

SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

FORM S-8
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)

27-1488943
(I.R.S. Employer
Identification No.)

5871 Oberlin Drive, Suite 150
San Diego, California 92121
(858) 550-9994
(Address of Principal Executive Offices)

Organovo Holdings, Inc. 2008 Equity Incentive Plan
Organovo Holdings, Inc. 2012 Equity Incentive Plan
(Full Title of the Plans)

Keith Murphy
Chief Executive Officer
5871 Oberlin Drive, Suite 150
San Diego, California 92121
(858) 550-9994
(Name, Address and Telephone Number of Agent for Service)

Copy to:
Jeffrey C. Thacker, Esq.
DLA Piper LLP (US)
4365 Executive, Suite 1100
San Diego, California 92121
Telephone: (858) 638-6728
Facsimile: (858) 638-5128

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

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

CALCULATION OF REGISTRATION FEE

Title of Securities to be Registered	Amount to be Registered(1)	Proposed Maximum Offering Price per Share(2)	Proposed Maximum Aggregate Offering Price(2)	Amount of Registration Fee(2)
Common stock, par value \$0.001 per share				
2008 Equity Incentive Plan	896,256	\$0.08	\$71,701	\$9
2012 Equity Incentive Plan	6,553,986	\$2.88	\$18,875,480	\$2,164
TOTAL	7,450,242		\$18,947,181	\$2,173

- (1) In addition, pursuant to Rule 416(c) under the Securities Act of 1933, as amended (the "Securities Act"), this registration statement shall also cover any additional securities that may be necessary to adjust the number of shares reserved for issuance pursuant to the Organovo Holdings, Inc. 2008 Equity Incentive Plan (the "2008 Plan") and the Organovo Holdings, Inc. 2012 Equity Incentive Plan (the "2012 Plan," and, together with the 2008 Plan, the "Plans") by reason of any stock split, stock dividend or similar adjustment effected without the Registrant's receipt of consideration that results in an increase in the number of the Registrant's outstanding shares of common stock.
- (2) Estimated solely for the purpose of computing the registration fee pursuant to Rule 457 under the Securities Act. For purposes of the 2008 Plan, the proposed maximum offering price per share, proposed maximum aggregate offering price and the amount of the registration fee are based on the weighted average exercise price of all outstanding stock options that represent all of the shares of common stock issuable pursuant to stock options under the 2008 Plan. For purposes of the 2012 Plan, the proposed maximum offering price per share, proposed maximum aggregate offering price and the amount of the registration fee are based on the average of the high and low prices of Registrant's common stock on the over-the-counter market on May 8, 2012.

This registration statement shall become effective upon filing in accordance with Rule 462 under the Securities Act.

PART I

INFORMATION REQUIRED IN THE SECTION 10(a) PROSPECTUS

The documents containing the information specified in Part I of Form S-8 will be sent or given to employees as specified by Securities and Exchange Commission (the "Commission") Rule 428(b)(1). Such documents need not be filed with the Commission either as part of this registration statement or as prospectuses or prospectus supplements pursuant to Rule 424. These documents and the documents incorporated by reference in this registration statement pursuant to Item 3 of Form S-8 (Part II hereof), taken together, constitute a prospectus that meets the requirements of Section 10(a) of the Securities Act. In this registration statement, unless the context otherwise requires, the terms "we," "us," and "our," refer to Organovo Holdings, Inc.

PART II

INFORMATION REQUIRED IN THE REGISTRATION STATEMENT

Item 3. Incorporation of Documents by Reference.

The following documents filed by us with the Commission are incorporated by reference in this registration statement:

- (a) The Registrant's Annual Report on Form 10-K for the fiscal year ended June 30, 2011;
- (b) All other reports filed pursuant to Sections 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended ("Exchange Act"), since the end of the fiscal year covered by the document referred to in (a) above; and
- (c) The description of our common stock contained or incorporated in the registration statements filed by the Registrant under the Exchange Act, including any amendments or reports filed for the purpose of updating such description.

All documents subsequently filed by the Registrant pursuant to Sections 13(a), 13(c), 14 and 15(d) of the Exchange Act, prior to the filing of a post-effective amendment which indicates that all securities offered hereby have been sold or which deregisters all securities then remaining unsold, shall be deemed to be incorporated by reference in this registration statement and to be part hereof from the date of filing such documents.

For the purposes of this registration statement, any statement contained in a document incorporated or deemed to be incorporated by reference herein shall be deemed to be modified or superseded to the extent that a statement contained herein or in any other subsequently filed document which also is or is 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 registration statement.

Under no circumstances will any information filed under current items 2.02 or 7.01 of Form 8-K be deemed incorporated herein by reference unless such Form 8-K expressly provides to the contrary.

You may request a copy of these filings, at no cost, by writing or telephoning us at:

Organovo Holdings, Inc.
5871 Oberlin Drive, Suite 150
San Diego, California 92121
(858) 550-9994
Attn: Chief Financial Officer

You should rely only on the information provided or incorporated by reference in this registration statement or any related prospectus. We have not authorized anyone to provide you with different information. You should not assume that the information in this registration statement or any related prospectus is accurate as of any date other than the date on the front of the document.

Item 4. Description of Securities.

Not applicable.

Item 5. Interests of Named Experts and Counsel.

Not applicable.

Item 6. Indemnification of Directors and Officers.

The Registrant is incorporated under the laws of the State of Delaware.

The Registrant's articles of incorporation and by-laws include provisions that eliminate the personal liability of our directors for monetary damages to the full extent permitted by applicable law. Section 145 of the Delaware General Corporation Law provides, in general, that each director and officer of a corporation may be indemnified against expenses (including attorneys' fees), judgments, fines and amounts paid in settlement actually and reasonably incurred in connection with any threatened, pending or completed legal proceedings in which he or she is involved by reason of the fact that he or she is or was a director or officer, if he or she acted in good faith and in a manner that he or she reasonably believed to be in or not opposed to the best interests of the corporation, and, with respect to any criminal action or proceeding, if he or she had no reasonable cause to believe that his or her conduct was unlawful. If the legal proceeding, however, is by or in the right of the corporation, the director or officer may not be indemnified in respect of any claim, issue or matter as to which he or she has been adjudged to be liable to the corporation unless a court determines otherwise.

We have been advised that in the opinion of the Commission indemnification for liabilities arising under the Securities Act 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 is asserted by one of our directors, officers, or controlling persons in connection with the securities being registered, we will, unless in the opinion of our legal counsel the matter has been settled by controlling precedent, submit the question of whether such indemnification is against public policy to a court of appropriate jurisdiction. We will then be governed by the court's decision.

Item 7. Exemption from Registration Claimed.

Not applicable.

Item 8. Exhibits.

See Exhibit Index below.

Item 9. Undertakings.

(a) The 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 this registration statement. Notwithstanding the foregoing, any increase or decrease in the 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 end of the estimated maximum offering range may be reflected in the form of a prospectus filed with the Commission pursuant to Rule 424(b) if, in the aggregate, the changes in volume and price represent no more than a 20 percent change in the maximum aggregate 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 (a)(1)(i) and (a)(1)(ii) do not apply if the information required to be included in a post-effective amendment by those paragraphs is contained in periodic reports filed by the Registrant pursuant to Section 13 or Section 15(d) of the Exchange Act that are incorporated by reference in this registration statement.

(2) That, for the purpose of determining any liability under the Securities Act, each such post-effective amendment will be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time will 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.

(b) The undersigned Registrant hereby further undertakes that, for purposes of determining any liability under the Securities Act, each filing of the Registrant's annual report pursuant to Section 13(a) or 15(d) of the Exchange Act (and, where applicable, each filing of any employee benefit plan's annual report pursuant to Section 15(d) of the Exchange Act) that is incorporated by reference in this registration statement shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at the time shall be deemed to be the initial *bona fide* offering thereof.

(c) 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 provisions summarized in Item 6 above, or otherwise, the Registrant has been advised that in the opinion of the Commission 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 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 Securities Act and will be governed by the final adjudication of such issue.

* * *

SIGNATURES

Pursuant to the requirements of the Securities Act, the Registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-8 and 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 this 10th day of May, 2012.

Organovo Holdings, Inc.

By: /s/ Keith Murphy
Keith Murphy
Chief Executive Officer

POWER OF ATTORNEY

Each director and/or officer of Organovo Holdings, Inc. whose signature appears below constitutes and appoints Keith Murphy as such person's true and lawful attorney-in-fact and agent, with full power of substitution and resubstitution, for such person and in such person's name, place and stead, in any and all capacities, to sign any and all amendments (including post-effective amendments) to this registration statement, and to file the same, with all exhibits thereto, and other documents in connection therewith, with the Commission granting unto said attorney-in-fact and agent, full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith, as fully to all intents and purposes as such person might or could do in person, hereby ratifying and confirming that said attorney-in-fact and agent or his substitute or substitutes, may lawfully do or cause to be done by virtue of this Power of Attorney.

Pursuant to the requirements of the Securities Act, this registration statement has been signed by the following persons in the capacities and on the date indicated:

Signature	Title	Date
<u>/s/ Keith Murphy</u> Keith Murphy	Chief Executive Officer Chairman of the Board and (Principal Executive Officer)	May 10, 2012
<u>/s/ Barry Michaels</u> Barry Michaels	Chief Financial Officer (Principal Financial Officer and Principal Accounting Officer)	May 10, 2012
<u>/s/ Robert Baltera, Jr.</u> Robert Baltera, Jr.	Director	May 10, 2012
<u>/s/ Andras Forgacs</u> Andras Forgacs	Director	May 10, 2012
<u>/s/ Adam K. Stern</u> Adam K. Stern	Director	May 10, 2012

EXHIBIT INDEX

<u>Exhibit No.</u>	<u>Description</u>
4.1*	Articles of Incorporation
4.2*	By-laws
5	Opinion of DLA Piper LLP (US)
23.1	Consent of Independent Registered Public Accounting Firm
23.2	Consent of DLA Piper LLP (US) (filed as a part of Exhibit 5)
24.1	Power of Attorney (contained on signature page)
99.1**	Organovo Holdings, Inc. 2008 Equity Incentive Plan
99.2**	Organovo Holdings, Inc. 2012 Equity Incentive Plan

* Incorporated by reference to Form S-1 filed on October 13, 2010.

** Incorporated by reference to Form 8-K filed on February 13, 2012.

DLA Piper LLP (US)
4365 Executive Drive, Suite 1100
San Diego, California 92121-2133
T: (858) 677-1400
F: (858) 677-1401
www.dlapiper.com

May 10, 2012

Organovo Holdings, Inc.
5871 Oberlin Drive, Suite 150
San Diego, California 92121
(858) 550-9994

Ladies and Gentlemen:

We have acted as legal counsel for Organovo Holdings, Inc., a Delaware corporation (the "Company"), in connection with a Registration Statement on Form S-8 (the "Registration Statement") under the Securities Act of 1933, as amended (the "Securities Act"), for the registration of (i) up to 896,256 shares of the common stock, \$0.001 par value, of the Company (the "Common Stock"), which may be granted under the Organovo Holdings, Inc. 2008 Equity Incentive Plan (the "2008 Plan") and (ii) up to 6,553,986 shares of the Common Stock that may be granted under the Organovo Holdings, Inc. 2012 Equity Incentive Plan (together with the 2008 Plan, the "Plans"). The shares of Common Stock referred to in the foregoing sentence shall be collectively referred to herein as the "Shares."

In connection herewith, we have examined and relied without independent investigation as to matters of fact upon such certificates of public officials, such statements and certificates of officers of the Company and originals or copies certified to our satisfaction of the Registration Statement, the Plans, the Articles of Incorporation of the Company, and the By-laws of the Company as now in effect and minutes of all pertinent meetings and actions of the Board of Directors of the Company.

In rendering this opinion, we have assumed the genuineness of all signatures on all documents examined by us, the due authority of the parties signing such documents, the authenticity of all documents submitted to us as originals, the conformity to the originals of all documents submitted to us as copies and that the offer and sale of the Shares complies in all respects with the terms, conditions and restrictions set forth in the Registration Statement and the Plans. The Company has represented to us and we have also assumed that the Company has reserved from its duly authorized capital stock a sufficient number of shares of common stock as were approved by the Company's stockholders for issuance under the Plans. We have also assumed that it will at all times reserve and keep available out of the aggregate of its authorized but unissued and otherwise unreserved common stock, solely for the purpose of enabling it to issue the Shares in accordance with the Plans, the number of Shares which are then issuable and deliverable upon the settlement of awards under the Plans.

We do not express any opinion herein concerning any law other than the laws of the State of California, Delaware General Corporation Law and the federal law of the United States. No opinion is expressed herein with respect to the qualification of the Shares under the securities or blue sky laws of any state or any foreign jurisdiction.

This opinion speaks only at and as of its date and is based solely on the facts and circumstances known to us and as of such date. In addition, in rendering this opinion, we assume no obligation to revise, update or supplement this opinion (i) should the present aforementioned laws be changed by legislative action, judicial decision or otherwise, or (ii) to reflect any facts or circumstances which may hereafter come to our attention.

Based upon, subject to and limited by the foregoing, we are of the opinion and so advise you that the issuance of the Shares has been duly authorized and, when issued, delivered and fully paid for in accordance with the terms of the Registration Statement and the Plans such Shares will be validly issued, fully paid and nonassessable.

We hereby consent to the filing of this opinion as Exhibit 5 to the Registration Statement. In giving this consent, we do not admit that we are within the category of persons whose consent is required under Section 7 of the Securities Act or the rules and regulations of the Securities and Exchange Commission promulgated thereunder.

Very truly yours,

/s/ DLA PIPER LLP (US)

DLA PIPER LLP (US)

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in this Registration Statement on Form S-8 of our report dated March 30, 2012, with respect to the financial statements of Organovo, Inc., appearing in the Current Report on Form 8-K/A of Organovo Holdings, Inc., for the year ended December 31, 2011 and for the period from Inception (April 19, 2007) through December 31, 2011.

/s/ Mayer Hoffman McCann P.C.
San Diego, California
May 10, 2012