

**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549**

**FORM S-1
REGISTRATION STATEMENT
UNDER
THE SECURITIES ACT OF 1933**

Organovo Holdings, Inc.

(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction of
incorporation or organization)

2836
(Primary Standard Classification
Code Number)

27-1488943
(I.R.S. Employer
Identification Number)

**1155 Sorrento Valley Road, Suite 100
San Diego, CA 92121
(858) 224-1000**
(Address, including zip code, and telephone number, including area code, of registrant's principal executive offices)

Keith Murphy
Executive Chairman
Organovo Holdings, Inc.
**1155 Sorrento Valley Road, Suite 100
San Diego, CA 92121
(858) 224-1000**
(Name, address including zip code, and telephone number, including area code, of agent for service)

With copies to:

**Jeffrey T. Hartlin, Esq.
Samantha H. Eldredge, Esq.
Paul Hastings LLP
1117 S. California Avenue
Palo Alto, CA 94304
(650) 320-1800**

**M. Ali Panjwani, Esq.
Pryor Cashman LLP
7 Times Square
New York, NY 10036
(212) 421-4100**

Approximate date of commencement of proposed sale to the public: As soon as practicable after the effective date of this registration statement.

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, other than securities offered only in connection with dividend or interest reinvestment plans, check the following box.

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

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

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

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 7(a)(2)(B) of Securities Act.

The Registrant hereby amends this Registration Statement on such date or dates as may be necessary to delay its effective date until the Registrant shall file a further amendment that specifically states that this Registration Statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933, as amended, or until this Registration Statement shall become effective on such date as the Securities and Exchange Commission, acting pursuant to said Section 8(a), may determine.

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

SUBJECT TO COMPLETION, DATED OCTOBER 25, 2024

PRELIMINARY PROSPECTUS



Up to [_____] Shares of Common Stock
Pre-Funded Warrants to Purchase up to [_____] Shares of Common Stock
Common Warrants to Purchase up to [_____] Shares of Common Stock
Up to [_____] Shares of Common Stock Underlying the Pre-Funded Warrants and Common Warrants

We are offering up to [_____] shares of common stock together with common warrants to purchase up to [_____] shares of common stock, based on assumed public offering price for each share of common stock and accompanying common warrant of \$[_____] , the last reported sale price of our common stock on the Nasdaq Capital Market on [_____] , 2024. Each share of common stock, or pre-funded warrant in lieu thereof, is being sold together with a common warrant to purchase one share of common stock. The shares of common stock, or pre-funded warrants in lieu thereof, and common warrants are immediately separable and will be issued separately in this offering, but must be purchased together in this offering. Each common warrant will have an exercise price of \$[_____] , will be immediately exercisable and will expire on the fifth anniversary of the original issuance date.

We are also offering to certain purchasers, if any, whose purchase of shares of common stock in this offering would otherwise result in such purchaser, together with its affiliates and certain related parties, beneficially owning more than 4.99% (or, at the election of the purchaser, 9.99%) of our outstanding common stock immediately following the consummation of this offering, the opportunity to purchase pre-funded warrants, in lieu of shares of common stock that would otherwise result in such purchaser's beneficial ownership exceeding 4.99% (or, at the election of the purchaser, 9.99%) of our outstanding common stock. The public offering price of each pre-funded warrant to purchase one share of common stock and accompanying common warrant to purchase one share of common stock will be equal to the price at which one share of common stock and accompanying common warrant to purchase one share of common stock is sold to the public in this offering, minus \$0.001, and the exercise price of each pre-funded warrant will be \$0.001 per share. The pre-funded warrants will be immediately exercisable and may be exercised at any time until all of the pre-funded warrants are exercised in full. For each pre-funded warrant we sell, the number of shares of common stock we are offering will be decreased on a one-for-one basis.

There is no established public trading market for the common warrants or pre-funded warrants and we do not expect a market to develop. Without an active trading market, the liquidity of the common warrants and pre-funded warrants will be limited. In addition, we do not intend to list the common warrants or pre-funded warrants on the Nasdaq Capital Market, any other national securities exchange or any other trading system.

We have engaged Roth Capital Partners, LLC (the "placement agent") to act as our lead placement agent in connection with this offering. The placement agent has agreed to use its reasonable best efforts to arrange for the sale of the securities offered by this prospectus. The placement agent is not purchasing or selling any of the securities we are offering and the placement agent is not required to arrange the purchase or sale of any specific number of securities or dollar amount. We have agreed to pay to the placement agent the placement agent fees set forth in the table below, which assumes that we sell all of the securities offered by this prospectus. There is no arrangement for funds to be received in escrow, trust or similar arrangement. There is no minimum number of securities or minimum aggregate amount of proceeds that is a condition for this offering to close. We may sell fewer than all of the securities offered hereby, which may significantly reduce the amount of proceeds received by us, and investors in this offering will not receive a refund if we do not sell all of the securities offered hereby. Because there is no escrow account and no minimum number of securities or amount of proceeds, investors could be in a position where they have invested in us, but we have not raised sufficient proceeds in this offering to adequately fund the intended uses of the proceeds as described in this prospectus. We will bear all costs associated with the offering. See "Plan of Distribution" on page 31 of this prospectus for more information regarding these arrangements. This offering will end no later than [_____] , 2024, unless we decide to terminate the offering (which we may do at any time in our discretion) prior to that date.

Our shares of common stock are listed on the Nasdaq Capital Market under the symbol “ONVO.” On [____], 2024, the last reported sale price of our common stock was \$[____]. The public offering price per share of common stock and per pre-funded warrant, each together with the accompanying common warrant, will be determined between us and the investors based on market conditions at the time of pricing, and may be at a discount to the then current market price of our common stock. The recent market price used throughout this prospectus may not be indicative of the actual offering price. The actual public offering price may be based upon a number of factors, including our history and our prospects, the industry in which we operate, our past and present operating results, the previous experience of our executive officers and the general condition of the securities markets at the time of this offering.

You should read this prospectus, together with additional information described under the headings “*Incorporation of Certain Information By Reference*” and “*Where You Can Find More Information*,” carefully before you invest in any of our securities.

Investing in our securities involves a high degree of risk. See the section entitled “*Risk Factors*” beginning on page 9 of this prospectus and under similar headings in documents incorporated by reference into this prospectus for a discussion of risks that should be considered in connection with an investment in our securities.

	Per Share and Common Warrant	Per Pre-Funded Warrant and Common Warrant	Total
Public offering price	\$ -	\$ -	\$ -
Placement agent fees ⁽¹⁾	\$ -	\$ -	\$ -
Proceeds, before expenses, to us ⁽²⁾	\$ -	\$ -	\$ -

- (1) Represents a cash fee equal to 7.0% of the aggregate purchase price paid by investors in this offering, including proceeds received from the exercise of pre-funded warrants and common warrants offered hereby. We have also agreed to reimburse the placement agent for certain of its offering-related expenses. See “Plan of Distribution” beginning on page 31 of this prospectus for a description of the compensation to be received by the placement agent.
- (2) Does not include proceeds from the exercise of the warrants and pre-funded warrants in cash, if any.

Delivery of the shares of common stock, pre-funded warrants and common warrants offered hereby is expected to be made on or about [____], 2024, subject to the satisfaction of customary closing conditions.

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

Roth Capital Partners

The date of this prospectus is [____], 2024

Organovo Holdings, Inc.

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ABOUT THIS PROSPECTUS

You should rely only on the information contained in this prospectus. We have not authorized anyone to provide you with information other than the information that we have provided or incorporated by reference in this prospectus and your reliance on any unauthorized information or representation is at your own risk. This prospectus may be used only in jurisdictions where offers and sales of these securities are permitted. You should assume that the information appearing in this prospectus is accurate only as of the date of this prospectus, regardless of the time of delivery of this prospectus, or any sale of our securities. Our business, financial condition and results of operations may have changed since those dates.

The information appearing in this prospectus and any free writing prospectus that we have authorized for use in connection with this offering is accurate only as of its respective date, regardless of the time of delivery of the respective document or of any sale of securities covered by this prospectus. You should not assume that the information contained in this prospectus, or in any free writing prospectus that we have authorized for use in connection with this offering, is accurate as of any date other than the respective dates thereof.

We further note that the representations, warranties and covenants made by us in any agreement that is filed as an exhibit to any document that is incorporated by reference herein were made solely for the benefit of the parties to such agreement, including, in some cases, for the purpose of allocating risk among the parties to such agreements, and should not be deemed to be a representation, warranty or covenant to you. Moreover, such representations, warranties or covenants were accurate only as of the date when made. Accordingly, such representations, warranties and covenants should not be relied on as accurately representing the current state of our affairs.

To the extent there is a conflict between the information contained in this prospectus, on the one hand, and the information contained in any document incorporated by reference filed with the U.S. Securities and Exchange Commission (the "SEC") before the date of this prospectus, on the other hand, you should rely on the information in this prospectus. If any statement in a document incorporated by reference is inconsistent with a statement in another document incorporated by reference having a later date, the statement in the document having the later date modifies or supersedes the earlier statement.

Neither we nor the placement agent have done anything that would permit this offering or possession or distribution of this prospectus in any jurisdiction where action for that purpose is required, other than in the United States. Persons who come into possession of this prospectus and any free writing prospectus in jurisdictions outside the United States are required to inform themselves about and to observe any restrictions as to this offering and the distribution of this prospectus and any free writing prospectus applicable to that jurisdiction.

This prospectus includes statistical and other industry and market data that we obtained from industry publications and research, surveys and studies conducted by third parties. Industry publications and third-party research, surveys and studies generally indicate that their information has been obtained from sources believed to be reliable, although they do not guarantee the accuracy or completeness of such information. Industry publications and third-party research, surveys and studies often indicate that their information has been obtained from sources believed to be reliable, although they do not guarantee the accuracy or completeness of such information and such information is inherently imprecise.

PROSPECTUS SUMMARY

This summary highlights selected information contained elsewhere in this prospectus. This summary does not contain all of the information you should consider before investing in our securities. You should read this entire prospectus carefully, including the sections of this prospectus titled “Risk Factors,” and “Special Note Regarding Forward-Looking Statements” “and under similar captions in the documents incorporated by reference into this prospectus, before making an investment decision. Unless otherwise indicated, all references in this prospectus to “Organovo,” the “company,” “we,” “our,” “us” or similar terms refer to Organovo Holdings, Inc. and its wholly owned subsidiaries, including Organovo, Inc. and Opal Merger Sub, Inc.

Overview

Organovo Holdings, Inc. (Nasdaq: ONVO), together with its wholly owned subsidiaries (collectively, “Organovo”, “we”, “us” and “our”), is a clinical stage biotechnology company that is focused on developing FXR314 in inflammatory bowel disease (“IBD”), including ulcerative colitis (“UC”), based on demonstration of clinical promise in three-dimensional (“3D”) human tissues as well as strong preclinical data. FXR is a mediator of gastrointestinal and liver diseases. FXR agonism has been tested in a variety of preclinical models of IBD. FXR314 is the lead compound in our established FXR program containing two clinically tested compounds (including FXR314) and over 2,000 discovery or preclinical compounds. FXR314 is a drug with safety and tolerability after daily oral dosing in Phase 1 and Phase 2 trials. Further, FXR314 has FDA clinical trial authorization for a Phase 2 trial in UC.

Our current clinical focus is in advancing FXR314 in IBD, including UC and Crohn’s disease (“CD”). We plan to start a Phase 2a clinical trial in UC in the calendar year 2025. We released Phase 2 data for FXR314 for the treatment of metabolic function-associated steatohepatitis (“MASH”) in April 2024 that are supportive of ongoing development, and we believe FXR314 has a commercial opportunity in MASH, most likely in combination therapy. We are exploring the potential for combination therapies using FXR314 and currently approved mechanisms in preclinical animal studies and our IBD disease models.

Our second focus is building high fidelity, 3D tissues that recapitulate key aspects of human disease. We use our proprietary technology to build functional 3D human tissues that mimic key aspects of native human tissue composition, architecture, function and disease. We believe these attributes can enable critical complex, multicellular disease models that can be used to develop clinically effective drugs across multiple therapeutic areas.

As with the clinical development program, we are initially focusing on the intestine and have ongoing 3D tissue development efforts in human tissue models of UC and CD. We use these models to identify new molecular targets responsible for driving the disease and to explore the mechanism of action of known drugs including FXR314 and related molecules. We intend to initiate drug discovery programs around these new validated targets to identify drug candidates for partnering and/or internal clinical development.

Our current understanding of intestinal tissue models and IBD disease models leads us to believe that we can create models that provide greater insight into the biology of these diseases than are generally currently available. We are creating high fidelity disease models, leveraging our prior work including the work found in our peer-reviewed publication on bioprinted intestinal tissues (Madden et al. Bioprinted 3D Primary Human Intestinal Tissues Model Aspects of Native Physiology and ADME/Tox Functions. *iScience*. 2018 Apr 27;2:156-167. doi: 10.1016/j.isci.2018.03.015.) Our advances include cell type-specific compartments, prevalent intercellular tight junctions, and the formation of microvascular structures.

Using these disease models, we intend to identify and validate novel therapeutic targets. After finding therapeutic drug targets, we intend to focus on developing novel small molecule, antibody, or other therapeutic drug candidates to treat the disease, and advance these novel drug candidates towards an Investigational New Drug filing and potential future clinical trials.

We expect to broaden our work into additional therapeutic areas over time and are currently exploring specific tissues for development. In our work to identify the areas of interest, we evaluate areas that might be better served with 3D disease models than currently available models as well as the potential commercial opportunity. In line with these plans, we are building upon both our external and in house scientific expertise, which will be essential to our drug development effort.

Recent Developments

Mosaic Cell Sciences Division

In February 2024, we formed our Mosaic Cell Sciences division (“Mosaic”) to serve as a key source of certain of the primary human cells we utilize in our research and development efforts. We believe Mosaic can help us optimize our supply chain, reduce operating expenses related to cell sourcing and procurement and ensure that the cellular raw materials we use are of the highest quality and are derived from tissues that are ethically sourced in full compliance with state and federal guidelines. Mosaic provides us with qualified human cells for use in our clinical research and development programs. In addition to supplying us with primary human cells, Mosaic offers human cells for sale to life science customers, both directly and through distribution partners, which we expect to offset costs and over time become a profit center that offsets overall R&D spending by Organovo.

Nasdaq Minimum Bid Notice

On July 18, 2024, we received a written notice (the “Notice”) 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 bid price of \$1 per share, as set forth in Nasdaq Listing Rule 5550(a)(2) (“Rule 5550(a)(2)”).

In accordance with Nasdaq Listing Rule 5810(c)(3)(A), we have been provided with an initial period of 180 calendar days, or until January 14, 2025, to regain compliance. In order to regain compliance with the minimum bid price requirement, the closing bid price of our common stock must be at least \$1 per share for a minimum of ten consecutive business days during this 180-day period. The Notice provides that the Nasdaq staff will provide written confirmation to us if we regain compliance with Rule 5550(a)(2).

If we do not regain compliance with Rule 5550(a)(2) by January 14, 2025, we may be eligible for an additional compliance period of 180 calendar days. 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, with the exception of the bid price requirement, and would need to provide written notice to Nasdaq of our intention to cure the bid price deficiency during the second compliance period. However, if it appears to the Nasdaq staff that we will not be able to cure the deficiency, or we are otherwise not eligible, Nasdaq would notify us that our securities will be subject to delisting. In the event of such a notification, we may appeal the Nasdaq staff’s determination to delist our securities, but there can be no assurance the Nasdaq staff would grant any request for continued listing.

The Notice had no immediate effect on the listing or trading of our common stock and our common stock will continue to trade on the Nasdaq Capital Market under the symbol “ONVO”. We intend to monitor the closing bid price of our common stock and consider our available options if our common stock does not trade at a level likely to result in us regaining compliance with Rule 5550(a)(2) by January 14, 2025, including effecting a reverse stock split, which would be subject to the prior approval of our stockholders.

At our 2024 annual meeting of our stockholders to be held on November 20, 2024, we are asking our stockholders to approve an amendment to our Certificate of Incorporation, as amended, to effect, in the sole discretion of our Board of Directors (our “Board”) at any time on or before November 20, 2024, a reverse split of our common stock at a ratio to be determined by the Board within a range of 1-to-5 to 1-to-20 (or any number in between).

There can be no assurance that we will be able to regain compliance with Nasdaq’s minimum bid price requirement or that we will maintain our compliance with the other listing requirements necessary for us to maintain the listing of our common stock on the Nasdaq Capital Market.

Legal Proceeding

On August 27, 2023, H.C. Wainwright & Co., LLC (“H.C. Wainwright”) filed a complaint against us in the State of New York alleging that we breached a tail financing provision included in an engagement agreement we entered into with H.C. Wainwright in May 2023. In its complaint, H.C. Wainwright is seeking compensatory and consequential damages and attorneys’ fees. On October 18, 2024, we filed an answer to the complaint. We are defending these claims vigorously, but there is no guarantee that we will be successful in these efforts.

Corporate Information

We were incorporated in Delaware under the name Organovo Holdings, Inc. in January 2012. We are operating the business of our subsidiaries, including Organovo, Inc., our wholly-owned subsidiary, which we acquired in February 2012. Organovo, Inc. was incorporated in Delaware in April 2007. Our common stock has traded on the Nasdaq Capital Market under the symbol “ONVO” since December 27, 2019. Prior to that time, it had traded on the Nasdaq Global Market under the symbol “ONVO” since August 8, 2016 and prior to that it traded on the NYSE MKT under the symbol “ONVO”.

Our principal executive offices are located at 11555 Sorrento Valley Road, Suite 100, San Diego, CA 92121, and our telephone number is (858) 224-1000. Our website address is www.organovo.com. Any information contained on, or that can be accessed through, our website is not incorporated by reference into, nor is it in any way part of this prospectus and should not be relied upon in connection with making any decision with respect to an investment in our securities. We are required to file annual, quarterly and current reports, proxy statements and other information with the SEC. You may obtain any of the documents filed by us with the SEC at no cost from the SEC’s website at <http://www.sec.gov>.

We are a “smaller reporting company” as defined in Rule 12b-2 of the Securities Exchange Act of 1934, as amended (the “Exchange Act”), and have elected to take advantage of certain of the scaled disclosure available for smaller reporting companies in this prospectus as well as our filings under the Exchange Act.

The Offering

Common stock offered by us	Up to [_____] shares of common stock assuming no sale of any pre-funded warrants to purchase shares of common stock.
Pre-funded warrants offered by us	Each purchaser whose purchase of shares in this offering would otherwise result in the purchaser, together with its affiliates and certain related parties, beneficially owning more than 4.99% (or, at the election of the purchaser, 9.99%) of our outstanding common stock immediately following the consummation of this offering, has the opportunity to purchase, if the purchaser so chooses, pre-funded warrants (each pre-funded warrant to purchase one share of our common stock) in lieu of shares that would otherwise result in the purchaser's beneficial ownership exceeding 4.99% of our outstanding common stock (or, at the election of the purchaser, 9.99%). The purchase price of each pre-funded warrant will equal the price at which one share of common stock is being sold to the public in this offering, minus \$0.001, and the exercise price of each pre-funded warrant will be \$0.001 per share. The pre-funded warrants will be immediately exercisable and may be exercised at any time until all of the pre-funded warrants are exercised in full. For each pre-funded warrant we sell, the number of shares we are offering will be decreased on a one-for-one basis. We are also registering the shares of common stock issuable upon the exercise of the pre-funded warrants.
Common warrants offered by us	Common warrants to purchase up to [_____] shares of common stock. Each share of common stock or pre-funded warrant to purchase one share of common stock is being sold together with a common warrant to purchase one share of common stock. Each common warrant has an exercise price of \$[___] per share, will be immediately exercisable and will expire on the fifth anniversary of the original issuance date. The exercise price is subject to customary adjustments for stock splits and similar recapitalization transactions. The shares of common stock or the pre-funded warrants, as the case may be, and the accompanying common warrants can only be purchased together in this offering but will be issued separately and will be immediately separable upon issuance. See "Description of Securities We Are Offering" on page 23 for more information.
Term of the offering	This offering will terminate on [_____] , 2024, unless we decide to terminate the offering (which we may do at any time in our discretion) prior to that date.
Common stock to be outstanding immediately after this offering	[_____] shares, assuming no sale of pre-funded warrants, which, if sold, would reduce the number of shares of common stock that we are offering on a one-for-one basis, and further assuming no exercise of any common warrants.
Use of proceeds	We expect to receive net proceeds, after deducting estimated placement agent fees and estimated expenses payable by us, of approximately \$[_____] million, assuming a public offering price of \$[_____] per share and common warrant, the last reported sale price of our common stock on the Nasdaq Capital Market on [_____] , 2024, after deducting commissions and estimated offering expenses payable by us, and assuming no sale of any pre-funded warrants and no exercise of common warrants. We intend to use the net proceeds from this offering for working capital and general

corporate purposes, which could include capital expenditures, research and development expenditures, regulatory affairs expenditures, clinical trial expenditures, legal expenditures, including intellectual property protection and maintenance expenditures, acquisitions of new technologies and investments, business combinations and the repurchase of capital stock. See “*Use of Proceeds*” on page 14 for more information.

Risk factors

Investing in our securities involves a high degree of risk. As an investor, you should be able to bear a complete loss of your investment. You should carefully consider the information set forth in the “*Risk Factors*” section beginning on page 9 of this prospectus and the other information included and incorporated by reference in this prospectus.

Nasdaq Capital Market trading symbol

Our common stock is listed on the Nasdaq Capital Market under the symbol “ONVO.” There is no established trading market for the common warrants or the pre-funded warrants, and we do not expect a trading market to develop. We do not intend to list the common warrants or pre-funded warrants on any securities exchange or other trading market. Without a trading market, the liquidity of the common warrants and pre-funded warrants will be extremely limited.

The number of shares immediately outstanding following this offering is based on 14,373,076 shares of common stock outstanding as of June 30, 2024 and also gives effect to the issuance of 991,000 shares of common stock upon the partial exercise of a pre-funded warrant on July 31, 2024 and excludes the following as of June 30, 2024:

- 835,322 shares of common stock issuable upon the exercise of stock options outstanding at a weighted average exercise price of approximately \$3.70 per share;
- 121,392 shares of common stock issuable upon the vesting and settlement of outstanding restricted stock units;
- 3,621,000 shares of common stock issuable upon the exercise of a pre-funded warrant, which is currently exercisable at an exercise price of \$0.001, which number does not give effect to the issuance of 991,000 shares of common stock upon the partial exercise of the pre-funded warrant on July 31, 2024;
- 6,562,500 shares of common stock issuable upon the exercise of warrants to purchase shares of our common stock, which are currently exercisable at an exercise price of \$0.80;
- 1,000 shares of common stock available for issuance pursuant to the 2021 Inducement Equity Plan;
- 1,569,724 shares of common stock available for issuance pursuant to the 2022 Equity Incentive Plan; and
- 45,000 shares of common stock available for issuance pursuant to the 2023 Employee Stock Purchase Plan.

Unless otherwise indicated, all information in this prospectus assumes no exercise of options under our equity incentive plans and no exercise of pre-funded warrants and common warrants.

In addition, the number of shares of our common stock outstanding immediately after this offering excludes additional shares of common stock that we may sell pursuant to a Sales Agreement that we entered into with JonesTrading Institutional Services LLC on March 16, 2018 (the “Sales Agreement”). As of the date of this prospectus, we may sell up to \$1.3 million of shares of our common stock remaining available for sale by us under the Sales Agreement, provided no such sales shall be made for [] days from the date of this prospectus. Pursuant to General Instruction I.B.6 of Form S-3, in no event will we sell securities pursuant to shelf registration statements with a value more than one-third of the aggregate market value of our common stock held by non-affiliates in any 12 month period, so long as the aggregate market value of our common stock held by non-affiliates is less than \$75 million.

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus and any accompanying prospectus supplement may contain forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended (the “Securities Act”), and Section 21E of the Exchange Act, about Organovo. These forward-looking statements are intended to be covered by the safe harbor for forward-looking statements provided by the Private Securities Litigation Reform Act of 1995. Forward-looking statements are not statements of historical fact, and can be identified by the use of forward-looking terminology such as “believes”, “expects”, “may”, “will”, “could”, “should”, “projects”, “plans”, “goal”, “targets”, “potential”, “estimates”, “pro forma”, “seeks”, “intends” or “anticipates” or the negative thereof or comparable terminology. Forward-looking statements include discussions of strategy, financial projections, guidance and estimates (including their underlying assumptions), statements regarding plans, objectives, expectations or consequences of various transactions, and statements about the future performance, operations, products and services of Organovo. We caution our stockholders and other readers not to place undue reliance on such statements.

You should read this prospectus, any accompanying prospectus supplement and the documents incorporated by reference completely and with the understanding that our actual future results may be materially different from what we currently expect. Our business and operations are and will be subject to a variety of risks, uncertainties and other factors. Consequently, actual results and experience may materially differ from those contained in any forward-looking statements. Such risks, uncertainties and other factors that could cause actual results and experience to differ from those projected include, but are not limited to, the risk factors described in the “Risk Factors” section beginning on page [•] of this prospectus.

You should assume that the information appearing in this prospectus, any accompanying prospectus supplement and any related free writing prospectus is accurate as of its date only. Because the risk factors referred to above could cause actual results or outcomes to differ materially from those expressed in any forward-looking statements made by us or on our behalf, you should not place undue reliance on any forward-looking statements. Further, any forward-looking statement speaks only as of the date on which it is made. New factors emerge from time to time, and it is not possible for us to predict which factors will arise. In addition, we cannot assess the impact of each factor on our business or the extent to which any factor, or combination of factors, may cause actual results to differ materially from those contained in any forward-looking statements. All written or oral forward-looking statements attributable to us or any person acting on our behalf made after the date of this prospectus are expressly qualified in their entirety by the risk factors and cautionary statements contained in and incorporated by reference into this prospectus. Unless legally required, we do not undertake any obligation to release publicly any revisions to such forward-looking statements to reflect events or circumstances after the date of this prospectus or to reflect the occurrence of unanticipated events.

MARKET, INDUSTRY AND OTHER DATA

Unless otherwise indicated, we have based the information concerning economic conditions, our industry and our market contained in this prospectus on a variety of sources, including information from third-party industry analysts and publications and our own estimates and research. This information involves a number of assumptions, estimates and limitations. The industry publications, surveys and forecasts and other public information generally indicate or suggest that their information has been obtained from sources believed to be reliable. None of the third-party industry publications used in this prospectus were prepared on our behalf. The industries in which we operate are subject to a high degree of uncertainty and risk due to a variety of factors, and are subject to change based on various factors, including those discussed in the “Risk Factors” section of this prospectus and in the other information contained in this prospectus. These and other factors could cause the information concerning our industry to differ materially from those expressed in this prospectus and incorporated by reference herein.

DIVIDEND POLICY

We have never declared or paid cash dividends on our common stock. We currently intend to retain our future earnings, if any, for use in our business and therefore do not anticipate paying cash dividends in the foreseeable future. Payment of future dividends, if any, will be at the discretion of our board of directors after taking into account various factors, including our financial condition, operating results, current and anticipated cash needs and plans for expansion.

RISK FACTORS

Investment in our securities involve a substantial degree of risk and should be regarded as speculative. As a result, the purchase of our securities should be considered only by persons who can reasonably afford to lose their entire investment. Before you elect to purchase our securities, you should carefully consider the risk and uncertainties described below in addition to the risks and uncertainties described under “Risk Factors” in our Annual Report on Form 10-K for the fiscal year ended March 31, 2024, any subsequent Quarterly Report on Form 10-Q and our other filings with the SEC, all of which are incorporated by reference herein. Additional risks and uncertainties of which we are unaware or which we currently believe are immaterial could also materially adversely affect our business, financial condition or results of operations. If any of the risks or uncertainties discussed in this prospectus occur, our business, prospects, liquidity, financial condition and results of operations could be materially and adversely affected, in which case the trading price of our common stock could decline, and you could lose all or part of your investment.

Risks related to this Offering

We need to raise capital in this offering to support our operations. If we are unable to raise capital in this offering, our financial position will be materially adversely impacted.

We have incurred substantial losses since our inception, and we expect to continue to incur additional losses for the next several years. For the three months ended June 30, 2024, we had net losses of \$3.3 million. From our inception through June 30, 2024, we had an accumulated deficit of \$343.0 million. We believe that current cash on hand, prior to the receipt of any proceeds from this offering, is not sufficient to fund operations beyond January 2025. If we were to receive net proceeds of \$[] million from this offering, we believe that the net proceeds from this offering, together with our existing cash and cash equivalents, will meet our capital needs into []. If we receive the foregoing net proceeds of \$[] million in this offering, and if we raise an additional \$[] million in net proceeds through the sale of securities or otherwise throughout 2024, we believe that we will then meet our capital needs through the end of []. In addition, the report of our independent registered public accounting firm on our financial statements for the year ended March 31, 2024 contains explanatory language that substantial doubt exists about our ability to continue as a going concern. If we do not have access to sufficient cash and liquidity to finance our business operations as currently contemplated, we would be compelled to reduce general and administrative expenses and delay research and development projects, including the purchase of scientific equipment and supplies, until we are able to obtain sufficient financing. We have no additional committed sources of capital and may find it difficult to raise money on terms favorable to us or at all. The failure to obtain sufficient capital to support our operations would have a material adverse effect on our business, financial condition and results of operations. If such sufficient financing is not received timely, we would then need to pursue a plan to license or sell assets, seek to be acquired by another entity, cease operations and/or seek bankruptcy protection.

Purchasers who purchase our securities in this offering pursuant to a securities purchase agreement may have rights not available to purchasers that purchase without the benefit of a securities purchase agreement.

In addition to rights and remedies available to all purchasers in this offering under federal securities and state law, the purchasers that enter into a securities purchase agreement will also be able to bring claims of breach of contract against us. The ability to pursue a claim for breach of contract provides those investors with the means to enforce the covenants uniquely available to them under the securities purchase agreement including: (i) timely delivery of shares; (ii) agreement to not enter into variable rate financings for [] days from closing, subject to certain exceptions; (iii) agreement to not enter into any financings for [] days from closing; and (iv) indemnification for breach of contract.

This is a best efforts offering, no minimum amount of securities is required to be sold, and we may not raise the amount of capital we believe is required for our business plans, including our near-term business plans.

The placement agent has agreed to use its reasonable best efforts to solicit offers to purchase the securities in this offering. The placement agent has no obligation to buy any of the securities from us or to arrange for the purchase or sale of any specific number or dollar amount of the securities. There is no required minimum number of securities that must be sold as a condition to completion of this offering. Because there is no minimum offering amount required as a condition to the closing of this offering, the actual offering amount, placement agent fees and proceeds to us are not presently determinable and may be substantially less than the maximum amounts set forth herein. We may sell fewer than all of the securities offered hereby, which may significantly reduce the amount of proceeds received by us, and investors in this offering will not receive a refund in the event that we do not sell an amount of securities sufficient to support our continued operations, including our near-term continued operations. Thus, we may not raise the amount of capital we believe is required for our operations in the short-term and may need to raise additional funds to complete such short-term operations. Such additional fundraises may not be available or available on terms acceptable to us.

Our management has broad discretion as to the use of the net proceeds from this offering.

Our management will have broad discretion in the application of the net proceeds from this offering, including for any of the purposes described in the section titled “Use of Proceeds.” Because of the number and variability of factors that will determine our use of the net proceeds from this offering, their ultimate use may vary substantially from their currently intended use. Our management might not apply our net proceeds in ways that ultimately increase the value of your investment, and the failure by our management to apply these funds effectively could harm our business. If we do not invest or apply the net proceeds from this offering in ways that enhance stockholder value, we may fail to achieve expected results, which could cause our common stock price to decline.

If you purchase securities in this offering, you will experience immediate and substantial dilution and may experience additional dilution in the future.

Investors purchasing shares of our common stock and accompanying common warrants in this offering will pay a price per share that substantially exceeds the pro forma as adjusted net tangible book value per share. As a result, investors purchasing our common stock and accompanying common warrants in this offering will incur immediate dilution of \$[_____] per share, representing the difference between the assumed public offering price of \$[_____] per share, which is the last reported sale price of our common stock on the Nasdaq Capital Market on [____], 2024, and our as adjusted net tangible book value as of June 30, 2024. For more information on the dilution you may suffer as a result of investing in this offering, see “Dilution.”

Because there is no minimum required for the offering to close, investors in this offering will not receive a refund in the event that we do not sell an amount of securities sufficient to pursue the business goals outlined in this prospectus.

We have not specified a minimum offering amount nor have or will we establish an escrow account in connection with this offering. Because there is no escrow account and no minimum offering amount, investors could be in a position where they have invested in our company, but we are unable to fulfill our objectives due to a lack of interest in this offering. Further, because there is no escrow account in operation and no minimum investment amount, any proceeds from the sale of securities offered by us will be available for our immediate use, despite uncertainty about whether we would be able to use such funds to effectively implement our business plan. Investor funds will not be returned under any circumstances whether during or after the offering.

We may issue additional equity or convertible debt securities in the future, which may result in additional dilution to you.

In order to raise additional capital, we expect to in the future offer additional shares of our common stock or other securities convertible into or exchangeable for our common stock. We cannot assure you that we will be able to sell shares or other securities in any other offering at a price per share that is equal to or greater than the price per share and accompanying common warrant paid by investors in this offering, and investors purchasing shares or other securities in the future could have rights superior to existing stockholders. The price per share at which we sell additional shares of our common stock or other securities convertible into or exchangeable for our common stock in future transactions may be higher or lower than the price per share in this offering.

Future sales of shares of our common stock in the public market, or the perception that such sales could occur, could cause our stock price to fall.

Sales of a substantial number of shares of our common stock in the public market, or the perception that these sales could occur, following this offering could cause the market price of our common stock to decline. A substantial majority of the outstanding shares of our common stock are, and the shares of common stock sold in this offering, as well as shares issuable upon exercise of common warrants or pre-funded warrants, upon issuance will be, freely tradable without restriction or further registration under the Securities Act. We may sell large quantities of our common stock at any time pursuant to one or more separate offerings in the future, including through “at the market offerings” pursuant the Sales Agreement. We cannot predict the effect that future sales of common stock or other equity-related securities would have on the market price of our common stock.

There is no public market for common warrants or the pre-funded warrants to purchase shares of our common stock being offered by us in this offering.

There is no established public trading market for the common warrants or pre-funded warrants to purchase shares of our common stock that are being offered as part of this offering, and we do not expect a market to develop. In addition, we do not intend to apply to list the common warrants or pre-funded warrants on any national securities exchange or other nationally recognized trading system, including the Nasdaq Capital Market. Without an active market, the liquidity of the common warrants and pre-funded warrants will be limited.

The common warrants and pre-funded warrants are speculative in nature.

The common warrants and pre-funded warrants do not confer any rights of common stock ownership on their holders, such as voting rights or the right to receive dividends, but rather merely represent the right to acquire shares of common stock at a fixed price. Specifically, commencing on the date of issuance, holders of the common warrants may exercise their right to acquire common stock and pay an exercise price of \$[] per share, subject to certain adjustments, prior to five years from the date on which such warrants were issued, after which date any unexercised common warrants will expire and have no further value. Holders of pre-funded warrants have identical rights, except that the pre-funded warrants have an exercise price of \$0.001 and do not expire until exercised in full. Moreover, following this offering, the market value of the common warrants and pre-funded warrants, if any, is uncertain and there can be no assurance that the market value of the common warrants or the pre-funded warrants will equal or exceed their imputed offering price.

Holders of the common warrants and pre-funded warrants offered hereby will have no rights as common stockholders with respect to the shares of our common stock underlying the common warrants and pre-funded warrants until such holders exercise their common warrants and pre-funded warrants and acquire our common stock, except as otherwise provided in the common warrants and pre-funded warrants.

Until holders of the common warrants and pre-funded warrants acquire shares of our common stock upon exercise thereof, such holders will have no rights with respect to the shares of our common stock underlying such warrants. Upon exercise of the common warrants and pre-funded warrants, the holders will be entitled to exercise the rights of a common stockholder only as to matters for which the record date occurs after the exercise date.

Risks Related to Our Common Stock and Liquidity Risks

We could fail to maintain the listing of our common stock on the Nasdaq Capital Market, which could seriously harm the liquidity of our stock and our ability to raise capital or complete a strategic transaction.

The Nasdaq Stock Market LLC (“Nasdaq”) has established continued listing requirements, including a requirement to maintain a minimum closing bid price of at least \$1 per share. If a company trades for 30 consecutive business days below such minimum closing bid price, it will receive a deficiency notice from Nasdaq. Assuming it is in compliance with the other continued listing requirements, Nasdaq would provide such company a period of 180 calendar days in which to regain compliance by maintaining a closing bid price at least \$1 per share for a minimum of ten consecutive business days. There can be no assurance that we will continue to maintain compliance with the minimum bid price requirement or other listing requirements necessary for us to maintain the listing of our common stock on the Nasdaq Capital Market.

On July 18, 2024, we received a written notice (the “Notice”) 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 bid price of \$1 per share, as set forth in Nasdaq Listing Rule 5550(a)(2) (“Rule 5550(a)(2)”).

In accordance with Nasdaq Listing Rule 5810(c)(3)(A), we have been provided with an initial period of 180 calendar days, or until January 14, 2025, to regain compliance. In order to regain compliance with the minimum bid price requirement, the closing bid price of our common stock must be at least \$1 per share for a minimum of ten consecutive business days during this 180-day period. The Notice provides that the Nasdaq staff will provide written confirmation to us if we regain compliance with Rule 5550(a)(2).

If we do not regain compliance with Rule 5550(a)(2) by January 14, 2025, we may be eligible for an additional compliance period of 180 calendar days. 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, with the exception of the bid price requirement, and would need to provide written notice to Nasdaq of our intention to cure the bid price deficiency during the second compliance period. However, if it appears to the Nasdaq staff that we will not be able to cure the deficiency, or we are otherwise not eligible, Nasdaq would notify us that our securities will be subject to delisting. In the event of such a notification, we may appeal the Nasdaq staff’s determination to delist our securities, but there can be no assurance the Nasdaq staff would grant any request for continued listing.

The Notice had no immediate effect on the listing or trading of our common stock and our common stock will continue to trade on the Nasdaq Capital Market under the symbol “ONVO”. We intend to monitor the closing bid price of our common stock and consider our available options if our common stock does not trade at a level likely to result in us regaining compliance with Rule 5550(a)(2) by January 14, 2025, including effecting a reverse stock split, which would be subject to the prior approval of our stockholders. At our 2024 annual meeting of our stockholders to be held on November 20, 2024, we are asking our stockholders to approve an amendment to our Certificate of Incorporation, as amended, to effect, in the sole discretion of our Board of Directors (our “Board”) at any time on

or before November 20, 2024, a reverse split of our common stock at a ratio to be determined by the Board within a range of 1-to-5 to 1-to-20 (or any number in between). However, there can be no assurances that our stockholders will approve this proposal.

There can be no assurance that we will be able to regain compliance with Nasdaq's minimum bid price requirement or that we will maintain our compliance with the other listing requirements necessary for us to maintain the listing of our common stock on the Nasdaq Capital Market.

A delisting from the Nasdaq Capital Market and commencement of trading on the Over-the-Counter Bulletin Board would likely result in a reduction in some or all of the following, each of which could have a material adverse effect on stockholders:

- the liquidity of our common stock;
- the market price of our common stock (and the accompanying valuation of our Company);
- our ability to obtain financing or complete a strategic transaction;
- the number of institutional and other investors that will consider investing in shares of our common stock;
- the number of market makers or broker-dealers for our common stock; and
- the availability of information concerning the trading prices and volume of shares of our common stock.

There is no assurance that an active market in our common stock will continue at present levels or increase in the future.

Our common stock is currently traded on the Nasdaq Capital Market, but there is no assurance that an active market in our common stock will continue at present levels or increase in the future. As a result, an investor may find it difficult to dispose of our common stock on the timeline and at the volumes they desire. This factor limits the liquidity of our common stock and may have a material adverse effect on the market price of our common stock and on our ability to raise additional capital.

Risks Related to Our Capital Requirements, Finances and Operations

We may engage in strategic transactions, including acquisitions, investments, joint development agreements or divestitures that may have an adverse effect on our business.

We may pursue transactions, including acquisitions of complementary businesses, technology licensing arrangements, strategic relationships, and joint development agreements to expand our product offerings and geographic presence as part of our business strategy, which could be material to our financial condition and results of operations. We may also consider divesting programs or other assets or out-licensing our technology. We may not complete transactions in a timely manner, on a cost-effective basis, or at all, and we may not realize the expected benefits of any acquisition, license arrangement, strategic relationship, joint development agreement or divestiture. Other companies may compete with us for these strategic opportunities. We also could experience negative effects on our results of operations and financial condition from charges related to acquisitions and investments, amortization of intangible assets and asset impairment charges, and other issues that could arise in connection with, or as a result of, acquisitions or divestitures, including issues related to internal control over financial reporting, regulatory or compliance issues and potential adverse short-term effects on results of operations through increased costs or otherwise. Acquisitions involve numerous risks, including the following:

- difficulties in finding suitable partners or acquisition candidates or purchasers for programs or assets that we may seek to divest;
- difficulties in obtaining financing on favorable terms, if at all;
- difficulties in completing transactions on favorable terms, if at all;
- the possibility that we will pay more than the value we derive from the acquisition, which could result in future non-cash impairment charges and/or a dilution of future earnings per share;
- the assumption of certain known and unknown liabilities of acquired companies;
- the incurrence of debt, contingent liabilities, or future write-offs of intangible assets or goodwill;
- difficulties in retaining key relationships with employees, customers, partners and suppliers following any transaction; and
- difficulties in operating in different business markets where we may not have historical experience.

Any of these factors could have a negative impact on our business, results of operations or financial position. Further, past and potential acquisitions entail risks, uncertainties and potential disruptions to our business, especially where we have limited experience

as a company developing or marketing a particular product or technology. Following any acquisition, we must integrate the new business, which can be expensive, time-consuming and cause disruptions to our existing operations. Failure to timely and successfully integrate acquired businesses may result in non-compliance with regulatory or other requirements and may result in unexpected costs, including as a result of inadequate cost containment and failure to fully realize expected synergies. As a result of any of the foregoing, we may not realize the expected benefit from any acquisition or investment. If we cannot integrate acquired businesses, products or technologies, our business, financial conditions and results of operations could be materially and adversely affected.

Any divestitures may result in a dilutive impact to our future earnings, as well as significant write-offs, including those related to goodwill and other intangible assets, which could have a material adverse effect on our results of operations and financial condition. Divestitures could involve additional risks, including difficulties in the separation of operations, services, products and personnel, the diversion of management's attention from other business concerns, the disruption of our business and the potential loss of key employees. We may not be successful in managing these or any other significant risks that we encounter in divesting a product or technology.

Risks Related to Litigation

Claims, litigation, government investigations and other proceedings may adversely affect our business, operating results and financial condition.

We are, from time to time, involved in various claims, litigation matters and regulatory proceedings that could have a material adverse effect on us. These matters may include intellectual property disputes, contract disputes, employment and tax matters and other proceedings and litigation, including class action lawsuits. It is not possible to predict the outcome of pending or future litigation and any such claims, with or without merit, could be time consuming and expensive, and may require the Company to incur substantial costs and divert the resources of management.

For example, on August 27, 2023, H.C. Wainwright filed a complaint against us in the State of New York alleging that we breached a tail financing provision included in an engagement agreement we entered into with H.C. Wainwright in May 2023. In its complaint, H.C. Wainwright is seeking compensatory and consequential damages and attorneys' fees. On October 18, 2024, we filed an answer to the complaint. We are defending these claims vigorously, but there is no guarantee that we will be successful in these efforts.

Determining legal reserves or possible losses from claims against us involves judgment and may not reflect the full range of uncertainties and unpredictable outcomes. Until the final resolution of such matters, we may be exposed to losses in excess of the amount recorded, and such excess amounts could have a material effect on our business, results of operations and financial condition. In addition, it is possible that a resolution of any claim, including as a result of a settlement, could require us to make substantial future payments or require us to change our business practices each of which could have a material adverse effect on our business, operating results and financial condition.

USE OF PROCEEDS

We estimate that we will receive net proceeds of approximately \$[_____] million, after deducting the estimated placement agent fees and estimated offering expenses payable by us (based on an assumed public offering price of \$[_____] per share, which was the last reported sales price of our common stock on the Nasdaq Capital Market on [____], 2024) and assuming no sale of any pre-funded warrants and no exercise of common warrants. However, because this is a best efforts offering and there is no minimum offering amount required as a condition to the closing of this offering, the actual offering amount, the placement agent's fees and net proceeds to us are not presently determinable and may be substantially less than the maximum amounts set forth on the cover page of this prospectus.

We intend to use the proceeds of this offering for working capital and general corporate purposes, which could include capital expenditures, research and development expenditures, regulatory affairs expenditures, clinical trial expenditures, legal expenditures, including intellectual property protection and maintenance expenditures, acquisitions of new technologies and investments, business combinations and the repurchase of capital stock. Pending these uses, we may invest the net proceeds in short- and intermediate-term interest-bearing obligations, investment-grade instruments, certificates of deposit or direct or guaranteed obligations of the United States government.

This expected use of net proceeds from this offering represents our intentions based upon our current plans and business conditions, which could change in the future as our plans and business conditions evolve. We cannot currently allocate specific percentages of the net proceeds to us from this offering that we may use for the purposes specified above. Our management will have broad discretion in the application of the net proceeds from this offering and could use them for purposes other than those contemplated at the time of this offering. Our stockholders may not agree with the manner in which our management chooses to allocate and spend the net proceeds. Moreover, our management may use the net proceeds for corporate purposes that may not result in our being profitable or increase our market value. See "*Risk Factors—Risks Related to this Offering and the Ownership of Our Common Stock—Our management has broad discretion as to the use of the net proceeds from this offering.*"

CAPITALIZATION

The following table sets forth our cash and cash equivalents and total capitalization as of June 30, 2024:

- on an actual basis;
- a pro forma basis to reflect the issuance of 991,000 shares of common stock upon the partial exercise of a pre-funded warrant to purchase shares of common stock on July 31, 2024; and
- on a pro forma as adjusted basis, giving effect to the issuance and sale of [] shares of common stock and accompanying common warrants to purchase [] shares of common stock (excluding the shares of common stock issuable upon exercise of the common warrants being offered in this offering) in this offering at the assumed combined public offering price of \$[] per share, which is the last reported sale price of our common stock on the Nasdaq Capital Market on [], 2024, and after deducting estimated placement agent fees and estimated offering expenses payable by us and assuming no sale of any pre-funded warrants in this offering and no exercise of any common warrants.

The as adjusted information below is illustrative only, and our capitalization following the closing of this offering will be adjusted based on the actual public offering price and other terms of this offering determined at pricing.

You should read this information in conjunction with “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and the historical financial statements and related notes in our Annual Report on Form 10-K for the fiscal year ended March 31, 2024 and our Quarterly Report on Form 10-Q for the period ended June 30, 2024, incorporated herein by reference.

	Actual (unaudited)	Pro Forma	June 30, 2024 Pro Forma As Adjusted
	(In thousands, except share and per share data)		
Cash and cash equivalents	\$ 6,187	\$ 6,188	\$ []
Stockholders' equity:			
Common stock, par value \$0.001 per share: 200,000,000 shares authorized, 14,373,076 shares issued and outstanding as of June 30, 2024, actual; 200,000,000 shares authorized, 15,364,076 shares issued and outstanding, pro forma; 200,000,000 shares authorized, [] shares issued and outstanding, pro forma as adjusted	14	15	\$ []
Additional paid-in capital	349,662	349,662	[]
Accumulated deficit	(343,013)	(343,013)	[]
Treasury stock, 46 shares at cost	(1)	(1)	[]
Total stockholders' equity	6,662	6,663	[]
Total capitalization	\$ 6,662	\$ 6,663	\$ []

The number of shares immediately outstanding following this offering is based on 14,373,076 shares of common stock outstanding as of June 30, 2024 and also gives effect to the issuance of 991,000 shares of common stock upon the partial exercise of a pre-funded warrant on July 31, 2024 and excludes the following as of June 30, 2024:

- 835,322 shares of common stock issuable upon the exercise of stock options outstanding at a weighted average exercise price of approximately \$3.70 per share;
- 121,392 shares of common stock issuable upon the vesting and settlement of outstanding restricted stock units;
- 3,621,000 shares of common stock issuable upon the exercise of a pre-funded warrant, which is currently exercisable at an exercise price of \$0.001, which number does not give effect to the issuance of 991,000 shares of common stock upon the partial exercise of the pre-funded warrant on July 31, 2024;
- 6,562,500 shares of common stock issuable upon the exercise of warrants to purchase shares of our common stock, which are currently exercisable at an exercise price of \$0.80;
- 1,000 shares of common stock available for issuance pursuant to the 2021 Inducement Equity Plan;

- 1,569,724 shares of common stock available for issuance pursuant to the 2022 Equity Incentive Plan; and
- 45,000 shares of common stock available for issuance pursuant to the 2023 Employee Stock Purchase Plan.

In addition, the number of shares of our common stock outstanding immediately after this offering excludes additional shares of common stock that we may sell pursuant to the Sales Agreement. As of the date of this prospectus, we may sell up to \$[] million of shares of our common stock remaining available for sale by us under the Sales Agreement, provided no such sales shall be made for [] days from the date of this prospectus. Pursuant to General Instruction I.B.6 of Form S-3, in no event will we sell securities pursuant to shelf registration statements with a value more than one-third of the aggregate market value of our common stock held by non-affiliates in any 12 month period, so long as the aggregate market value of our common stock held by non-affiliates is less than \$75 million.

DILUTION

If you purchase our common stock in this offering, your interest will be diluted to the extent of the difference between the public offering price per share of common stock and accompanying common warrant to purchase one share of common stock and the net tangible book value per share of our common stock after this offering (excluding the shares of common stock issuable upon exercise of the common warrants being offering in this offering and the payment of the exercise price therefor).

As of June 30, 2024, we had net tangible book value of approximately \$4.6 million, or \$0.32 per share. Net tangible book value per share represents the amount of total tangible assets less total liabilities divided by the number of shares of our common stock outstanding.

Our pro forma net tangible book value as of June 30, 2024, before giving effect to this offering, was approximately \$4.6 million, or \$0.30 per share of our common stock. Pro forma net tangible book value, before the issuance and sale of shares of common stock and accompanying common warrants in this offering, gives effect to the issuance of 991,000 shares of common stock upon the partial exercise of a pre-funded warrant on July 31, 2024.

After giving effect to (i) the pro forma adjustments set forth above and (ii) the issuance and sale of [] shares of our common stock in this offering [and accompanying common warrants to purchase [] shares of our common stock (excluding the shares of common stock issuable upon exercise of the common warrants being offered in this offering)] at an assumed combined public offering price of \$[] per share, the last reported sale price of our common stock on the Nasdaq Capital Market on [], 2024, assuming no sale of pre-funded warrants in this offering and no exercise of common warrants and after deducting estimated placement agent fees and estimated offering expenses payable by us, our pro forma as adjusted net tangible book value as of June 30, 2024 would have been approximately \$[] million, or approximately \$[] per share. This amount represents an immediate increase in net tangible book value of approximately \$[] per share to our existing stockholders and an immediate dilution in pro forma net tangible book value of approximately \$[] per share to new investors purchasing shares of common stock in this offering.

Dilution per share to new investors is determined by subtracting pro forma as adjusted net tangible book value per share after this offering from the offering price per share paid by new investors. The pro forma as adjusted information below is based on an assumed public offering price of \$[] per share, the last reported sale price of our common stock on the Nasdaq Capital Market on [], 2024, and is illustrative only, and dilution following the closing of this offering will be adjusted based on the actual public offering price and other terms of this offering determined at pricing.

The following table illustrates this dilution, assuming the holders of the common warrants do not exercise any of the common warrants:

Assumed public offering price per share	\$ []
Net tangible book value per share as of June 30, 2024	\$ 0.32
Decrease in net tangible book value per share attributable to the issuance of 991,000 shares of common stock upon the partial exercise of a pre-funded warrant on July 31, 2024	(0.02)
Pro forma net tangible book value per share as of June 30, 2024	0.30
Increase in net tangible book value per share attributable to this offering	\$ []
Pro forma as adjusted net tangible book value per share, after giving effect to this offering	\$ []
Dilution per share to investors purchasing shares in this offering	\$ []

The dilution information discussed above is illustrative only and may change based on the actual public offering price, the actual number of shares of common stock, pre-funded warrants and accompanying common warrants we offer in this offering and other terms of this offering determined at pricing.

A \$0.50 increase or decrease in the assumed public offering price of \$[] per share of common stock and accompanying common warrant to purchase one share of common stock, based on the last reported sale price for our common stock as reported on the Nasdaq Capital Market on [], 2024, would decrease the number of shares of our common stock and accompanying common warrants offered in this offering by approximately [] million shares and accompanying common warrants to purchase [] million shares or increase the number of shares of our common stock and accompanying common warrants offered in this offering by approximately [] million shares and accompanying common warrants to purchase [] million shares.

We may also increase or decrease the number of shares of common stock and accompanying common warrants we are offering. An increase of 100,000 in the number of shares of common stock and accompanying common warrants offered by us would increase our pro forma as adjusted net tangible book value by approximately \$[] million, or \$[] per share, and decrease the dilution per share to investors participating in this offering by \$[] per share, assuming the assumed offering price per share remains the same and after deducting the estimated placement agent fees and estimated offering expenses payable by us. Similarly, a decrease of

100,000 in the number of shares of common stock and accompanying common warrants offered by us would decrease our pro forma as adjusted net tangible book value by approximately \$[_____] million or \$[_____] per share, and increase the dilution per share to investors participating in this offering by \$[_____] per share, assuming the assumed offering price per share remains the same and after deducting the estimated placement agent fees and estimated offering expenses payable by us.

The number of shares immediately outstanding following this offering is based on 14,373,076 shares of common stock outstanding as of June 30, 2024 and also gives effect to the issuance of 991,000 shares of common stock upon the partial exercise of a pre-funded warrant on July 31, 2024 and excludes the following as of June 30, 2024:

- 835,322 shares of common stock issuable upon the exercise of stock options outstanding at a weighted average exercise price of approximately \$3.70 per share;
- 121,392 shares of common stock issuable upon the vesting and settlement of outstanding restricted stock units;
- 3,621,000 shares of common stock issuable upon the exercise of a pre-funded warrant, which is currently exercisable at an exercise price of \$0.001, which number does not give effect to the issuance of 991,000 shares of common stock upon the partial exercise of the pre-funded warrant on July 31, 2024;
- 6,562,500 shares of common stock issuable upon the exercise of warrants to purchase shares of our common stock, which are currently exercisable at an exercise price of \$0.80;
- 1,000 shares of common stock available for issuance pursuant to the 2021 Inducement Equity Plan;
- 1,569,724 shares of common stock available for issuance pursuant to the 2022 Equity Incentive Plan; and
- 45,000 shares of common stock available for issuance pursuant to the 2023 Employee Stock Purchase Plan.

To the extent options, restricted units or warrants are additionally exercised or settled or other shares are issued, there may be further dilution to investors. In addition, we may choose to raise additional capital due to market conditions or strategic considerations even if we believe we have sufficient funds for our current or future operating plans. As of the date of this prospectus, we may sell up to \$[_____] million of shares of our common stock remaining available for sale by us under the Sales Agreement, provided no such sales shall be made for [_____] days from the date of this prospectus. Pursuant to General Instruction I.B.6 of Form S-3, in no event will we sell securities pursuant to shelf registration statements with a value more than one-third of the aggregate market value of our common stock held by non-affiliates in any 12 month period, so long as the aggregate market value of our common stock held by non-affiliates is less than \$75 million. To the extent that additional capital is raised through the sale of equity or convertible debt securities, the issuance of these securities could result in further dilution to our stockholders.

DESCRIPTION OF CAPITAL STOCK

The following description summarizes the most important terms of our capital stock. Because it is only a summary of the provisions of our certificate of incorporation, as amended (the “Certificate of Incorporation”), and our amended and restated bylaws (the “Bylaws”), it does not contain all of the information that may be important to you. For a complete description of the matters set forth in this “Description of Capital Stock,” you should refer to our Certificate of Incorporation and Bylaws, each of which are included as exhibits to the registration statement of which this prospectus is a part, and to the applicable provisions of Delaware law.

Our authorized capital stock consists of 200,000,000 shares of common stock, \$0.001 par value per share, and 25,000,000 shares of preferred stock, \$0.001 par value per share. Our Board of Directors (the “Board”) may establish the rights and preferences of the preferred stock from time to time. As of September 30, 2024, there were 15,365,826 shares of our common stock issued and outstanding and no shares of preferred stock issued and outstanding.

Common Stock

Dividend Rights. Subject to limitations under Delaware law and preferences that may apply to any then-outstanding shares of preferred stock, holders of common stock are entitled to share ratably in dividends, if any, as may be declared from time to time by our Board in its discretion from funds legally available therefor. Dividends, if any, will be contingent upon our revenues and earnings, if any, and capital requirements and financial conditions. The payment of dividends, if any, will be within the discretion of our Board. We presently intend to retain all earnings, if any, and accordingly our Board does not anticipate declaring any dividends prior to a business combination.

Voting Rights. Holders of our common stock are entitled to one vote for each share held on all matters submitted to a vote of the stockholders. Our Certificate of Incorporation does not provide for cumulative voting for the election of directors. Generally, all matters to be voted on by stockholders must be approved by a majority (or, in the case of election of directors, by a plurality) of the votes cast by all shares of common stock that are present in person or represented by proxy. The Certificate of Incorporation establishes a classified board of directors that is divided into three classes with staggered three-year terms. Only the directors in one class will be subject to election at each annual meeting of our stockholders, with the directors in the other classes continuing for the remainder of their respective three-year terms. The Certificate of Incorporation and the Bylaws also provide that the directors may be removed only for cause. In addition, Organovo has reserved the right to amend, alter, change or repeal any provision in the Certificate of Incorporation, subject to any approval of our stockholders as may be required under the DGCL, and our Board is authorized to adopt, amend or repeal the Bylaws.

No Preemptive or Similar Rights. Our common stock is not entitled to preemptive rights, and is not subject to conversion, redemption or sinking fund provisions.

Right to Receive Liquidation Distributions. In the event of a liquidation, dissolution or winding up, the holders of common stock are entitled to share pro rata all assets remaining after payment in full of all liabilities and after providing for each class of stock, if any, having preference over the common stock, subject to the liquidation preference of any then outstanding shares of preferred stock.

Fully Paid and Non-Assessable. All of the outstanding shares of our common stock are duly authorized, validly issued, fully paid and non-assessable.

Preferred Stock

As of the date of this prospectus, no shares of preferred stock are issued and outstanding. Our Board is authorized, subject to limitations prescribed by Delaware law, to issue up to 25,000,000 shares of preferred stock in one or more series, to determine and fix from time to time the number of shares to be included in such series, and to fix the designations, powers, preferences and rights, qualifications, limitations and restrictions thereof, including, without limitation, dividend rights, dividend rate, conversion rights, voting rights, rights and terms of redemption (including sinking fund provisions), redemption price or prices and liquidation preferences of such series, in each case without further vote or action by the stockholders. Our Board can also increase or decrease the number of shares of any such series, but not above the total number of authorized shares and not below the number of shares of such series then outstanding, without any further vote or action by the stockholders.

Our Board may authorize the issuance of preferred stock with voting or conversion rights that could adversely affect the voting power or other rights of the holders of our common stock. The issuance of preferred stock, while providing flexibility in connection with possible acquisitions and other corporate purposes, could, among other things, have the effect of delaying, deferring or preventing a change in control and may adversely affect the market price of our common stock and the voting and other rights of the holders of our common stock. We have no current plans to issue any shares of preferred stock.

Warrants

As of October 24, 2024, we had outstanding warrants to purchase an aggregate of 10,183,500 shares of common stock as follows:

- a warrant to purchase an aggregate of 2,630,000 shares of common stock with an exercise price of \$0.001 per share, all of which is currently exercisable (subject to certain beneficial ownership requirements); and
- warrants to purchase an aggregate of 6,562,500 shares of common stock with an exercise price of \$0.80 per share, all of which are currently exercisable (subject to certain beneficial ownership requirements) and expire on May 13, 2029.

All of the outstanding warrants contain provisions for the adjustment of the exercise price in the event of stock dividends, stock splits or similar transactions. In addition, certain of the warrants contain a “cashless exercise” feature that allows the holders thereof to exercise the warrants without a cash payment to us under certain circumstances. Certain of the warrants also contain provisions that provide certain rights to warrant holders in the event of a fundamental transaction, including a merger or consolidation with or into another entity, such as:

- the right to receive the same amount and kind of consideration paid to the holders of common stock in the fundamental transaction;
- the right to require us or a successor entity to purchase the unexercised portion of certain warrants at the warrant’s respective fair value using the Black Scholes option pricing formula; or
- the right to require us a successor entity to redeem the unexercised portion of certain warrants for the same consideration paid to holders of common stock in the fundamental transaction at the warrant’s respective fair value using the Black Scholes option pricing formula.

Anti-Takeover Effects of Certain Provisions of our Certificate of Incorporation, Bylaws and the General Corporation Law of the State of Delaware

Certain provisions of Delaware law, along with the Certificate of Incorporation and the Bylaws, may have the effect of delaying, deferring or discouraging another person from acquiring control of us. These provisions are expected to discourage coercive takeover practices and inadequate takeover bids. These provisions are also designed, in part, to encourage persons seeking to acquire control of us to first negotiate with our Board. However, these provisions could have the effect of delaying, discouraging or preventing attempts to acquire us, which could deprive the stockholders of opportunities to sell their shares of our common stock at prices higher than prevailing market prices.

Delaware Law

We are subject to Section 203 of the General Corporation Law of the State of Delaware (“DGCL”), which prohibits persons deemed to be “interested stockholders” from engaging in a “business combination” with a publicly held Delaware corporation for three years following the date these persons become interested stockholders unless the business combination is, or the transaction in which the person became an interested stockholder was, approved in a prescribed manner or another prescribed exception applies. Generally, an “interested stockholder” is a person who, together with affiliates and associates, owns, or within three years prior to the determination of interested stockholder status did own, 15% or more of a corporation’s voting stock. Generally, a “business combination” includes a merger, asset or stock sale, or other transaction resulting in a financial benefit to the interested stockholder. The existence of this provision may have an anti-takeover effect with respect to transactions not approved in advance by our Board.

Choice of Forum

The Bylaws provide that, unless we consent in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware (or, if the Court of Chancery does not have jurisdiction, another state or federal court located in the State of Delaware) will be the sole and exclusive forum for: (1) any derivative action or proceeding brought on our behalf; (2) any action asserting a claim of breach of a fiduciary duty by any of our directors, officers or stockholders to us or our stockholders; (3) any action arising pursuant to any provision of the DGCL or the Certificate of Incorporation or the Bylaws; or (4) any action asserting a claim governed by the internal affairs doctrine. The provision will not apply to suits brought to enforce a duty or liability created by the Securities Act, the Exchange Act or any other claim for which the federal courts have exclusive jurisdiction. Section 27 of the Exchange Act creates exclusive federal jurisdiction over all suits brought to enforce any duty or liability created by the Exchange Act or the rules and regulations thereunder. As a result, the choice of forum provision will not apply to suits brought to enforce any duty or liability created by the Exchange Act or any other claim for which the federal courts have exclusive jurisdiction. However, the Certificate of Incorporation does not relieve us of our duties to comply with federal securities laws and the rules and regulations thereunder, and our stockholders will not be deemed to have waived our compliance with these laws, rules and regulations. The Bylaws also provide that

any person or entity purchasing or otherwise acquiring any interest in shares of our capital stock will be deemed to have notice of and to have consented to this choice of forum provision.

This choice of forum provision in the Bylaws may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers, employees or agents, which may discourage such lawsuits against us and our directors, officers, employees or agents. In addition, stockholders who do bring a claim in the Court of Chancery in the State of Delaware could face additional litigation costs in pursuing any such claim, particularly if they do not reside in or near Delaware. Furthermore, the enforceability of similar choice of forum provisions in other companies' governing documents has been challenged in legal proceedings, and it is possible that a court could find these types of provisions to be inapplicable or unenforceable.

Board of Directors Vacancies. Any vacancy or newly created directorship in our Board, however occurring, shall be filled only by the vote of a majority of the directors then in office, although less than a quorum, and shall not be filled by the stockholders, unless our Board determines by resolution that any such vacancy or newly created directorship shall be filled by the stockholders. In addition, the number of directors constituting our Board shall be determined from time to time by a resolution adopted by our Board. These provisions may prevent a stockholder from increasing the size of our Board and then gaining control of our Board by filling the resulting vacancies with its own nominees. This makes it more difficult to change the composition of our Board and promotes continuity of management.

Classified Board. Our Board is divided into three classes. The directors in each class will serve for a three-year term, one class being elected each year by the stockholders. This system of electing and removing directors may tend to discourage a third party from making a tender offer or otherwise attempting to obtain control of us, because it generally makes it more difficult for stockholders to replace a majority of the directors.

Stockholder Meetings. The Bylaws provide that a special meeting of stockholders may be called only by the chairperson of our Board, chief executive officer or president (in the absence of a chief executive officer) or a majority of the authorized number of directors, thus prohibiting a stockholder (in the capacity as a stockholder) from calling a special meeting. These provisions might delay the ability of the stockholders to force consideration of a proposal or for stockholders controlling a majority of the capital stock to take any action, including the removal of directors.

Elimination of Stockholder Action by Written Consent. The Certificate of Incorporation and the Bylaws eliminate the right of stockholders to act by written consent without a meeting unless the action to be effected by written consent and the taking of such action by written consent is approved in advance by resolution of our Board. As a result, a holder controlling a majority of the capital stock would not be able to amend the Bylaws or remove directors without holding a meeting of the stockholders called in accordance with the Bylaws.

Advance Notice Requirements for Stockholder Proposals and Director Nominations. The Bylaws establish advance notice procedures with respect to stockholder proposals to be brought before a stockholder meeting and the nomination of candidates for election as directors. The Bylaws also specify certain requirements regarding the form and content of a stockholder's notice. These provisions might preclude the stockholders from bringing matters before an annual meeting of stockholders or from making nominations for directors at an annual meeting of stockholders if the proper procedures are not followed. We expect that these provisions may also discourage or deter a potential acquirer from conducting a solicitation of proxies to elect the acquirer's own slate of directors or otherwise attempting to obtain control of us.

No Cumulative Voting. The Certificate of Incorporation does not permit stockholders to cumulate their votes in the election of directors. Accordingly, the holders of a majority of the outstanding shares of common stock entitled to vote in any election of directors can elect all of the directors standing for election, if they choose, other than any directors that holders of Preferred Stock may be entitled to elect.

Directors Removed Only for Cause. The Certificate of Incorporation and the Bylaws provide that no member of our Board may be removed from office by the stockholders except for cause.

Issuance of Undesignated Preferred Stock. The ability of our Board, without action by the stockholders, to issue up to 25,000,000 shares of undesignated preferred stock with voting or other rights or preferences as designated by our Board could impede the success of any attempt to change control of our company. This may have the effect of deferring hostile takeovers or delaying changes in control or management of our company.

Amendment of Charter Provisions. Organovo has reserved the right to amend, alter, change or repeal any provision in the Certificate of Incorporation, subject to any approval of our stockholders as may be required under the DGCL, and our Board is authorized to adopt, amend or repeal the Bylaws. The provisions of the DGCL, the Certificate of Incorporation and the Bylaws could have the effect of discouraging others from attempting hostile takeovers and, as a consequence, they may also inhibit temporary fluctuations in the market price of our common stock that often result from actual or rumored hostile takeover attempts. These provisions may also have the effect of preventing changes in the composition of our Board. It is possible that these provisions could make it more difficult to accomplish transactions that stockholders may otherwise deem to be in their best interests.

Transfer Agent and Registrar

The Transfer Agent and Registrar for our common stock is Continental Stock Transfer & Trust Company, One State Street, 30th Floor, New York, NY 10004.

Listing

Our common stock is listed on the Nasdaq Capital Market under the symbol "ONVO". There is no established public trading market for the pre-funded warrants or common warrants to be sold in this offering, and we do not expect a market to develop. In addition, we do not intend to apply for listing of the common warrants or pre-funded warrants on any national securities exchange.

DESCRIPTION OF SECURITIES WE ARE OFFERING

We are offering up to [_____] shares of our common stock or pre-funded warrants to purchase up to [_____] shares of our common stock together with common warrant to purchase up to [_____] shares of common stock. For each pre-funded warrant we sell, the number of shares of common stock we are offering will be decreased on a one-for-one basis. Each share of common stock or pre-funded warrant is being sold together with a common warrant to purchase one share of common stock. The shares of common stock or pre-funded warrants and accompanying common warrants will be issued separately and will be immediately separable upon issuance but must be purchased together in this offering. We are also registering the shares of common stock issuable from time to time upon exercise of the common warrants and pre-funded warrants offered hereby.

Common Stock

The material terms and provisions of our common stock are described under the caption “Description of Capital Stock – Common Stock” in this prospectus and are incorporated herein by reference.

Common Warrants

The following summary of certain terms and provisions of the common warrants that are being offered hereby is not complete and is subject to, and qualified in its entirety by, the provisions of the common warrant, the form of which is filed as an exhibit to the registration statement of which this prospectus forms a part. Prospective investors should carefully review the terms and provisions of the form of common warrant for a complete description of the terms and conditions of the common warrants.

We are offering common warrants to purchase up to an aggregate of [_____] shares of our common stock.

Each common warrant issued in this offering represents the right to purchase one share of common stock at an initial exercise price of \$[___] per share. Each common warrant may be exercised, in cash or by a cashless exercise at the election of the holder immediately upon issuance and from time to time thereafter through and including the fifth anniversary of the initial exercise date.

The common warrants will be exercisable in whole or in part by delivering to the Company a completed instruction form for exercise and complying with the requirements for exercise set forth in the common warrant. Payment of the exercise price may be made in cash or pursuant to a cashless exercise, in which case the holder would receive upon such exercise the net number of shares of common stock determined according to the formula set forth in the common warrants.

No Fractional Shares

No fractional shares or scrip representing fractional shares shall be issued upon the exercise of the common warrants. As to any fraction of a share which the holder would otherwise be entitled to purchase upon such exercise, the number of shares of common stock to be issued shall be rounded up to the nearest whole number.

Exercise Limitation

In general, a holder will not have the right to exercise any portion of a common warrant if the holder (together with its Attribution Parties (as defined in the common warrant)) would beneficially own in excess of 4.99% or 9.99%, at the election of the holder, of the number of shares of our common stock outstanding immediately after giving effect to the exercise, as such percentage ownership is determined in accordance with the terms of the warrant. However, any holder may increase or decrease such percentage to any other percentage not in excess of 9.99% upon notice to us, provided that any increase in this limitation will not be effective until 61 days after such notice from the holder to us and such increase or decrease will apply only to the holder providing such notice.

Cashless Exercise

If, at the time a holder exercises its common warrants, a registration statement registering the issuance of the shares of common stock underlying the common warrants under the Securities Act, is not then effective or available for the issuance of such shares, then in lieu of making the cash payment otherwise contemplated to be made to us upon such exercise in payment of the aggregate exercise price, the holder may elect instead to receive upon such exercise (either in whole or in part) the net number of shares of common stock determined according to a formula set forth in the warrant.

Adjustment for Stock Splits

The exercise price and the number of shares of common stock purchasable upon the exercise of the common warrants are subject to adjustment upon the occurrence of specific events, including sales of additional shares of common stock, stock dividends, stock splits, and combinations of our common stock.

Dividends or Distributions

If we declare or make any dividend or other distribution of its assets (or rights to acquire its assets) to holders of shares of our common stock, by way of return of capital or otherwise (including, without limitation, any distribution of cash, stock or other securities, property, options, evidence of indebtedness or any other assets by way of a dividend, spin off, reclassification, corporate rearrangement, scheme of arrangement or other similar transaction) at any time after the issuance of the common warrants, then, in each such case, the holders of the common warrants shall be entitled to participate in such distribution to the same extent that the holders would have participated therein if the holders had held the number of shares of common stock acquirable upon complete exercise of the common warrants.

Purchase Rights

If we grant, issue or sell any shares of our common stock or securities exercisable for, exchangeable for or convertible into our common stock, or rights to purchase stock, common warrants, securities or other property pro rata to the record holders of any class of shares of our common stock, referred to as Purchase Rights, then each holder of the common warrants will be entitled to acquire, upon the terms applicable to such Purchase Rights, the aggregate Purchase Rights which the holder could have acquired if the holder had held the number of shares of common stock acquirable upon complete exercise of the common warrants immediately before the record date, or, if no such record is taken, the date as of which the record holders of shares of common stock are to be determined, for the grant, issue or sale of such Purchase Rights.

Fundamental Transactions

In the event of a fundamental transaction, as described in the common warrants and generally including any reorganization, recapitalization or reclassification of our common stock, the sale, transfer or other disposition of all or substantially all of our properties or assets, our consolidation or merger with or into another person, the consummation of a business combination with another person or group of persons whereby such other person or group acquires greater than 67% of the voting power of the outstanding common stock and preferred stock, the holders of the common warrants will be entitled to receive upon exercise of the common warrants the kind and amount of securities, cash or other property that the holders would have received had they exercised the common warrants immediately prior to such fundamental transaction.

Transferability

Subject to applicable laws, the common warrants may be offered for sale, sold, transferred or assigned. There is currently no trading market for the common warrants and a trading market is not expected to develop.

Rights as a Stockholder

Except as otherwise provided in the common warrants or by virtue of a holder's ownership of shares of our common stock, the holders of the common warrants do not have the rights or privileges of holders of our common stock, including any voting rights, unless and until they exercise their common warrants.

Amendments

The common warrants may be amended with the written consent of the holder of such common warrant and us.

Listing

There is no established public trading market for the common warrants, and we do not expect a market to develop. In addition, we do not intend to apply for listing of the common warrants on any national securities exchange.

Pre-Funded Warrants

The following summary of certain terms and provisions of the pre-funded warrants that are being offered hereby is not complete and is subject to, and qualified in its entirety by, the provisions of the pre-funded warrant, the form of which is filed as an exhibit to the registration statement of which this prospectus forms a part. Prospective investors should carefully review the terms and provisions of the form of pre-funded warrant for a complete description of the terms and conditions of the pre-funded warrants.

Duration and Exercise Price

Each pre-funded warrant offered hereby will have an initial exercise price per share equal to \$0.001. The pre-funded warrants will be immediately exercisable and may be exercised at any time until the pre-funded warrants are exercised in full. The exercise price and number of shares of common stock issuable upon exercise is subject to appropriate adjustment in the event of stock dividends, stock splits, reorganizations or similar events affecting our common stock and the exercise price.

Exercisability

Each pre-funded warrant may be exercised, in cash or by a cashless exercise at the election of the holder at any time following the date of issuance and from time to time thereafter until the pre-funded warrants are exercised in full. The pre-funded warrants will be exercisable in whole or in part by delivering to the Company a completed instruction form for exercise and complying with the requirements for exercise set forth in the pre-funded warrant. Payment of the exercise price may be made in cash or pursuant to a cashless exercise, in which case the holder would receive upon such exercise the net number of shares of common stock determined according to the formula set forth in the pre-funded warrant.

Cashless Exercise

At the time a holder exercises its pre-funded warrants, in lieu of making the cash payment otherwise contemplated to be made to us upon such exercise in payment of the aggregate exercise price, the holder may elect instead to receive upon such exercise (either in whole or in part) the net number of shares of common stock determined according to a formula set forth in the pre-funded warrants.

Exercise Limitation

In general, a holder will not have the right to exercise any portion of a pre-funded warrant if the holder (together with its Attribution Parties (as defined in the pre-funded warrant)) would beneficially own in excess of 4.99% or 9.99%, at the election of the holder, of the number of shares of our common stock outstanding immediately after giving effect to the exercise, as such percentage ownership is determined in accordance with the terms of the pre-funded warrant. However, any holder may increase or decrease such percentage to any other percentage not in excess of 9.99% upon notice to us, provided, that any increase in this limitation will not be effective until 61 days after such notice from the holder to us and such increase or decrease will apply only to the holder providing such notice.

Transferability

Subject to applicable laws, a pre-funded warrant may be transferred at the option of the holder upon surrender of the pre-funded warrant to us together with the appropriate instruments of transfer.

Fractional Shares

No fractional shares of common stock will be issued upon the exercise of the pre-funded warrants. Rather, the number of shares of common stock to be issued will, at our election, either be rounded up to the nearest whole number or we will pay a cash adjustment in respect of such final fraction in an amount equal to such fraction multiplied by the exercise price.

Trading Market

There is no trading market available for the pre-funded warrants on any securities exchange or nationally recognized trading system.

Right as a Stockholder

Except as otherwise provided in the pre-funded warrants or by virtue of such holder's ownership of shares of our common stock, the holders of the pre-funded warrants do not have the rights or privileges of holders of our common stock, including any voting rights, until they exercise their pre-funded warrants.

MATERIAL U.S. FEDERAL INCOME TAX CONSIDERATIONS FOR U.S. AND NON-U.S. HOLDERS

The following is a summary of the material U.S. federal income tax consequences of the acquisition, ownership and disposition of our common stock, common warrants and pre-funded warrants, but does not purport to be a complete analysis of all the potential tax considerations relating thereto. Throughout this summary, all references to our common stock are meant to include our pre-funded warrants. This summary is based upon the provisions of the Internal Revenue Code of 1986, as amended, or the Code, Treasury Regulations promulgated thereunder, administrative rulings and judicial decisions, all as of the date hereof. These authorities may be changed or subject to differing interpretations, possibly with retroactive effect, with the resulting U.S. federal income tax consequences being different from those set forth below. We have not sought and will not seek any ruling from the Internal Revenue Service, or the IRS, with respect to the statements made and the conclusions reached in the following summary, and there can be no assurance that the IRS or a court will agree with such statements and conclusions.

This summary also does not address the tax considerations arising under the laws of any U.S. state or local or any non-U.S. jurisdiction, estate or gift tax, the 3.8% Medicare tax on net investment income or any alternative minimum tax consequences. In addition, this discussion does not address tax considerations applicable to a holder's particular circumstances or to a holder that may be subject to special tax rules, including, without limitation:

- banks, insurance companies or other financial institutions;
- tax-exempt or government organizations;
- brokers or dealers in securities or currencies;
- traders in securities that elect to use a mark-to-market method of accounting for their securities holdings;
- persons that own, or are deemed to own, more than 5.0% of our capital stock;
- certain U.S. expatriates, citizens or former long-term residents of the United States;
- persons who hold our common stock as a position in a hedging transaction, "straddle," "conversion transaction," synthetic security, other integrated investment, or other risk reduction transaction;
- persons who do not hold our common stock as a capital asset within the meaning of Section 1221 of the Code (generally, for investment purposes);
- persons deemed to sell our common stock under the constructive sale provisions of the Code;
- pension plans;
- partnerships, or other entities or arrangements treated as partnerships for U.S. federal income tax purposes, or investors in any such entities;
- persons for whom our stock constitutes "qualified small business stock" within the meaning of Section 1202 of the Code;
- integral parts or controlled entities of foreign sovereigns;
- passive foreign investment companies and corporations that accumulate earnings to avoid U.S. federal income tax; or
- persons that acquire our common stock or common warrants as compensation for services.

In addition, if a partnership, including any entity or arrangement classified as a partnership for U.S. federal income tax purposes, holds our common stock or common warrants, the tax treatment of a partner generally will depend on the status of the partner, the activities of the partnership, and certain determinations made at the partner level. Accordingly, partnerships that hold our common stock or common warrants, and partners in such partnerships, should consult their tax advisors regarding the U.S. federal income tax consequences to them of the purchase, ownership, and disposition of our common stock or common warrants.

You are urged to consult your tax advisor with respect to the application of the U.S. federal income tax laws to your particular situation, as well as any tax consequences of the purchase, ownership and disposition of our common stock or common warrants arising under the U.S. federal estate or gift tax rules or under the laws of any U.S. state or local or any non-U.S. or other taxing jurisdiction or under any applicable tax treaty.

Definition of a U.S. Holder

For purposes of this summary, a “U.S. Holder” is any beneficial owner of our common stock or common warrants that is a “U.S. person,” and is not a partnership, or an entity treated as a partnership or disregarded from its owner, each for U.S. federal income tax purposes. A U.S. person is any person that, for U.S. federal income tax purposes, is or is treated as any of the following:

- an individual who is a citizen or resident of the United States;
- a corporation created or organized under the laws of the United States, any state thereof, or the District of Columbia;
- an estate, the income of which is subject to U.S. federal income tax regardless of its source; or
- a trust that (1) is subject to the primary supervision of a U.S. court and the control of one or more U.S. persons (within the meaning of Section 7701(a)(30) of the Code), or (2) has a valid election in effect to be treated as a U.S. person for U.S. federal income tax purposes.

For purposes of this summary, a “Non-U.S. Holder” is any beneficial owner of our common stock or common warrants that is not a U.S. Holder or a partnership, or other entity treated as a partnership or disregarded from its owner, each for U.S. federal income tax purposes.

Treatment of Pre-Funded Warrants

Although it is not entirely free from doubt, we believe a pre-funded warrant should be treated as common stock for U.S. federal income tax purposes and a holder of pre-funded warrants should generally be taxed in the same manner as a holder of our common stock, as described below. Accordingly, no gain or loss should be recognized upon the exercise of a pre-funded warrant and, upon exercise, the holding period of a pre-funded warrant should carry over to the common stock received. Similarly, the tax basis of the pre-funded warrant should carry over to the common stock received upon exercise, increased by the exercise price of \$0.001 per share. However, our characterization of a pre-funded warrant is not binding on the IRS, and the IRS may treat our pre-funded warrants as warrants to acquire our common stock. If so, the amount and character of your gain with respect to an investment in our pre-funded warrants could change. Accordingly, each holder should consult his, her or its own tax advisor regarding the risks associated with the acquisition of pre-funded warrants pursuant to this offering (including potential alternative characterizations). The balance of this discussion generally assumes that our characterization described above is respected for U.S. federal income tax purposes.

Tax Consequences to U.S. Holder

Distributions on Common Stock

As discussed above under “Dividend Policy,” we do not currently expect to make distributions on our common stock. In the event that we do make distributions of cash or other property, distributions paid on common stock, other than certain pro rata distributions of common stock, will be treated as a dividend to the extent paid out of our current or accumulated earnings and profits, if any, and will be includible in income by the U.S. Holder and taxable as ordinary income when received. If a distribution exceeds our current and accumulated earnings and profits, the excess will be first treated as a tax-free return of the U.S. Holder’s investment, up to the U.S. Holder’s tax basis in the common stock. Any remaining excess will be treated as a capital gain. Subject to applicable limitations, dividends paid to certain non-corporate U.S. Holders may be eligible for taxation as “qualified dividend income” and therefore may be taxable at rates applicable to long-term capital gains. U.S. Holders should consult their tax advisers regarding the availability of the reduced tax rate on dividends in their particular circumstances. Dividends received by a corporate U.S. Holder will be eligible for the dividends-received deduction if the U.S. Holder meets certain holding period and other applicable requirements.

Sale or Other Disposition of Common Stock

For U.S. federal income tax purposes, gain or loss realized on the sale or other disposition of common stock will be capital gain or loss, and will be long-term capital gain or loss if the U.S. Holder held the common stock for more than one year. The amount of the gain or loss will equal the difference between the U.S. Holder’s tax basis in the common stock disposed of and the amount realized on the disposition. Long-term capital gains recognized by non-corporate U.S. Holders will be subject to reduced tax rates. The deductibility of capital losses is subject to limitations.

Sale or Other Disposition, Exercise or Expiration of Common Warrants

A U.S. Holder will recognize gain or loss on the sale or other taxable disposition of common warrants in an amount equal to the difference, if any, between the amount of cash plus the fair market value of any property received and such U.S. Holder’s tax basis in common warrants sold or otherwise disposed of, in each case as determined in U.S. dollars. Gain or loss recognized on such sale or other taxable disposition generally will be a capital gain or loss, which will be long-term capital gain or loss if the common warrant is held for more than one year. The gain or loss will generally be U.S.-source gain or loss for foreign tax credit purposes. Deductions for capital losses are subject to complex limitations under the Code.

A U.S. Holder should not recognize gain or loss on the exercise of common warrants and related receipt of common stock. A U.S. Holder's initial tax basis in the common stock received on the exercise of a common warrant should be equal to the sum of (i) such U.S. Holder's initial tax basis in such common warrant plus (ii) the exercise price paid by such U.S. Holder on the exercise of such common warrant.

In certain limited circumstances, a U.S. Holder may be permitted to undertake a cashless exercise of the common warrants into shares of common stock. The U.S. federal income tax treatment of a cashless exercise of common warrants into shares of common stock is unclear, and the tax consequences of a cashless exercise could differ from the consequences upon the exercise of a common warrant described in the preceding paragraph. U.S. Holders should consult their own tax advisors regarding the U.S. federal income tax consequences of a cashless exercise of common warrants.

Upon the lapse or expiration of a warrant, a U.S. Holder will recognize a loss in an amount equal to such U.S. Holder's tax basis in the warrant. Any such loss generally will be a capital loss and will be long-term capital loss if the warrants are held for more than one year. Deductions for capital losses are subject to complex limitations under the Code.

Certain Adjustments to the Common Warrants and Pre-funded Warrants

Under Section 305 of the Code, an adjustment to the number of shares of common stock that will be issued on the exercise of the common warrants or pre-funded warrants, or an adjustment to the exercise price of the common warrants or pre-funded warrants, may be treated as a constructive distribution to a U.S. Holder of the common warrants or pre-funded warrants if, and to the extent that, such adjustment has the effect of increasing such U.S. Holder's proportionate interest in our earnings and profits or our assets, depending on the circumstances of such adjustment (for example, if such adjustment is to compensate for a distribution of cash or property to the shareholders). Adjustments to the exercise price of the common warrants or pre-funded warrants made pursuant to a bona fide reasonable adjustment formula that has the effect of preventing dilution of the interest of the holder of the common warrants or pre-funded warrants should generally not be considered to result in a constructive distribution. Any such constructive distribution would be taxable whether or not there is an actual distribution of cash or other property (see more detailed discussion of the rules applicable to distributions we make at "Distributions on Common Stock" above).

Tax Consequences to Non-U.S. Holders

Distributions

As discussed in the section entitled "Dividend Policy," we do not anticipate paying any dividends on our common stock in the foreseeable future. If we make distributions on our common stock, those payments will constitute dividends for U.S. federal income tax purposes to the extent we have current or accumulated earnings and profits, as determined under U.S. federal income tax principles. To the extent those distributions exceed both our current and our accumulated earnings and profits, they will constitute a return of capital and will first reduce a Non-U.S. Holder's basis in our common stock, as applicable, but not below zero. Any excess will be treated as capital gain and will be treated as described below under the "—Gain on Sale or Other Disposition of Common Stock" section. Any such distributions would be subject to the discussions below regarding back-up withholding and the Foreign Account Tax Compliance Act, or FATCA.

Subject to the discussion below on effectively connected income, any dividend paid to a Non-U.S. Holder generally will be subject to U.S. withholding tax either at a rate of 30% of the gross amount of the dividend or such lower rate as may be specified by an applicable income tax treaty between the U.S. and such holder's country of residence. To receive a reduced treaty rate, a Non-U.S. Holder must provide us or our agent with an IRS Form W-8BEN or W-8BEN-E (generally including a U.S. taxpayer identification number), or another appropriate version of IRS Form W-8 (or a successor form), which must be updated periodically, and which, in each case, must certify qualification for the reduced treaty rate. Non-U.S. Holders should consult their tax advisors regarding their entitlement to benefits under any applicable income tax treaty.

Dividends paid to a Non-U.S. Holder that are effectively connected with the Non-U.S. Holder's conduct of a trade or business within the United States and that are not eligible for relief from U.S. (net basis) income tax under an applicable income tax treaty, generally are exempt from the (gross basis) withholding tax described above. To obtain this exemption from withholding tax, the Non-U.S. Holder must provide the applicable withholding agent with an IRS Form W-8ECI or successor form or other applicable IRS Form W-8 certifying that the dividends are effectively connected with the Non-U.S. Holder's conduct of a trade or business within the United States. Such effectively connected dividends, if not eligible for relief under a tax treaty, would not be subject to a withholding tax, but would be taxed at the same rates applicable to U.S. persons, net of certain deductions and credits and if, in addition, the Non-U.S. Holder is a corporation, may also be subject to a branch profits tax at a rate of 30% (or such lower rate as may be specified by an applicable income tax treaty).

If you are eligible for a reduced rate of withholding tax pursuant to a tax treaty, you may be able to obtain a refund of any excess amounts withheld if you timely file an appropriate claim for refund with the IRS.

Gain on Sale or Other Disposition of Common Stock and Common Warrants

Subject to the discussion below regarding backup withholding and FATCA, a Non-U.S. Holder generally will not be required to pay U.S. federal income tax on any gain realized upon the sale or other disposition of our common stock or common warrants unless:

- the gain is effectively connected with the Non-U.S. Holder's conduct of a trade or business within the United States and not eligible for relief under an applicable income tax treaty, in which case the Non-U.S. Holder will be required to pay tax on the net gain derived from the sale under regular U.S. federal income tax rates applicable to U.S. persons, and for a Non-U.S. Holder that is a corporation, such Non-U.S. Holder may be subject to the branch profits tax at a 30% rate (or such lower rate as may be specified by an applicable income tax treaty) on such effectively connected gain, as adjusted for certain items;
- the Non-U.S. Holder is an individual who is present in the United States for a period or periods aggregating 183 days or more during the calendar year in which the sale or disposition occurs and certain other conditions are met, in which case the Non-U.S. Holder will be required to pay a flat 30% tax on the gain derived from the sale, which tax may be offset by U.S. source capital losses (even though the Non-U.S. Holder is not considered a resident of the United States) (subject to applicable income tax or other treaties); or
- we are a "U.S. real property holding corporation" for U.S. federal income tax purposes, or a USRPHC, at any time within the shorter of the five-year period preceding the disposition or the Non-U.S. Holder's holding period for our common stock. We believe we are not currently and do not anticipate becoming a USRPHC. However, because the determination of whether we are a USRPHC depends on the fair market value of our United States real property interests relative to the fair market value of our other business assets, there can be no assurance that we will not become a USRPHC in the future. Even if we become a USRPHC, however, gain arising from the sale or other taxable disposition by a Non-U.S. Holder of our common stock will not be subject to United States federal income tax if (a) shares of our common stock are "regularly traded," as defined by applicable Treasury Regulations, on an established securities market, such as Nasdaq, and (b) the Non-U.S. Holder owns or owned, actually and constructively, 5% or less of the shares of our common stock throughout the five-year period ending on the date of the sale or exchange. If the foregoing exception does not apply, such Non-U.S. Holder's proceeds received on the disposition of shares will generally be subject to withholding at a rate of 15% and such Non-U.S. Holder will generally be taxed on any gain in the same manner as gain that is effectively connected with the conduct of a U.S. trade or business, except that the branch profits tax generally will not apply. Non-U.S. Holders of pre-funded warrants should consult their tax advisors regarding the application of these rules with respect to the pre-funded warrants (which are not expected to be "regularly traded" on an established securities market).

Information Reporting and Backup Withholding

Information returns may be filed with the IRS in connection with distributions on common stock, and the proceeds of a sale or other disposition of common stock or common warrants. A non-exempt U.S. Holder may be subject to U.S. backup withholding on these payments if it fails to provide its taxpayer identification number to the withholding agent and comply with certification procedures or otherwise establish an exemption from backup withholding.

A Non-U.S. Holder may be subject to U.S. information reporting and backup withholding on these payments unless the Non-U.S. Holder complies with certification procedures to establish that it is not a U.S. person (within the meaning of the Code). The certification requirements generally will be satisfied if the Non-U.S. Holder provides the applicable withholding agent with a statement on the applicable IRS Form (or a suitable substitute or successor form), together with all appropriate attachments, signed under penalties of perjury, stating, among other things, that such Non-U.S. Holder is not a U.S. person. Applicable Treasury Regulations provide alternative methods for satisfying this requirement. In addition, the amount of distributions on common stock paid to a Non-U.S. Holder, and the amount of any U.S. federal tax withheld therefrom, must be reported annually to the IRS and the holder. This information may be made available by the IRS under the provisions of an applicable tax treaty or agreement to the tax authorities of the country in which the Non-U.S. Holder resides.

Payment of the proceeds of the sale or other disposition of common stock or common warrants to or through a non-U.S. office of a U.S. broker or of a non-U.S. broker with certain specified U.S. connections generally will be subject to information reporting requirements, but not backup withholding, unless the Non-U.S. Holder certifies under penalties of perjury that it is not a U.S. person or an exemption otherwise applies. Payments of the proceeds of a sale or other disposition of common stock or common warrants to or through a U.S. office of a broker generally will be subject to information reporting and backup withholding, unless the Non-U.S. Holder certifies under penalties of perjury that it is not a U.S. person or otherwise establishes an exemption.

Backup withholding is not an additional tax. The amount of any backup withholding from a payment generally will be allowed as a credit against the holder's U.S. federal income tax liability and may entitle the holder to a refund, provided that the required information is timely furnished to the IRS.

Foreign Accounts

The Code generally imposes a U.S. federal withholding tax of 30% on dividends and, subject to the discussion below regarding proposed regulations issued by the U.S. Treasury Department, the gross proceeds of a disposition of securities paid to a "foreign financial institution" (as specifically defined for this purpose), unless such institution enters into an agreement with the U.S. government to, among other things, withhold on certain payments and to collect and provide to the U.S. tax authorities substantial information regarding U.S. account holders of such institution (which includes certain equity and debt holders of such institution, as well as certain account holders that are foreign entities with U.S. owners) or otherwise qualifies for an exemption from these rules. A U.S. federal withholding tax of 30% also applies to dividends and, subject to the discussion below regarding proposed regulations issued by the U.S. Treasury Department, will apply to the gross proceeds of a disposition of securities paid to a non-financial foreign entity (as defined in the Code), unless such entity either provides the withholding agent with a certification that it does not have any substantial direct or indirect "United States owners" (as defined in the Code) or provides information regarding each substantial United States owners of the entity, or otherwise qualifies for an exemption from these rules.

Under certain circumstances, a Non-U.S. Holder might be eligible for refunds or credits of such taxes. An intergovernmental agreement between the United States and an applicable foreign country may modify the requirements described in the paragraph above.

The U.S. Treasury Department released proposed regulations which, if finalized in their present form, would eliminate the federal withholding tax of 30% applicable to the gross proceeds of a sale or other disposition of our common stock or common warrants. In its preamble to such proposed regulations, the U.S. Treasury Department stated that taxpayers may generally rely on the proposed regulations until final regulations are issued. Prospective investors should consult their own tax advisors regarding the possible impact of these rules on their investment in our common stock or common warrants, and the possible impact of these rules and the proposed regulations on the entities through which they hold our common stock or common warrants, including, without limitation, the process and deadlines for meeting the applicable requirements to prevent the imposition of this 30% withholding tax.

EACH PROSPECTIVE INVESTOR SHOULD CONSULT ITS TAX ADVISOR REGARDING THE PARTICULAR U.S. FEDERAL, STATE AND LOCAL AND NON-U.S. TAX CONSEQUENCES OF PURCHASING, HOLDING AND DISPOSING OF OUR SECURITIES, INCLUDING THE CONSEQUENCES OF ANY PROPOSED CHANGE IN APPLICABLE LAWS. PROSPECTIVE INVESTORS SHOULD ALSO CONSULT WITH THEIR TAX ADVISORS WITH RESPECT TO SUCH CHANGES IN U.S. TAX LAW AS WELL AS POTENTIAL CONFORMING CHANGES IN STATE TAX LAWS.

PLAN OF DISTRIBUTION

We have engaged Roth Capital Partners, LLC, or the placement agent, to act as our lead placement agent to solicit offers to purchase the securities offered by this prospectus on a reasonable best efforts basis. The placement agent is not purchasing or selling any such securities, nor is it required to arrange for the purchase and sale of any specific number or dollar amount of such securities, other than to use its “reasonable best efforts” to arrange for the sale of such securities by us. Therefore, we may not sell the entire amount of securities being offered. There is no minimum amount of proceeds that is a condition to closing of this offering. The placement agent does not guarantee that it will be able to raise new capital in this offering. The terms of this offering were subject to market conditions and negotiations between us and prospective investors in consultation with the placement agent. The placement agent will have no authority to bind us by virtue of the placement agency agreement. This offering will terminate no later than [____], 2024, unless we decide to terminate the offering (which we may do at any time in our discretion) prior to that date. We will have one closing for all the securities purchased in this offering. The public offering price per share and accompanying common warrant will be fixed for the duration of this offering. The placement agent may engage one or more sub-placement agents or selected dealers to assist with the offering.

We will enter into a securities purchase agreement directly with the institutional investors, at the investor’s option, who purchase our securities in this offering. Investors who do not enter into a securities purchase agreement shall rely solely on this prospectus in connection with the purchase of our securities in this offering.

Placement Agent Fees and Expenses

The following table shows the per share and total cash fees we will pay to the placement agent in connection with the sale of the common stock and shares of common stock underlying the pre-funded warrants and common warrants pursuant to this prospectus.

	Per Share and Common Warrant	Per Pre-Funded Warrant and Common Warrant	Total
Public offering price	\$	\$	\$
Placement agent fees ⁽¹⁾	\$	\$	\$
Proceeds, before expenses, to us ⁽²⁾	\$	\$	\$

- (1) We have agreed to pay the placement agent a cash placement commission equal to 7.0% of the total gross proceeds from this offering, including proceeds received from the exercise of pre-funded warrants and common warrants offered hereby. Because there is no minimum number of securities or amount of proceeds required as a condition to closing in this offering, the actual public offering amount, placement agent fees, and proceeds to us, if any, are not presently determinable and may be substantially less than the total maximum offering amounts set forth above.
- (2) We have also agreed to reimburse the placement agent at closing for legal and other expenses incurred by the placement agent in connection with this offering in an amount equal to up to \$100,000 if a transaction is consummated or \$40,000 if a transaction is not consummated.

We estimate that the total expenses of the offering, including registration, filing and listing fees, printing fees and legal and accounting expenses, but excluding placement agent fees, will be approximately \$[____], all of which are payable by us. This figure includes the placement agent’s accountable expenses, including, but not limited to, legal fees for the placement agent’s legal counsel, that we have agreed to pay at the closing of the offering up to an aggregate expense reimbursement of \$100,000.

Tail

In the event this offering does not close we have also agreed to pay the placement agent a tail fee equal to the cash compensation in this offering, if any investor, who was contacted or introduced to us by the placement agent during the term of their engagement, provides us with capital in any public or private offering or other financing or capital raising transaction during the six-month period following the termination or expiration of our engagement letter with the placement agent, subject to certain exceptions.

Indemnification

We have agreed to indemnify the placement agent against certain liabilities, including certain liabilities under the Securities Act, and to contribute to payments that the placement agent may be required to make for these liabilities.

Lock-up Agreements

Each of our officers and directors and certain of our stockholders have agreed to be subject to a lock-up period of [_____] days following the closing date of this offering. This means that, during the applicable lock-up period, they may not offer for sale, contract to sell, or sell any shares of our common stock or any securities convertible into, or exercisable or exchangeable for, shares of our common stock subject to certain customary exceptions. The placement agent may, in its sole discretion and without notice, waive the terms of any of these lock-up agreements. In addition, we have agreed to not issue any shares of common stock or securities exercisable or convertible into shares of common stock for a period of [_____] days following the closing date of this offering, subject to certain exceptions, or enter into an agreement to issue securities at a future determined price, for a period of [_____] days following the closing date of this offering. The placement agent may, in its sole discretion and without notice, waive the terms of this lock-up agreement or prohibition.

Other Relationships

The placement agent and its affiliates may in the future provide various investment banking, commercial banking and other financial services for us and our affiliates for which they may in the future receive customary fees. We have no present arrangements with the placement agent for any further services.

Regulation M Compliance

The placement agent may be deemed to be an underwriter within the meaning of Section 2(a)(11) of the Securities Act and any fees received by it and any profit realized on the sale of the securities by it while acting as principal might be deemed to be underwriting discounts or commissions under the Securities Act. The placement agent will be required to comply with the requirements of the Securities Act and the Exchange Act, including, without limitation, Rule 10b-5 and Regulation M under the Exchange Act. These rules and regulations may limit the timing of purchases and sales of our securities by the placement agent. Under these rules and regulations, the placement agent may not (i) engage in any stabilization activity in connection with our securities; or (ii) bid for or purchase any of our securities or attempt to induce any person to purchase any of our securities, other than as permitted under the Exchange Act, until it has completed its participation in the distribution.

Electronic Distribution

A prospectus in electronic format may be made available on a website maintained by the placement agent and the placement agent may distribute prospectuses electronically. Other than the prospectus in electronic format, the information on these websites is not part of this prospectus or the registration statement of which this prospectus forms a part, has not been approved and/or endorsed by us or the placement agent and should not be relied upon by investors.

Listing

Our common stock is listed on the Nasdaq Capital Market under the symbol "ONVO." There is no established public trading market for the pre-funded warrants and common warrants to be sold in this offering, and we do not expect a market to develop. In addition, we do not intend to apply for listing of the pre-funded warrants or common warrants on any national securities exchange.

Selling Restrictions

Other than in the United States, no action has been taken by us or the placement agents that would permit a public offering of the securities offered by this prospectus in any jurisdiction where action for that purpose is required. The securities offered by this prospectus may not be offered or sold, directly or indirectly, nor may this prospectus or any other offering material or advertisements in connection with the offer and sale of any such securities be distributed or published, in any jurisdiction, except under circumstances that will result in compliance with the applicable rules and regulations of that jurisdiction. Persons into whose possession this prospectus comes are advised to inform themselves about and to observe any restrictions relating to this offering and the distribution of this prospectus. This prospectus does not constitute an offer to sell or a solicitation of an offer to buy any securities offered by this prospectus in any jurisdiction in which such an offer or a solicitation is unlawful.

Australia. No placement document, prospectus, product disclosure statement or other disclosure document has been lodged with the Australian Securities and Investments Commission (ASIC), in relation to the offering.

This prospectus does not constitute a prospectus, product disclosure statement or other disclosure document under the Corporations Act 2001 (the Corporations Act) and does not purport to include the information required for a prospectus, product disclosure statement or other disclosure document under the Corporations Act.

Any offer in Australia of the securities may only be made to persons (the Exempt Investors) who are “sophisticated investors” (within the meaning of section 708(8) of the Corporations Act), “professional investors” (within the meaning of section 708(11) of the Corporations Act) or otherwise pursuant to one or more exemptions contained in section 708 of the Corporations Act so that it is lawful to offer the securities without disclosure to investors under Chapter 6D of the Corporations Act.

The securities applied for by Exempt Investors in Australia must not be offered for sale in Australia in the period of 12 months after the date of allotment under the offering, except in circumstances where disclosure to investors under Chapter 6D of the Corporations Act would not be required pursuant to an exemption under section 708 of the Corporations Act or otherwise or where the offer is pursuant to a disclosure document which complies with Chapter 6D of the Corporations Act. Any person acquiring securities must observe such Australian on-sale restrictions.

This prospectus contains general information only and does not take account of the investment objectives, financial situation or particular needs of any particular person. It does not contain any securities recommendations or financial product advice. Before making an investment decision, investors need to consider whether the information in this prospectus is appropriate to their needs, objectives and circumstances, and, if necessary, seek expert advice on those matters.

Brazil. The offer of securities described in this prospectus will not be carried out by means that would constitute a public offering in Brazil under Law No. 6,385, of December 7, 1976, as amended, under the CVM Rule (Instrução) No. 400, of December 29, 2003. The offer and sale of the securities have not been and will not be registered with the Comissão de Valores Móbielarios in Brazil. The securities have not been offered or sold, and will not be offered or sold in Brazil, except in circumstances that do not constitute a public offering or distribution under Brazilian laws and regulations.

Canada. The securities may be sold in Canada only to purchasers purchasing, or deemed to be purchasing, as principal that are accredited investors, as defined in National Instrument 45-106 Prospectus Exemptions or subsection 73.3(1) of the Securities Act (Ontario), and are permitted clients, as defined in National Instrument 31 103 Registration Requirements, Exemptions and Ongoing Registrant Obligations. Any resale of the securities must be made in accordance with an exemption from, or in a transaction not subject to, the prospectus requirements of applicable securities laws.

Securities legislation in certain provinces or territories of Canada may provide a purchaser with remedies for rescission or damages if this prospectus (including any amendment thereto) contains a misrepresentation, provided that the remedies for rescission or damages are exercised by the purchaser within the time limit prescribed by the securities legislation of the purchaser’s province or territory. The purchaser should refer to any applicable provisions of the securities legislation of the purchaser’s province or territory for particulars of these rights or consult with a legal advisor.

Pursuant to section 3A.3 of National Instrument 33 105 Underwriting Conflicts (NI 33 105), the underwriters are not required to comply with the disclosure requirements of NI 33-105 regarding underwriters’ conflicts of interest in connection with this offering.

Cayman Islands. No invitation, whether directly or indirectly, may be made to the public in the Cayman Islands to subscribe for our securities.

European Economic Area. In relation to each Member State of the European Economic Area which has implemented the Prospectus Directive (each, a “Relevant Member State”) an offer to the public of any securities may not be made in that Relevant Member State, except that an offer to the public in that Relevant Member State of any securities may be made at any time under the following exemptions under the Prospectus Directive, if they have been implemented in that Relevant Member State:

- to any legal entity which is a qualified investor as defined in the Prospectus Directive;
- to fewer than 100 or, if the Relevant Member State has implemented the relevant provision of the 2010 PD Amending Directive, 150, natural or legal persons (other than qualified investors as defined in the Prospectus Directive), as permitted under the Prospectus Directive, subject to obtaining the prior consent of the representatives for any such offer; or
- in any other circumstances falling within Article 3(2) of the Prospectus Directive, provided that no such offer of securities shall result in a requirement for the publication by us or any placement agent of a prospectus pursuant to Article 3 of the Prospectus Directive.

For the purposes of this provision, the expression an “offer to the public” in relation to any securities in any Relevant Member State means the communication in any form and by any means of sufficient information on the terms of the offer and any securities to be offered so as to enable an investor to decide to purchase any securities, as the same may be varied in that Member State by any measure implementing the Prospectus Directive in that Member State, the expression “Prospectus Directive” means Directive 2003/71/EC (and amendments thereto, including the 2010 PD Amending Directive, to the extent implemented in the Relevant Member State), and includes any relevant implementing measure in the Relevant Member State, and the expression “2010 PD Amending Directive” means Directive 2010/73/EU.

Hong Kong. The contents of this prospectus have not been reviewed by any regulatory authority in Hong Kong. You are advised to exercise caution in relation to the offer. If you are in any doubt about any of the contents of this prospectus, you should obtain independent professional advice. Please note that (i) our shares may not be offered or sold in Hong Kong, by means of this prospectus or any document other than to “professional investors” within the meaning of Part I of Schedule 1 of the Securities and Futures Ordinance (Cap.571, Laws of Hong Kong) (SFO) and any rules made thereunder, or in other circumstances which do not result in the document being a “prospectus” within the meaning of the Companies Ordinance (Cap.32, Laws of Hong Kong) (CO) or which do not constitute an offer or invitation to the public for the purpose of the CO or the SFO, and (ii) no advertisement, invitation or document relating to our shares may be issued or may be in the possession of any person for the purpose of issue (in each case whether in Hong Kong or elsewhere) which is directed at, or the contents of which are likely to be accessed or read by, the public in Hong Kong (except if permitted to do so under the securities laws of Hong Kong) other than with respect to the shares which are or are intended to be disposed of only to persons outside Hong Kong or only to “professional investors” within the meaning of the SFO and any rules made thereunder.

Israel. This document does not constitute a prospectus under the Israeli Securities Law, 5728-1968, or the Securities Law, and has not been filed with or approved by the Israel Securities Authority. In the State of Israel, this document is being distributed only to, and is directed only at, and any offer of the shares is directed only at, investors listed in the first addendum, or the Addendum, to the Israeli Securities Law, consisting primarily of joint investment in trust funds, provident funds, insurance companies, banks, portfolio managers, investment advisors, members of the Tel Aviv Stock Exchange, underwriters, venture capital funds, entities with equity in excess of NIS 50 million and “qualified individuals”, each as defined in the Addendum (as it may be amended from time to time), collectively referred to as qualified investors (in each case purchasing for their own account or, where permitted under the Addendum, for the accounts of their clients who are investors listed in the Addendum). Qualified investors will be required to submit written confirmation that they fall within the scope of the Addendum, are aware of the meaning of same and agree to it.

The People’s Republic of China. This prospectus may not be circulated or distributed in the PRC and the shares may not be offered or sold, and will not offer or sell to any person for re-offering or resale directly or indirectly to any resident of the PRC except pursuant to applicable laws, rules and regulations of the PRC. For the purpose of this paragraph only, the PRC does not include Taiwan and the special administrative regions of Hong Kong and Macau.

Switzerland. The securities may not be publicly offered in Switzerland and will not be listed on the SIX Swiss Exchange (the SIX) or on any other stock exchange or regulated trading facility in Switzerland. This document has been prepared without regard to the disclosure standards for issuance prospectuses under art. 652a or art. 1156 of the Swiss Code of Obligations or the disclosure standards for listing prospectuses under art. 27 ff. of the SIX Listing Rules or the listing rules of any other stock exchange or regulated trading facility in Switzerland. Neither this document nor any other offering or marketing material relating to the securities or the offering may be publicly distributed or otherwise made publicly available in Switzerland.

Neither this document nor any other offering or marketing material relating to the offering, or the securities have been or will be filed with or approved by any Swiss regulatory authority. In particular, this document will not be filed with, and the offer of securities will not be supervised by, the Swiss Financial Market Supervisory Authority FINMA, and the offer of securities has not been and will not be authorized under the Swiss Federal Act on Collective Investment Schemes (CISA). Accordingly, no public distribution, offering or advertising, as defined in CISA, its implementing ordinances and notices, and no distribution to any non-qualified investor, as defined in CISA, its implementing ordinances and notices, shall be undertaken in or from Switzerland, and the investor protection afforded to acquirers of interests in collective investment schemes under CISA does not extend to acquirers of securities.

Taiwan. The securities have not been and will not be registered with the Financial Supervisory Commission of Taiwan pursuant to relevant securities laws and regulations and may not be sold, issued or offered within Taiwan through a public offering or in circumstances which constitutes an offer within the meaning of the Securities and Exchange Act of Taiwan that requires a registration or approval of the Financial Supervisory Commission of Taiwan. No person or entity in Taiwan has been authorized to offer, sell, give advice regarding or otherwise intermediate the offering and sale of the securities in Taiwan.

United Kingdom. This prospectus has only been communicated or caused to have been communicated and will only be communicated or caused to be communicated as an invitation or inducement to engage in investment activity (within the meaning of Section 21 of the Financial Services and Markets Act of 2000, or the FSMA) as received in connection with the issue or sale of our Common Stock in circumstances in which Section 21(1) of the FSMA does not apply to us. All applicable provisions of the FSMA will be complied with in respect to anything done in relation to our Common Stock in, from or otherwise involving the United Kingdom.

LEGAL MATTERS

The validity of the securities being offered by this prospectus will be passed upon for us by Paul Hastings LLP, Palo Alto, California. Certain legal matters will be passed upon for the placement agent by Pryor Cashman LLP, New York, New York.

EXPERTS

The consolidated financial statements of Organovo Holdings, Inc. (“Company”) as of and for the year ended March 31, 2023, appearing in the Company’s Annual Report on Form 10-K for the year ended March 31, 2024, have been audited by CBIZ CPAs P.C., (formerly Mayer Hoffman McCann P.C.), independent registered public accounting firm, as set forth in their report (which report includes an explanatory paragraph regarding the existence of substantial doubt about the Company’s ability to continue as a going concern), and have been incorporated herein by reference in reliance upon such report given on the authority of such firm as experts in accounting and auditing, in giving said reports.

The Company’s consolidated financial statements as of and for the year ended March 31, 2024, incorporated by reference in this prospectus have been so included in reliance on the report of Rosenberg Rich Baker Berman, P.A., an independent registered public accounting firm, given upon the authority of such firm as experts in accounting and auditing.

INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

The SEC allows us to “incorporate by reference” information into this prospectus, which means that we can disclose important information to you by referring you to another document filed separately with the SEC. The documents incorporated by reference into this prospectus contain important information that you should read about us.

The following documents are incorporated by reference into this prospectus:

- our Annual Report on Form 10-K for the year ended March 31, 2024 filed with the SEC on [May 31, 2024](#), as amended by Amendment No. 1 on Form 10-K/A, filed with the SEC on [July 26, 2024](#);
- Our Quarterly Report on Form 10-Q for the quarterly period ended June 30, 2024, filed with the SEC on [August 5, 2024](#);
- Our Current Reports on Form 8-K filed with the SEC on [April 23, 2024](#), [May 13, 2024](#), [July 24, 2024](#) and [August 9, 2024](#);
- The description of our common stock set forth in our Registration Statement on Form 8-A (File No. 001-35996), filed with the SEC on [July 26, 2016](#), including any amendments or reports filed for the purpose of updating such description, including the description of our common stock included as [Exhibit 4.3](#) to our Annual Report on Form 10-K for the fiscal year ended March 31, 2024, filed with the SEC on May 31, 2024, as amended by Amendment No. 1 on Form 10-K/A, filed with the SEC on July 26, 2024.

We also incorporate by reference any future filings (other than current reports furnished under Item 2.02 or Item 7.01 of Form 8-K and exhibits filed on such form that are related to such items unless such Form 8-K expressly provides to the contrary) made with the SEC pursuant to Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act, including those made after the date of the initial filing of the registration statement of which this prospectus is a part and prior to effectiveness of such registration statement, until we file a post-effective amendment that indicates the termination of the offering of the securities made by this prospectus and such future filings and will become a part of this prospectus from the respective dates that such documents are filed with the SEC. Any statement contained herein or in a document incorporated or deemed to be incorporated by reference herein shall be deemed to be modified or superseded for purposes hereof or of the related prospectus supplement to the extent that a statement contained herein or in any other subsequently filed document which is also incorporated or deemed to be incorporated by reference herein modifies or supersedes such statement. Any such statement so modified or superseded shall not be deemed, except as so modified or superseded, to constitute a part of this prospectus.

You may obtain any of the documents incorporated by reference in this prospectus from the SEC through the SEC’s website at the address provided above. Documents incorporated by reference are also available from us, without charge. You may obtain documents incorporated by reference in this prospectus by requesting them in writing or by telephone at the following address or phone number:

Organovo Holdings, Inc.
11555 Sorrento Valley Road, Suite 100
San Diego, CA 92121
Attn: Corporate Secretary
Phone: (858) 224-1000

WHERE YOU CAN FIND MORE INFORMATION

We are a reporting company and file annual, quarterly and current reports, proxy statements and other information with the SEC. We have filed with the SEC a registration statement on Form S-1 under the Securities Act with respect to the securities being offered under this prospectus. This prospectus, which constitutes a part of the registration statement, does not contain all of the information set forth in the registration statement and the exhibits to the registration statement. For further information with respect to us and the securities being offered under this prospectus, we refer you to the registration statement of which this prospectus is a part and the exhibits filed as a part of the registration statement. Statements contained in this prospectus as to the contents of any contract or any other document are not necessarily complete. If a contract or document has been filed as an exhibit to the registration statement, please see the copy of the contract or document that has been filed. Each statement in this prospectus relating to a contract or document filed as an exhibit is qualified in all respects by the filed exhibit.

The SEC maintains an Internet site that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC, including Organovo Holdings, Inc. The SEC's Internet site can be found at <http://www.sec.gov>. You may also request a copy of these filings, at no cost, by writing us at 11555 Sorrento Valley Road, Suite 100, San Diego, CA 92121 or telephoning us at (858) 224-1400.

We are subject to the information and reporting requirements of the Exchange Act and, in accordance with this law, file periodic reports, proxy statements and other information with the SEC. These periodic reports, proxy statements and other information are available at the website of the SEC referred to above. We also maintain a website at www.organovo.com. You may access these materials free of charge as soon as reasonably practicable after they are electronically filed with, or furnished to, the SEC. Information contained on or connected to our website is not a part of, and is not incorporated into, this prospectus and the inclusion of our website address in this prospectus is an inactive textual reference only.

DISCLOSURE OF COMMISSION POSITION ON INDEMNIFICATION FOR SECURITIES ACT LIABILITIES

Insofar as indemnification for liabilities arising under the Securities Act may be permitted to our directors, officers, and persons controlling us pursuant to the provisions described in Item 14 of the registration statement of which this prospectus is a part or otherwise, we have been advised that in the opinion of the SEC such indemnification is against public policy as expressed in the Securities Act and is therefore unenforceable. In the event that a claim for indemnification against such liabilities (other than our payment of expenses incurred or paid by our directors, officers, or controlling persons in the successful defense of any action, suit, or proceeding) is asserted by our directors, officers, or controlling persons in connection with the securities being registered, we will, unless in the opinion of our counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by us is against public policy as expressed in the Securities Act and will be governed by the final adjudication of the issue.



Up to [_____] shares of Common Stock
Pre-Funded Warrants to Purchase up to [_____] Shares of Common Stock
Common Warrants to Purchase up to [_____] Shares of Common Stock
Up to [_____] Shares of Common Stock Underlying the Pre-Funded Warrants and Common Warrants

PROSPECTUS

Roth Capital Partners

[_____] , 2024

Part II

Information Not Required in the Prospectus

Item 13. Other Expenses of Issuance and Distribution.

The following table sets forth an estimate of the fees and expenses relating to the issuance and distribution of the securities being registered hereby, other than placement agent fees, all of which shall be borne by Organovo Holdings, Inc. (the “Registrant”). All of such fees and expenses, except for the SEC registration fee, are estimates:

SEC registration fee	\$[_____]
FINRA filing fee	\$[_____]
Legal fees and expenses	\$[_____]
Printing fees and expenses	\$[_____]
Accounting fees and expenses	\$[_____]
Transfer agent fees and expenses	\$[_____]
Miscellaneous fees and expenses	\$[_____]
Total	<u>\$[_____]</u>

Item 14. Indemnification of Directors and Officers.

Section 102 of the General Corporation Law of the State of Delaware (the “DGCL”) permits a corporation to eliminate or limit the personal liability of directors of a corporation to the corporation or its stockholders for monetary damages for a breach of fiduciary duty as a director, except where the director breached his duty of loyalty to the corporation or its stockholders, failed to act in good faith, engaged in intentional misconduct or knowingly violated a law, authorized the payment of a dividend or approved a stock repurchase or redemption in violation of the DGCL or derived an improper personal benefit. The Registrant’s certificate of incorporation, as amended, provides that no director of the Registrant shall be personally liable to it or its stockholders for monetary damages for any breach of fiduciary duty as a director, notwithstanding any provision of law imposing such liability, except to the extent that the DGCL prohibits the elimination or limitation of liability of directors for breaches of fiduciary duty.

Section 145 of the DGCL provides that a corporation has the power to indemnify a director, officer, employee or agent of the corporation, or a person serving at the request of the corporation for another corporation, partnership, joint venture, trust or other enterprise in related capacities against expenses (including attorneys’ fees), judgments, fines and amounts paid in settlement actually and reasonably incurred by the person in connection with an action, suit or proceeding to which he or she was or is a party or is threatened to be made a party to any threatened, pending or completed action, suit or proceeding by reason of such position, if such person acted in good faith and in a manner he or she reasonably believed to be in or not opposed to the best interests of the corporation, and, in any criminal action or proceeding, had no reasonable cause to believe his or her conduct was unlawful, except that, in the case of actions brought by or in the right of the corporation, no indemnification shall be made with respect to judgments, fines and amounts paid in settlement in connection with such action, suit or proceeding or with respect to any claim, issue or matter as to which such person shall have been adjudged to be liable to the corporation unless and only to the extent that the Court of Chancery or other adjudicating court determines that, despite the adjudication of liability but in view of all of the circumstances of the case, such person is fairly and reasonably entitled to indemnity for such expenses which the Court of Chancery or such other court shall deem proper.

The Registrant’s amended and restated bylaws provide that the Registrant will indemnify each person who was or is a party or threatened to be made a party to any threatened, pending or completed action, suit or proceeding (other than an action by or in the right of the Registrant) by reason of the fact that he or she is or was a director or officer of the Registrant, or is or was serving, at the Registrant’s request as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise (all such persons being referred to as an “Indemnitee”), against expenses (including, attorneys’ fees), judgments, fines, and amounts paid in settlement actually and reasonably incurred in connection with such action, suit or proceeding, if such Indemnitee acted in good faith and in a manner he or she reasonably believed to be in, or not opposed to, the Registrant’s best interests, and, with respect to any criminal action or proceeding, he or she had no reasonable cause to believe his or her conduct was unlawful. The Registrant’s bylaws, as amended, also provide that the Registrant will indemnify any Indemnitee who was or is a party to an action or suit by or in the right of the Registrant to procure a judgment in the Registrant’s favor by reason of the fact that the Indemnitee is or was, a director or officer, or is or was serving, or has agreed to serve, at the Registrant’s request as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise, against expenses (including, attorneys’ fees) actually and reasonably incurred by such Indemnitee in connection with the defense or settlement of such action or suit, if the Indemnitee acted in good faith and in a manner he or she reasonably believed to be in, or not opposed to, the Registrant’s best interests, except that no indemnification shall be made with respect to any claim, issue or matter as to which such person shall have been adjudged to be liable to the Registrant, unless, and only to the extent, that the Court of Chancery or the court in which such action or suit was brought

determines, despite the adjudication of liability but in view of all the circumstances, he or she is entitled to indemnification of such expenses which the Court of Chancery or such other court shall deem proper. Notwithstanding the foregoing, to the extent that any Indemnitee has been successful, on the merits or otherwise, he or she will be indemnified against expenses (including attorneys' fees) actually and reasonably incurred in connection therewith. Expenses must be advanced to an Indemnitee under certain circumstances.

The Registrant has entered into indemnification agreements with each of its directors and executive officers that may be broader than the specific indemnification provisions contained in the DGCL. These indemnification agreements require the Registrant, among other things, to indemnify its directors and executive officers against liabilities that may arise by reason of their status or service. These indemnification agreements also require the Registrant to advance all expenses incurred by the directors and executive officers in investigating or defending any such action, suit or proceeding, subject to certain exceptions.

The Registrant's amended and restated bylaws provide that the Registrant may purchase and maintain insurance on behalf of any person who is or was a director, officer, employee or agent of the Registrant or is or was serving at the request of the Registrant as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise against any liability asserted against him or her in any such capacity, or arising out of his or her status as such, whether or not the Registrant would have the power to indemnify such person against such liability under the DGCL. The Registrant has obtained insurance under which, subject to the limitations of the insurance policies, coverage is provided to the Registrant's directors and executive officers against loss arising from claims made by reason of breach of fiduciary duty or other wrongful acts as a director or executive officer, including claims relating to public securities matters, and to the Registrant with respect to payments that may be made by the Registrant to these directors and executive officers pursuant to the Registrant's indemnification obligations or otherwise as a matter of law.

See also the undertakings set out in response to Item 17 herein.

Item 15. Recent Sales of Unregistered Securities.

Since January 1, 2021, the Registrant has issued the following securities that were not registered under the Securities Act of 1933, as amended (the "Securities Act"):

- (1) On December 6, 2023, the Registrant issued 65,789 unregistered shares of common stock to a marketing firm as consideration for services pursuant to a marketing agreement.

The issuance of the shares of common stock was not registered under the Securities Act in reliance upon the exemption from registration provided by Section 4(a)(2) of the Securities Act promulgated by the SEC, and in reliance on similar exemptions under applicable state laws. The marketing firm represented that it was an accredited investor and was acquiring the shares of common stock for investment purposes only and not with a view to, or for sale in connection with, any distribution thereof and that it could bear the risks of the investments and could hold the securities for an indefinite period of time.

Item 16. Exhibits and Financial Statement Schedules.

(a) Exhibits

<u>Exhibit No.</u>	<u>Description</u>
3.1	<u>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).</u>
3.2	<u>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).</u>
3.3	<u>Certificate of Second 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 August 17, 2020).</u>
3.4	<u>Amended and Restated Bylaws of Organovo Holdings, Inc., effective as of July 12, 2023 (incorporated by reference to Exhibit 3.4 to the Company's Annual Report on Form 10-K, as filed with the SEC on July 14, 2023).</u>
4.1	<u>Description of Securities (incorporated by reference to Exhibit 4.3 to the Company's Annual Report on Form 10-K, as filed with the SEC on May 31, 2024).</u>
4.2	<u>Form of Common Warrant (incorporated by reference from Exhibit 4.1 to the Company's Current Report on Form 8-K, as filed with the SEC on May 13, 2024).</u>
4.3	<u>Form of Pre-Funded Warrant (incorporated by reference from Exhibit 4.2 to the Company's Current Report on Form 8-K, as filed with the SEC on May 13, 2024).</u>
4.4**	Form of Pre-Funded Warrant.
4.5**	Form of Common Warrant.
5.1**	Opinion of Paul Hastings LLP.
10.1+	<u>Organovo Holdings, Inc. Amended and Restated 2012 Equity Incentive Plan (incorporated by reference from Exhibit 10.1 to the Company's Current Report on Form 8-K, as filed with the SEC on October 6, 2021).</u>
10.2+	<u>Form of Stock Option Award Agreement under the 2012 Equity Incentive Plan (incorporated by reference from Exhibit 10.16 to the Company's Current Report on Form 8-K, as filed with the SEC on February 13, 2012).</u>
10.3+	<u>Form of Non-Employee Director Stock Option Award Agreement under the 2012 Equity Incentive Plan (incorporated by reference to Exhibit 10.35 to the Company's Annual Report on Form 10-K, as filed with the SEC on June 9, 2015).</u>
10.4+	<u>Form of Executive Stock Option Award Agreement under the 2012 Equity Incentive Plan (incorporated by reference to Exhibit 10.36 to the Company's Annual Report on Form 10-K, as filed with the SEC on June 9, 2015).</u>
10.5+	<u>Form of Indemnification Agreement (incorporated by reference from Exhibit 10.17 to the Company's Current Report on Form 8-K, as filed with the SEC on February 13, 2012).</u>
10.6†	<u>License Agreement dated as of March 24, 2009, by and between Organovo, Inc. and the Curators of the University of Missouri (incorporated by reference from Exhibit 10.23 to the Company's Current Report on Form 8-K, as filed with the SEC on May 11, 2012).</u>
10.7†	<u>License Agreement dated as of March 12, 2010 by and between the Company and the Curators of the University of Missouri (incorporated by reference from Exhibit 10.24 to the Company's Current Report on Form 8-K, as filed with the SEC on May 11, 2012).</u>
10.8†	<u>License Agreement dated as of May 2, 2011, by and between the Company and Clemson University Research Foundation (incorporated by reference from Exhibit 10.25 to the Company's Current Report on Form 8-K, as filed with the SEC on May 11, 2012).</u>
10.9+	<u>Organovo Holdings, Inc. Severance and Change in Control Plan (incorporated by reference to Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q, as filed with the SEC on November 9, 2015).</u>
10.10+	<u>Amendment to the Organovo Holdings, Inc. Severance and Change in Control Plan, dated May 19, 2020 (incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K, as filed with the SEC on May 20, 2020).</u>
10.11+	<u>Form of Organovo Holdings, Inc. Severance and Change in Control Plan Participation Agreement (incorporated by reference to Exhibit 10.3 to the Company's Quarterly Report on Form 10-Q, as filed with the SEC on November 9, 2015).</u>

Exhibit No.	Description
10.12+	<u>Form of Restricted Stock Unit Grant Notice and Restricted Stock Unit Agreement (Retention Form) under the 2012 Equity Incentive Plan (incorporated by reference from Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q, as filed with the SEC on August 4, 2016).</u>
10.13+	<u>Form of Employee Restricted Stock Unit Grant Notice and Restricted Stock Unit Agreement under the 2012 Equity Incentive Plan (incorporated by reference from Exhibit 10.3 to the Company's Quarterly Report on Form 10-Q, as filed with the SEC on August 4, 2016).</u>
10.14+	<u>Form of Non-Employee Director Restricted Stock Unit Grant Notice and Restricted Stock Unit Agreement under the 2012 Equity Incentive Plan (incorporated by reference from Exhibit 10.4 to the Company's Quarterly Report on Form 10-Q, as filed with the SEC on August 4, 2016).</u>
10.15+	<u>Consulting Agreement, dated September 15, 2020, by and between Organovo and Multi Dimensional Bio Insight LLC. (incorporated by reference from Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q, as filed with the SEC on November 5, 2020).</u>
10.16+	<u>Consulting Agreement, dated August 25, 2020, by and between Organovo and Danforth Advisors (incorporated by reference from Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q, as filed with the SEC on November 5, 2020).</u>
10.17+	<u>Amendment No. 5 dated October 4, 2021 to Consulting Agreement dated August 25, 2021 by and between Company and Danforth Advisors LLC (incorporated by reference from Exhibit 10.3 to the Company's Current Report on Form 8-K, as filed with the SEC on October 6, 2021).</u>
10.18	<u>Lease Agreement dated November 23, 2020, between Organovo Holdings, Inc. and San Diego Inspire 1, LLC (Permanent Lease Agreement 176640186.8) (incorporated by reference from Exhibit 10.2 to the Company's Current Report on Form 8-K, as filed with the SEC on November 25, 2020).</u>
10.19	<u>Amended and Restated Lease Agreement dated November 23, 2020, between Organovo, Inc., as Tenant, and San Diego Inspire 2, LLC, as Landlord, as amended by First Amendment to Amended & Restated Lease, dated November 17, 2021, between San Diego Inspire 2, LLC, as Landlord, and Organovo, Inc., as Tenant (incorporated by reference from Exhibit 10.1 to the Company's Current Report on Form 8-K, as filed with the SEC on November 19, 2021).</u>
10.20#	<u>Intercompany Agreement, dated December 28, 2020, by and among Organovo Holdings, Inc., Organovo, Inc. and Viscient Biosciences, Inc. (incorporated by reference from Exhibit 10.1 to the Company's Current Report on Form 8-K, as filed with the SEC on December 31, 2020).</u>
10.21	<u>Sales Agreement, dated March 16, 2018, by and among Organovo Holdings, Inc., H.C. Wainwright & Co., LLC and JonesTrading Institutional Services LLC. (incorporated by reference from Exhibit 10.1 to the Company's Current Report on Form 8-K, as filed with the SEC on March 16, 2018).</u>
10.22+	<u>Organovo Holdings, Inc. 2021 Inducement Equity Incentive Plan (incorporated by reference from Exhibit 10.2 to the Company's Current Report on Form 8-K, as filed with the SEC on March 10, 2021).</u>
10.23+	<u>Form of Stock Option Agreement under the Organovo Holdings, Inc. 2021 Inducement Equity Incentive Plan (incorporated by reference from Exhibit 4.2 to the Company's Registration Statement on Form S-8 (File No. 333-254714), as filed with the SEC on March 25, 2021).</u>
10.24+	<u>Form of Restricted Stock Unit Agreement under the Organovo Holdings, Inc. 2021 Inducement Equity Incentive Plan (incorporated by reference from Exhibit 4.3 to the Company's Registration Statement on Form S-8 (File No. 333-254714), as filed with the SEC on March 25, 2021).</u>
10.25	<u>Settlement and Patent License Agreement, dated February 22, 2022, by and between Organovo Holdings, Inc. and BICO Group AB (incorporated by reference from Exhibit 10.34 to the Company's Annual Report on Form 10-K, as filed with the SEC on June 10, 2022).</u>
10.26+	<u>Organovo Holdings, Inc. 2022 Equity Incentive Plan (incorporated by reference from Exhibit 10.1 to the Company's Current Report on Form 8-K, as filed with the SEC on October 14, 2022).</u>
10.27+	<u>Form of Global Stock Option Award Agreement under the Organovo Holdings, Inc. 2022 Equity Incentive Plan (incorporated by reference from Exhibit 4.2 to the Company's Registration Statement on Form S-8 (No. 333-268001), filed with the SEC on October 25, 2022).</u>
10.28+	<u>Form of Global Restricted Stock Unit Award Agreement under the Organovo Holdings, Inc. 2022 Equity Incentive Plan (incorporated by reference from Exhibit 4.3 to the Company's Registration Statement on Form S-8 (No. 333-268001), filed with the SEC on October 25, 2022).</u>

Exhibit No.	Description
10.29	Purchase Agreement, dated March 10, 2023, by and between Organovo Holdings, Inc. and Metacrine, Inc. (incorporated by reference from Exhibit 10.38 to the Company's Annual Report on Form 10-K, as filed with the SEC on July 14, 2023).
10.30	Separation Agreement and General Release, effective as of September 15, 2023, between Organovo Holdings, Inc. and Tom Jurgensen (incorporated by reference from Exhibit 10.1 to the Company's Current Report on Form 8-K, as filed with the SEC on September 12, 2023).
10.31	Separation Agreement and General Release, effective as of September 27, 2023, between Organovo Holdings, Inc. and Jeffrey Miner (incorporated by reference from Exhibit 10.1 to the Company's Current Report on Form 8-K/A, as filed with the SEC on September 22, 2023).
10.32+	Organovo Holdings, Inc. 2023 Employee Stock Purchase Plan (incorporated by reference from Exhibit 10.1 to the Company's Current Report on Form 8-K, as filed with the SEC on November 3, 2023).
10.33	Placement Agency Agreement, dated May 8, 2024, between the Company and JonesTrading Institutional Services LLC (incorporated by reference from Exhibit 10.1 to the Company's Current Report on Form 8-K, as filed with the SEC on May 13, 2024).
10.34^	Form of Securities Purchase Agreement, dated May 8, 2024 (incorporated by reference from Exhibit 10.2 to the Company's Current Report on Form 8-K, as filed with the SEC on May 13, 2024).
10.35**	Form of Securities Purchase Agreement.
21.1	Subsidiaries of Organovo Holdings, Inc. (incorporated by reference to Exhibit 21.1 to the Company's Annual Report on Form 10-K, as filed with the SEC on May 31, 2024).
23.1*	Consent of Independent Registered Public Accounting Firm.
23.2*	Consent of Independent Registered Public Accounting Firm.
24.1*	Power of Attorney (included on signature page hereto).
101.INS*	Inline XBRL Instance Document
101.SCH*	Inline XBRL Taxonomy Extension Schema With Embedded Linkbase Documents.
104*	Cover Page Interactive Data File (embedded within the Inline XBRL document)
107*	Filing Fee Table.

* Filed herewith.

** To be filed by amendment.

+ Designates management contracts and compensation plans.

† This Exhibit has been filed separately with the Secretary of the Securities and Exchange Commission without the redaction pursuant to a Confidential Treatment Request under Rule 24b-2 of the Securities Exchange Act of 1934, as amended.

Certain identified information has been omitted pursuant to Item 601(b)(10) of Regulation S-K because such information is both (i) not material and (ii) would likely cause competitive harm to the Registrant if publicly disclosed. The Registrant hereby undertakes to furnish supplemental copies of the unredacted exhibit upon request by the Securities and Exchange Commission.

^ Non-material schedules and exhibits have been omitted pursuant to Item 601(a)(5) of Regulation S-K. The Company hereby undertakes to furnish supplemental copies of any of the omitted schedules and exhibits upon request by the Securities and Exchange Commission.

Item 17. Undertakings

The undersigned Registrant hereby undertakes:

- (1) To file, during any period in which offers or sales are being made, a post-effective amendment to this registration statement:
 - (i) To include any prospectus required by Section 10(a)(3) of the Securities Act;
 - (ii) To reflect in the prospectus any facts or events arising after the effective date of this registration statement (or the most recent post-effective amendment thereof) which, individually or in the aggregate, represent a fundamental change in the information set forth in the registration statement. Notwithstanding the foregoing, any increase or decrease in volume of securities offered (if the total dollar value of securities offered would not exceed that which was registered) and any deviation from the low or high and of the estimated maximum offering range may be reflected in the form of prospectus filed with the Securities and Exchange Commission (the "Commission") pursuant to Rule 424(b) if, in the aggregate, the changes in volume and price represent no more than 20% change in the maximum aggregate offering price set forth in the "Calculation of Registration Fee" table in the effective registration statement; and
 - (iii) To include any material information with respect to the plan of distribution not previously disclosed in this registration statement or any material change to such information in this registration statement;

provided, however, that paragraphs (1)(i), (1)(ii) and (1)(iii) above do not apply if the information required to be included in a post-effective amendment by those paragraphs is contained in reports filed with or furnished to the Commission by the registrant pursuant to Section 13 or Section 15(d) of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), that are incorporated by reference in the registration statement, or is contained in a form of prospectus filed pursuant to Rule 424(b) that is part of the registration statement.

- (2) That, for the purpose of determining any liability under the Securities Act, each such post-effective amendment shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.
- (3) To remove from registration by means of a post-effective amendment any of the securities being registered which remain unsold at the termination of the offering.
- (4) That, for the purpose of determining liability of the registrant under the Securities Act to any purchaser in the initial distribution of the securities, in a primary offering of securities of the undersigned registrant pursuant to this registration statement, regardless of the underwriting method used to sell the securities to the purchaser, if the securities are offered or sold to such purchaser by means of any of the following communications, the undersigned registrant will be a seller to the purchaser and will be considered to offer or sell such securities to such purchaser:
 - (i) any preliminary prospectus or prospectus of the undersigned registrant relating to the offering required to be filed pursuant to Rule 424;
 - (ii) any free writing prospectus relating to the offering prepared by or on behalf of the undersigned registrant or used or referred to by the undersigned registrant;
 - (iii) the portion of any other free writing prospectus relating to the offering containing material information about the undersigned registrant or its securities provided by or on behalf of the undersigned registrant; and
 - (iv) any other communication that is an offer in the offering made by the undersigned registrant to the purchaser.

The undersigned registrant hereby undertakes:

Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers and controlling persons of the Registrant pursuant to the foregoing provisions, or otherwise, the Registrant has been advised that in the opinion of the SEC such indemnification is against public policy as expressed in the Act and is therefore unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the Registrant of expenses incurred or paid by a director, officer or controlling person of the Registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the Registrant will, unless in the opinion of its counsel the matter

has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Act and will be governed by the final adjudication of such issue.

The undersigned registrant hereby undertakes that:

For purposes of determining any liability under the Securities Act of 1933, as amended, the information omitted from a form of prospectus filed as part of this registration statement in reliance upon Rule 430A and contained in the form of prospectus filed by the Registrant pursuant to Rule 424(b)(1) or (4) or 497(h) under the Securities Act of 1933, as amended, shall be deemed to be part of this registration statement as of the time it was declared effective.

For the purpose of determining any liability under the Securities Act of 1933, as amended, each post-effective amendment that contains a form of prospectus shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, as amended, the Registrant has duly caused this Registration Statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of San Diego, State of California, on October 25, 2024.

ORGANOVO HOLDINGS, INC.

By: /s/ Keith Murphy

Keith Murphy

Executive Chairman

Pursuant to the requirements of the Securities Act of 1933, this Registration Statement has been signed by the following persons in the capacities and on the dates indicated.

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/ Keith Murphy</u> Keith Murphy	Executive Chairman (Principal Executive Officer)	October 25, 2024
<u>/s/ Thomas Hess</u> Thomas Hess	Chief Financial Officer (Principal Financial and Principal Accounting Officer)	October 25, 2024
<u>/s/ Adam Stern</u> Adam Stern	Director	October 25, 2024
<u>/s/ Douglas Cohen</u> Douglas Cohen	Director	October 25, 2024
<u>/s/ David Gobel</u> David Gobel	Director	October 25, 2024
<u>/s/ Vaidehi Joshi</u> Vaidehi Joshi	Director	October 25, 2024
<u>/s/ Alison Milhous</u> Alison Milhous	Director	October 25, 2024

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in this Registration Statement on Form S-1 and related prospectus of our report dated July 13, 2023, with respect to the consolidated financial statements of Organovo Holdings, Inc., as of March 31, 2023 and for the year then ended (which report includes an explanatory paragraph regarding the existence of substantial doubt about the Company’s ability to continue as a going concern), included in the Company’s Annual Report on Form 10-K for the year ended March 31, 2024, and to the reference to us under the heading “Experts” in the prospectus which is part of this Registration Statement.

/s/ CBIZ CPAs P.C.¹

San Diego, California
October 25, 2024

¹ In certain jurisdictions, CBIZ CPAs P.C. operates under its previous name, Mayer Hoffman McCann P.C.

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in this Registration Statement on Form S-1 of our report dated May 31, 2024 (which report includes an explanatory paragraph relating to the existence of substantial doubt about the Company's ability to continue as a going concern), with respect to the consolidated financial statements of Organovo Holdings, Inc. as of March 31, 2024 and for the year then ended, included in the Company's Annual Report on Form 10-K for the year ended March 31, 2024 and to the reference to our Firm under the caption "Experts" in the Registration Statement.

/s/ Rosenberg Rich Baker Berman P.A.

Somerset, New Jersey
October 25, 2024

Calculation of Filing Fee Tables

Form S-1 (Form Type)

Organovo Holdings, Inc.

(Exact Name of Registrant as Specified in its Charter)

Table 1: Newly Registered and Carry Forward Securities

	Security Type	Security Class Title(1)	Fee Calculation or Carry Forward Rule	Amount Registered	Proposed Maximum Offering Price per Unit	Maximum Aggregate Offering Price(2)	Fee Rate	Amount of Registration Fee	Carry Forward Form Type	Carry Forward File Number	Carry Forward Initial Effective Date	Filing Fee Previously Paid in Connection with Unsold Securities to be Carried Forward
Newly Registered Securities												
Fees to Be Paid	Equity	Common Stock, par value \$0.001 per share or Pre-Funded warrants to purchase shares of Common Stock	Rule 457(o)	—	—	\$5,000,000	0.0001531	\$765.50				
	Equity	Common Stock underlying the Pre-Funded Warrants	Rule 457(o)	—	—	Included above		—				
	Equity	Common warrants to purchase shares of Common Stock	Rule 457(o)	—	—	Included below						
	Equity	Common Stock underlying the common warrants(3)	Rule 457(g)	—	—	\$5,000,000	0.0001531	\$765.50				
Fees Previously Paid	N/A	N/A	N/A	N/A	N/A							
Carry Forward Securities												
Carry Forward Securities						N/A		—	N/A	N/A	N/A	N/A
						Total Offering Amounts		\$10,000,000				
						Total Fees Previously Paid		\$1,531.00				
						Total Fee Offsets		—				
						Net Fee Due		\$1,531.00				

(1) The Registrant may issue pre-funded warrants to purchase common stock in the offering. The purchase price of each pre-funded warrant will equal the price per share at which common stock are being sold to the public in this offering, minus \$0.001, which constitutes the pre-funded portion of the exercise price, and the remaining unpaid exercise price of the pre-funded warrant will equal \$0.001 per share (subject to adjustment as provided for therein). The proposed maximum aggregate offering price of the common stock proposed to be sold in the offering will be reduced on a dollar-for-dollar basis based on the offering price of any pre-funded warrants offered and sold in the offering, and the proposed maximum offering price of the pre-funded warrants to be sold in the offering will be reduced on a dollar-for-dollar basis based on the offering price of any common stock sold in the offering.

(2) Estimated solely for the purpose of calculating the amount of the registration fee pursuant to Rule 457(o) under the Securities Act of 1933, as amended (the "Securities Act"). Pursuant to Rule 416 under the Securities Act, this registration statement also covers any additional securities that may be offered or issued in connection with any stock split, stock dividend or pursuant to anti-dilution provisions of any of the securities. The proposed maximum aggregate offering price of the common stock, pre-funded warrants and common stock issuable upon exercise of the pre-funded warrants, if any, is \$5,000,000.

(3) In accordance with Rule 457(g) under the Securities Act, because the shares of the common stock underlying the common warrants are registered hereby, no separate registration fee is required with respect to such common warrants.

