

PROSPECTUS SUPPLEMENT
(To Prospectus dated January 29, 2021)



Organovo Holdings, Inc.

Up to \$4,442,637 Shares of Common Stock

This prospectus supplement amends and supplements the information in the prospectus, dated January 29, 2021, filed as part of our registration statement on Form S-3 (File No. 333-252224). This prospectus supplement should be read in conjunction with the prospectus and is qualified in its entirety by reference thereto, except to the extent that the information herein amends or supersedes the information contained in prospectus. This prospectus supplement is not complete without, and may only be delivered or utilized in connection with, the prospectus and any future amendments or supplements thereto.

We filed the prospectus to register the offer and sale of shares of our common stock from time to time pursuant to the terms of a sales agreement dated March 16, 2018 (the "Sales Agreement") that we entered into with H.C. Wainwright & Co., LLC and JonesTrading Institutional Services LLC (each an "Agent" and together, the "Agents"), pursuant to which we may offer and sell shares of our common stock through the Agents, having an aggregate offering price of up to \$50,000,000. As of the date of this prospectus supplement, we have sold \$22.8 million of shares of our common stock through the Agents under the Sales Agreement pursuant to the prospectus, which leaves \$27.2 million of common stock available under the prospectus, without giving effect to any offering limit imposed by General Instruction I.B.6 of Form S-3.

We are filing this prospectus supplement to amend the prospectus to update the amount of shares of our common stock we are eligible to sell under General Instruction I.B.6 of Form S-3. As of December 22, 2023, the aggregate market value of our outstanding common stock held by non-affiliates was approximately \$16.8 million, based on 9,147,815 shares of our outstanding common stock that were held by non-affiliates on such date and a price of \$1.835 per share, which was the price at which our common stock was last sold on the Nasdaq Capital Market on November 7, 2023 (a date within 60 days of the date hereof). In the past 12 calendar months, we have offered and sold pursuant to General Instruction I.B.6 of Form S-3 an aggregate of 841,600 shares of our common stock for gross proceeds of approximately \$1.15 million.

We are filing this prospectus supplement to amend and supplement the information in the prospectus based on the amount of securities that we are eligible to sell under General Instruction I.B.6 of Form S-3. After giving effect to the \$5,595,413 offering limit imposed by General Instruction I.B.6 of Form S-3 and deducting amounts offered and sold pursuant to General Instruction I.B.6 of Form S-3 in the past 12 months, we may offer and sell additional shares of our common stock having an aggregate offering price of up to \$4,442,637 from time to time through the Agents in accordance with the terms of the Sales Agreement.

Our common stock is listed on the Nasdaq Capital Market under the symbol "ONVO". On December 21, 2023, the last reported sale price of our common stock on the Nasdaq Capital Market was \$1.11 per share.

Investing in our securities involves risks. You should read this prospectus supplement and the documents we incorporate herein by reference carefully before you make your investment decision. See "Risk Factors" set forth in the documents we file with the Securities and Exchange Commission that are incorporated by reference herein for more information.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or passed upon the accuracy or adequacy of this prospectus supplement. Any representation to the contrary is a criminal offense.

H.C. Wainwright & Co.

JonesTrading

The date of this prospectus supplement is December 22, 2023