

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

SCHEDULE 14A INFORMATION

Proxy Statement Pursuant to Section 14(a) of the Securities Exchange Act of 1934
(Amendment No. __)

Filed by the Registrant ☒
Filed by a Party other than the Registrant ☐

Check the appropriate box:

☐	Preliminary Proxy Statement
☐	Confidential, for Use of the Commission Only (as permitted by Rule 14a-6(e)(2))
☒	Definitive Proxy Statement
☐	Definitive Additional Materials
☐	Soliciting Material under § 240.14a-12

FIBROBIOLOGICS, INC.

(Name of Registrant as Specified In Its Charter)

(Name of Person(s) Filing Proxy Statement if Other Than the Registrant)

Payment of Filing Fee (Check all boxes that apply)

☒	No fee required.
☐	Fee paid previously with preliminary materials.
☐	Fee computed on table in exhibit required by Item 25(b) per Exchange Act Rules 14a-6(i)(1) and 0-11.

FIBROBIOLOGICS, INC.

**9350 Kirby Drive, Suite 300,
Houston, Texas 77054
281-671-5150**

NOTICE OF SPECIAL MEETING OF STOCKHOLDERS

To Be Held On September 17, 2026

Dear Stockholder:

You are cordially invited to attend the Special Meeting of Stockholders of **FIBROBIOLOGICS, INC.**, a Delaware corporation, or the Special Meeting. The meeting will be held on Thursday, September 17, 2026 at 11:00 a.m. Central Time virtually via the Internet at www.virtualshareholdermeeting.com/FBLG2026SM2, originating from Houston, Texas. **You will not be able to attend the Special Meeting in person.** At the Special Meeting, you will be asked to consider and vote upon the following proposal:

1. To approve, in accordance with Nasdaq Listing Rule 5635(d), the issuance of up to 8,163,266 shares of common stock issuable upon the exercise of outstanding common warrants issued pursuant to that certain Securities Purchase Agreement, dated June 25, 2026, by and among the Company and the purchaser party thereto, or the SPA, and up to 285,714 shares of common stock issuable upon the exercise of outstanding common warrants issued pursuant to that certain Engagement Letter, dated November 10, 2025, between the Company and H.C. Wainwright & Co., LLC, as amended on March 12, 2026, or the Engagement Letter, in connection with the SPA; and
2. To conduct any other business properly brought before the Special Meeting.

These items of business are more fully described in the proxy statement that accompanies this notice.

In accordance with rules established by the Securities and Exchange Commission, we are providing you access to our proxy materials over the Internet. Accordingly, we plan to mail a Notice of Internet Availability of Proxy Materials, or the Notice, to our stockholders on or about July 31, 2026. The Notice will describe how to access and review our proxy materials, including our proxy statement. The Notice as well as the printed copy of proxy cards will also describe how you may submit your proxy via the Internet or by telephone. If you received a Notice by mail and would like to receive a printed copy of our proxy materials, you should follow the instructions for requesting such materials included in the Notice. In accordance with Delaware law, a list of stockholders entitled to vote at the Special Meeting will be accessible during normal business hours for ten days prior to the Special Meeting at our principal place of business, 9350 Kirby Drive, Suite 300, Houston, Texas 77054.

The record date for the Special Meeting is July 20, 2026. Only stockholders of record at the close of business on that date are entitled to receive notice of and to vote at the Special Meeting or any postponement or adjournment thereof. Instructions on how to participate in the Special Meeting and demonstrate proof of stock ownership are posted at www.virtualshareholdermeeting.com/FBLG2026SM2. The webcast of the Special Meeting will be archived for one year after the date of the Special Meeting at www.virtualshareholdermeeting.com/FBLG2026SM2. Whether or not you plan to attend the Special Meeting, please vote as soon as possible.

By Order of the Board of Directors,

/s/ Pete O'Heeron

Pete O'Heeron

Founder, Chief Executive Officer, and Chairperson

Houston, Texas

July 31, 2026

**Important Notice Regarding the Availability of Proxy Materials for the Stockholders' Meeting to Be Held
on Thursday, September 17, 2026 at 11:00 a.m. Central Time.**

The proxy statement and notice are available at www.proxyvote.com.

Whether or not you expect to attend the Special Meeting, please vote by telephone or the Internet as instructed in these materials, or if you request or we deliver to you a proxy card in the mail, you may complete, date, sign and return that proxy card. Regardless of the method used, please vote as promptly as possible in order to ensure your representation at the Special Meeting. You may also vote through our virtual web conference if you attend the Special Meeting, even if you have voted by proxy.

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FIBROBIOLOGICS, INC.

**9350 Kirby Drive, Suite 300,
Houston, Texas 77054
281-671-5150**

**PROXY STATEMENT
FOR THE SPECIAL MEETING OF STOCKHOLDERS**

QUESTIONS AND ANSWERS ABOUT THESE PROXY MATERIALS AND VOTING

Why did I receive a notice regarding the availability of proxy materials on the Internet?

Pursuant to rules adopted by the Securities and Exchange Commission, or the SEC, we have elected to provide access to our proxy materials over the Internet. Accordingly, we have sent you a Notice of Internet Availability of Proxy Materials, or the Notice, because the Board of Directors, or the Board, of FibroBiologics, Inc., or FibroBiologics, the Company, we, us or our, is soliciting your proxy to vote at the Special Meeting of Stockholders, or the Special Meeting, including at any adjournments or postponements of the meeting. All stockholders will have the ability to access the proxy materials on the website referred to in the Notice or request to receive a printed set of the proxy materials. Instructions on how to access the proxy materials over the Internet or to request a printed copy may be found in the Notice.

We intend to mail the Notice on or about July 31, 2026 to all stockholders of record entitled to vote at the Special Meeting.

Will I receive any other proxy materials by mail?

We may send you a proxy card, along with a second Notice, on or after August 10, 2026.

How do I attend the Special Meeting?

Stockholders as of the record date and/or their authorized representatives are permitted to attend the Special Meeting. The Special Meeting will be held on Thursday, September 17, 2026 at 11:00 a.m. Central Time virtually via the Internet at www.virtualshareholdermeeting.com/FBLG2026SM2. Instructions on how to participate in the Special Meeting and demonstrate proof of stock ownership are posted at www.virtualshareholdermeeting.com/FBLG2026SM2. You will not be able to attend the Special Meeting in person.

Why a Virtual-Only Online Meeting?

The virtual format for the Special Meeting will enhance, rather than constrain, stockholder access and participation by allowing our stockholders to participate fully, and equally, from any location around the world at no cost. Stockholder rights are not affected. The virtual meeting format also allows stockholders to communicate with us during the Special Meeting so they can ask questions of the Board and management. During the live Q&A session, we will answer appropriate questions as they come in, as time permits. Given the above listed factors, we feel a virtual-only meeting is the right choice for FibroBiologics and its stockholders at this time.

What happens if there are technical difficulties during the Special Meeting?

We will have technicians ready to assist you with any technical difficulties you may have accessing the virtual Special Meeting, voting at the Special Meeting or submitting questions at the Special Meeting. If you encounter any difficulties accessing the virtual Special Meeting during the check-in or meeting time, please refer to the technical support information located on the login screen at www.virtualshareholdermeeting.com/FBLG2026SM2.

Who can vote at the Special Meeting?

Only stockholders of record at the close of business on July 20, 2026 will be entitled to vote at the Special Meeting. On this record date, there were (i) 6,658,193 shares of common stock outstanding and entitled to vote and (ii) 125 shares of our Series C Preferred Stock outstanding and entitled to vote. Each share of common stock is entitled to one vote on each matter to be voted on. Each share of our Series C Preferred Stock, par value \$0.00001 per share, or the Series C Preferred Stock, is entitled to 13,000 votes on each matter to be voted on.

Stockholder of Record: Shares Registered in Your Name

If on July 20, 2026 your shares were registered directly in your name with our transfer agent, Vstock Transfer LLC, then you are a stockholder of record. As a stockholder of record, you may vote by proxy or vote at the Special Meeting by going to www.virtualshareholdermeeting.com/FBLG2026SM2 and following the instructions regarding voting. Whether or not you plan to attend the Special Meeting, we urge you to fill out and return the enclosed proxy card to ensure your vote is counted.

Beneficial Owner: Shares Registered in the Name of a Broker or Bank

If on July 20, 2026 your shares were held, not in your name, but rather in an account at a brokerage firm, bank, dealer or other similar organization, then you are the beneficial owner of shares held in “street name” and the Notice is being forwarded to you by that organization. The organization holding your account is considered to be the stockholder of record for purposes of voting at the Special Meeting. As a beneficial owner, you have the right to direct your broker or other agent regarding how to vote the shares in your account. You are also invited to attend the Special Meeting. Beneficial holders who attend the Special Meeting may also vote during the Special Meeting by going to www.virtualshareholdermeeting.com/FBLG2026SM2 and following the instructions regarding voting.

What is the impact of the 125 shares of Series C Preferred Stock with super voting rights?

Pete O’Heeron, our founder, Chief Executive Officer, or CEO, and Chairperson, holds all 125 shares of outstanding Series C Preferred Stock. Each share of Series C Preferred Stock is entitled to 13,000 votes.

The shares of Series C Preferred Stock are subject to an irrevocable proxy issued by Mr. O’Heeron in favor and for the benefit of, the Board, granting the Board the irrevocable proxy, for as long as the Series C Preferred Stock remains outstanding, to vote all of the shares of Series C Preferred Stock on all matters on which the shares of Series C Preferred Stock are entitled to vote, in any manner that the Board may determine in its sole and absolute discretion; *provided, however*, that such irrevocable proxy does not, without the written consent of Mr. O’Heeron, permit the Board to vote the Series C Preferred Stock with respect to any proposal to amend, delete or waive any rights of Mr. O’Heeron with respect to the Series C Preferred Stock as set forth in our amended and restated certificate of incorporation currently in effect, or the Amended and Restated Certificate of Incorporation. In light of the superior voting rights associated with the Series C Preferred Stock, the irrevocable proxy is intended to ensure that such superior voting rights are utilized in our best interest and to avoid or mitigate conflicts that may arise in the future for Mr. O’Heeron as an individual stockholder employee.

The Board will exercise the irrevocable proxy to cast 1,625,000 votes, which constitutes approximately 20% of the total votes eligible to be cast at the Special Meeting, FOR the proposal described in this proxy statement.

What am I voting on?

There is one matter scheduled for a vote:

- Approval, for purposes of Nasdaq Listing Rule 5635(d), of the issuance of up to 8,163,266 shares of common stock pursuant to the SPA and up to 285,714 shares of common stock pursuant to the Engagement Letter in connection with the SPA (Proposal 1).

What are the Board’s voting recommendations?

A summary of the Special Meeting proposal is below. **Every stockholder’s vote is important. The Board urges you to vote your shares FOR the proposal.**

Matter	Page	Board Recommends	Vote Required for Approval	Effect of Abstentions	Effect of Broker Non-Votes
Approval, for purposes of Nasdaq Listing Rule 5635(d), of the issuance of up to 8,163,266 shares of common stock pursuant to the SPA and up to 285,714 shares of common stock pursuant to the Engagement Letter in connection with the SPA	7	FOR	Majority of shares present and entitled to vote	Against	None

What if another matter is properly brought before the Special Meeting?

The Board knows of no other matters that will be presented for consideration at the Special Meeting. If any other matters are properly brought before the Special Meeting, it is the intention of the persons named in the accompanying proxy to vote on those matters in accordance with their best judgment.

How do I vote?

You may either vote “For” or “Against” or “Abstain” from voting on the proposal.

The procedures for voting are fairly simple:

Stockholder of Record: Shares Registered in Your Name

If you are a stockholder of record, you may vote at the Special Meeting by going to www.virtualshareholdermeeting.com/FBLG2026SM2 and following the instructions regarding voting or vote by proxy (i) over the telephone, (ii) through the Internet or (iii) using a proxy card that you may request or that we may elect to deliver at a later time. Whether or not you plan to attend the Special Meeting, we urge you to vote by proxy to ensure your vote is counted. You may still attend the Special Meeting and vote by going to www.virtualshareholdermeeting.com/FBLG2026SM2 and following the instructions regarding voting even if you have already voted by proxy.

- To vote at the Special Meeting, go to www.virtualshareholdermeeting.com/FBLG2026SM2 and follow the instructions regarding voting.
- To vote using the proxy card, simply complete, sign and date the proxy card that may be delivered and return it promptly in the envelope provided. If you return your signed proxy card to us before the Special Meeting, we will vote your shares as you direct.
- To vote over the telephone, dial toll-free 1-800-690-6903 using a touch-tone phone and follow the recorded instructions. You will be asked to provide our company number and control number from the Notice. Your vote must be received by 11:59 p.m. ET on September 16, 2026 to be counted.
- To vote through the Internet, go to www.virtualshareholdermeeting.com/FBLG2026SM2 to complete an electronic proxy card. You will be asked to provide our company number and control number from the Notice. Your vote must be received by 11:59 p.m. ET on September 16, 2026 to be counted.

Beneficial Owner: Shares Registered in the Name of Broker or Bank

If you are a beneficial owner of shares registered in the name of your broker, bank, or other agent, you should have received a notice containing voting instruction from that organization rather than from FibroBiologics. Simply follow the voting instructions in the notice to ensure that your vote is counted. Beneficial holders who attend the Special

Meeting may also vote during the Special Meeting by going to www.virtualshareholdermeeting.com/FBLG2026SM2 and following the instructions regarding voting.

Internet proxy voting may be provided to allow you to vote your shares online, with procedures designed to ensure the authenticity and correctness of your proxy vote instructions. However, please be aware that you must bear any costs associated with your Internet access, such as usage charges from Internet access providers and telephone companies.

How many votes do I have?

If you own shares of our common stock, then on each matter to be voted upon, you have one vote for each share of common stock you own as of July 20, 2026.

Our founder, CEO and Chairperson, Pete O’Heeron, owns 125 shares of our Series C Preferred Stock and has 13,000 votes for each share of Series C Preferred Stock. The Series C Preferred Stock is subject to an irrevocable proxy issued to the Board. The Board will exercise the irrevocable proxy to cast 1,625,000 votes “For” the proposal described in this proxy statement, which constitutes approximately 20% of the total votes eligible to be cast at the Special Meeting.

What happens if I do not vote, or if I return a proxy card or otherwise vote without giving specific voting instructions?

Stockholder of Record: Shares Registered in Your Name

If you are a stockholder of record and do not vote through the Internet, by telephone, by completing a proxy card that may be delivered to you, or at the Special Meeting, your shares will not be voted. If you return a signed and dated proxy card without giving specific voting instructions, then the proxy holders will vote your shares in the manner recommended by the Board on all matters presented in this proxy statement and as the proxy holders may determine in their discretion with respect to any other matters properly presented for a vote at the Special Meeting.

Beneficial Owner: Shares Registered in the Name of a Broker or Bank

If you are a beneficial owner of shares held in “street name” and you do not provide the organization that holds your shares with specific instructions, the organization that holds your shares may still be able to vote your shares in its discretion. In this regard, under the rules of the New York Stock Exchange, or NYSE, brokers, banks and other securities intermediaries that are subject to NYSE rules may use their discretion to vote, including with respect to Nasdaq-listed companies, your “uninstructed” shares with respect to matters considered to be “routine” under NYSE rules, but not with respect to “non-routine” matters. Accordingly, if the organization that holds your shares does not receive instructions from you on how to vote your shares on a non-routine matter, the organization that holds your shares will inform our inspector of elections that it does not have the authority to vote on this matter with respect to your shares. This is generally referred to as a “broker non-vote.” When our inspector of elections tabulates the votes for any particular matter, broker non-votes will be counted for purposes of determining whether a quorum is present, but will not be counted toward the vote total for any proposal. We encourage you to provide voting instructions to the organization that holds your shares to ensure that your vote is counted on all proposals.

Which proposals are considered “routine” or “non-routine”?

If the beneficial owner does not provide voting instructions, such beneficial owner’s broker or nominee can still vote the shares with respect to matters that are considered to be “routine,” but not with respect to “non-routine” matters.

The approval, for purposes of Nasdaq Listing Rule 5635(d), of the issuance of up to 8,163,266 shares of common stock pursuant to the SPA and up to 285,714 shares of common stock pursuant to the Engagement Letter in connection with the SPA (Proposal 1), is a matter considered non-routine under applicable rules. A broker or other nominee cannot vote without instructions on non-routine matters, and therefore we expect broker non-votes on Proposal 1.

Who is paying for this proxy solicitation?

We will pay for the entire cost of soliciting proxies. In addition to these proxy materials, our directors and employees may also solicit proxies in person, by telephone, or by other means of communication. Directors and employees will not be paid any additional compensation for soliciting proxies. We may also reimburse brokerage firms, banks, and other agents for the cost of forwarding proxy materials to beneficial owners. Certain of our directors, officers and employees may participate in the solicitation of proxies, including electronically or by mail or telephone, without additional compensation.

What does it mean if I receive more than one Notice?

If you receive more than one Notice, your shares may be registered in more than one name or in different accounts. Please follow the voting instructions on the Notices to ensure that all of your shares are voted.

Can I change my vote after submitting my proxy?

Stockholder of Record: Shares Registered in Your Name

Yes. You can revoke your proxy at any time before the final vote at the Special Meeting. If you are the record holder of your shares, you may revoke your proxy in any one of the following ways:

- You may submit another properly completed proxy card with a later date.
- You may grant a subsequent proxy by telephone or through the Internet.
- You may send a timely written notice that you are revoking your proxy to FibroBiologics' Secretary at 9350 Kirby Drive, Suite 300, Houston, Texas 77054.
- You may attend the Special Meeting **and** vote. Simply attending the Special Meeting will not, by itself, revoke your proxy.

Your most current proxy card or telephone or Internet proxy is the one that is counted.

Beneficial Owner: Shares Registered in the Name of Broker or Bank

If your shares are held by your broker or bank as a nominee or agent, you should follow the instructions provided by your broker or bank.

How are votes counted?

Votes will be counted by the inspector of election appointed for the meeting, who will separately count, for the approval, for purposes of Nasdaq Listing Rule 5635(d), of the issuance of up to 8,163,266 shares of common stock pursuant to the SPA and up to 285,714 shares of common stock pursuant to the Engagement Letter in connection with the SPA (Proposal 1), votes "For," "Against," abstentions and broker non-votes. Broker non-votes have no effect on the outcome of the proposal and will not be counted towards the vote total for Proposal 1.

What are "broker non-votes"?

Broker non-votes occur when a beneficial owner of shares held in "street name" does not give instructions to the broker or nominee holding the shares as to how to vote on matters deemed "non-routine." Generally, if shares are held in street name, the beneficial owner of the shares is entitled to give voting instructions to the broker or nominee holding the shares. If the beneficial owner does not provide voting instructions, the broker or nominee can still vote the shares with respect to matters that are considered to be "routine," but not with respect to "non-routine" matters. Under the rules and interpretations of the NYSE, "non-routine" matters are matters that may substantially affect the rights or privileges of stockholders, such as mergers, stockholder proposals, elections of directors (even if not contested) and executive compensation, including the advisory stockholders vote on executive compensation. The proposal described in this proxy statement is "non-routine."

What is the quorum requirement?

A quorum of stockholders is necessary to hold a valid meeting. A quorum will be present if stockholders holding at least one third of the voting power of the outstanding shares entitled to vote are present at the meeting in person or represented by proxy. On the record date, there were (i) 6,658,193 shares of common stock outstanding and entitled to vote and (ii) 125 shares of our Series C Preferred Stock outstanding and entitled to vote, with each share of common stock entitled to one vote and each share of Series C Preferred Stock entitled to 13,000 votes. Thus, the holders of shares representing 2,761,065 votes must be present in person or represented by proxy at the meeting to have a quorum.

Your shares will be counted towards the quorum only if you submit a valid proxy (or one is submitted on your behalf by your broker, bank, or other nominee) or if you vote at the meeting. Abstentions and broker non-votes will be counted towards the quorum requirement. If there is no quorum, the Chairperson of the Board or the majority of the Board may adjourn the meeting to another date.

How can I find out the results of the voting at the Special Meeting?

Preliminary voting results will be announced at the Special Meeting. In addition, final voting results will be published in a current report on Form 8-K that we expect to file within four business days after the Special Meeting. If final voting results are not available to us in time to file a Form 8-K within four business days after the Special Meeting, we intend to file a Form 8-K to publish preliminary results and, within four business days after the final results are known to us, file an additional Form 8-K to publish the final results.

PROPOSAL 1

APPROVAL OF THE JUNE 2026 STOCK ISSUANCE PROPOSAL

The Company is asking stockholders to approve the issuance of (i) up to 8,163,266 shares of common stock issuable upon the exercise of outstanding warrants issued pursuant to the SPA, and (ii) up to 285,714 shares of common stock issuable upon the exercise of outstanding warrants issued pursuant to the Engagement Letter in connection with the Offering (as defined below), for purposes of Nasdaq Listing Rule 5635(d), as described in more detail below.

GENERAL BACKGROUND

On June 25, 2026, we entered into a securities purchase agreement, or the SPA, with an accredited investor, or the Purchaser, pursuant to which we issued and sold to the Purchaser, in a private placement, or the Offering, (i) pre-funded warrants to purchase up to 4,081,633 shares of common stock at an exercise price of \$0.00001 per share, or the Pre-Funded Warrants, (ii) warrants to purchase up to 4,081,633 shares of common stock at an exercise price of \$0.735 per share, which will be exercisable on or after the effective date of stockholder approval, or the Stockholder Approval Date, of the issuance of the shares of common stock upon exercise of such warrants, or the Stockholder Approval, and will expire 18 months from the later of the Stockholder Approval Date and the effective date, or the Effective Date, of the resale registration statement registering the shares of common stock issuable upon exercise of such warrants, or the Short-term Warrants, and (iii) warrants to purchase up to 4,081,633 shares of common stock at an exercise price of \$0.735 per share, which will be exercisable on or after the Stockholder Approval Date and will expire 5 years from the later of the Stockholder Approval Date and the Effective Date, or the Long-term Warrants and together with the Short-term Warrants, the Warrants. The exercisability of the Warrants is subject to stockholder approval as described below. The Pre-Funded Warrants were immediately exercisable upon issuance. Accordingly, this Proposal 1 does not seek stockholder approval of the shares of common stock issuable upon exercise of the Pre-Funded Warrants. The Offering closed on June 29, 2026.

H.C. Wainwright & Co., LLC acted as the exclusive placement agent, or the Placement Agent, in connection with the Offering pursuant to that certain engagement letter, or the Engagement Letter, dated November 10, 2025 (as amended on March 12, 2026), by and between the Company and the Placement Agent. Pursuant to the Engagement Letter, the Placement Agent received (i) a cash fee of 7.0% of the aggregate purchase price paid by the Purchaser in the Offering and (ii) a management fee of 1.0% of the aggregate purchase price paid by the Purchaser in the Offering. In addition, the Company reimbursed the Placement Agent for its legal fees in an amount of \$50,000. Additionally, in connection with the closing of the Offering, the Company issued to designees of the Placement Agent (or their assignees) warrants to purchase up to an aggregate of 285,714 shares of common stock at an exercise price of \$0.9188 per share, or the Placement Agent Warrants. The Placement Agent Warrants have substantially the same terms as the Long-term Warrants except for the exercise price and will be exercisable upon receipt of stockholder approval.

Subject to limited exceptions, following the date our stockholders approve this Proposal 1, a holder of the Pre-Funded Warrants and the Warrants will not have the right to exercise any portion of its warrants if such holder, together with its affiliates, would beneficially own in excess of 9.99% or 4.99%, respectively, of the number of shares of common stock outstanding immediately after giving effect to such exercise. In addition, a holder of Placement Agent Warrants will not have the right to exercise any portion of such warrants to the extent that, after giving effect to the exercise, the holder, together with its affiliates, and any other person acting as a group together with the holder or any of its affiliates, would beneficially own in excess of 4.99% of the number of shares of common stock outstanding immediately after giving effect to its exercise. A holder, upon notice to the Company, may increase or decrease these beneficial ownership limitation provisions, provided that in no event shall the limitation exceed 9.99% of the number of shares of common stock outstanding immediately after giving effect to the exercise of such warrants. Any increase in these beneficial ownership limitations will not be effective until the 61st day after such notice is delivered to us.

We also entered into a registration rights agreement, or RRA, with the Purchaser in which we agreed to file with the SEC a registration statement covering the resale of all of the common stock issuable upon exercise of the Pre-Funded Warrants and the Warrants and to maintain the effectiveness thereof until the date that all registrable securities covered by such registration statement (i) have been sold, thereunder or pursuant to Rule 144 under the Securities Act, or (ii) may be sold without volume or manner-of-sale restrictions pursuant to Rule 144 and without the requirement for us to be in compliance with the current public information requirement under Rule 144. On July 9, 2026, we filed the

resale registration statement on Form S-3, or the Registration Statement, registering for resale up to 12,530,613 shares of common stock issuable upon the exercise of the Pre-Funded Warrants, the Warrants and the Placement Agent Warrants. The Registration Statement was declared effective by the SEC on July 16, 2026.

We are not seeking the approval of stockholders to authorize us to enter into the SPA, the Engagement Letter, the RRA, or any other transaction agreements, to file the Registration Statement, or to issue the Pre-Funded Warrants and Warrants to the Purchaser and the Placement Agent Warrants to designees of the Placement Agent (or their assignees). We have already entered into those agreements, made the filing and completed the issuances, which are binding obligations on us. Accordingly, the failure of our stockholders to approve this Proposal 1 will not affect our obligations under these agreements, which will remain binding on us.

The 577,633 shares of Common Stock issued to the Purchaser through the Record Date upon the exercise of Pre-Funded Warrants are not entitled to vote on this Proposal 1 in accordance with Nasdaq Listing Rule 5635(d). Accordingly, although we anticipate that the 577,633 shares of Common Stock held by the Purchaser would be voted in favor of this Proposal 1 for purposes of adopting the proposal, to comply with Nasdaq rules, to the extent such shares are voted, we will instruct the inspector of elections to conduct a separate tabulation that subtracts such shares held by the Purchaser from the total number of shares voted in favor of Proposal 1 to determine whether the proposal has been adopted in accordance with applicable Nasdaq rules.

For further information regarding the terms of the Pre-Funded Warrants, Warrants and the Placement Agent Warrants, please refer to the Company's Current Report on Form 8-K filed with the SEC on June 29, 2026. The discussion herein relating to the Pre-Funded Warrants, Warrants and the Placement Agent Warrants is qualified in its entirety by reference to the Pre-Funded Warrants, Warrants and the Placement Agent Warrants filed as Exhibits 4.1, 4.2 and 4.3, respectively, to such Form 8-K.

THE NASDAQ STOCKHOLDER APPROVAL RULE

The common stock is listed on the Nasdaq Capital Market and, as such, the Company is subject to the Nasdaq Listing Rules.

The Nasdaq 20% Rule. Nasdaq Listing Rule 5635(d) requires stockholder approval prior to the issuance of securities in connection with a transaction, other than a public offering, involving the sale, issuance or potential issuance by the Company of common stock (or securities convertible into or exercisable for common stock), which alone or together with sales by officers, directors or substantial stockholders of the company, equals 20% or more of the common stock or 20% or more of the voting power outstanding before the issuance, in each case, at a price that is less than the "Minimum Price." The Minimum Price is the lower of (1) the Nasdaq official closing price (as reflected on Nasdaq.com) immediately preceding the signing of the binding agreement or (2) the average Nasdaq official closing price of the common stock (as reflected on Nasdaq.com) for the five trading days immediately preceding the signing of the binding agreement.

The Company is asking stockholders to approve the issuance of up to 8,163,266 shares of common stock issuable upon the exercise of outstanding Warrants and up to 285,714 shares of common stock issuable upon the exercise of outstanding Placement Agent Warrants, because in the absence of stockholder approval, such issuances could result in the Offering violating Nasdaq Listing Rule 5635(d).

ADVERSE EFFECTS OF APPROVAL OF THIS PROPOSAL

The approval of this proposal will result in holders of Warrants and Placement Agent Warrants being able to exercise such warrants, although such holders will have no obligation to do so. The full exercise of the Warrants would result in the issuance of 8,163,266 additional shares of our common stock and the full exercise of the Placement Agent Warrants would result in the issuance of 285,714 additional shares of our common stock, which would dilute the ownership interest of our existing stockholders. The exercise of Warrants and Placement Agent Warrants and/or the sale of common stock received upon such exercise in the open market could materially and adversely affect the market price of our common stock, particularly if the trading price of our common stock is greater than \$0.735, in the case of the Warrants, and \$0.9188, in the case of the Placement Agent Warrants, at the time.

EFFECTS IF THIS PROPOSAL IS NOT APPROVED

If this proposal is not approved, we will not be able to issue shares of common stock to the Purchaser or the designees of the Placement Agent in excess of Nasdaq Listing Rule 5635(d). As a result, under the terms of the Warrants and the Placement Agent Warrants, we may be required to make payment as liquidated damages. We may not have sufficient cash on hand or available resources to meet such an obligation, which could force us to seek emergency financing or other arrangements which may not be available or, if available, may be on unfavorable terms. In the event we do have sufficient funds available, such obligations, if triggered, could significantly reduce the cash we have available to fund our operations or make necessary investments. This would adversely affect our financial condition, limit our ability to pursue growth opportunities, and adversely affect our business prospects.

Under the SPA, we agreed to seek shareholder approval for the matters described in this Proposal 1 within 90 days of the closing date of the Offering, or June 29, 2026. If we do not obtain shareholder approval of this Proposal 1 within such period, we are required to continue seeking shareholder approval every 90 days thereafter until such shareholder approval is obtained. The process of continuing to hold stockholder meetings to obtain the requisite stockholder approval would cause us to incur significant legal expenses and would divert our management's attention from the operation of our business, which could materially harm our business.

FACTORS CONSIDERED BY THE BOARD IN ITS RECOMMENDATION

After careful consideration at the time of the Offering, our Board determined that the Offering, including the sale of the Warrants and issuance of the Placement Agent Warrants, was in the best interests of the Company in light of the Company's cash position and liquidity needs at the time. In reaching its determination the Board consulted with members of the Company's senior management and its legal and strategic advisors, among others, and considered a number of factors.

After further careful consideration, including of the Company's current cash position and continuing liquidity needs, our Board determined to recommend that our stockholders approve the issuance of common stock upon the exercise of the Warrants and the Placement Agent Warrants. Although there can be no assurance that the holders of the Warrants and the Placement Agent Warrants will exercise all, or any part of, their warrants, the full exercise of the Warrants would result in gross proceeds to the Company of approximately \$6.0 million and the full exercise of the Placement Agent Warrants would result in gross proceeds to the Company of approximately \$263 thousand. In connection with any exercise of the Warrants and the Placement Agent Warrants, we currently intend to use the proceeds for working capital and general corporate purposes, as we pursue longer term financing.

NO APPRAISAL RIGHTS

Stockholders have no rights under the DGCL or under our Certificate of Incorporation or Second Amended and Restated Bylaws to exercise dissenters' rights of appraisal with respect to the issuance of shares of common stock upon exercise of the Pre-Funded Warrants, the Warrants or the Placement Agent Warrants.

THE BOARD RECOMMENDS A VOTE IN FAVOR OF PROPOSAL 1.

SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT

The following table sets forth, as of July 20, 2026, certain information regarding the beneficial ownership of our voting securities (being our voting common stock and our Series C Preferred Stock) by (i) each person or group of affiliated persons known by us to be the beneficial owner of more than 5% of our voting securities, (ii) each of our named executive officers, (iii) each of our directors and (iv) all of our directors and executive officers as a group. Except as otherwise indicated, all persons listed below have (i) sole voting power and investment power with respect to their common stock and Series C Preferred Stock, as applicable, except to the extent that authority is shared by spouses under applicable law, and (ii) record and beneficial ownership with respect to their common stock and Series C Preferred Stock, as applicable.

In accordance with the rules of the SEC, beneficial ownership includes voting or investment power with respect to securities and includes the common stock issuable pursuant to options and warrants that are exercisable or settled within 60 days of July 20, 2026. Shares of common stock issuable pursuant to options and warrants are deemed outstanding for computing the percentage of the class beneficially owned by the person holding such securities but are not deemed outstanding for computing the percentage of the class beneficially owned by any other person.

In the table below, the percentage of beneficial ownership is based on, as applicable: (i) 6,658,193 shares of our common stock outstanding; and (ii) 125 shares of our Series C Preferred Stock outstanding, each as of July 20, 2026.

Each share of our Series C Preferred Stock is entitled to 13,000 votes per share and each share of our common stock is entitled to one vote per share. The percentage of total voting power in the table below is based on the sum of (i) 6,658,193 votes, being the total number of votes associated with 6,658,193 shares of our common stock (with each share of common stock having one vote) and (ii) 1,625,000 votes, being the total number of votes associated with 125 shares of Series C Preferred Stock (with each share of Series C Preferred Stock having 13,000 votes).

Unless otherwise indicated, the business address of each of the individuals and entities named below is c/o FibroBiologics, Inc., 9350 Kirby Drive, Suite 300, Houston, Texas 77054.

Name and address of Beneficial Owner	Common Stock		Series C Preferred Stock		Percentage of Total Voting
	Shares	%	Shares	%	Power(1)
5% Stockholders:					
Pete O’Heeron, MSHA(2)	399,323	5.91%	125	100%	24.1%
Golden Knight Incorporated, L.P. (3)	701,493	9.99%			8.1%
Armistice Capital Master Fund Ltd. (4)	674,633	9.99%			8.1%
Named Executive Officers and Directors					
Pete O’Heeron, MSHA(2)	399,323	5.9%	125	100%	24.1%
Hamid Khoja, Ph.D. (5)	31,284	*	—	—	*
Jason D. Davis (6)	10,531	*	—	—	*
Ruben A. Garcia (7)	21,640	*	—	—	*
Robert E. Hoffman (8)	10,467	*	—	—	*
Victoria Niklas, M.D.(8)	10,467	*	—	—	*
Richard Cilento, Jr., MBA(9)	14,754	*	—	—	*
Kathleen H. Rubins, Ph.D.(10)	562	*	—	—	*
Directors and Executive Officers as a Group (8 persons)(11)	499,028	7.3%	125	100%	25.1%

* Less than 1%.

- (1) After giving effect to the rights of the Series C Preferred Stock to 13,000 votes per share.
- (2) Shares of common stock include 297,908 shares of common stock and 101,415 vested stock options to purchase common stock. The 125 shares of Series C Preferred Stock held constitute the maximum number of Series C Preferred Stock we are authorized to issue. Each share of Series C Preferred Stock is entitled to 13,000 votes. For

as long as they remain outstanding, the shares of Series C Preferred Stock are subject to an irrevocable proxy issued by Pete O’Heeron in favor and for the benefit of the Board, as more particularly described in this proxy statement.

- (3) Shares of common stock include 337,493 shares of common stock and 364,000 shares of common stock issuable upon the exercise of warrants. Michael F. Newlin and Cindy L. Newlin, as General Partners of Golden Knight Incorporated, L.P., share discretionary authority to vote and dispose of the shares directly held by Golden Knight Incorporated, L.P. and may be deemed to be the beneficial owners of such shares. The address for Golden Knight Incorporated, L.P. is 907 West Russell Road, Suite 100, Las Vegas, NV 89148.
- (4) Shares of common stock include 577,633 shares of common stock and 97,000 shares of common stock issuable upon the exercise of warrants. The securities are held by Armistice Capital Master Fund Ltd. (“Armistice Master Fund”), and may be deemed to be beneficially owned by: (i) Armistice Capital, LLC (“Armistice Capital”), as the investment manager of the Armistice Master Fund; and (ii) Steven Boyd, as the Managing Member of Armistice Capital. The address of Armistice Capital Master Fund Ltd. is c/o Armistice Capital, LLC, 510 Madison Avenue, 7th Floor, New York, NY 10022.
- (5) Shares of common stock include 3,063 shares of common stock and 28,221 vested stock options to purchase common stock.
- (6) Shares of common stock include 3,500 shares of common stock and 7,031 vested stock options to purchase common stock.
- (7) Shares of common stock include 9,000 shares of common stock and 12,640 vested stock options to purchase common stock.
- (8) Shares of common stock include 375 shares of common stock and 10,092 vested stock options to purchase common stock.
- (9) Shares of common stock include 4,662 shares of common stock and 10,092 vested stock options to purchase common stock.
- (10) Shares of common stock include 562 vested stock options to purchase common stock.
- (11) Shares of common stock include 318,883 shares of common stock and 180,145 vested stock options to purchase common stock. The 125 shares of Series C Preferred Stock held constitute the maximum number of Series C Preferred Stock we are authorized to issue. Each share of Series C Preferred Stock is entitled to 13,000 votes. For as long as they remain outstanding, the shares of Series C Preferred Stock are subject to an irrevocable proxy issued by Pete O’Heeron in favor and for the benefit of the Board, as more particularly described in this proxy statement.

Change in Control

Series C Preferred Stock

There is currently one series of designated preferred stock, being the Series C Preferred Stock, 125 total shares of which are authorized and all of which are issued, outstanding and held by Pete O’Heeron, our founder, CEO and Chairperson. In January 2024, in conjunction with our Direct Listing, we issued the 125 shares of Series C Preferred Stock with super voting rights to Mr. O’Heeron for no consideration. The outstanding shares of Series C Preferred Stock are fully paid and nonassessable.

The Series C Preferred Stock ranks senior to our common stock upon our liquidation, dissolution, winding up or otherwise.

The Series C Preferred Stock is entitled to vote on any matter to be voted on by our stockholders, in each case voting together with the holders of our common stock as a single class, and each share of Series C Preferred Stock is entitled to 13,000 votes. The Series C Preferred Stock is entitled to receive the same prior notice of any meeting of stockholders as provided to our common stockholders.

The Series C Preferred Stock is not entitled to any dividend, whether payable in cash, stock, or property.

Subject to the superior rights of other, then outstanding, classes or series of preferred stock, in the event of any liquidation, dissolution or winding up of our company, the Series C Preferred Stock shall be entitled to receive, prior and in preference to any distribution in such liquidation, dissolution or winding up of any of our assets to the holders

of our common stock, a liquidation preference of \$360.00 per share (subject to appropriate adjustment in the event of any stock split, combination or other similar recapitalization).

The Series C Preferred Stock may be converted at any time as follows:

- At the option of the holder, a share of Series C Preferred Stock may be converted into one share of our common stock; and
- Upon the election of the holders of a majority of the then outstanding shares of Series C Preferred Stock, all outstanding shares of Series C Preferred Stock may be converted into an equal number of shares of our common stock, on a one-for-one basis.

In addition, the Series C Preferred Stock is subject to a mandatory conversion upon any transfer of the Series C Preferred Stock. Each share of Series C Preferred Stock shall automatically convert, without the payment of additional consideration by or to the holder thereof, into one fully paid and non-assessable share of our common stock, upon any transfer of any share of Series C Preferred Stock, whether or not for value. Any shares of Series C Preferred Stock converted as described above must be retired and cancelled and may not be reissued as shares of such series.

For as long as the Series C Preferred Stock remains outstanding, the aggregate number of shares of Series C Preferred Stock then outstanding, shall be proportionately adjusted for any increase or decrease in the number of issued shares of our common stock resulting from a subdivision or combination of our common stock or other similar recapitalization, in each case effected without our receipt of consideration.

The Series C Preferred Stock is subject to an irrevocable proxy issued by Pete O’Heeron, the holder of all of the Series C Preferred Stock, in favor and for the benefit of, the Board, granting the Board the irrevocable proxy, for as long as the Series C Preferred Stock remains outstanding, to vote all of the shares of Series C Preferred Stock on all matters on which the shares of Series C Preferred Stock are entitled to vote, in any manner that the Board may determine in its sole and absolute discretion; *provided, however*, that such irrevocable proxy shall not, without the written consent of Pete O’Heeron, permit the Board to vote the shares of Series C Preferred Stock with respect to any proposal to amend, delete or waive any rights of Pete O’Heeron with respect to the Series C Preferred Stock as set forth in our Amended and Restated Certificate of Incorporation. In light of the superior voting rights associated with the Series C Preferred Stock, the irrevocable proxy is intended to ensure that such superior voting rights are utilized in our best interest and to avoid or mitigate conflicts that may arise in the future for Pete O’Heeron as an individual stockholder employee.

OTHER MATTERS

Stockholder Proposals for 2027 Annual Meeting

To be included in our proxy statement for the 2027 annual meeting of stockholders, stockholder proposals must comply with the requirements of Rule 14a-8 under the Exchange Act. Except as provided below, stockholder proposals must be received by our Secretary at our principal executive offices no later than January 4, 2027.

In addition to satisfying the requirements under our Amended and Restated Bylaws, stockholders who intend to solicit proxies in support of director nominees, other than our nominees, must provide notice that sets forth the information required by Rule 14a-19 under the Exchange Act to comply with the universal proxy rules, which notice must be postmarked or transmitted electronically to us at our principal executive offices no later than April 23, 2027. However, if the date of the 2027 annual meeting is changed by more than 30 calendar days from the anniversary date of the 2026 annual meeting of stockholders, then notice must be provided by the later of 60 calendar days prior to the date of the 2027 annual meeting or the 10th calendar day following the day on which public announcement of the date of the 2027 annual meeting is first made by us.

To be raised at the 2027 annual meeting of stockholders, stockholder proposals must comply with our Amended and Restated Bylaws. Under our Amended and Restated Bylaws, a stockholder must give advance written notice to our Secretary of any business, including nominations of directors for the Board, which the stockholder wishes to raise at the 2027 annual meeting of stockholders. Except as provided below, a stockholder's notice must be delivered to our Secretary at our principal executive offices no earlier than February 22, 2027 and no later than March 24, 2027, in order to be raised at our 2027 annual meeting of stockholders.

Under Rule 14a-8 of the Exchange Act, if the date of the 2027 annual meeting of stockholders changes by more than 30 days from the anniversary of this year's annual meeting, to be included in our proxy statement for such meeting, stockholder proposals must be received by us within a reasonable time before our solicitation is made. Under our Amended and Restated Bylaws, if the date of the 2027 annual meeting of stockholders is more than thirty (30) days before or more than sixty (60) days after the anniversary of the annual meeting, for stockholder proposals that will not be included in our proxy statement for such meeting, notice of such proposal must be delivered no earlier than the close of business on the one hundred twentieth (120) day prior to the 2027 annual meeting, nor later than the close of business on the later of (A) the ninetieth (90) day prior to the 2027 annual meeting or (B) the tenth (10) day following the day on which public announcement of the date of the 2027 annual meeting is first made by us.

Householding of Proxy Materials

The SEC has adopted rules that permit companies and intermediaries (e.g., brokers) to satisfy the delivery requirements for Notices of Internet Availability of Proxy Materials or other Special Meeting materials with respect to two or more stockholders sharing the same address by delivering a single set of Notice of Internet Availability of Proxy Materials or other Special Meeting materials addressed to those stockholders. This process, which is commonly referred to as "householding," potentially means extra convenience for stockholders and cost savings for companies.

This year, a number of brokers with account holders who are FibroBiologics stockholders will be "householding" our proxy materials. A single set of Notice of Internet Availability of Proxy Materials will be delivered to multiple stockholders sharing an address unless contrary instructions have been received from the affected stockholders. Once you have received notice from your broker that they will be "householding" communications to your address, "householding" will continue until you are notified otherwise or until you revoke your consent. If, at any time, you no longer wish to participate in "householding" and would prefer to receive a separate set of Notice of Internet Availability of Proxy Materials, please notify your broker or FibroBiologics. Direct your written request to Secretary, FibroBiologics, Inc., 9350 Kirby Drive, Suite 300, Houston, Texas 77054, or call our principal office at (281) 671-5150. Stockholders who currently receive multiple copies of the Notices of Internet Availability of Proxy Materials at their addresses and would like to request "householding" of their communications should contact their brokers.

Availability of Additional Information

We will provide, free of charge, a copy of our Annual Report on Form 10-K for the year ended December 31, 2025, including exhibits, upon the written or oral request of any stockholder of our company. Please send a written request to our Secretary at the address set forth on the first page of this proxy statement or call the number above.

FIBROBIOLOGICS, INC.
9950 KIRBY DRIVE
SUITE 300
HOUSTON, TEXAS 77054



SCAN TO
VIEW MATERIALS & VOTE



VOTE BY INTERNET

Before The Meeting - Go to www.proxyvote.com or scan the QR Barcode above

Use the Internet to transmit your voting instructions and for electronic delivery of information up until 11:59 p.m. Eastern Time on September 16, 2026. Have your proxy card in hand when you access the web site and follow the instructions to obtain your records and to create an electronic voting instruction form.

During The Meeting - Go to www.virtualshareholdermeeting.com/FBLG2026M2

You may attend the meeting via the Internet and vote during the meeting. Have the information that is printed in the box marked by the arrow available and follow the instructions.

VOTE BY PHONE - 1-800-690-6903

Use any touch-tone telephone to transmit your voting instructions up until 11:59 p.m. Eastern Time on September 16, 2026. Have your proxy card in hand when you call and then follow the instructions.

VOTE BY MAIL

Mark, sign and date your proxy card and return it in the postage-paid envelope we have provided or return it to Vote Processing, c/o Broadridge, 51 Mercedes Way, Edgewood, NY 11717.

TO VOTE, MARK BLOCKS BELOW IN BLUE OR BLACK INK AS FOLLOWS:

T02362-544622

KEEP THIS PORTION FOR YOUR RECORDS

THIS PROXY CARD IS VALID ONLY WHEN SIGNED AND DATED.

DETACH AND RETURN THIS PORTION ONLY

FIBROBIOLOGICS, INC.



The Board of Directors recommends you vote FOR the following proposal:

For Against Abstain

1. To approve, in accordance with Nasdaq Listing Rule 5635(d), the issuance of up to 8,163,266 shares of common stock issuable upon the exercise of outstanding common warrants issued pursuant to that certain Securities Purchase Agreement, dated June 25, 2026, by and among the Company and the purchaser party thereto, or the SPA, and up to 285,714 shares of common stock issuable upon the exercise of outstanding common warrants issued pursuant to that certain Engagement Letter, dated November 10, 2025, between the Company and H.C. Wainwright & Co., LLC, as amended on March 12, 2026, or the Engagement Letter, in connection with the SPA.

☐ ☐ ☐

NOTE: Such other business as may properly come before the meeting or any adjournment thereof.

Please sign exactly as your name(s) appear(s) hereon. When signing as attorney, executor, administrator, or other fiduciary, please give full title as such. Joint owners should each sign personally. All holders must sign. If a corporation or partnership, please sign in full corporate or partnership name by authorized officer.

Signature [PLEASE SIGN WITHIN BOX] Date

Signature (Joint Owners) Date

Important Notice Regarding the Availability of Proxy Materials for the Special Meeting:
The Notice and Proxy Statement is available at www.proxyvote.com.

T02363-S44622

FIBROBIOLOGICS, INC.
Special Meeting of Stockholders
September 17, 2026 11:00 AM Central Time
This proxy is solicited by the Board of Directors

The stockholder(s) hereby appoint(s) Pete O'Heeron and Jason D. Davis, or either of them, as proxies, each with the power to appoint his substitute, and hereby authorizes them to represent and to vote, as designated on the reverse side of this ballot, all of the shares of common stock of FIBROBIOLOGICS, INC. that the stockholder(s) is/are entitled to vote at the Special Meeting of Stockholders to be held at 11:00 AM, Central Time on September 17, 2026, at the virtual meeting at: www.virtualshareholdermeeting.com/FBLG2026SM2, and any adjournment or postponement thereof.

This proxy, when properly executed, will be voted in the manner directed herein. If no such direction is made, this proxy will be voted in accordance with the Board of Directors' recommendations.

Continued and to be signed on reverse side