

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.)

6275 Nancy Ridge Drive, Suite 110
San Diego, California 92121
(858) 550-9994
(Address of Principal Executive Offices)

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

Keith Murphy
Chairman, Chief Executive Officer and President
6275 Nancy Ridge Drive, Suite 110
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 Drive, 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 2012 Equity Incentive Plan	5,000,000	\$7.10	\$35,500,000	\$4,573

- (1) An aggregate of 11,553,986 shares of common stock may be offered or issued pursuant to the Organovo Holdings, Inc. 2012 Equity Incentive Plan (the "Plan"), 6,553,986 of which were previously registered on Form S-8 (File No. 333-181324), and 5,000,000 of which are registered on this Form S-8. 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 Plan 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. 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 NYSE MKT on November 5, 2013. Pursuant to General Instruction E of Form S-8, the registration fee is calculated with respect to the additional securities registered on this Form S-8 only.

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

EXPLANATORY NOTE

As permitted by the rules of the Securities and Exchange Commission (the "Commission"), this registration statement omits the information specified in Part I of Form S-8. The documents containing the information specified in Part I will be delivered to the participants in the Plan covered by this registration statement as required by Rule 428(b) promulgated under the Securities Act. Such documents are not being filed with the Commission as part of this registration statement or as prospectuses or prospectus supplements pursuant to Rule 424 of the Securities Act.

INCORPORATION BY REFERENCE

In accordance with General Instruction E to Form S-8, the contents of the registration statement filed by the Registrant with the Commission (File No. 333-181324), with respect to securities offered pursuant to the Plan are hereby incorporated by reference.

All documents subsequently filed by the Registrant pursuant to Sections 13(a), 13(c), 14 and 15(d) of the Securities Exchange Act of 1934, as amended, 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.

EXHIBITS

See Exhibit Index below.

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 8th day of November, 2013.

Organovo Holdings, Inc.

By: /s/ Keith Murphy

Keith Murphy

Chairman, Chief Executive Officer and President

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	Chairman, Chief Executive Officer and President (Principal Executive Officer)	November 8, 2013
<u>/s/ Barry Michaels</u> Barry Michaels	Chief Financial Officer and Secretary (Principal Accounting and Financial Officer)	November 8, 2013
<u>/s/ Robert Baltera, Jr.</u> Robert Baltera, Jr.	Director	November 8, 2013
<u>/s/ James T. Glover</u> James T. Glover	Director	November 8, 2013
<u>/s/ Richard A. Heyman</u> Richard A. Heyman	Director	November 8, 2013
<u>/s/ Tamar D. Howson</u> Tamar D. Howson	Director	November 8, 2013

EXHIBIT INDEX

<u>Exhibit No.</u>	<u>Description</u>
4.1	Certificate of Incorporation (incorporated by reference from Exhibit 3.1 to Form 8-K filed on February 3, 2012)
4.2	Bylaws (incorporated by reference from Exhibit 3.2 to Form 8-K filed on February 3, 2012)
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	Power of Attorney (contained on signature page)
99.1	Organovo Holdings, Inc. 2012 Equity Incentive Plan (incorporated by reference from Appendix A to Definitive Proxy Statement filed on September 17, 2012)
99.2	Amendment to 2012 Equity Incentive Plan, dated August 21, 2013 (incorporated by reference from Exhibit 10.1 to Form 8-K filed on August 23, 2013)

DLA Piper LLP (US)
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November 8, 2013

Organovo Holdings, Inc.
6275 Nancy Ridge Drive, Suite 110
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 up to 5,000,000 shares of the common stock, \$0.001 par value, of the Company (the "Common Stock"), which may be granted under the Organovo Holdings, Inc. 2012 Equity Incentive Plan, as amended (the "Plan"). 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 Plan, the Certificate of Incorporation of the Company, and the Bylaws 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 Plan. 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 Plan. 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 Plan, the number of Shares which are then issuable and deliverable upon the settlement of awards under the Plan.

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 Plan 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 May 24, 2013, relating to the consolidated financial statements of Organovo Holdings, Inc. and Subsidiary, appearing in the Transition Report on Form 10-KT of Organovo Holdings, Inc. for the three months ended March 31, 2013, and for the period from Inception (April 19, 2007) through March 31, 2013, and our report dated March 15, 2013, relating to the consolidated financial statements of Organovo Holdings, Inc. and Subsidiary, appearing in the Annual Report on Form 10-K of Organovo Holdings, Inc. for the year ended December 31, 2012, and for the period from Inception (April 19, 2007) through December 31, 2012.

/s/ Mayer Hoffman McCann P.C.

San Diego, California
November 8, 2013