ 3,948

After the initial adoption of ASC 842, on an on-going basis, the Company evaluates all contracts upon inception and determines whether the contract contains a lease by assessing whether there is an identified asset and whether the contract conveys the right to control the use of identified asset in exchange for consideration over a period of time. If a lease is identified, the Company will apply the guidance from ASC 842 to properly account for the lease.

Operating Leases

From July 2012 to November 2019, the Company leased its main facilities at 6275 Nancy Ridge Drive, San Diego, California 92121. The lease, as amended in 2013, 2015, 2016, 2018, and 2019, consisted of approximately 45,580 rentable square feet containing laboratory, clean room and office space. Monthly rental payments are approximately $87,000 with 3% annual escalators. The lease for 14,685 of the total rentable square footage was amended to accelerate the expiration date from December 15, 2018 to October 31, 2018. On November 30, 2018, the Company agreed to extend the term for the remainder of the total rentable square footage under the lease from August 31, 2021 to August 31, 2024 in exchange for $500,000 of landlord funded tenant improvements and a rescission of its option to terminate the lease on or after September 1, 2019 with 9 months prior written notice. On October 11, 2019, the Company entered into an agreement to accelerate the expiration date of the term of the lease for its main facilities on 6275 Nancy Ridge Drive from August 31, 2024 to November 15, 2019. Under this agreement, the Landlord and Tenant agreed that the other is excused as of the termination date from any further obligations. As such, the Company wrote-off its associated right-of-use asset of approximately $4.1 million and lease liabilities of approximately $4.6 million in the third quarter of Fiscal 2020, which resulted in a $0.5 million gain on lease termination.

In addition to the Company's main facility lease, on March 21, 2019, the Company entered into an agreement to lease several copy machines for a term of 36 months. The lease contained fixed monthly payments through the entire term of the lease, and it did not contain an option to extend the term or a bargain purchase option. This lease was also carried forward as an operating lease through the adoption of Topic 842. On October 9, 2019, the Company entered into an agreement to assume its leased copy machines, which terminates future obligations. As such, the Company wrote-off its associated right-of-use asset of approximately $26,000 and lease liabilities of approximately $26,000 in the third quarter of Fiscal 2020.

On October 2, 2019, the Company entered into an agreement to rent office space at 440 Stevens Avenue, Suite 200, Solana Beach, California 92075. This agreement is a month-to-month contract and can be terminated at-will by either party at any time. As such, the Company has concluded that this agreement does not contain a lease and will be expensed as incurred. Monthly rental payments are approximately $4,000 per month.

The Company recorded operating lease expense on a straight-line basis over the life of the leases. This is consistent with the Company's historical treatment of the lease costs included in operating expenses (referred to as "Rent Expense" prior to adoption of Topic 842). For the three and nine months ended December 31, 2019, the Company recorded operating lease expense of approximately $45,000 and $568,000, respectively. In addition, the Company recorded rent expense for the office space of approximately $7,000 for the three and nine months ended December 31, 2019. For the three and nine months ended December 31, 2018, the Company recorded rent expense of approximately $264,000 and $915,000, respectively. Variable lease costs associated with the Company's leases, such as payments for additional monthly fees to cover the Company's share of certain facility expenses (common area maintenance, or CAM) are not included in operating lease right-of-use assets and lease liabilities, but rather expensed as incurred. Variable lease expense was approximately $65,000 and $302,000 for the three and nine months ended December 31, 2019, respectively. Short-term lease cost for the three and nine months ended December 31, 2019 was approximately $0 and $37,000, respectively. The short-term lease was terminated in the fiscal second quarter.

The table below is a summary of the cash flows associated with the Company's leases for the nine months ended December 31, 2019 (in thousands):

	For the Nine Months Ended December 31, 2019
Cash paid for amount included in measurement of liabilities:	
Operating cash flows from operating leases	$ 579

Note 7. Concentrations

Credit risk

Financial instruments that potentially subject the Company to concentrations of credit risk consist principally of temporary cash investments. The Company maintains cash balances at various financial institutions located within the United States. Accounts at these institutions are secured by the Federal Deposit Insurance Corporation. Balances may exceed federally insured limits. The Company has not experienced losses in such accounts and management believes that the Company is not exposed to any significant credit risk with respect to its cash and cash equivalents.

The Company is also potentially subject to concentrations of credit risk in its revenues and accounts receivable. Because it is in the early commercial stage, the Company's revenues to date have been derived from a relatively small number of customers and collaborators. However, the Company has not historically experienced any accounts receivable write-downs and management does not believe significant credit risk exists as of December 31, 2019.

Note 8. Related Parties

From time to time, the Company will enter into an agreement with a related party in the ordinary course of its business and on terms and conditions it believes are as fair as those it offers and receives from independent third parties. These agreements are ratified by the Company's Board of Directors or a committee thereof pursuant to its related party transaction policy.

In August 2017, the Company entered into a research services agreement with Cirius Therapeutics, Inc. ("Cirius"), an entity for which Robert Baltera, Jr., a former director of the Company, serves as Chief Executive Officer and President. Under this agreement, the Company is providing standard research services to Cirius utilizing its ExVive™ Liver Tissue platform. The Company has provided and recognized revenue for ExVive™ Liver Tissue Services for Cirius in the amount of $281,000 to date. Organovo completed its obligations as of December 2018. No further revenues are expected.

In November 2018, the Company entered into a research services Quote with Viscient Biosciences ("Viscient"), an entity for which Keith Murphy, the Company's former director, Chief Executive Officer, and President, serves as the Chief Executive Officer and President. Under this Quote, the Company is providing research services in the amount of $142,000, amended in April 2019 to include an additional $7,000 of services. As of March 31, 2019, the Company recognized revenue of $42,000 for services provided and the remaining amount of $107,000 was recognized as revenue in the nine months ended December 31, 2019. In November 2019, the Company entered into an agreement with Viscient to sell certain bioprinting equipment and a non-exclusive license to certain intellectual property for approximately $171,000, of which $101,000 was recognized as other income and $70,000 was recognized as revenue in the nine months ended December 31, 2019. In addition to the services provided by Organovo, Viscient has purchased primary human cell-based products from our subsidiary, Samsara. Pursuant to the terms of multiple Quotes, $44,000 and $128,000 was recognized as revenue in the three and nine months ended December 31, 2019, respectively. Pursuant to the terms of multiple Quotes, $88,000 and $91,000 was recognized as revenue in the three and nine months ended December 31, 2018, respectively.

Note 9. Restructuring

In August 2019, after a rigorous assessment of the Company's lead liver therapeutic tissue program following completion of various preclinical studies, the Company's Board of Directors (the "Board") concluded that the variability of biological performance and related duration of potential benefits presented development challenges and lengthy redevelopment timelines that no longer supported an attractive opportunity for the Company and its stockholders. Furthermore, the Board deemed the stage of development of the Company's other therapeutic pipeline assets, including stem cell based tissue programs, to be too premature to potentially reach IND filing status within an acceptable investment horizon and with the Company's available resources. As a result, the Company suspended all development of its lead program and all other related pipeline development activity and engaged a financial advisory firm to explore its strategic alternatives, including evaluating a range of ways to generate value from the Company's technology platform and intellectual property, its commercial and development capabilities, its listing on the Nasdaq Stock Market, and its remaining financial assets. Under the restructuring plan, the Company terminated the employment of 52 employees, or 90% of its workforce and recorded a restructuring charge during the nine months ended December 31, 2019 of approximately $2.8 million, primarily related to employee severance and benefits costs, of which $1.7 million was paid out during the fiscal second quarter, $0.9 million was paid out during the fiscal third quarter, and the remainder is anticipated to be paid out during the fiscal fourth quarter.

The Company currently expects further restructuring actions tied to progress made on the strategic alternatives process, which could lead to an additional $3.5 million of severance and benefits costs that would be incurred and paid upon the closing of the Merger.

Restructuring charges were recorded in selling, general and administrative expenses and were comprised of the following (in thousands):

	Three Months Ended December 31, 2019	Three Months Ended December 31, 2018	Nine Months Ended December 31, 2019	Nine Months Ended December 31, 2018
Severance for Involuntary Employee Terminations	$ 341	$ —	$ 2,797	$ 428
Total Restructuring Expense	$ 341	$ —	$ 2,797	$ 428

The following table summarizes the activity and balances of the restructuring reserve (in thousands):

	Severance for Involuntary Employee Terminations	Total
Balance at March 31, 2019	$ —	$ —
Reserve established	2,456	2,456
Increase to reserve	341	341
Utilization of reserve:		
Payments	(2,572)	(2,572)
Balance at December 31, 2019	$ 225	$ 225

The restructuring accrual is reflected on the condensed consolidated balance sheet at December 31, 2019 as accrued expenses.

Note 10. Subsequent Events

On January 26, 2020, the Company, its wholly owned subsidiary, Opal Merger Sub, Inc., and Tarveda entered into the First Amendment (the "Amendment") to the Merger Agreement. The Amendment amends the definition of Organovo Valuation (as defined in the Merger Agreement) under the terms of the Merger Agreement to increase the Company's valuation by $1.5 million for value attributable to the Company's intellectual property if it does not sell or transfer its intellectual property and remaining assets prior to the closing of the Merger. The Organovo Valuation is used to calculate the Exchange Ratio (as defined in the Merger Agreement) between the Company and Tarveda stockholders. The Amendment also makes technical changes to the Organovo Stockholder Proposals (as defined in the Merger Agreement) to be voted on by the Company's stockholders.

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 our historical consolidated financial statements and the related notes thereto included in our Annual Report on Form 10-K for the fiscal year ended March 31, 2019. This discussion and analysis contains forward-looking statements, such as statements related to our plans, objectives, expectations and intentions. Any statements that are not statements of historical fact are forward-looking statements. When used, the words "believe," "plan," "intend," "anticipate," "target," "estimate," "expect" and the like, and/or future tense or conditional constructions such as "will," "may," "could," "should," or similar expressions, identify certain of these forward-looking statements. These forward-looking statements speak only as of the date of this Quarterly Report on Form 10-Q and are subject to risks and uncertainties, including those described in this Quarterly Report on Form 10-Q, as well as the risk factors disclosed in our Annual Report on the Form 10-K for the fiscal year ended March 31, 2019, filed with the Securities and Exchange Commission on June 3, 2019, that could cause our actual results or events to differ materially from those expressed or implied by such forward-looking statements. Except to the limited extent required by applicable law, the Company does not undertake any obligation to update forward-looking statements to reflect events or circumstances occurring after the date of this Quarterly Report.

Basis of Presentation

The condensed consolidated financial statements included in this Form 10-Q have been prepared in accordance with the Securities and Exchange Commission (the "SEC") instructions to Quarterly Reports on Form 10-Q. Accordingly, the condensed consolidated financial statements presented elsewhere in this Form 10-Q and discussed below are unaudited and do not contain all the information required by U.S. generally accepted accounting principles ("GAAP") to be included in a full set of financial statements. The audited financial statements for the year ended March 31, 2019, filed with the SEC on Form 10-K on June 3, 2019 include a summary of our significant accounting policies and should be read in conjunction with this Form 10-Q. In the opinion of management, all material adjustments necessary to present fairly the results of operations for such periods have been included in this Form 10-Q. All such adjustments are of a normal recurring nature. The results of operations for interim periods are not necessarily indicative of the results of operations for the entire year.

Overview

We are a biotechnology company that has been focused on pioneering the development of bioprinted human tissues that emulate human biology and disease. We have been developing our *in vivo* liver tissues to treat end-stage liver disease and a select group of life-threatening, orphan diseases, for which there are limited treatment options other than organ transplantation.

Recent Events

On December 13, 2019, we entered into an Agreement and Plan of Merger and Reorganization (the "Merger Agreement") with Tarveda Therapeutics, Inc. ("Tarveda"), a privately owned biopharmaceutical company, and Opal Merger Sub, Inc. ("Opal"), a new wholly-owned subsidiary of ours. The Merger Agreement provides that, upon the terms and subject to the conditions set forth in the Merger Agreement, Opal will merge with and into Tarveda, with Tarveda as the surviving corporation, becoming a wholly-owned subsidiary of ours. As a result of the Merger, each outstanding share of Tarveda capital stock will be converted into the right to receive shares of our common stock. Under the terms of the Merger Agreement, we will issue, and Tarveda securityholders will be entitled to receive, in a tax-free exchange, shares of our common stock such that Tarveda securityholders will own approximately 75% of the combined company on a fully diluted basis (as defined in the Merger Agreement) and our securityholders will own approximately 25% of the combined company on a fully diluted basis (as defined in the Merger Agreement). The Merger Agreement provides that the exchange ratio for Tarveda's capital stock are subject to upward and downward adjustment based on our net cash balance at the closing of the Merger. If our net cash balance at the closing of the Merger is below $22 million, the Merger Agreement provides for adjusting the exchange ratio to increase the number of shares of our common stock issued to former Tarveda securityholders. As a result, Tarveda's security holders may receive additional shares of our common stock as merger consideration, and consequently our securityholders may be further diluted as a result of the Merger. If our net cash balance at the closing of the Merger is above $22 million, the Merger Agreement provides for adjusting the exchange ratio to decrease the number of shares of our common stock issued to former Tarveda securityholders. Additionally, the Merger Agreement provides for certain adjustments for debt of each of the parties. These percentages are calculated based on other assumptions as well, and, to the extent these assumptions prove to be inaccurate, Tarveda's securityholders may receive a larger or smaller percentage of the combined company's pro forma fully diluted capitalization. If Tarveda's net cash balance at the closing of the Merger is below $15 million, we may elect to not consummate the Merger.

The Merger is subject to customary closing conditions, including approval by our stockholders of the issuance of our common stock in the Merger, as well as a reverse stock split of our common shares. We anticipate the Merger will be completed in the fiscal fourth quarter of 2020. The Merger Agreement contains certain termination rights for both us and Tarveda, and further provides that, upon termination of the Merger Agreement under specified circumstances, either party may be required to pay the other party a termination fee ranging between $1.0 million (plus reimbursement of $0.3 million of expenses) and $2.0 million (plus reimbursement of $0.5 million of expenses), depending on the cause of the termination.

Prior to execution of the Merger Agreement, we solicited bids from potential purchasers for our operating assets, which we had sought to sell or otherwise dispose of in one or more strategic transactions. In connection with that process, we entered into an agreement with LifeNet Health ("LifeNet") on November 7, 2019 to sell certain equipment and inventory of our Samsara Sciences, for $1.5 million in cash, which was recorded to other income. In addition, on January 26, 2020, we and Tarveda agreed to amend the Merger Agreement to provide that we would be credited with $1.5 million for purposes of calculating the number of shares to be issued to Tarveda stockholders in connection with the Merger if we do not sell or transfer our intellectual property and remaining assets prior to the closing of the Merger. Our remaining assets following these actions will consist primarily of our cash, cash equivalents, interest receivables, restricted cash and other working capital items related to our corporate administrative function, our intellectual property portfolio, our license and collaboration agreements, our remaining assets, our listing on the Nasdaq Capital Market and the Merger Agreement with Tarveda. In addition, the majority of our employees have been terminated, except for six general and administrative personnel.

As a result of the sale transaction with LifeNet, aside from the maintenance of our intellectual property portfolio, license and collaboration agreements, remaining assets, and listing on the Nasdaq Capital Market, all of our business immediately following the Merger will be the business conducted by Tarveda immediately prior to the Merger, if the Merger closes. Accordingly, because of the pending Merger with Tarveda and the actions described above, we believe our historical operating results are not indicative of future results. We cannot assure you that we will close the pending Merger with Tarveda on favorable terms, in a timely manner or at all.

Critical Accounting Policies, Estimates, and Judgments

Our financial statements are prepared in accordance with U.S. generally accepted accounting principles ("GAAP"). The preparation of these financial statements requires us to make estimates and judgments that affect the reported amounts of assets and liabilities, disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. We continually evaluate our estimates and judgments, the most critical of which are those related to revenue recognition, stock-based compensation expense, the valuation of impairment of long-lived assets, and the valuation allowance on deferred tax assets. We base our estimates and judgments on historical experience and other factors that we believe to be reasonable under the circumstances. Materially different results can occur as circumstances change and additional information becomes known. Besides the estimates identified above that are considered critical, we make many other accounting estimates in preparing our financial statements and related disclosures. All estimates, whether or not deemed critical, affect reported amounts of assets, liabilities, revenues and expenses, as well as disclosures of contingent assets and liabilities. These estimates and judgments are also based on historical experience and other factors that are believed to be reasonable under the circumstances. Materially different results can occur as circumstances change and additional information becomes known, even for estimates and judgments that are not deemed critical.

There have been no significant changes to our critical accounting policies since March 31, 2019, with the exception of changes made upon adoption of Accounting Standards Update ("ASU") 2016-02, Leases ("ASC 842") and the related supplemental ASUs. For a description of critical accounting policies that affect our significant judgments and estimates used in the preparation of our consolidated financial statements, refer to Item 7. "Management's Discussion and Analysis of Financial Condition and Results of Operations" and "Note 1. Description of Business and Summary of Significant Accounting Policies" in the Notes to Consolidated Financial Statements contained in our Annual Report on Form 10-K for the year ended March 31, 2019, filed with the SEC on June 3, 2019. For a description of accounting policy changes resulting from the adoption of ASC 842 and the related supplemental ASUs, refer to Note 1 to our unaudited condensed consolidated financial statements contained in this quarterly report on Form 10-Q.

Results of Operations

Comparison of the three months ended December 31, 2019 and 2018

The following table summarizes our results of operations for the three months ended December 31, 2019 and 2018 (in thousands, except %):

	Three months ended December 31,		Increase (decrease)	
	2019	2018	$	%
Revenues	$ 298	$ 779	$ (481)	(62%)
Cost of revenues	$ 13	$ 136	$ (123)	(90%)
Research and development	$ 145	$ 3,782	$ (3,637)	(96%)
Selling, general and administrative	$ 5,374	$ 3,387	$ 1,987	59%
Other income	$ 1,864	$ 127	$ 1,737	1,368%

Revenues

For the three months ended December 31, 2019, total revenue was $0.3 million, a decrease of $0.5 million, or 62%, from the three months ended December 31, 2018, due to the reduction of service revenue activities and a reduction in product revenues from sales of primary human cells following the sale of our inventory to LifeNet. Product and service revenues of approximately $0.2 million for the three months ended December 31, 2019 decreased 66% from the prior year period due to a $0.2 million decrease in revenue from the sales of primary human liver cells and related products and a $0.3 million decrease in service revenue. We had no grant revenue for the three months ended December 31, 2019 compared to less than $0.1 million in prior year quarter as we reduced our activities during the quarter.

Costs and Expenses

Cost of Revenues

Cost of product and service revenues, which reflects expenses related to manufacturing our products and delivering services was less than $0.1 million for the three months ended December 31, 2019, compared to approximately $0.1 million for the three months ended December 31, 2018. The decrease was primarily due to the wind-down of certain commercial activities related to our liver tissues during the third quarter of Fiscal 2020. In addition, we sold primary human liver cells and related products during the three months ended December 31, 2019 that had been previously reserved.

Research and Development Expenses

The following table summarizes our research and development expenses for the three months ended December 31, 2019 and 2018 (in thousands, except %):

	Three months ended December 31, 2019	% of total	Three months ended December 31, 2018	% of total	Increase (decrease) $	Increase (decrease) %
Research and development	$ 79	54%	$ 3,397	89%	$ (3,318)	(98%)
Non-cash stock-based compensation	66	46%	249	7%	(183)	(73%)
Depreciation and amortization	-	0%	136	4%	(136)	(100%)
Total research and development expenses	**$ 145**	**100%**	**$ 3,782**	**100%**	**$ (3,637)**	**(96%)**

Research and development expenses were approximately $0.1 million, a decrease of $3.6 million, or 96%, from the prior year period as we reduced nearly all research and development activities following our decision to pursue our strategic alternatives during the second quarter of Fiscal 2020. This action caused a $1.6 million reduction of personnel related costs, a $0.7 million reduction in lab supply costs, a $0.7 million reduction in facilities costs, and a $0.6 million reduction in all other costs. The Company's average full-time research and development staff decreased from an average of forty-four full-time employees for the three months ended December 31, 2018 to an average of zero full-time employees for the three months ended December 31, 2019. Going forward, we do not expect to incur any further research and development expenses.

Selling, General and Administrative Expenses

The following table summarizes our selling, general and administrative expenses for the three months ended December 31, 2019 and 2018 (in thousands, except %):

	Three months ended December 31, 2019	% of total	Three months ended December 31, 2018	% of total	Increase (decrease) $	Increase (decrease) %
Selling, general and administrative	$ 3,428	64%	$ 2,161	64%	$ 1,267	59%
Non-cash stock-based compensation	1,186	22%	1,109	33%	77	7%
Depreciation and amortization	760	14%	117	3%	643	550%
Total selling, general and administrative expenses	**$ 5,374**	**100%**	**$ 3,387**	**100%**	**$ 1,987**	**59%**

For the three months ended December 31, 2019, selling, general and administrative expenses were approximately $5.4 million, an increase of $2.0 million, or 59%, over the prior year period as we incurred approximately $1.0 million of legal, accounting and financial printer costs related to our proposed Merger with Tarveda and $0.1 million of costs related to dismissing a stockholder lawsuit. In addition, we also incurred approximately $0.8 million of depreciation and amortization costs related to leasehold improvement write-offs in connection with the early termination of our lease and $0.3 million of severance related costs during the current quarter in connection with restructuring the business following our decision to pursue our strategic alternatives. These actions caused a $1.1 million increase in corporate costs, a $0.6 million increase in depreciation and amortization costs, a $0.4 million increase in allocated facilities costs, which were offset by a $0.1 million decrease in personnel costs. Our average selling, general and administrative headcount was eight full-time employees for the three months ended December 31, 2019 compared to twenty-three full-time employees in the prior year period.

Other Income (Expense)

Other income was approximately $1.9 million for the three months ended December 31, 2019 consisting of $1.2 million of proceeds received from the sale of Samsara assets, $0.5 million of gain on our lease termination, $0.1 million of income from the sale of other assets, and $0.1 million of interest income. Other income was approximately $0.1 million for the three months ended December 31, 2018 and consisted of $0.2 million of interest income, offset by a $0.1 million loss on disposal of assets. Interest income decreased from the same period of fiscal 2019 due to lower average yields and investment balances.

Comparison of the nine months ended December 31, 2019 and 2018

The following table summarizes our results of operations for the nine months ended December 31, 2019 and 2018 (in thousands):

	Nine months ended December 31, 2019	Nine months ended December 31, 2018	Increase (decrease) $	Increase (decrease) %
Revenues	$ 2,196	$ 2,411	$ (215)	(9%)
Cost of revenues	$ 328	$ 381	$ (53)	(14%)
Research and development	$ 5,413	$ 10,348	$ (4,935)	(48%)
Selling, general and administrative	$ 15,037	$ 11,794	$ 3,243	27%
Other income	$ 2,597	$ 463	$ 2,134	461%

Revenues

For the nine months ended December 31, 2019, total revenue was $2.2 million, a decrease of $0.2 million, or 9%, from the nine months ended December 31, 2018 due to the recognition of a $0.5 million non-refundable up-front fee related to an agreement that expired and higher product revenues from primary human cells out of inventory, which were more than offset by a reduction in grant and service revenues. Product and service revenues of approximately $2.1 million for the nine months ended December 31, 2019 increased 20% from the prior year period. The increase was due to a $0.4 million increase in sales of primary human liver cells and less than $0.1 million decrease in service revenue, which included the recognition of the $0.5 million non-refundable up-front fee referenced above. The increase in product revenues occurred after our customers learned that we intended to cease offering primary human liver cells. Grant revenue decreased by approximately $0.5 million for the nine months ended December 31, 2019 compared to the prior year period as we ceased activities during the second quarter of Fiscal 2020.

Costs and Expenses

Cost of Revenues

Cost of product and service revenues, which reflects expenses related to manufacturing our products and delivering services was approximately $0.3 million and $0.4 million for the nine months ended December 31, 2019 and 2018, respectively. The decrease is primarily due to a $0.2 million write-off of inventory related to the wind-down of our commercial activities related to our liver tissues during the second quarter of Fiscal 2020. In addition, there were lower sales from liver tissue research services versus the prior year period.

Research and Development Expenses

The following table summarizes our research and development expenses for the nine months ended December 31, 2019 and 2018 (in thousands):

	Nine months ended December 31, 2019	% of total	Nine months ended December 31, 2018	% of total	Increase (decrease) $	Increase (decrease) %
Research and development	$ 4,940	92%	$ 9,250	89%	$ (4,310)	(47%)
Non-cash stock-based compensation	240	4%	679	7%	(439)	(65%)
Depreciation and amortization	233	4%	419	4%	(186)	(44%)
Total research and development expenses	**$ 5,413**	**100%**	**$ 10,348**	**100%**	**$ (4,935)**	**(48%)**

Research and development expenses were approximately $5.4 million, a decrease of $4.9 million, or 48%, from the prior year period as we reduced nearly all research and development activities following our decision to pursue our strategic alternatives during the second quarter of Fiscal 2020. This action caused a $2.5 million decrease in personnel related costs, a $1.1 million decrease in lab services and supply costs, a $0.9 million decrease in facilities and allocated overhead costs, a $0.3 million decrease in outside services costs, and a $0.2 million decrease in depreciation and amortization costs. Our average full-time research and development staff decreased from an average of forty-seven full-time employees for the nine months ended December 31, 2018 to an average of nineteen full-time employees for the nine months ended December 31, 2019.

Selling, General and Administrative Expenses

The following table summarizes our selling, general and administrative expenses for the nine months ended December 31, 2019 and 2018 (in thousands):

	Nine months ended December 31, 2019	% of total	Nine months ended December 31, 2018	% of total	Increase (decrease) $	Increase (decrease) %
Selling, general and administrative	$ 10,663	71%	$ 8,158	70%	$ 2,505	31%
Non-cash stock-based compensation	3,468	23%	3,232	27%	236	7%
Depreciation and amortization	906	6%	404	3%	502	124%
Total selling, general and administrative expenses	**$ 15,037**	**100%**	**$ 11,794**	**100%**	**$ 3,243**	**27%**

For the nine months ended December 31, 2019, selling, general and administrative expenses were approximately $15.0 million, an increase of $3.2 million, or 27%, over the prior year period of approximately $11.8 million as we incurred approximately $2.8 million of severance related costs during Fiscal 2020 in connection with restructuring the business following our decision to pursue our strategic alternatives, as well as $1.0 million of legal, accounting and financial printer costs related to our proposed Merger with Tarveda and $0.1 million of costs related to dismissing a stockholder lawsuit. In addition, we also incurred approximately $0.8 million of depreciation and amortization costs related to leasehold improvement write-offs in connection with the early termination of our lease. These actions caused a $1.2 million increase in personnel related costs, a $1.1 million increase in corporate costs, a $0.5 million increase in depreciation and amortization costs, and a $0.4 million increase in facilities costs. Our average selling, general and administrative headcount was fourteen full-time employees for the nine months ended December 31, 2019 compared to twenty-four full-time employees in the prior year period.

Other Income (Expense)

Other income was approximately $2.6 million for the nine months ended December 31, 2019 consisting of $1.1 million of proceeds received from the sale of Samsara assets, $0.5 million of gain on lease termination, $0.5 million of income from the sale of other assets and $0.5 million of interest income. Other income was approximately $0.5 million for the nine months ended December 31, 2018 and consisted primarily of interest income. Interest income was comparable to the same period of fiscal 2019.

Financial Condition, Liquidity and Capital Resources

Until our recent decision to explore strategic alternatives and merge with Tarveda, we had primarily devoted our efforts to developing and commercializing a platform technology to produce and study living tissues that emulate key aspects of human biology and disease, raising capital and building infrastructure. Following the decision to explore strategic alternatives, ultimately leading to the decision to merge with Tarveda, we have taken steps to manage our resources and extend our cash runway, including reducing all commercial and research and development laboratory activities, except for sales of primary human cells out of inventory, negotiating an exit from our long-term facility lease, selling lab equipment and inventory, and reducing our workforce to the minimum level necessary to explore and support these strategic alternatives and maintain our core intellectual property, licenses and collaborations with research institutions and universities, and to maximize the amount of cash we deliver in the proposed Merger with Tarveda.

As of December 31, 2019, we had cash and cash equivalents of approximately $30.5 million and an accumulated deficit of $276.7 million. We also had negative cash flow from operations of $11.7 million during the nine months ended December 31, 2019. At March 31, 2019, we had cash and cash equivalents of approximately $36.5 million and an accumulated deficit of $260.8 million.

At December 31, 2019, we had total current assets of approximately $31.1 million and current liabilities of approximately $2.4 million, resulting in working capital of $28.7 million. At March 31, 2019, we had total current assets of approximately $38.6 million and current liabilities of approximately $3.8 million, resulting in working capital of $34.8 million.

The following table sets forth a summary of the primary sources and uses of cash for the three months ended December 31, 2019 and 2018 (in thousands):

	Nine months ended December 31,	
	2019	2018
Net cash (used in) provided by:		
Operating activities	$ (11,673)	$ (15,298)
Investing activities	728	(34)
Financing activities	4,935	6,830
Net decrease in cash, cash equivalents, and restricted cash	$ (6,010)	$ (8,502)

Operating activities

Net cash used by operating activities for the nine months ended December 31, 2019 was approximately $11.7 million as compared to $15.3 million used in operating activities for the nine months ended December 31, 2018. This $3.6 million decrease in operating cash usage can be attributed entirely to the improvement in the net loss less depreciation and amortization and stock-based compensation, resulting from the Company’s restructuring and reduction of headcount, as there was no difference in working capital between the two periods.

Investing activities

Net cash provided by investing activities, consisting primarily of proceeds from the sale of assets was $0.7 million for the nine months ended December 31, 2019, compared to less than $0.1 million of cash usage for the prior year period.

Financing activities

Net cash provided by financing activities was approximately $4.9 million during the nine months ended December 31, 2019 compared to approximately $6.8 million during the nine months ended December 31, 2018. Financing in both periods was driven by the sale of common stock through at-the-market (“ATM”) offerings.

Operations funding requirements

Through December 31, 2019, we have financed our operations primarily through the sale of convertible notes, the private placement of equity securities, the sale of common stock through public and ATM offerings, and from revenue derived from grants and royalty payments, collaborative agreements, product sales and research-based services. Based on our current operating plan and available cash resources, we have sufficient resources to fund our ongoing operations as currently planned for at least the next twelve months.

Aside from the maintenance of our intellectual property portfolio, license and collaboration agreements, remaining assets, and listing on the Nasdaq Capital Market, our remaining cash requirements consist primarily of fees associated with the Merger including fees payable to financial advisors, consulting fees, legal and accounting support, insurance premiums, key employee retention, severance and change of control benefits and ongoing compensation obligations for the six general and administrative personnel that remain with us through the date the sale transaction is completed, if the Merger closes. We currently anticipate incurring approximately $4.2 million in transaction related costs and $3.5 million in severance related costs to complete the Merger.

We have an effective shelf registration statement on Form S-3 (File No. 333-222929), or the 2018 Shelf, that registered $100,000,000 of common stock, preferred stock, warrants and units, or any combination of the foregoing, which expires on February 22, 2021. On March 16, 2018, we filed a prospectus supplement to the 2018 Shelf to register the sale of up to $50.0 million of shares of our common stock that may be issued in at-the-market offerings pursuant to an equity offering sales agreement we entered into with two investment banking firms as of the same date. During the nine months ended December 31, 2019, we sold 6,087,382 shares of common stock in at-the-market offerings, with net proceeds of approximately $5.0 million under the 2018 Shelf.

Based on our use of the 2018 Shelf through December 31, 2019, we can offer an aggregate of $81.3 million in future offerings under the 2018 Shelf, including the $31.3 million remaining available for future issuance through its at-the-market program, prior to its expiration date on February 22, 2021.

We do not anticipate any further financing activities pending the completion of the Merger with Tarveda.

Having insufficient funds may require us to relinquish rights to our technology or pursue or consummate a strategic transaction on less favorable terms than we would otherwise choose. Failure to obtain adequate financing could eventually adversely affect our ability to operate as a going concern. If we raise additional funds from the issuance of equity securities, there would be substantial dilution to our existing stockholders. If we raise additional funds by incurring debt financing, the terms of the debt may involve significant cash payment obligations as well as covenants and specific financial ratios that may restrict our ability to operate our business.

On June 25, 2019, we received a notice letter from the Listing Qualifications Staff of the Nasdaq Stock Market LLC (“Nasdaq”) indicating that, based upon the closing bid price of our common stock for the last 30 consecutive business days, we no longer meet the requirement to maintain a minimum closing bid price of $1 per share, as set forth in Nasdaq Listing Rule 5450(a)(1). On December 26, 2019, we obtained an additional compliance period of 180 calendar days by electing to transfer to The Nasdaq Capital Market to take advantage of the additional compliance period offered on that market. 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. In connection with our proposed Merger with Tarveda, we are also seeking to effect a reverse stock split, which would be subject to the prior approval of our stockholders. There can be no assurance that we will be able to regain compliance with the minimum bid price requirement or maintain compliance with the other listing requirements necessary for us to maintain the listing of our common stock on the Nasdaq Capital Market. Our failure to regain compliance during this second compliance period could result in delisting and impact our ability to complete the Merger with Tarveda.

As of December 31, 2019, we had 130,497,563 total issued and outstanding shares of common stock.

In addition, our 2008 Equity Incentive Plan provides for the issuance of up to 896,256 shares of our outstanding common stock and the 2012 Equity Incentive Plan, as amended, provides for the issuance of up to 28,553,986 shares of our common stock, of which 6,547,442 options and 7,015,674 restricted stock units remain outstanding and 10,482,484 shares remain available for issuance as of December 31, 2019, to executive officers, directors, advisory board members, employees and consultants. We have also issued time-based and performance-based inducement awards under the Incentive Award Agreements for up to 3,098,473 shares of our common stock. Additionally, 1,188,718 shares of common stock remain available for issuance under our 2016 Employee Stock Purchase Plan. In aggregate, issued and outstanding common stock, shares underlying outstanding warrants, and shares issuable under outstanding equity awards or reserved for future issuance under the 2008 and 2012 Equity Incentive Plans and the 2016 Employee Stock Purchase Plan total 158,830,354 shares of common stock out of the 200,000,000 shares of common stock authorized for issuance as of December 31, 2019.

Off-Balance Sheet Arrangements

We have no off-balance sheet arrangements, including unrecorded derivative instruments that have or are reasonably likely to have a current or future material effect on our financial condition, changes in financial condition, revenues or expenses, results of operations, liquidity, capital expenditures or capital resources. We have certain warrants and options outstanding but we do not expect to receive sufficient proceeds from the exercise of these instruments unless and until the underlying securities are registered, and/or all restrictions on trading, if any, are removed, and in either case the trading price of our common stock is significantly greater than the applicable exercise prices of the options and warrants.

ITEM 3. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Not required for smaller reporting companies under Item 305(e).

ITEM 4. CONTROLS AND PROCEDURES

Disclosure Controls and Procedures

We maintain disclosure controls and procedures that are designed to ensure that information required to be disclosed in our reports filed pursuant to the Securities Exchange Act of 1934, as amended (the “Exchange Act”) is recorded, processed, summarized, and reported within the time periods specified in the SEC’s rules and forms, and that such information is accumulated and communicated to our management, including our principal executive officer and principal financial and accounting officer, as appropriate, to allow timely decisions regarding required disclosure.

Our management, with the participation of our Chief Executive Officer and Chief Financial Officer, evaluated the effectiveness of our disclosure controls and procedures (as defined in Rule 13a-15(e) of the Exchange Act) as of the end of the period covered by this report. Based on that evaluation, our Chief Executive Officer and Chief Financial Officer concluded that our disclosure controls and procedures as of the end of the quarterly period covered by this report were designed and operating effectively.

Changes in Internal Control over Financial Reporting

There was no change in our internal control over financial reporting (as defined in Rule 13a-15(f) of the Exchange Act) that occurred during the fiscal quarter to which this report relates that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Inherent Limitations on Effectiveness of Controls

Our management, including our Chief Executive Officer and our Chief Financial Officer, do not expect that our disclosure controls or our internal control over financial reporting will prevent or detect all error and all fraud. A control system, no matter how well designed and operated, can provide only reasonable, not absolute, assurance that the control system’s objectives will be met. The design of a control system must reflect the fact that there are resource constraints, and the benefits of controls must be considered relative to their costs. Further, because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that misstatements due to error or fraud will not occur or that all control issues and instances of fraud, if any, have been detected. These inherent limitations include the realities that judgments in decision-making can be faulty and that breakdowns can occur because of simple error or mistake. Controls can also be circumvented by the individual acts of some persons, by collusion of two or more people, or by management override of the controls. The design of any system of controls is based in part on certain assumptions about the likelihood of future events, and there can be no assurance that any design will succeed in achieving its stated goals under all potential future conditions. Projections of any evaluation of controls effectiveness to future periods are subject to risks. Over time, controls may become inadequate because of changes in conditions or deterioration in the degree of compliance with policies or procedures.

PART II—OTHER INFORMATION

ITEM 1. LEGAL PROCEEDINGS

See Note 5 of the Notes to the Unaudited Condensed Consolidated Financial Statements within this Form 10-Q for a discussion of our legal proceedings and contingencies.

ITEM 1A. RISK FACTORS

Investing in our common stock involves a high degree of risk. In evaluating us and our common stock, we urge you to carefully consider the risks and other information in this Quarterly Report on Form 10-Q, including the section titled "Management's Discussion and Analysis of Financial Condition and Results of Operations" and our condensed consolidated financial statements and related notes, as well as the risk factors disclosed in our Annual Report on Form 10-K for the year ended March 31, 2019 (the "2019 Annual Report"), filed with the SEC on June 3, 2019 and in each of our Quarterly Reports on Form 10-Q for the quarters ended June 30, 2019 and September 30, 2019, filed with the SEC on August 8, 2019 and November 7, 2019, respectively (the "Previous Quarterly Reports"). Other than the risk factors related to the Merger, which we have updated and set forth below, there has been no material changes from the risk factors as previously disclosed in our 2019 Annual Report and Previous Quarterly Reports. Any of the risks discussed in this Quarterly Report on Form 10-Q, the 2019 Annual Report and Previous Quarterly Reports, as well as additional risks and uncertainties not currently known to us or that we currently deem immaterial, could materially and adversely affect our results of operations or financial condition. If any unfavorable events or circumstances actually occurs, our business may suffer, the trading price of our common stock could decline, and you could lose all or part of your investment.

Risks Related to the Merger

The Exchange Ratio (as defined in the Merger Agreement) is not adjustable based on the market price of our common stock so the Merger consideration at the closing of the Merger (the "Closing") may have a greater or lesser value than at the time the Merger Agreement was signed.

The estimated Exchange Ratio calculation is based upon our and Tarveda's capitalization immediately prior to the date of the proxy statement/prospectus/information statement relating to the Merger filed on the Registration Statement on Form S-4/A as filed with the SEC on January 29, 2020 (the "Registration Statement"), and will be adjusted based on the amount of our net cash, our and Tarveda's debt and changes in our capitalization or the capitalization of Tarveda prior to the Closing, not taking into account the proposed reverse stock split at a ratio of one (1) new share for every 20 to 40 shares of our outstanding common stock (the "Organovo Reverse Stock Split"), as described in the section titled "*The Merger — Merger Consideration and Adjustment* " of the Registration Statement. Any changes in the market price of our common stock before the completion of the Merger will not affect the number of shares Tarveda securityholders will be entitled to receive pursuant to the Merger Agreement. Therefore, if before the completion of the Merger the market price of our common stock declines from the market price on the date of the Merger Agreement, then Tarveda securityholders could receive merger consideration with substantially lower value. Similarly, if before the completion of the Merger the market price of our common stock increases from the market price on the date of the Merger Agreement, then, Tarveda securityholders could receive merger consideration with considerably more value for their shares of Tarveda capital stock than the parties had negotiated for in the establishment of the Exchange Ratio. The Merger Agreement does not include a price-based termination right. Because the Exchange Ratio does not adjust as a result of changes in the value of our common stock, for each one percentage point that the market value of our common stock rises or declines, there is a corresponding one percentage point rise or decline, respectively, in the value of the total merger consideration issued to Tarveda securityholders.

Failure to complete the Merger may result in us or Tarveda paying a termination fee or reimbursing expenses to the other party and could harm the common stock price of Organovo and future business and operations of each company.

If the Merger is not completed, we and Tarveda are subject to the following risks:

- if the Merger Agreement is terminated under certain circumstances, we or Tarveda will be required to pay certain transaction expenses incurred by the other party, up to a maximum of $0.3 million (or $0.5 million in certain circumstances);

- if the Merger Agreement is terminated under certain circumstances, we or Tarveda will be required to pay the other party a termination fee equal to $1.0 million (or $2.0 million in certain circumstances) and the third-party expenses incurred by the other party up to a maximum of $0.3 million (or $0.5 million in certain circumstances);

- the price of our stock may decline and remain volatile; and

- costs related to the Merger, such as legal and accounting fees which we and Tarveda estimate will total approximately $4.2 million and $3.0 million, respectively, some of which must be paid even if the Merger is not completed.

In addition, if the Merger Agreement is terminated and our board of directors or the Tarveda board of directors determines to seek another business combination, there can be no assurance that either we or Tarveda will be able to find a partner willing to provide equivalent or more attractive consideration than the consideration to be provided by each party in the Merger on a timely basis, or at all.

The Merger may be completed even though material adverse changes may result from the announcement of the Merger, industry-wide changes and other causes.

In general, either we or Tarveda can refuse to complete the Merger if there is a material adverse change affecting the other party between December 13, 2019, the date of the Merger Agreement, and the Closing. However, certain types of changes do not permit either party to refuse to complete the Merger, even if such change could be said to have a material adverse effect on us or Tarveda, including:

- any effect resulting from the execution, delivery, announcement or performance of obligations under the Merger Agreement or the announcement or pendency or anticipated consummation of the Merger or any related transactions;

- any natural disaster or any act of terrorism, sabotage, military action or war (whether or not declared) or escalation or any worsening thereof;

- any change in United States GAAP or any change in applicable laws, rules or regulations or the interpretation thereof;

- any conditions generally affecting the industries in which Tarveda and us and their or our respective subsidiaries participate or the United States or global economy or capital markets as a whole to the extent such conditions do not have a disproportionate impact on Tarveda or us and their or our respective subsidiaries, as applicable;

- any failure by us or Tarveda to meet internal projections or forecasts or third-party revenue or earnings predictions for any period ending on or after the date of the Merger Agreement; or

- the resignation or termination of any of our directors or officers or any director or officer of Tarveda.

If adverse changes occur and we and Tarveda still complete the Merger, the combined organization stock price may suffer. This in turn may reduce the value of the Merger to our stockholders, the stockholders of Tarveda or both.

Some of our and Tarveda officers and directors have interests in the Merger that are different from yours and that may influence them to support or approve the Merger without regard to your interests.

Certain of our officers and directors and officers and directors of Tarveda participate in arrangements that provide them with interests in the Merger that are different from yours, including, among others, the continued service as an officer or director of the combined organization, severance benefits, the acceleration of stock option vesting, continued indemnification and the potential ability to sell an increased number of shares of common stock of the combined organization in accordance with Rule 144 under the Securities Act of 1933, as amended (the “Securities Act”). For example, in November 2015 we entered into a Severance and Change in Control Plan Participation Agreement with each of our executive officers and certain key employees pursuant to our Severance and Change in Control Plan (the “Organovo Severance Plan”), which was approved by our compensation committee. The Organovo Severance Plan establishes the amount of severance payments and benefits available in the event of a (i) termination of employment by us for reasons other than cause, death or disability or by the participant for good reason and (ii) termination of employment by us for reasons other than cause, death or disability or by the participant for good reason within six months before or within 12 months after a change in control. Our executive officers, including Taylor Crouch, our Chief Executive Officer, who also serves on our board of directors, are each parties to a participation agreement under the Organovo Severance Plan and are contractually entitled to severance payments, including a cash severance payment equal to a multiple of the employee’s base salary, paid in a lump sum, plus a target bonus for the fiscal year in which the termination occurs, health benefit continuation for up to 18 months, and outplacement assistance. In addition, our executive officers are also entitled to full accelerated vesting of all outstanding equity grants and a one-year time period to exercise any stock options or stock appreciation rights.

Based on the terms of their respective participation agreements, our executive officers will be entitled to receive a total value of approximately $3.06 million (collectively, not individually) in connection with the consummation of the Merger and the associated termination of their employment from us, not including the value associated with the acceleration of their outstanding equity awards.

Additionally, our directors and officers are parties to support agreements and lock-up agreements with us and Tarveda.

Our board of directors and special committee was aware of these interests and considered them, among other matters, in the decision to approve the Merger Agreement. For more information, please see the section titled "*The Merger — Interests of the Organovo Directors and Executive Officers in the Merger*" of the Registration Statement.

All of Tarveda's executive officers and certain of its directors have options, subject to vesting, to purchase shares of Tarveda common stock which shall be converted into and become options to purchase shares of our common stock, Tarveda's directors and executive officers are expected to become our directors and executive officers upon the consummation of the Merger and all of Tarveda's directors and executive officers are entitled to certain indemnification and liability insurance coverage pursuant to the terms of the Merger Agreement. In addition, certain of Tarveda's executive officers and directors and affiliates of Tarveda's directors currently hold shares of Tarveda common stock and preferred stock. The shares of Tarveda preferred stock will be converted into shares of Tarveda common stock prior to the consummation of the Merger. In addition and for example, certain of Tarveda's officers received grants of shares of Tarveda common stock prior to the execution of the Merger Agreement, certain of Tarveda's directors and executive officers have options, subject to vesting, to purchase shares of Tarveda common stock, which shall be converted into and become options to purchase shares of our common stock, certain of Tarveda's directors and executive officers are expected to become our directors and executive officers upon the closing of the Merger and all of Tarveda's directors and executive officers are entitled to certain indemnification and liability insurance coverage pursuant to the terms of the Merger Agreement.

These interests, among others, may influence our officers and directors and the officers and directors of Tarveda to support or approve the Merger. For more information concerning the interests of Organovo and Tarveda executive officers and directors, see the sections titled "*The Merger — Interests of the Organovo Directors and Executive Officers in the Merger*" and "*The Merger — Interests of the Tarveda Directors and Executive Officers in the Merger*" in the Registration Statement.

The market price of the combined organization's common stock following the Merger may decline as a result of the Merger.

The market price of our common stock may decline as a result of the Merger for a number of reasons including if:

- investors react negatively to the prospects of the combined organization's business and prospects from the Merger;
- the effect of the Merger on the combined organization's business and prospects is not consistent with the expectations of financial or industry analysts; or
- the combined organization does not achieve the perceived benefits of the Merger as rapidly or to the extent anticipated by financial or industry analysts.

Our and Tarveda's stockholders may not realize a benefit from the Merger commensurate with the ownership dilution they will experience in connection with the Merger.

If the combined organization is unable to realize the full strategic and financial benefits currently anticipated from the Merger, our and Tarveda's stockholders will have experienced substantial dilution of their ownership interests in their respective companies without receiving any commensurate benefit, or only receiving part of the commensurate benefit to the extent the combined organization is able to realize only part of the strategic and financial benefits currently anticipated from the Merger.

During the pendency of the Merger, we and Tarveda may not be able to enter into a business combination with another party at a favorable price because of restrictions in the Merger Agreement, which could adversely affect our and Tarveda's respective businesses.

Covenants in the Merger Agreement impede our ability and the ability of Tarveda to make acquisitions, subject to certain exceptions relating to fiduciaries duties, as set forth below, or complete other transactions that are not in the ordinary course of business, subject to certain exceptions, pending completion of the Merger. As a result, if the Merger is not completed, the parties may be at a disadvantage to their competitors during that period. In addition, while the Merger Agreement is in effect, each party is generally prohibited from, among other things, soliciting, initiating, knowingly encouraging or entering into certain extraordinary transactions, such as a merger, sale of assets or other business combination outside the ordinary course of business, with any third party. Any such transactions could be favorable to such party's stockholders.

Certain provisions of the Merger Agreement may discourage third parties from submitting alternative takeover proposals, including proposals that may be superior to the arrangements contemplated by the Merger Agreement.

The terms of the Merger Agreement prohibit us and Tarveda from soliciting alternative takeover proposals or cooperating with persons making unsolicited takeover proposals, except in limited circumstances when, among other things, such party's board of directors determines in good faith that an unsolicited alternative takeover proposal is or is reasonably likely to result in a superior takeover proposal and that failure to cooperate with the proponent of the proposal is a breach of the board's fiduciary duties. In addition, if we or Tarveda terminate the Merger Agreement under certain circumstances, including terminating because of a decision of a board of directors to recommend a superior proposal, we or Tarveda would be required to pay to the other party a termination fee equal to $1.0 million (or $2.0 million in certain circumstances) and the third-party expenses incurred by the other party, up to a maximum of $0.3 million (or $0.5 million in certain circumstances). This termination fee may discourage third parties from submitting alternative takeover proposals to us or our stockholders or Tarveda or their stockholders, and may cause the respective boards of directors to be less inclined to recommend an alternative proposal.

Because the lack of a public market for Tarveda shares makes it difficult to evaluate the fairness of the Merger, and our stockholders may pay more than the aggregate fair market value for Tarveda.

The outstanding capital stock of Tarveda is privately held and is not traded in any public market. The lack of a public market makes it extremely difficult to determine the fair market value of Tarveda. Because the percentage of our equity to be issued to Tarveda stockholders was determined based on negotiations between the parties, it is possible that we may pay more than the aggregate fair market value for Tarveda.

If the conditions to the Merger are not met, the Merger will not occur.

Even if the Merger is approved by our stockholders and the stockholders of Tarveda, specified conditions must be satisfied or waived to complete the Merger. These conditions are set forth in the Merger Agreement and described in the section titled "*The Merger Agreement — Conditions to the Completion of the Merger*" in the Registration Statement. Neither we nor Tarveda can assure you that all of the conditions will be satisfied. If the conditions are not satisfied or waived, the Merger will not occur or will be delayed, and we and Tarveda each may lose some or all of the intended benefits of the Merger.

If the Merger does not qualify as a "reorganization" for U.S. federal income tax purposes, U.S. Holders of Tarveda common stock will be required to recognize gain or loss for U.S. federal income tax purposes upon the exchange of their Tarveda common stock for our common stock in the Merger.

The U.S. federal income tax consequences of the Merger to U.S. Holders (as defined in the section titled "*The Merger — Certain Material U.S. Federal Income Tax Consequences of the Merger*" of the Registration Statement) will depend on whether the Merger qualifies as a "reorganization" for U.S. federal income tax purposes. Our and Tarveda's obligations to effect the Merger are subject to the satisfaction, or waiver, at or prior to the effective time of the Merger, of the condition that each company receive an opinion of counsel (or if either company's counsel is unable to issue such an opinion, of another nationally recognized law firm proposed by the other party that is reasonably acceptable to the other party) dated as of the closing date of the Merger, to the effect that the Merger will qualify as a "reorganization" within the meaning of Section 368(a) of the Internal Revenue Code of 1986, as amended (the "Code"). If, contrary to the opinions from counsel, the Merger fails to qualify as a reorganization within the meaning of Section 368(a) of the Code, a U.S. Holder of Tarveda common stock would recognize gain or loss for U.S. federal income tax purposes on each share of Tarveda common stock surrendered in the Merger for our common stock and any cash received in lieu of a fractional share. For a more complete discussion of the material U.S. federal income tax consequences of the Merger, please carefully review the information set forth in the section titled "*The Merger —Certain Material U.S. Federal Income Tax Consequences of the Merger*" in the Registration Statement.

Risks Related to the Proposed Organovo Reverse Stock Split

The proposed Organovo Reverse Stock Split may not increase the combined organization's stock price over the long-term.

The principal purpose of the proposed Organovo Reverse Stock Split is to increase the per-share market price of our common stock and provide for sufficient authorized shares of our common stock to issue shares of our common stock in the Merger. It cannot be assured, however, that the proposed Organovo Reverse Stock Split will accomplish the objective of increasing the per-share market price of our common stock for any meaningful period of time. While it is expected that the reduction in the number of outstanding shares of our common stock will proportionally increase the market price of our common stock, it cannot be assured that the proposed Organovo Reverse Stock Split will increase the market price of our common stock by a multiple of the proposed Organovo Reverse Stock Split ratio, or result in any permanent or sustained increase in the market price of our common stock, which is dependent upon many factors, including the combined organization's business and financial performance, general market conditions and prospects for future success. Therefore, while the stock price of the combined organization might meet the continued listing requirements for The Nasdaq Capital Market initially, it cannot be assured that it will continue to do so.

The proposed Organovo Reverse Stock Split may decrease the liquidity of the combined organization's common stock.

Although our board of directors believes that the anticipated increase in the market price of the combined organization's common stock could encourage interest in our common stock and possibly promote greater liquidity for our stockholders, such liquidity could also be adversely affected by the reduced number of shares outstanding after the proposed Organovo Reverse Stock Split. The reduction in the number of outstanding shares may lead to reduced trading and a smaller number of market makers for our common stock.

The proposed Organovo Reverse Stock Split may lead to a decrease in the combined organization's overall market capitalization.

Should the market price of the combined organization's common stock decline after the proposed Organovo Reverse Stock Split, the percentage decline may be greater, due to the smaller number of shares outstanding, than it would have been prior to the proposed Organovo Reverse Stock Split. A reverse stock split may be viewed negatively by the market and, consequently, can lead to a decrease in the combined organization's overall market capitalization. If the per share market price does not increase in proportion to the proposed Organovo Reverse Stock Split ratio, then the value of the combined organization, as measured by its stock capitalization, will be reduced. In some cases, the per-share stock price of companies that have effected reverse stock splits subsequently declined back to pre-reverse split levels, and accordingly, it cannot be assured that the total market value of our common stock will remain the same after the proposed Organovo Reverse Stock Split is effected, or that the proposed Organovo Reverse Stock Split will not have an adverse effect on the stock price of our common stock due to the reduced number of shares outstanding after the proposed Organovo Reverse Stock Split.

The issuance of shares of our common stock to Tarveda's stockholders in the Merger will dilute substantially the voting power of our current stockholders.

If the Merger is completed, each outstanding share of Tarveda capital stock will be converted into the right to receive approximately 0.1311 shares of our common stock, subject to adjustment to account for the proposed Organovo Reverse Stock Split. Immediately following the Merger, our stockholders and optionholders are expected to own, or hold rights to acquire, approximately 25% of our common stock on a fully diluted basis as defined in the Merger Agreement, and Tarveda's stockholders, optionholders and warrantholders are expected to own, or hold rights to acquire, approximately 75% of our common stock on a fully diluted basis as defined in the Merger Agreement. Accordingly, the issuance of shares of our common stock to Tarveda's stockholders in the Merger will reduce significantly the relative voting power of each share of our common stock held by our current stockholders. Consequently, our stockholders as a group will have significantly less influence over the management and polices of the combined organization after the Merger than prior to the Merger.

Risks Related to Our Capital Requirements, Finances and Operations if the Merger is not Completed

There is no assurance that the proposed Merger between us and Tarveda will be completed in a timely manner or at all. If the Merger with Tarveda is not consummated, our business could suffer materially and our stock price could decline.

The consummation of the Merger between us and Tarveda is subject to a number of closing conditions, including approval by our and Tarveda's respective stockholders and other customary closing conditions. The parties are targeting a Closing of the transaction in the first calendar quarter of 2020, however, there can be no assurance that the Merger will be consummated within this desired timeframe, or at all.

If the Merger between us and Tarveda is not consummated, we may be subject to a number of material risks, and its business and stock price could be adversely affected, as follows:

- We have incurred and expect to continue to incur significant expenses related to the Merger with Tarveda, even if the Merger is not consummated;
- We could be obligated to pay Tarveda a $1.0 million (or $2.0 million in certain circumstances) termination fee and expense reimbursements in connection with the termination of the Merger Agreement, depending on the reason for the termination;
- The market price of our common stock may decline to the extent that the current market price reflects a market assumption that the Merger will be completed; and
- Nasdaq could determine to delist our common stock which could have an adverse effect on the value of our common stock and any future ability to raise capital.

If the Merger is not completed, we may be unsuccessful in completing an alternative strategic transaction on terms that are as favorable as the terms of the proposed transaction with Tarveda, or at all, and we may be unable to reestablish a viable operating business.

To date, we have not generated significant revenue from product sales, and our assets currently consist primarily of cash, cash equivalents and marketable securities, our intellectual property portfolio, license and collaboration agreements, our remaining assets, our listing on The Nasdaq Capital Market and the Merger Agreement with Tarveda. While we have entered into the Merger Agreement with Tarveda, the consummation of the Merger with Tarveda may be delayed or may not occur at all. If the Merger is not completed, our board of directors may elect to pursue an alternative strategic transaction similar to the proposed Merger with Tarveda. Attempting to complete an alternative transaction will be costly and time consuming. If the Merger with Tarveda is not completed and our board of directors determines to pursue an alternative transaction, the terms of any such alternative transaction may not be as favorable to us and our stockholders as the terms of the Merger with Tarveda, and we can make no assurances that such an alternative transaction would occur at all. Further, if the Merger with Tarveda is not completed, given the level of investment and time that would be required to redesign our liver tissue product or pursue the development of products and services pursuant to our collaboration agreements, it is unlikely that we would be able to obtain the funding required to recommence our product development activities on terms favorable to our stockholders, or at all.

If the Merger is not completed, our board of directors may decide to pursue a dissolution and liquidation of the Company. In such an event, the amount of cash available for distribution to our stockholders will depend heavily on the timing of such liquidation as well as the amount of cash that will need to be reserved for commitments and contingent liabilities.

There can be no assurance that the Merger will be completed. If the Merger is not completed, our board of directors may decide to pursue a dissolution and liquidation of the Company. In such an event, the amount of cash available for distribution to our stockholders will depend heavily on the timing of such decision, as with the passage of time the amount of cash available for distribution will be reduced as we continue to fund our operations. In addition, if our board of directors were to approve and recommend, and our stockholders were to approve, a dissolution and liquidation of the Company, we would be required under Delaware corporate law to pay our outstanding obligations, as well as to make reasonable provision for contingent and unknown obligations, prior to making any distributions in liquidation to our stockholders. As a result of this requirement, a portion of our remaining cash assets may need to be reserved pending the resolution of such obligations. In addition, we may be subject to litigation or other claims related to a dissolution and liquidation of the Company. If a dissolution and liquidation were pursued, our board of directors, in consultation with its advisors, would need to evaluate these matters and make a determination about a reasonable amount to reserve. Accordingly, holders of our common stock could lose all or a significant portion of their investment in the event of our liquidation, dissolution or winding up.

We may be unable to continue as a going concern if the Merger is not completed.

We have had recurring losses from operations since inception and will likely not generate meaningful revenue for the foreseeable future. We believe that our existing cash, cash equivalents and marketable securities and interest thereon will be sufficient to fund our projected operating requirements under our current operating plan. However, if the Merger is not completed and our operating plans change and our projected operating requirements increase, we may be unable to continue as a going concern. In this event, the perception that we may not be able to continue as a going concern may have an adverse impact on our business due to concerns about our ability to meet our future contractual obligations or pursue additional strategic transactions. Further, if we are unable to continue as a going concern, we may have to liquidate our assets, and the values we receives for our assets in liquidation and dissolution could be significantly lower than the values reflected in our financial statements and an investor could lose all or part of its investment in the Company.

If we were to continue to advance our research and development activities and pursue development of any of our pipeline products, it would require substantial additional funding. Raising additional capital would cause dilution to our existing stockholders, and may restrict our operations or require us to relinquish rights to our technologies or to a product candidate.

We currently do not have any committed external source of funds and do not expect to generate any meaningful revenue in the foreseeable future. We believe that our existing cash, cash equivalents and marketable securities and interest thereon will be sufficient to fund our projected operating requirements under our current operating plan. We have based our estimates on assumptions that may prove to be wrong, and it may use our available capital resources sooner than we currently expect if our operating plans change. If the Merger is not completed and our current operating plans change and we determine to pursue further research and development activities, we will require substantial additional funding to operate, and would expect to finance these cash needs through a combination of equity offerings, debt financings, government or other third-party funding and licensing or collaboration arrangements.

To the extent that we raise additional capital through the sale of equity or convertible debt, the ownership interests of our stockholders will be diluted. In addition, the terms of any equity or convertible debt we agree to issue may include liquidation or other preferences that adversely affect the rights of our stockholders. Convertible debt financing, if available, may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures, and declaring dividends, and may impose limitations on our ability to acquire, sell or license intellectual property rights and other operating restrictions that could adversely impact our ability to conduct our business.

Additional funds may not be available when we need them on terms that are acceptable to us, or at all. If adequate funds are not available to us on a timely basis, we may be required to curtail or cease our operations.

If the Merger is not completed, raising additional funding through debt or equity financing would be difficult or not successful at all, would be dilutive and may cause the market price of our common stock to decline further.

If the Merger is not completed, raising additional funding through debt or equity financing is likely to be difficult or unavailable altogether given the early stage of our therapeutic candidates. To the extent that we raise additional capital through the sale of equity or convertible debt securities, the issuance of those securities would result in substantial dilution for our current stockholders and the terms may include liquidation or other preferences that adversely affect the rights of our current stockholders. Furthermore, the issuance of additional securities, whether equity or debt, by us, or the possibility of such issuance, may cause the market price of our common stock to decline further and existing stockholders may not agree with our financing plans or the terms of such financings.

We have incurred and will continue to incur significant transaction costs in connection with the Merger.

We have incurred and will continue to incur significant transaction costs in connection with the Merger. We estimate that we will incur aggregate direct transaction costs of approximately $3.9 million associated with the Merger and approximately $0.3 million for our portion of shared transaction expenses, as well as additional costs associated with the commencement of the combined organization’s operation as a public company, which cannot be estimated accurately at this time.

Our ability to use net operating loss (“NOL”) carryforwards and other tax attributes may be limited in connection with the Merger and other ownership changes.

We have incurred substantial losses during our history and do not expect to become profitable in the near future, and we may never achieve profitability. To the extent that we continue to generate taxable losses, unused losses will carry forward to offset future taxable income, if any, until such unused losses expire (if at all). At March 31, 2019, we had federal and state NOL carryforwards of approximately $170.3 million and $49.2 million, respectively. Such federal and state NOL carryforwards will begin to expire in 2028, unless previously utilized. At March 31, 2019, we had federal and state research and development credit carryforwards of approximately $4.0 million and $3.6 million, respectively. The federal research and development credit carryforwards will begin expiring in 2028, unless previously utilized.

Under the Tax Act, federal NOLs generated in taxable years ending after December 31, 2017, may be carried forward indefinitely but federal NOLs generated in taxable years beginning after December 31, 2017 may only be used to offset 80% of our taxable income annually. Our NOL carryforwards are subject to review and possible adjustment by the U.S. Internal Revenue Service (the “IRS”), and state tax authorities. Under Sections 382 and 383 of the Code, our federal NOL and research and development tax credit carryforwards may become subject to an annual limitation in the event of certain cumulative changes in the ownership interest of significant stockholders over a three-year period in excess of 50 percentage points. Our ability to utilize our NOL carryforwards and other tax attributes to offset future taxable income or tax liabilities may be limited as a result of ownership changes, including in connection with the Merger. Similar rules may apply under state tax laws. We have not yet determined the amount of the cumulative change in our ownership resulting from the Merger or other transactions, or any resulting limitations on our ability to utilize our NOL carryforwards and other tax attributes. If we earn taxable income, such limitations could result in increased future tax liability to us and our future cash flows could be adversely affected. We have recorded a full valuation allowance related to our NOLs and other deferred tax assets due to the uncertainty of the ultimate realization of the future benefits of those assets.

ITEM 2. UNREGISTERED SALES OF EQUITY SECURITIES AND USE OF PROCEEDS

None.

ITEM 3. DEFAULTS UPON SENIOR SECURITIES

None.

ITEM 4. MINE SAFETY DISCLOSURE

Not applicable.

ITEM 5. OTHER INFORMATION

None.

ITEM 6. EXHIBITS

The following exhibit index shows those exhibits filed with this report and those incorporated herein by reference:

Exhibit No.	Description
2.1	Agreement and Plan of Merger and Reorganization, dated as of December 13, 2019, by and among Organovo Holdings, Inc., Opal Merger Sub, Inc. and Tarveda Therapeutics, Inc. (incorporated by reference from Exhibit 2.1 to the Company's Current Report on Form 8-K, as filed with the SEC on December 16, 2019).
2.2	First Amendment to Merger Agreement, dated as of January 26, 2020, by and among Organovo Holdings, Inc., Opal Merger Sub, Inc. and Tarveda Therapeutics, Inc. (incorporated by reference from Exhibit 2.1 to the Company's Current Report on Form 8-K, as filed with the SEC on January 29, 2020).
2.3	Form of Support Agreement, by and between Organovo, Tarveda and certain directors, officers and stockholders of Tarveda (incorporated by reference from Exhibit 2.2 to the Company's Current Report on Form 8-K, as filed with the SEC on December 16, 2019).
2.4	Form of Support Agreement, by and between Tarveda, Organovo and certain directors and officers of Organovo (incorporated by reference from Exhibit 2.3 to the Company's Current Report on Form 8-K, as filed with the SEC on December 16, 2019).
2.5	Form of Lock-Up Agreement, by and among Tarveda, Organovo and certain directors and officers of Tarveda and Organovo (incorporated by reference from Exhibit 2.4 to the Company's Current Report on Form 8-K, as filed with the SEC on December 16, 2019).
3.1	Certificate of Incorporation of Organovo Holdings, Inc. (Delaware) (incorporated by reference from Exhibit 3.1 to the Company's Current Report on Form 8-K, as filed with the SEC on February 3, 2012).
3.2	Certificate of Amendment of Certificate of Incorporation of Organovo Holdings, Inc. (incorporated by reference from Exhibit 3.1 to the Company's Current Report on Form 8-K, as filed with the SEC on July 27, 2018).
3.3	Bylaws of Organovo Holdings, Inc. (Delaware) (incorporated by reference from Exhibit 3.2 to the Company's Current Report on Form 8-K, as filed with the SEC on February 3, 2012).
3.4	Amendment to Organovo Holdings Bylaws, dated October 10, 2019 (incorporated by reference from Exhibit 99.1 to the Company's Current Report on Form 8-K, as filed with the SEC on October 11, 2019).
31.1	Certification of Chief Executive Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.*
31.2	Certification of Chief Financial Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.*
32.1	Certification pursuant to 18 U.S.C. Section 1350.*
101	Interactive Data File*

* Filed herewith.

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.

ORGANOVO HOLDINGS, INC.

Date: February 10, 2020

By: */s/ Taylor Crouch*
Name: Taylor Crouch
Title: Chief Executive Officer and President
(Principal Executive Officer)

Date: February 10, 2020

By: */s/ Craig Kussman*
Name: Craig Kussman
Title: Chief Financial Officer
(Principal Financial Officer)

Exhibit 31.1

CERTIFICATION

I, Taylor Crouch, Chief Executive Officer and President of Organovo Holdings, Inc. (the "Registrant"), certify that:

1. I have reviewed this quarterly report on Form 10-Q of the Registrant;

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 consolidated 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 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 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 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: February 10, 2020

/s/ Taylor Crouch
Taylor Crouch
Chief Executive Officer and President
(Principal Executive Officer)

Exhibit 31.2

CERTIFICATION

I, Craig Kussman, Chief Financial Officer of Organovo Holdings, Inc. (the "Registrant"), certify that:

1. I have reviewed this quarterly report on Form 10-Q of the Registrant;

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 consolidated 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 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 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 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: February 10, 2020

/s/ Craig Kussman

Craig Kussman
Chief Financial Officer
(Principal Financial Officer)

Exhibit 32.1

CERTIFICATION 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 on Form 10-Q of Organovo Holdings, Inc. (the "Company") for the period ended December 31, 2019, as filed with the Securities and Exchange Commission (the "Report"), I, Taylor Crouch, Chief Executive Officer and President and I, Craig Kussman, Chief Financial Officer of the Company hereby certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that:

- The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
- The information in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: February 10, 2020

/s/ Taylor Crouch
Taylor Crouch
Chief Executive Officer and President
(Principal Executive Officer)

/s/ Craig Kussman
Craig Kussman
Chief Financial Officer
(Principal Financial Officer)

A signed original of this written statement required by Section 906 has been provided to Organovo Holdings, Inc. and will be retained by Organovo Holdings, Inc. and furnished to the Securities and Exchange Commission or its staff upon request.

This certification accompanies the Form 10-Q to which it relates, is not deemed filed with the Securities and Exchange Commission, and is not to be incorporated by reference into any filing of Organovo Holdings, Inc. under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended (whether made before or after the date of the Form 10-Q), irrespective of any general incorporation language contained in such filing.