

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

FORM S-3

REGISTRATION STATEMENT

UNDER THE SECURITIES ACT OF 1933

FibroBiologics, Inc.

(Exact name of registrant as specified in its charter)

Delaware

(State or other jurisdiction of
incorporation or organization)

2834

(Primary Standard Industrial Classification
Code Number)

86-3329066

(I.R.S. Employer
Identification Number)

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

(Address, including zip code, and telephone number, including area code, of registrant's principal executive offices)

**Pete O'Heeron
Chief Executive Officer
FibroBiologics, Inc.
9350 Kirby Drive
Suite 300
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(281) 671-5150**

(Name, address, including zip code, and telephone number, including area code, of agent for service)

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General Counsel
FibroBiologics, Inc.
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Approximate date of commencement of proposed sale to the public: **From time to time after this registration statement becomes effective.**

If the only securities being registered on this Form are being offered pursuant to dividend or interest reinvestment plans, please check the following box. ☐

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

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

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

If this Form is a registration statement pursuant to General Instruction I.D. or a post-effective amendment thereto that shall become effective upon filing with the Commission pursuant to Rule 462(e) under the Securities Act, check the following box. ☐

If this Form is a post-effective amendment to a registration statement filed pursuant to General Instruction I.D. filed to register additional securities or additional classes of securities pursuant to Rule 413(b) under the Securities Act, check the following box. ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of “large accelerated filer,” “accelerated filer,” “smaller reporting company,” and “emerging growth company” in Rule 12b-2 of the Exchange Act.

Large accelerated filer	☐	Accelerated filer	☐
Non-accelerated filer	☒	Smaller reporting company	☒
		Emerging growth company	☒

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 7(a)(2)(B) of the Securities Act. ☐

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

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

PRELIMINARY PROSPECTUS

**SUBJECT TO COMPLETION, DATED
JULY 9, 2026**



FibroBiologics, Inc.

Up to 12,530,613 Shares of Common Stock

This prospectus relates to the registration of the resale or other disposition, from time to time, of up to 12,530,613 shares of our common stock, par value \$0.00001 per share, or the common stock, by the selling stockholders named in this prospectus, or the Selling Stockholders. The shares of our common stock to which this prospectus relates consist of (i) up to 4,081,633 shares of common stock issuable upon the exercise of pre-funded warrants to purchase common stock, or the Pre-Funded Warrants, (ii) up to 4,081,633 shares of common stock issuable upon the exercise of warrants to purchase common stock, or the Short-term Warrants, (iii) up to 4,081,633 shares of common stock issuable upon the exercise of warrants to purchase common stock, or the Long-term Warrants and, together with the Short-term Warrants, the Warrants, and (iv) up to 285,714 shares of common stock issuable upon the exercise of placement agent warrants issued concurrently with the Warrants, or Placement Agent Warrants and, together with the Pre-Funded Warrants, and the Warrants, the June Warrants.

The shares of common stock being registered for resale by the Selling Stockholders in the registration statement of which this prospectus forms a part were issued and sold pursuant to a private placement, or Private Placement, which was priced at the market at a combined purchase price per Pre-Funded Warrant and accompanying Warrants of \$0.73499. In addition, the Company issued to the placement agent, or its designees, for the Private Placement, the Placement Agent Warrants to purchase up to an aggregate of 285,714 shares of common stock, at an exercise price equal to \$0.9188 per share. The Warrants and Placement Agent Warrants will be exercisable upon receipt of the Stockholder Approval (as defined below).

We are not selling any securities under this prospectus and will not receive any of the proceeds from the sale of our common stock by the Selling Stockholders. However, we may receive up to approximately \$6.3 million aggregate gross proceeds upon exercise of the June Warrants by the Selling Stockholders. See “*Prospectus Summary—The Securities Purchase Agreement*” on page 2 of this prospectus for a description of the securities purchase agreement and June Warrants and “*Principal and Selling Stockholders*” on page 10 of this prospectus for additional information regarding the Selling Stockholders.

The Selling Stockholders may sell or otherwise dispose of the common stock described in this prospectus in a number of different ways and at varying prices. We will pay the expenses incurred in registering under the Securities Act the offer and sale of the shares of the common stock to which this prospectus relates by the Selling Stockholders, including our legal and accounting fees, but all selling and other expenses incurred by the Selling Stockholders will be paid by them. The Securities and Exchange Commission may take a position that each of the Selling Stockholders is an “underwriter” within the meaning of Section 2(a)(11) of the Securities Act of 1933, as amended, or the Securities Act. See the sections “*About this Prospectus*” on page 1 and “*Plan of Distribution*” on page 15 of this prospectus for more information. No securities may be sold without delivery of this prospectus and any applicable prospectus supplement describing the method and terms of the offering of such securities. You should carefully read this prospectus and any applicable prospectus supplement before you invest in our securities.

Our common stock is listed on the Nasdaq Capital Market under the symbol “FBLG”. On July 8, 2026, the last reported sales price of our common stock was \$0.8168 per share.

We are an “emerging growth company” and a “smaller reporting company” as defined under the federal securities laws and, as such, have elected to comply with certain reduced public company reporting requirements for this prospectus and may elect to do so in future filings. See “*Prospectus Summary—Implications of Being an Emerging Growth Company and a Smaller Reporting Company.*”

Investing in our common stock involves a high degree of risk. See the “*Risk Factors*” section beginning on page 6 of this prospectus for the risks and uncertainties you should consider before investing in our common stock.

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

Prospectus Dated , 2026

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You should rely only on the information contained in this prospectus or contained in any free writing prospectus filed with the Securities and Exchange Commission. Neither we nor the Selling Stockholders have authorized anyone to provide any information different from, or in addition to, the information contained in this prospectus and in any free writing prospectuses we have prepared or that have been prepared on our behalf or to which we have referred you. Neither we nor the Selling Stockholders take responsibility for, and can provide no assurance as to the reliability of, any other information that others may give you. The Selling Stockholders are offering to sell, and seeking offers to buy, shares of our common stock only under the circumstances and in jurisdictions where it is lawful to do so. The information contained in this prospectus is current only as of its date, regardless of the time of delivery of this prospectus or of any sale of our common stock. Our business, financial condition, results of operations and prospects may have changed since such date.

For investors outside the United States: Neither we nor the Selling Stockholders have done anything that would permit the use of or possession or distribution of this prospectus or any related free writing prospectus in any jurisdiction where action for that purpose is required, other than in the United States. Persons outside the United States who come into possession of this prospectus must inform themselves about, and observe any restrictions relating to, the offering of the shares of our common stock by the Selling Stockholders and the distribution of this prospectus outside the United States.

ABOUT THIS PROSPECTUS

This prospectus is a part of a registration statement on Form S-3 that we filed with the Securities and Exchange Commission, or the SEC, using a “shelf” registration or continuous offering process. Under this process, the Selling Stockholders may, from time to time, sell the common stock covered by this prospectus in the manner described in the section titled “*Plan of Distribution*.” Additionally, we may provide a prospectus supplement to add information to, or update or change information contained in, this prospectus, including the section titled “*Plan of Distribution*.” You may obtain this information without charge by following the instructions under the “*Where You Can Find Additional Information*” section of this prospectus. You should read this prospectus and any prospectus supplement before deciding to invest in our common stock.

This prospectus contains summaries of certain provisions contained in some of the documents described herein, but reference is made to the actual documents for complete information. All of the summaries are qualified in their entirety by the actual documents. Copies of some of the documents referred to herein have been filed or will be filed as exhibits to the registration statement of which this prospectus is a part, and you may obtain copies of those documents as described under “*Where You Can Find Additional Information*.”

PROSPECTUS SUMMARY

The following is a summary of selected information contained elsewhere in this prospectus and any documents incorporated by reference herein or therein. It does not contain all of the information that you should consider before buying our securities. You should read this prospectus and any documents incorporated by reference herein or therein in their entirety. Unless otherwise indicated or the context otherwise requires, all references in this prospectus to “we,” “us,” “our,” the “Company,” “FibroBiologics” and similar terms refer to FibroBiologics, Inc. and its subsidiary.

Overview

We are a clinical-stage biotechnology company focused on developing and commercializing fibroblast-based therapies for patients suffering from chronic diseases with significant unmet medical needs, including wound healing, multiple sclerosis, degenerative disc disease, psoriasis, certain cancers, and potential human longevity applications including thymic involution reversal using a thymic organoid. Our most advanced product candidates are CYWC628, CYPS317, CYMS101 and CybroCell™.

The Securities Purchase Agreement

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 in lieu of shares of the Company’s common stock, \$0.00001 par value per share, or the common stock, 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 may be exercised commencing on the issuance date, in whole or in part, at any time by means of a cashless (net) exercise, and do not expire. If the holders of the Pre-Funded Warrants and Warrants exercise such warrants in full for cash following stockholder approval, as applicable, we would receive additional gross proceeds of approximately \$6.0 million. However, we cannot predict when or if the Pre-Funded Warrants and Warrants will be exercised for cash or exercised at all. It is possible that the Pre-Funded Warrants and the Warrants may be exercised on a cashless (net) basis as described below or may expire and never be exercised. The exercise price of the Pre-Funded Warrants and the Warrants is subject to adjustment for customary stock splits, stock dividends, stock combinations, and similar capital transactions or such other event as further described in the Pre-Funded Warrants and the Warrants.

H.C. Wainwright & Co., LLC, or Wainwright, 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, 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.

We intend to submit the issuance of the shares of common stock upon exercise of the Pre-Funded Warrants, the Warrants, and the Placement Agent Warrants, or the Warrant Shares, for approval of our shareholders, but there can

be no assurance that such approval will be obtained. Holders 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.

If at the time of exercise of the Warrants or the Placement Agent Warrants there is no effective registration statement registering the Warrant Shares for resale or the prospectus contained therein is not available for the resale of the Warrant Shares by the holder of the Warrants or the Placement Agent Warrants, then the Warrants and Placement Agent Warrants may also be exercised, in whole or in part, by cashless (net) exercise. The exercise price of the June Warrants is subject to customary adjustment for stock splits, stock dividends, stock combinations, and similar capital transactions or such other event as further described in the June Warrants.

The Registration Rights Agreement

On June 25, 2026, we also entered into a registration rights agreement, or the RRA, with the Purchaser in which we agreed to file with the Securities and Exchange Commission, or the SEC, a registration statement covering the resale of the Warrant Shares within fifteen calendar days after the date of the RRA, to use our best efforts to cause the registration statement to become effective by the 45th calendar day following the effective date of the RRA (or, in the event of a “full review” by the SEC, the 75th calendar day) 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 the Company to be in compliance with the current public information requirement under Rule 144.

Other Recent Developments

Nasdaq Listing Compliance

As previously disclosed, on July 1, 2025, we received a notification letter from the Nasdaq Listing Qualifications Staff, or the Staff, notifying us that the closing bid price of our shares of common stock was below the minimum closing bid price of \$1.00 per share during the previous 30 consecutive trading days, as required for continued listing on the Nasdaq Capital Market, or the Bid Price Rule. We were provided an initial period of 180 calendar days, or until December 29, 2025, to regain compliance with the Bid Price Rule. To regain compliance, the closing bid price of our common stock had to be \$1.00 per share or more for a minimum of 10 consecutive business days at any time before December 29, 2025. If we did not regain compliance with the Bid Price Rule by December 29, 2025, we would be eligible for an additional 180 calendar day compliance period if we met the continued listing requirement for market value of publicly held shares, or MVLS, and all other initial listing standards for the Nasdaq Capital Market, except the bid price requirement, and provided written notice to Nasdaq of our intention to cure the deficiency during the second compliance period. On August 4, 2025, we received a notification letter from the Staff notifying us that our MVLS had closed below the minimum \$35 million threshold required for continued listing on the Nasdaq Capital Market, or the Equity Rule, for the previous thirty (30) consecutive trading day period. We were provided a 180-calendar day period to regain compliance with the Equity Rule, through February 2, 2026.

We evaluated available options to regain compliance with the applicable rules. To that end, on February 20, 2026, our stockholders approved the implementation of a reverse split of our outstanding common stock, at a ratio ranging from any whole number between and including 1-for-5 and 1-for-30 shares, with the ratio to be determined by our board of directors.

On March 9, 2026, we received a letter from the Nasdaq Hearings Panel, or the Panel, confirming that we demonstrated compliance with the Equity Rule. The compliance determination also noted that we remain subject to a Mandatory Panel Monitor with respect to the Equity Rule for a period of one year from March 9, 2026. If within that one-year monitoring period we fail to satisfy the Equity Rule, we will not be permitted to provide the Nasdaq Listing Qualifications Staff with a compliance plan nor would the Staff be permitted to grant additional time to regain compliance. Instead, the Staff will issue a delist determination, at which time we may request a new hearing before a Nasdaq Hearings Panel. Such request would stay any delisting action by Nasdaq at least pending the conclusion of the hearing process.

On April 17, 2026, we received formal notice from Nasdaq that we have demonstrated compliance with the Bid Price Rule and all other applicable criteria for continued listing on the Nasdaq Capital Market. Accordingly, the previously disclosed listing matter has been closed. We were also informed that we will remain subject to a Mandatory Panel Monitor for a period of one year from April 17, 2026. If within that one-year monitoring period we fail to maintain compliance with the Bid Price Rule, we will not be afforded a cure period to regain compliance with the Bid Price Rule. Instead, the Staff will issue a delist determination, at which time we may request a new hearing before a Nasdaq Hearings Panel. Such request would stay any further delisting action by Nasdaq at least pending the conclusion of the hearing process.

Reverse Stock Split

On March 25, 2026, our board of directors approved a reverse split of our outstanding common stock at a ratio of 1-for-20 shares. The reverse stock split became effective as of 12:01 a.m. Eastern Time on March 30, 2026. As a result of the reverse stock split, every 20 shares of our issued and outstanding common stock automatically were combined into one share of common stock. The reverse stock split reduced the number of shares of our outstanding common stock from 70,256,883 shares to approximately 3,512,845 shares, subject to adjustment for fractional shares. The number of authorized shares of common stock and preferred stock under our amended and restated certificate of incorporation, as amended, was not reduced in connection with the reverse stock split. Our board of directors determined that implementing the reverse split was appropriate to regain compliance with the Bid-Price Rule and to broaden potential investor interest. **All share and per share numbers in this prospectus give effect to the reverse split unless otherwise stated; however, any documents incorporated by reference herein that were filed prior to March 30, 2026 do not give effect to the reverse stock split, unless otherwise stated.**

April Offering

On March 31, 2026, we commenced a best-efforts public offering, or the April Offering, of (i) 1,028,788 shares of common stock, (ii) pre-funded warrants in lieu of shares to purchase up to 1,243,940 shares of common stock, or the April Pre-Funded Warrants, and (iii) warrants to purchase one share of common stock for each share of common stock and/or April Pre-Funded Warrant purchased for an aggregate of up to 2,272,728 shares of common stock, or the April Warrants. Certain of the investors purchased their shares and pre-funded warrants, together with the accompanying April Warrants, pursuant to a securities purchase agreement, dated March 31, 2026, by and among the Company and such investors, or the April Purchase Agreement. The combined public offering price for each share of common stock, together with an accompanying April Warrant to purchase one share of common stock, is \$1.32, and the combined public offering price for each April Pre-Funded Warrant, together with an accompanying April Warrant to purchase one share of common stock, is \$1.31999 (equal to the offering price, minus \$0.00001, the exercise price of each April Pre-Funded Warrant). The exercise price of the April Warrants is \$1.32 per share. The exercisability of the April Warrants was initially subject to stockholder approval as described below. The April Offering closed on April 2, 2026.

The net proceeds to the Company from the April Offering were approximately \$2.5 million, after deducting placement agent fees and offering expenses payable by the Company. Additionally, if the holders of the April Warrants exercise such warrants in full for cash following stockholder approval, we would receive additional gross proceeds of approximately \$3.0 million. However, we cannot predict when or if the April Warrants will be exercised for cash or exercised at all. It is possible that the April Warrants may be exercised on a cashless (net) basis as described below or may expire and never be exercised.

Wainwright acted as exclusive placement agent in connection with the April Purchase Agreement, pursuant to the Engagement Letter. Pursuant to the Engagement Letter and the April Purchase Agreement, in connection with the closing of the registered direct offering, we issued to designees of Wainwright (or their assignees) warrants to purchase 7.0% of the number of Shares of common stock sold in the April Offering (or warrants to purchase up to 159,091 shares of common stock), at an exercise price of \$1.65 per share, or the April Placement Agent Warrants. The exercisability of the April Placement Agent Warrants is subject to stockholder approval as described below. The April Placement Agent Warrants will expire five years from the commencement of sales in the April Offering. Except as provided above, the April Placement Agent Warrants have substantially the same terms as the April Warrants.

On June 22, 2026, we held our 2026 Annual Meeting of Stockholders, or the Annual Meeting, during which our stockholders approved the issuance of up to 2,272,728 shares of common stock issuable upon the exercise of the April Warrants and the April Placement Agent Warrants, or together, the April Warrant Shares. As a result, the April

Warrants will expire five years following the date of the stockholder approval. The April Placement Agent Warrants will expire five years from the commencement of sales in the April Offering. A holder of the April Warrants or the April Placement Agent Warrants will not have the right to exercise any portion of such warrants if such holder, together with its affiliates, would beneficially own in excess of 4.99% of the number of common stock outstanding immediately after giving effect to such exercise. If at the time of exercise of the April Warrants or the April Placement Agent Warrants, as the case may be, there is no effective registration statement registering the April Warrant Shares for resale or the prospectus contained therein is not available for the resale of the April Warrant Shares by their holder, then such warrants may also be exercised, in whole or in part, by cashless (net) exercise. The exercise price of the April Warrants and the April Placement Agent Warrants is subject to customary adjustment for stock splits, stock dividends, stock combinations, and similar capital transactions or such other event as further described in such warrants.

Lease Termination Agreement

On April 3, 2026, we entered into a Sublease Buyout Agreement, or the Lease Termination Agreement, with United Fire & Casualty Co. (doing business as United Fire Group), or the Sublandlord, to terminate that certain Sublease Agreement, which was effective as of October 5, 2022, or the Sublease, pursuant to which Sublandlord subleased to the Company certain premises located at the third floor of 455 E. Medical Center Blvd, Webster, County of Harris, Texas 77598. The Lease Termination Agreement terminated the Sublease effective April 2, 2026, successfully concluding the Sublease well ahead of its original expiration date of November 30, 2027. We resolved our remaining rent obligations with a single payment of \$45,108.25 and expect to save approximately \$0.8 million in future rent payments.

This strategic consolidation follows the 2025 opening of our state-of-the-art laboratory facility, encompassing over 10,000 square feet of dedicated lab and office space. By eliminating redundant office costs approximately 18 months ahead of schedule, we strengthen our operational efficiency and redirect resources toward our core mission of advancing fibroblast-based therapeutics.

Amended and Restated Bylaws

On April 16, 2026, our board of directors amended and restated our Amended and Restated Bylaws, or the Bylaws, to amend Section 2.07 of the Bylaws to change the requirement for quorum at a meeting of the stockholders from a majority of voting power to one-third of the voting power.

Executive Grants

On May 4, 2026, or the Grant Date, the compensation committee of our board of directors granted, pursuant to our 2022 Stock Plan, options to purchase 92,410 shares of common stock to Pete O’Heeron, our Chief Executive Officer, and options to purchase 61,607 shares of common stock to each of Jason D. Davis, our Chief Financial Officer, Hamid Khoja, Ph.D., our Chief Scientific Officer, and Ruben A. Garcia, our General Counsel. The options are exercisable at an exercise price of \$1.38 per share. One fourth (1/4th) of the option shares shall vest on the one-year anniversary of the Grant Date, and the remaining balance of the option shares shall vest in thirty-six (36) equal consecutive monthly installments thereafter until fully vested so long as the grantee remains in continuous service through such applicable vesting periods.

At The Market Offering Agreement

On May 1, 2026, we entered into that certain At The Market Offering Agreement, or the Sales Agreement, with Wainwright as sales agent, or the Sales Agent, under which we may issue and sell shares of our common stock from time to time through or to the Sales Agent, or the ATM Offering. The shares of common stock to be sold under the Sales Agreement, if any, will be issued and sold pursuant to our shelf registration statement on Form S-3 (Registration No. 333-284663), which was filed with the SEC on February 3, 2025, and declared effective by the SEC on February 10, 2025, including the base prospectus contained therein, a prospectus supplement which was filed with the SEC on May 1, 2026, and the Updated ATM Prospectus Supplement (as defined below). We expect to use net proceeds, if any, from the ATM Offering over time as a source for working capital and general corporate purpose.

Sales of our common stock through the Sales Agent, if any, will be made by any method that is deemed an “at the market offering” as defined in Rule 415 promulgated under the Securities Act. The Sales Agent will use its commercially reasonable efforts, consistent with applicable state and federal law, rules and regulations and rules of the Nasdaq Capital Market, to make such offerings consistent with its normal trading and sales practices. We agreed to pay the Sales Agent an aggregate of 3.0% of the gross proceeds of the sales price per share of common stock sold through the Sales Agent under the Sales Agreement. In addition, we also will reimburse the Sales Agent for \$100,000 for reasonable fees and expenses incurred by its legal counsel in connection with entering into the transactions contemplated by the Sales Agreement (excluding any periodic due diligence fees) and up to \$5,000 per due diligence session update in connection with filing our Annual Report on Form 10-K or a material amendment to the shelf registration statement on Form S-3, prospectus or prospectus supplement, and \$3,500 per applicable due diligence update session in connection with filing Quarterly Reports on Form 10-Q pursuant to the terms of the Sales Agreement, plus any incidental expense incurred by the Sales Agent in connection therewith. We also may sell some or all of the shares of common stock to the Sales Agent as principal for its own account at a price agreed upon at the time of sale. We have agreed to provide the Sales Agent and certain affiliates of the Sales Agent with customary indemnification and contribution rights, including for liabilities under the Securities Act.

On May 5, 2026, we filed a prospectus supplement to increase the maximum number of shares of common stock issuable pursuant to the ATM Offering to up to an aggregate offering price of up to \$7,500,000, or the Updated ATM Prospectus Supplement. As of such date, 71,830 shares of common stock had been sold under the Sales Agreement.

2026 Equity and Incentive Compensation Plan

On June 22, 2026, we held our Annual Meeting, during which our stockholders approved our 2026 Equity and Incentive Compensation Plan, or the 2026 Plan, which succeeds our 2022 Stock Plan, or the Predecessor Plan. On April 22, 2026, upon the recommendation of the compensation committee of our board of directors, or the Compensation Committee, the board of directors approved and adopted, subject to the approval of our stockholders at the Annual Meeting, the 2026 Plan to succeed the Predecessor Plan. Upon stockholder approval at the Annual Meeting, the 2026 Plan became effective as of June 22, 2026.

In general, the 2026 Plan will be administered by the Committee and will enable the Committee to provide equity-based or cash-based compensation, including in the form of stock options, appreciation rights, restricted stock, restricted stock units, performance shares, performance units, cash incentive awards and certain other awards based on or related to shares of our common stock. The purpose of these awards is to attract and retain employees, officers, consultants, and non-employee directors, and to provide such persons with incentives and rewards for service or performance. The 2026 Plan permits the Committee to make certain performance-based awards to participants under the 2026 Plan, which awards will be earned based on the achievement of certain management objectives, all as further described in the 2026 Plan.

Subject to adjustment as described in the 2026 Plan, and subject to the 2026 Plan’s share counting rules, as of June 22, 2026, 2,061,968 shares of our common stock (consisting of 2,000,000 new shares approved for issuance at the Annual Meeting, plus 61,968 shares that remained available for issuance under the Predecessor Plan), are available for awards granted under the 2026 Plan. Pursuant to the “evergreen” provisions of the 2026 Plan, the number of available shares under the 2026 Plan will be increased on the first day of each fiscal year beginning in 2027 and ending in 2036, by an amount equal to the lesser of (a) 4% of the shares of Common Stock outstanding on the last day of the preceding fiscal year and (b) such smaller number of shares as determined by the Board. Shares underlying certain awards under the 2026 Plan and certain awards under the Predecessor Plan that are cancelled or forfeited, expire, are settled for cash, or are unearned, will again be available under the 2026 Plan.

The 2026 Plan also provides that, subject to adjustment as described in the 2026 Plan, the aggregate number of shares actually issued or transferred upon the exercise of incentive stock options will not exceed 2,000,000 shares, and non-employee members of our board of directors will not be granted more than \$800,000 in compensation for such service in any one calendar year, determined as described in the 2026 Plan. Our board of directors generally will be able to amend the 2026 Plan, in certain circumstances as described in the 2026 Plan.

Annual Director Grants

On June 23, 2026, in accordance with our Non-Employee Director Compensation Policy, as amended, the Compensation Committee granted, pursuant to the 2026 Plan, options to purchase 30,803 shares of common stock to each of our non-employee directors continuing in office after the Annual Meeting, or the Director Options. The Director Options will vest in full upon the earlier of (i) the first anniversary of the date of grant or (ii) the date of the next annual meeting, and are exercisable at an exercise price of \$0.7503 per share.

Board Changes

Stacy Coen did not stand for re-election to the Board at the Annual Meeting. Accordingly, her term as a Class III director expired at the conclusion of the Annual Meeting. On July 2, 2026, Matt Link notified us that he was resigning from the Board, effective as of July 2, 2026. On July 8, 2026, the Board appointed Kathleen Rubins, Ph.D. as a Class III director of the Board, effective July 8, 2026, to serve until the expiration of her term at the 2029 annual meeting of stockholders. Dr. Rubins was also appointed to serve on the Board's Audit Committee, Compensation Committee and Governance and Nominating Committee.

Implications of Being an Emerging Growth Company and a Smaller Reporting Company

We are an "emerging growth company" as defined in the Securities Act of 1933, or the Securities Act, as modified by the Jumpstart Our Business Startups Act of 2012, or the JOBS Act. As such, we are eligible to take, and intend to take, advantage of certain exemptions from various reporting requirements applicable to other public companies that are not emerging growth companies for as long as we continue to be an emerging growth company, including (i) the exemption from the auditor attestation requirements with respect to internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act of 2002, or the Sarbanes-Oxley Act, (ii) the exemptions from say-on-pay, say-on-frequency and say-on-golden parachute voting requirements and (iii) reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements.

We will remain an emerging growth company until the earliest of (i) December 31, 2028, (ii) the last day of the fiscal year in which we have total annual gross revenue of at least \$1.235 billion, (iii) the last day of the fiscal year in which we are deemed to be a "large accelerated filer" as defined in Rule 12b-2 under the Securities Exchange Act of 1934, as amended, or the Exchange Act, which would occur if the market value of our common stock held by non-affiliates was \$700.0 million or more as of the last business day of the second fiscal quarter of such year or (iv) the date on which we have issued more than \$1.0 billion in non-convertible debt securities during the prior three-year period.

In addition, the JOBS Act provides that an emerging growth company can take advantage of an extended transition period for complying with new or revised accounting standards. This allows an emerging growth company to delay the adoption of certain accounting standards until those standards would otherwise apply to private companies. We have elected to avail ourselves of this extended transition period and, as a result, we may adopt new or revised accounting standards on the relevant dates on which adoption of such standards is required for non-public companies instead of the dates required for other public companies.

We are also a "smaller reporting company" as defined in the Exchange Act. We may continue to be a smaller reporting company even after we are no longer an emerging growth company. We may take advantage of certain of the scaled disclosures available to smaller reporting companies until the fiscal year following the determination that our common stock held by non-affiliates is \$250 million or more measured on the last business day of our second fiscal quarter, or our annual revenues are less than \$100 million during the most recently completed fiscal year and our common stock held by non-affiliates is \$700 million or more measured on the last business day of our second fiscal quarter.

Corporate Information

We were formed in April 2021 as a Texas limited liability company under the name FibroBiologics, LLC, and converted to a Delaware corporation in December 2021 under the name Fibrobiologics, Inc. On April 12, 2023, we changed our name to FibroBiologics, Inc. Our principal executive offices are located at 9350 Kirby Drive, Suite 300, Houston, Texas 77054. Our telephone number is (281) 671-5150 and our website address is www.fibrobiologics.com. Information contained on or that can be accessed through our website is neither a part of nor incorporated by reference into this prospectus, and you should not consider information on our website to be part of this prospectus. Our website address is included in this prospectus as an inactive textual reference only.

THE OFFERING

The following is a brief summary of the terms of this offering. For a more complete description of the terms of the common stock offered hereby, see “*Principal and Selling Stockholders*” and “*Plan of Distribution*.”

Common stock offered by the Selling Stockholders	Up to 12,530,613 shares of common stock, consisting of (i) up to 4,081,633 shares of common stock issuable upon the exercise of Pre-Funded Warrants, (ii) up to 4,081,633 shares of common stock issuable upon the exercise of Short-term Warrants, (iii) up to 4,081,633 shares of common stock issuable upon the exercise of Long-term Warrants, and (iv) up to 285,714 shares of common stock issuable upon the exercise of Placement Agent Warrants.
Common stock outstanding prior to this offering	6,080,560 shares of common stock as of July 8, 2026.
Common stock to be outstanding after this offering	18,611,173 shares of common stock, assuming all Pre-Funded Warrants, Short-term Warrants, Long-term Warrants and Placement Agent Warrants are exercised in full.
Terms of the offering	The Selling Stockholders will determine when and how they will dispose of the shares of common stock registered under this prospectus for resale. See “ <i>Plan of Distribution</i> .”
Use of proceeds	We will not receive any proceeds from the sale of shares of common stock by the Selling Stockholders pursuant to this prospectus. We may receive up to approximately \$6.3 million in aggregate gross proceeds upon exercise of the June Warrants by the Selling Stockholders. See “ <i>Use of Proceeds</i> .”
Risk factors	Investing in our common stock involves a high degree of risk. You should carefully review and consider the “ <i>Risk Factors</i> ” section of this prospectus beginning on page 6 and the risk factors incorporated by reference herein for a discussion of factors to consider before deciding to invest in shares of our common stock.
Nasdaq Capital Market symbol	“FBLG”
Transfer Agent and Registrar	The transfer agent and registrar for our shares of common stock is VStock Transfer, LLC, with its business address at 18 Lafayette Place, Woodmere, NY 11598.

The numbers of shares of common stock outstanding prior to this offering does not include up to 12,530,613 shares issuable upon exercise of the Pre-Funded Warrants, Short-term Warrants, Long-term Warrants and Placement Agent Warrants. In addition, the numbers of shares of common stock outstanding prior to this offering and to be outstanding after this offering do not include:

- 563,032 shares of common stock issuable upon exercise of stock options outstanding under the Predecessor Plan;
 - 92,409 shares of common stock issuable upon exercise of stock options outstanding under the 2026 Plan;
 - 1,969,559 shares of common stock reserved for issuance under the 2026 Plan;
 - 515 shares of common stock underlying warrants that were issued in connection with the issuance of certain shares of Series B-1 preferred stock, par value \$0.00001 per share;
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- 125 shares of common stock issuable upon conversion of outstanding shares of Series C preferred stock, par value \$0.00001 per share, or the Series C Preferred Stock;
- 374,761 shares of common stock underlying the outstanding pre-funded warrants that were issued in a registered direct offering pursuant to a securities purchase agreement, dated November 18, 2025, with a single investor, at an exercise price of \$0.0002 per share;
- 605,510 shares of common stock underlying warrants that were issued in a concurrent private placement to the November 18 Offering, at an exercise price of \$6.60 per share;
- 223,878 shares of common stock issuable upon exercise of warrants that were issued in a private placement concurrent to a registered direct offering pursuant to a securities purchase agreement, dated November 24, 2025, with certain institutional investors, at an exercise price of \$6.80 per share, or the November 24 Offering;
- 15,668 shares of common stock issuable upon exercise of the warrants that were issued to the placement agent (or its designees) as compensation in connection with the November 24 Offering, at an exercise price of \$8.40 per share.
- 261,363 shares of common stock issuable upon exercise of warrants that were issued in a private placement concurrent to a registered direct offering pursuant to a securities purchase agreement, dated December 14, 2025, with certain institutional investors, at an exercise price of \$6.60 per share, or the December Offering;
- 18,294 shares of common stock issuable upon exercise of the warrants that were issued to the placement agent (or its designees) as compensation in connection with the December Offering, at an exercise price of \$8.20 per share;
- 2,272,728 shares of common stock underlying the April Warrants, at an exercise price of \$1.32 per share; and
- 159,091 shares of common stock issuable upon exercise of the April Placement Agent Warrants, at an exercise price of \$1.65 per share.

All share and per share numbers in this prospectus give effect to the 1-for-20 reverse stock split of our common stock that became effective on March 30, 2026, unless otherwise stated; however, any documents incorporated by reference herein that were filed prior to March 30, 2026 do not give effect to the reverse stock split, unless otherwise stated.

RISK FACTORS

An investment in our common stock involves a high degree of risk. Before you decide to invest in our common stock, you should carefully consider the following risks and uncertainties as well as the risks set forth under the section titled “Risk Factors” in our Annual Report on Form 10-K for the year ended December 31, 2022, or the Annual Report, and in our Quarterly Report on Form 10-Q for the three months ended March 31, 2023, or the Quarterly Report, both of which are incorporated by reference herein. You should also refer to the other information contained in this prospectus, and the documents incorporated by reference herein, including our financial statements and related notes and the section titled “Management’s Discussion and Analysis of Financial Condition and Results of Operations” included in our Annual Report and in our Quarterly Report. The occurrence of one or more of the events or circumstances described in such risk factors, alone or in combination with other events or circumstances, may have a material adverse effect on our business, reputation, revenue, financial condition, results of operations and future prospects, in which event you could lose all or part of your investment. The risks and uncertainties described and incorporated by reference herein are not intended to be exhaustive and are not the only ones we face. Additional risks and uncertainties not presently known to us or that we currently deem immaterial may also impair our business operations. This prospectus also contains forward-looking statements that involve risks and uncertainties. See “Cautionary Note Regarding Forward-Looking Statements.” Our actual results could differ materially and adversely from those anticipated in these forward-looking statements.

Risks Related to this Offering

Future issuance of our common stock upon conversion of outstanding preferred stock and exercise of outstanding options and warrants could result in substantial dilution to existing stockholders.

The issuance of shares of our common stock upon conversion of outstanding preferred stock and exercise of outstanding options and warrants would result in dilution to the interests of other holders of our common stock. See “*The Offering*” above.

Sales of a substantial number of our securities in the public market by our existing stockholders could cause the price of our shares of common stock to fall.

The Selling Stockholders can resell, under this prospectus, up to 12,530,613 shares of common stock from time to time after the date of this prospectus. If all of the 12,530,613 shares offered for resale by the Selling Stockholders under this prospectus were issued and outstanding as of the date hereof, such shares would represent approximately 67% of the total number of outstanding shares of common stock and approximately 69% of the total number of outstanding shares of common stock held by non-affiliates, in each case as of July 8, 2023.

In addition to the Private Placement, we may in the future engage in transactions pursuant to which we may issue shares of common stock or securities convertible into shares of our common stock. For example, in April 2023 we registered for resale up to 1,028,788 shares of common stock pursuant to a Registration Statement on Form S-1 (No. 333-294713) and in December 2022 we registered for resale up to 22,494,434 shares of common stock pursuant to a Registration Statement on Form S-1 (No. 333-292407), in each case by the selling stockholders named in the prospectus therein, pursuant to various private placement transactions. In addition, in May 2023, we entered into the Sales Agreement pursuant to which we may issue shares of common stock up to an aggregate offering price of \$7,500,000 in the ATM Offering.

Sales of a substantial number of our shares of common stock in the public market by the Selling Stockholders and/or by our other existing stockholders, or the perception that those sales might occur, could depress the market price of our shares of common stock and could impair our ability to raise capital through the sale of additional equity securities.

An investment in this offering may result in uncertain U.S. federal income tax consequences.

The U.S. federal, state, local and non-U.S. tax consequences of an investment in our securities may vary depending on a holder’s particular circumstances. Prospective investors are urged to consult their own tax advisors regarding such tax consequences.

CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus contains forward-looking statements that can involve substantial risks and uncertainties. All statements other than statements of historical facts contained in this prospectus, including statements regarding our future results of operations and financial position, business strategy, prospective products, product approvals, research and development costs, future revenue, timing and likelihood of success, plans and objectives of management for future operations, future results of anticipated products and prospects, plans and objectives of management are forward-looking statements. These statements involve known and unknown risks, uncertainties and other important factors that may cause our actual results, performance or achievements to be materially different from any future results, performance or achievements expressed or implied by the forward-looking statements.

In some cases, you can identify forward-looking statements by terms such as “anticipate,” “believe,” “contemplate,” “continue,” “could,” “estimate,” “expect,” “intend,” “may,” “plan,” “potential,” “predict,” “project,” “should,” “target,” “will,” or “would” or the negative of these terms or other similar expressions, although not all forward-looking statements contain these words. Forward-looking statements contained in this prospectus include, but are not limited to, statements about:

- the timing, progress and results of preclinical studies and clinical trials for our current and future product candidates, including statements regarding the timing of initiation and completion of studies or trials and related preparatory work, the period during which the results of the trials will become available and our research and development programs;
 - the timing, scope or likelihood of regulatory submissions, filings, and approvals, including final regulatory approval of our product candidates;
 - our ability to develop and advance product candidates into, and successfully complete, clinical trials;
 - our expectations regarding the size of the patient populations for our product candidates, if approved for commercial use;
 - the implementation of our business model and our strategic plans for our business, product candidates and technology;
 - our commercialization, marketing and manufacturing capabilities and strategy;
 - the pricing and reimbursement of our product candidates, if approved;
 - the rate and degree of market acceptance and clinical utility of our product candidates, in particular, and cell therapy, in general;
 - our ability to establish or maintain collaborations or strategic relationships or obtain additional funding;
 - our competitive position;
 - the scope of protection we and/or our licensors are able to establish and maintain for intellectual property rights covering our product candidates;
 - developments and projections relating to our competitors and our industry;
 - our estimates regarding expenses, future revenue, capital requirements and needs for additional financing;
 - our ability to maintain compliance with the continued listing requirements of the Nasdaq Capital Market;
 - the period over which we estimate our existing cash and cash equivalents will be sufficient to fund our future operating expenses and capital expenditure requirements;
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- the impact of laws and regulations; and
- the risks described in this prospectus, in our Annual Report under Item 1A, “Risk Factors,” and our other filings with the SEC.

We have based these forward-looking statements largely on our current expectations and projections about our business, the industry in which we operate and financial trends that we believe may affect our business, financial condition, results of operations and prospects, and these forward-looking statements are not guarantees of future performance or development. These forward-looking statements speak only as of the date of this prospectus and are subject to a number of risks, uncertainties and assumptions described in the section titled “*Risk Factors*” and elsewhere in this prospectus. Because forward-looking statements are inherently subject to risks and uncertainties, some of which cannot be predicted or quantified, you should not rely on these forward-looking statements as predictions of future events. The events and circumstances reflected in our forward-looking statements may not be achieved or occur and actual results could differ materially from those projected in the forward-looking statements. Except as required by applicable law, we do not plan to publicly update or revise any forward-looking statements contained herein, whether as a result of any new information, future events or otherwise.

In addition, statements that “we believe” and similar statements reflect our beliefs and opinions on the relevant subject. These statements are based upon information available to us as of the date of this prospectus, and while we believe such information forms a reasonable basis for such statements, such information may be limited or incomplete, and our statements should not be read to indicate that we have conducted an exhaustive inquiry into, or review of, all potentially available relevant information. These statements are inherently uncertain and you are cautioned not to unduly rely upon these statements.

TRADEMARKS, SERVICE MARKS AND TRADENAMES

We own or otherwise have rights to the trademarks, including those mentioned in this prospectus and the documents incorporated by reference herein and therein, used in conjunction with the operation of our business. This prospectus and the documents incorporated by reference herein and therein includes our own trademarks, which are protected under applicable intellectual property laws, as well as trademarks, service marks and tradenames of other entities, which are the property of their respective owners. Solely for convenience, trademarks, trade names and service marks referred to in this prospectus may appear without the ®, ™ or ™ symbols, but such references are not intended to indicate, in any way, that the applicable licensor will not assert, to the fullest extent under applicable law, its rights to these trademarks, service marks and tradenames. We do not intend our use or display of other entities' trademarks, service marks or tradenames to imply a relationship with, or endorsement or sponsorship of us by, any other entities.

USE OF PROCEEDS

The Selling Stockholders may, or may not, elect to sell shares of our common stock covered by this prospectus. To the extent the Selling Stockholders choose to sell shares of our common stock covered by this prospectus, we will not receive any proceeds from any such sales of our common stock. Although there can be no assurance that the holders of June Warrants will exercise all, or any part of, their June Warrants, the full exercise of the June Warrants for cash would result in gross proceeds to the Company of approximately \$6.3 million. In connection with any exercise of June Warrants, we currently intend to use the proceeds for working capital and general corporate purposes.

DIVIDEND POLICY

We have never declared or paid cash dividends on our common stock. We currently intend to retain all available funds and any future earnings to fund the development, commercialization and growth of our business, and therefore we do not anticipate declaring or paying any cash dividends on our common stock in the foreseeable future. Any future determination as to the declaration and payment of dividends, if any, will be at the discretion of our board of directors. Any such determination will also depend upon our business prospects, operating results, financial condition, capital requirements, general business conditions and other factors that our board of directors may deem relevant. Our future ability to pay cash dividends on our common stock may also be limited by the terms of any future debt securities or credit facility.

PRINCIPAL AND SELLING STOCKHOLDERS

Security Ownership of Certain Beneficial Owners and Management

The following table sets forth, as of July 8, 2026, certain information regarding the beneficial ownership of our voting securities (being our 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, (iv) all of our directors and executive officers as a group and (v) the number of shares of our common stock held by, and registered for resale by means of this prospectus for, the Selling Stockholders. 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.

We are registering the shares of our common stock included in this prospectus pursuant to the provisions of the securities purchase agreement we entered into with the Selling Stockholders in order to permit the Selling Stockholders to offer the shares included in this prospectus for resale from time to time. Except for the transactions contemplated by the securities purchase agreement, existing equity positions, and as set forth in the section titled “*Plan of Distribution*” in this prospectus, the Selling Stockholders have not had any material relationship with us within the past three years. No Selling Stockholder currently holds, nor has any Selling Stockholder held within the past three years, any position or office with us or any of our predecessors or affiliates.

The table below presents information regarding the Selling Stockholders and the shares of our common stock that may be resold by the Selling Stockholders from time to time under this prospectus. This table is prepared based on information supplied to us by the Selling Stockholders. The Selling Stockholders may sell some, all or none of the shares being offered for resale in this offering. We do not know how long the Selling Stockholders will hold the shares before selling them and, except as set forth in the section titled “*Plan of Distribution*” in this prospectus, we are not aware of any existing arrangements between the Selling Stockholders and any other stockholder, broker, dealer, underwriter or agent relating to the sale or distribution of the shares of our common stock being offered for resale by this prospectus.

Beneficial ownership is determined in accordance with Rule 13d-3(d) promulgated by the SEC under the Exchange Act, and includes shares of our common stock with respect to which the Selling Stockholders have sole or shared voting and investment power. In calculating the number of shares beneficially owned after the offering, we assume the resale by the Selling Stockholders of all of the shares of our common stock being offered for resale pursuant to this prospectus.

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 8, 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) 6,080,560 shares of our common stock outstanding; and (ii) 125 shares of our Series C Preferred Stock outstanding, each as of July 8, 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) 6,080,560 votes, being the total number of votes associated with 6,080,560 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	Beneficial Ownership Prior to the Offering					Shares of Common Stock Being Registered Pursuant to this Prospectus
	Common Stock		Series C Preferred Stock		Percentage of Total Voting Power ⁽¹⁾	
	Shares	%	Shares	%		
5% Stockholders:						
Pete O’Heeron, MSHA ⁽²⁾	399,323	6.5%	125	100%	25.9%	—
Golden Knight Incorporated, L.P. ⁽³⁾	630,493	9.9%	—	—	7.9%	—
Armistice Capital Master Fund Ltd. ⁽⁴⁾	667,500	9.9			8.0%	12,244,899
Named Executive Officers and Directors						
Pete O’Heeron, MSHA ⁽²⁾	399,323	6.5%	125	100%	25.9%	—
Hamid Khoja, Ph.D. ⁽⁵⁾	31,284	*	—	—	*	—
Ruben A. Garcia ⁽⁶⁾	21,640	*	—	—	*	—
Jason D. Davis ⁽⁷⁾	10,062	—	—	—	*	—
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⁾	498,559	8.0%	125	100%	26.9%	—
Selling Stockholders:						
Armistice Capital Master Fund Ltd. ⁽⁴⁾	667,500	9.9%	—	—	8.0%	12,244,899
Augustus Trading LLC ⁽¹²⁾	123,798	2.0	—	—	1.6	183,214
Noam Rubinstein ⁽¹³⁾⁽¹⁴⁾	42,473	*	—	—	*	62,857
Michael Mirsky ⁽¹³⁾⁽¹⁵⁾	18,341	*	—	—	*	27,143
Wilson Drive Holdings LLC ⁽¹⁶⁾	6,515	*	—	—	*	9,643
Charles Worthman ⁽¹³⁾⁽¹⁷⁾	1,931	*			*	2,857
Total Number of Shares Being Registered						12,530,613

	Beneficial Ownership After the Offering				
Name and address of Beneficial Owner	Common Stock		Series C Preferred Stock		Percentage of Total Voting Power ⁽¹⁾
	Shares	%	Shares	%	
5% Stockholders:					
Pete O’Heeron, MSHA ⁽²⁾	399,323	2.1%	125	100%	10.0%
Golden Knight Incorporated, L.P. ⁽³⁾	2,012,493	9.9%	—	—	9.2%
Armistice Capital Master Fund Ltd. ⁽⁴⁾	1,515,152	7.5%			7.0%
Named Executive Officers and Directors					
Pete O’Heeron, MSHA ⁽²⁾	399,323	2.1%	125	100%	10.0%
Hamid Khoja, Ph.D. ⁽⁵⁾	31,284	*	—	—	*
Ruben A. Garcia ⁽⁶⁾	21,640	*	—	—	*
Jason D. Davis ⁽⁷⁾	10,062	*	—	—	*
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⁾	498,559	2.7%	125	100%	10.4%
Selling Stockholders:					
Armistice Capital Master Fund Ltd. ⁽⁴⁾	1,515,152	7.5%	—	—	7.0%
Augustus Trading LLC ⁽¹²⁾	123,798	*	—	—	*
Noam Rubinstein ⁽¹³⁾⁽¹⁴⁾	42,473	*	—	—	*

Michael Mirsky ⁽¹³⁾⁽¹⁵⁾	18,341	*	—	—	*
Wilson Drive Holdings LLC ⁽¹⁶⁾	6,515	*	—	—	*
Charles Worthman ⁽¹³⁾⁽¹⁷⁾	1,931	*	—	—	*

* 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. Each of the 125 shares of Series C Preferred Stock held 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 prospectus.
- (3) Shares of common stock include, before the offering, 337,493 shares of common stock and 293,000 shares of common stock issuable upon the exercise of warrants, and after the offering, 337,493 shares of common stock and 1,675,000 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, before the offering, 667,500 shares of common stock issuable upon the exercise of warrants, and after the offering, 1,515,152 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. Assumes the sale of all shares of our common stock being offered for resale pursuant to this prospectus.
- (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 9,000 shares of common stock and 12,640 vested stock options to purchase common stock.
- (7) Shares of common stock include 3,500 shares of common stock and 6,562 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 179,676 vested stock options to purchase common stock. Each of the 125 shares of Series C Preferred Stock held 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 prospectus.
- (12) Shares of common stock include, before the offering, 123,798 shares of common stock issuable upon the exercise of warrants, and after the offering, 123,798 shares of common stock issuable upon the exercise of warrants. Orsium Capital LLC, the authorized agent to Augustus Trading LLC, has discretionary authority to vote and dispose of the securities held by Augustus Trading LLC and may be deemed to be the beneficial owner of these

securities. Olivier Morali, in his capacity as managing member of Orsium Capital LLC, may also be deemed to have investment discretion and voting power over the shares held by Augustus Trading LLC. Orsium Capital LLC and Mr. Morali each disclaims any beneficial ownership of these securities. The business address of the Selling Stockholder is 430 Park Ave, 3rd Floor, New York NY 10022. Assumes the sale of all shares of our common stock being offered for resale pursuant to this prospectus.

- (13) Each of these Selling Stockholders is affiliated with Wainwright, the placement agent in connection with the Offering. Wainwright is a registered broker dealer with a business address of 430 Park Ave, 3rd Floor, New York, NY 10022, and each has the voting and dispositive power over the securities held. Each of these Selling Stockholders acquired the Placement Agent Warrants in the ordinary course of business and, at the time such securities were acquired, each of these Selling Stockholders had no agreement or understanding, directly or indirectly, with any person to distribute such securities.
 - (14) Shares of common stock include, before the offering, 42,473 shares of common stock issuable upon the exercise of warrants, and after the offering, 42,473 shares of common stock issuable upon the exercise of warrants. The business address of the Selling Stockholder is 430 Park Ave, 3rd Floor, New York NY 10022. Assumes the sale of all shares of our common stock being offered for resale pursuant to this prospectus.
 - (15) Shares of common stock include, before the offering, 18,341 shares of common stock issuable upon the exercise of warrants, and after the offering, 18,341 shares of common stock issuable upon the exercise of warrants. Assumes the sale of all shares of our common stock being offered for resale pursuant to this prospectus.
 - (16) Shares of common stock include, before the offering, 6,515 shares of common stock issuable upon the exercise of warrants, 529 shares of which are held directly by Craig Schwabe, and after the offering, 6,515 shares of common stock issuable upon the exercise of warrants, 529 shares of which are held directly by Craig Schwabe. Craig Schwabe is the managing member of Wilson Drive Holdings LLC and has the power to vote and dispose the securities held. Neither Wilson Drive Holdings LLC nor Mr. Schwabe is a broker-dealer. Mr. Schwabe is affiliated with the following registered broker-dealers: H.C. Wainwright & Co., LLC, Rodman & Renshaw LLC and Stockblock Securities LLC.. The securities were acquired in the ordinary course of business and, at the time the securities were acquired, the Selling Stockholder had no agreement or understanding, directly or indirectly, with any person to distribute such securities. The business address of the Selling Stockholder is 600 Lexington Avenue, 32nd Floor, New York, NY 10022. Assumes the sale of all shares of our common stock being offered for resale pursuant to this prospectus.
 - (17) Shares of common stock include, before the offering, 1,931 shares of common stock issuable upon the exercise of warrants, and after the offering, 1,931 shares of common stock issuable upon the exercise of warrants. Assumes the sale of all shares of our common stock being offered for resale pursuant to this prospectus.
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PLAN OF DISTRIBUTION

The shares of our common stock offered by this prospectus are being offered by the Selling Stockholders. The shares may be sold or distributed from time to time by the Selling Stockholders directly to one or more purchasers or through brokers, dealers, or underwriters who may act solely as agents at market prices prevailing at the time of sale, at prices related to the prevailing market prices, at negotiated prices, or at fixed prices, which may be changed. The sale of the shares of our common stock offered by this prospectus could be effected in one or more of the following methods:

- ordinary brokers' transactions;
- transactions involving cross or block trades;
- through brokers, dealers, or underwriters who may act solely as agents;
- "at the market" into an existing market for our common stock;
- in other ways not involving market makers or established business markets, including direct sales to purchasers or sales effected through agents;
- in privately negotiated transactions;
- any combination of the foregoing; or
- any other method permitted pursuant to applicable law.

In order to comply with the securities laws of certain states, if applicable, the shares may be sold only through registered or licensed brokers or dealers. In addition, in certain states, the shares may not be sold unless they have been registered or qualified for sale in the state or an exemption from the state's registration or qualification requirement is available and complied with.

Except as set forth above, we know of no existing arrangements between the Selling Stockholders and any other stockholder, broker, dealer, underwriter or agent relating to the sale or distribution of the shares of our common stock offered by this prospectus.

Brokers, dealers, underwriters or agents participating in the distribution of the shares of our common stock offered by this prospectus may receive compensation in the form of commissions, discounts, or concessions from the purchasers, for whom the broker-dealers may act as agent, of the shares sold by the Selling Stockholders through this prospectus. The compensation paid to any such particular broker-dealer by any such purchasers of shares of our common stock sold by the Selling Stockholders may be less than or in excess of customary commissions. Neither we nor the Selling Stockholders can presently estimate the amount of compensation that any agent will receive from any purchasers of shares of our common stock sold by the Selling Stockholders.

We may from time to time file with the SEC one or more supplements to this prospectus or amendments to the registration statement of which this prospectus forms a part to amend, supplement or update information contained in this prospectus, including, if and when required under the Securities Act, to disclose certain information relating to a particular sale of shares offered by this prospectus by the Selling Stockholders, including with respect to any compensation paid or payable by the Selling Stockholders to any brokers, dealers, underwriters or agents that participate in the distribution of such shares by the Selling Stockholders, and any other related information required to be disclosed under the Securities Act.

We will pay the expenses incident to the registration under the Securities Act of the offer and sale of the shares of our common stock covered by this prospectus by the Selling Stockholders.

We also have agreed to indemnify the Selling Stockholders and certain other persons against certain liabilities in connection with the offering of shares of our common stock offered hereby, including liabilities arising under the Securities Act or, if such indemnity is unavailable, to contribute amounts required to be paid in respect of such

liabilities. The Selling Stockholders have agreed to indemnify us against liabilities under the Securities Act that may arise from certain written information furnished to us by the Selling Stockholders specifically for use in this prospectus or, if such indemnity is unavailable, to contribute amounts required to be paid in respect of such liabilities. Insofar as indemnification for liabilities arising under the Securities Act may be permitted to our directors, officers, and controlling persons, we have been advised that in the opinion of the SEC this indemnification is against public policy as expressed in the Securities Act and is therefore, unenforceable.

We estimate that the total expenses for the offering will be approximately \$101,441.

This offering will terminate on the date that all shares of our common stock offered by this prospectus have been sold by the Selling Stockholders.

Our common stock is listed on the Nasdaq Capital Market and trades under the symbol "FBLG". The transfer agent of our common stock is VStock Transfer LLC.

LEGAL MATTERS

The validity of the shares of common stock offered hereby will be passed upon for us by Sichenzia Ross Ference Carmel LLP, New York, New York.

EXPERTS

The consolidated financial statements of FibroBiologics, Inc. as of and for the years ended December 31, 2025 and 2024, have been audited by Withum Smith+Brown, PC, an independent registered public accounting firm, as stated in their report incorporated by reference herein (which report includes an explanatory paragraph about the existence of substantial doubt concerning the Company's ability to continue as a going concern). Such audited consolidated financial statements have been so included in reliance upon the report of such firm given upon their authority as experts in accounting and auditing. Such consolidated financial statements are, and audited consolidated financial statements to be included in subsequently filed documents will be, incorporated herein in reliance upon the report of Withum Smith+Brown, PC pertaining to such consolidated financial statements (to the extent covered by consents filed with the SEC) given on the authority of such firm as experts in accounting and auditing.

WHERE YOU CAN FIND ADDITIONAL INFORMATION

We are subject to the informational reporting requirements of the Exchange Act. We file reports, proxy statements and other information with the SEC. Our SEC filings are available over the internet at the SEC's website at <http://www.sec.gov>. We make available, free of charge, on our website at www.fibrobiologics.com, our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and amendments to those reports and statements as soon as reasonably practicable after they are filed with the SEC. The contents of our website are not part of this prospectus, and the reference to our website does not constitute incorporation by reference into this prospectus of the information contained on or through that site, other than documents we file with the SEC that are specifically incorporated by reference into this prospectus. Our website address is included in this prospectus as an inactive textual reference only.

This prospectus is part of a registration statement that we filed with the SEC. As permitted by SEC rules, this prospectus forms a part of the registration statement, but does not contain all of the information that is included in the registration statement. The registration statement contains more information regarding us and our securities, including certain exhibits. You can obtain a copy of the registration statement from the SEC's website.

INCORPORATION OF CERTAIN DOCUMENTS BY REFERENCE

This prospectus is part of a registration statement on Form S-3 filed by us with the SEC. This prospectus does not contain all of the information set forth in the registration statement, certain parts of which are omitted in accordance with the rules and regulations of the SEC. For further information about us and the securities offered by this prospectus, we refer you to the registration statement and its exhibits and schedules which may be obtained as described herein.

The SEC allows us to "incorporate by reference" information into this prospectus. This means that we can disclose important information about us and our financial condition to you by referring you to another document filed separately with the SEC. The information incorporated by reference is considered to be part of this prospectus. This prospectus incorporates by reference the documents listed below that we have previously filed with the SEC:

- our Annual Report on Form 10-K for the fiscal year ended December 31, 2025, filed with the SEC on [February 24, 2026](#), as amended on Form 10-K/A, filed with the SEC on [March 13, 2026](#);
 - our Quarterly Report on Form 10-Q for the fiscal quarter ended March 31, 2026, filed with the SEC on [April 30, 2026](#);
 - our Current Reports on Form 8-K filed with the SEC on [January 2, 2026](#), [February 6, 2026](#), [February 23, 2026](#), [March 6, 2026](#), [April 2, 2026](#), [April 3, 2026](#), [April 9, 2026](#) (as amended on Form 8-K/A filed with the SEC on [April 9, 2026](#)), [April 17, 2026](#), [April 20, 2026](#), [May 1, 2026](#), [May 5, 2026](#), [May 6, 2026](#), [June 23, 2026](#);
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[2026](#), [June 29, 2026](#), and [July 9, 2026](#) (except, in each case, any information, including exhibits, furnished and not filed with the SEC); and

- the description of our common stock set forth in the registration statement on [Form 8-A](#) filed on January 24, 2024, as updated by [Exhibit 4.2](#) to our Annual Report on Form 10-K, filed on February 24, 2026, and all amendments and reports filed for the purpose of updating that description.

We also incorporate by reference into this prospectus all documents filed by us with the SEC pursuant to Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act prior to the termination of any offering of securities made by this prospectus, including all such documents we may file with the SEC after the date of the initial registration statement and prior to the effectiveness of the registration statement. Nothing in this prospectus shall be deemed to incorporate information furnished but not filed with the SEC (including without limitation, information furnished under Item 2.02 or Item 7.01 of Form 8-K, and any exhibits relating to such information).

Any statement contained in this prospectus or in a document incorporated or deemed to be incorporated by reference in this prospectus shall be deemed to be modified or superseded for purposes of this prospectus to the extent that a statement contained herein or therein or in any other subsequently filed document which also is or is deemed to be incorporated by reference modifies or supersedes the statement. Any statement so modified or superseded shall not be deemed, except as so modified or superseded, to constitute a part of this prospectus.

You may request a copy of the filings incorporated herein by reference, including exhibits to such documents that are specifically incorporated by reference, at no cost, by writing or calling us at the following address or telephone number:

FibroBiologics, Inc.
9350 Kirby Drive
Suite 300
Houston, Texas 77054
(281) 671-5150

Statements contained in this prospectus as to the contents of any contract or other documents are not necessarily complete, and in each instance investors are referred to the copy of the contract or other document filed as an exhibit to the registration statement, each such statement being qualified in all respects by such reference and the exhibits and schedules thereto.



FibroBiologics, Inc.

Up to 12,530,613 Shares of Common Stock

PRELIMINARY PROSPECTUS

, 2026

PART II

INFORMATION NOT REQUIRED IN PROSPECTUS

Item 14. *Other Expenses of Issuance and Distribution*

The following table sets forth the costs and expenses payable by us in connection with this registration statement and the listing of our common stock. All amounts shown are estimates except for the SEC registration fee.

	Amount
SEC registration fee	\$ 1,441
Legal fees and expenses	50,000
Accounting fees and expenses	20,000
Miscellaneous expenses	30,000
Total	\$ 101,441

Item 15. *Indemnification of Directors and Officers*

We are incorporated under the laws of the State of Delaware. Section 145 of the DGCL provides that a Delaware corporation may indemnify any person who was or is, or is threatened to be made, a party to any threatened, pending, or completed action, suit or proceeding, whether civil, criminal, administrative or investigative (other than an action by or in the right of such corporation), by reason of the fact that such person is or was a director, officer, employee or agent of such corporation, or is or was serving at the request of such corporation as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise, against expenses (including attorneys' fees), judgments, fines and amounts paid in settlement actually and reasonably incurred by the person in connection with such action, suit or proceeding, if the person acted in good faith and in a manner the person reasonably believed to be in or not opposed to best interests of the corporation and, with respect to any criminal action or proceeding, had no reasonable cause to believe the person's conduct was unlawful.

Section 145 of the DGCL also provides that a Delaware corporation may indemnify any person who was or is, or is threatened to be made, a party to any threatened, pending, or completed action or suit by or in the right of the corporation by reason of the fact that such person is or was a director, officer, employee or agent of such corporation, or is or was serving at the request of such corporation as a director, officer, employee or agent of another corporation partnership, joint venture, trust or other enterprise, against expenses (including attorneys' fees) actually and reasonably incurred by such person in connection with the defense or settlement of such action or suit if such person acted in good faith and in a manner such person reasonably believed to be in or not opposed to the best interests of the corporation, except that no indemnification of any claim, issue or matter is permitted without judicial approval if such person is adjudged to be liable to the corporation.

Under the DGCL, where a present or former officer or director is successful on the merits or otherwise in the defense of any action referred to above, or in defense of any claim, issue or matter therein, the corporation must indemnify such present or former officer or director against the expenses (including attorney's fees) which such present or former officer or director actually and reasonably incurred in connection with such action (or claim, issue or matter therein).

Section 102(b)(7) of the DGCL permits a corporation to provide in its certificate of incorporation that a director or officer of the corporation shall not be personally liable to the corporation or its stockholders for monetary damages for breach of fiduciary duties as a director or officer, except for liability for any:

- breach of a director's or officer's duty of loyalty to the corporation or its stockholders;
 - act or omission not in good faith or that involves intentional misconduct or a knowing violation of law;
 - in the case of a director, unlawful payment of dividends or unlawful stock purchase or redemption;
 - transaction from which the director or officer derived an improper personal benefit; or
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- in the case of an officer, any action by or in the right of the corporation.

Our amended and restated certificate of incorporation contains a provision that precludes any director or officer of ours from being personally liable to us or our stockholders for monetary damages for breach of fiduciary duty as a director or officer, except for the aforementioned liabilities which we are not permitted to eliminate or limit under Section 102(b)(7) of the DGCL.

In addition, our amended and restated certificate of incorporation requires us to indemnify, and advance expenses to, to the fullest extent permitted by law, any person who was or is, or is threatened to be made, a party to any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative by reason of the fact that the person is or was our director or officer, or is or was serving at our request as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise.

Our amended and restated bylaws authorize us to purchase and maintain insurance on behalf of any person who is or was our director or officer, or is or was serving at our request as a director, officer, employee or agent of another corporation, partnership, joint venture, trust, enterprise or nonprofit entity against any liability asserted against such person and incurred by such person in any such capacity, or arising out of such person's status as such, whether or not we would have the power to indemnify such person against such liability under the provisions of the DGCL.

We maintain an insurance policy covering our officers and directors with respect to certain liabilities, including liabilities arising under the Securities Act. In addition, we entered into separate indemnification agreements with each of our directors and executive officers.

Item 16. *Exhibits and Financial Statement Schedules*

Exhibits

See the Exhibit Index immediately preceding the signature page hereto for a list of exhibits filed as part of this registration statement, which Exhibit Index is incorporated herein by reference.

Financial Statement Schedules

All financial statement schedules are omitted because the information called for is not required or is shown either in the financial statements or in the accompanying notes.

Item 17. *Undertakings*

(a) The undersigned registrant hereby undertakes:

(1) To file, during any period in which offers or sales are being made, a post-effective amendment to this registration statement:

(i) To include any prospectus required by Section 10(a)(3) of the Securities Act;

(ii) To reflect in the prospectus any facts or events arising after the effective date of the registration statement (or the most recent post-effective amendment thereof) which, individually or in the aggregate, represent a fundamental change in the information set forth in the registration statement. Notwithstanding the foregoing, any increase or decrease in volume of securities offered (if the total dollar value of securities offered would not exceed that which was registered) and any deviation from the low or high end of the estimated maximum offering range may be reflected in the form of prospectus filed with the SEC pursuant to Rule 424(b) if, in the aggregate, the changes in volume and price represent no more than 20% change in the maximum aggregate offering price set forth in the "Calculation of Filing Fee" table in the effective registration statement.

(iii) To include any material information with respect to the plan of distribution not previously disclosed in the registration statement or any material change to such information in the registration statement;

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

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

(3) To remove from registration by means of a post-effective amendment any of the securities being registered which remain unsold at the termination of the offering.

(4) That, for the purpose of determining liability under the Securities Act. to any purchaser:

(i) Each prospectus filed by the registrant pursuant to Rule 424 (b)(3) shall be deemed to be part of this registration statement as of the date the filed prospectus was deemed part of and included in this registration statement; and

(ii) Each prospectus required to be filed pursuant to Rule 424 (b)(2), (b)(5), or (b)(7) as part of a registration statement in reliance on Rule 430B relating to an offering made pursuant to Rule 415(a)(1)(i), (vii) or (x) for the purpose of providing the information required by Section 10(a) of the Securities Act of 1933, as amended, shall be deemed to be part of and included in the registration statement as of the earlier of the date such prospectus is first used after effectiveness or the date of the first contract of sale of securities in the offering described in the prospectus. As provided in Rule 430B, for liability purposes of the issuer and any person that is at that date an underwriter, such date shall be deemed to be a new effective date of the registration statement relating to the securities in the registration statement to which that prospectus relates, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof; provided, however, that no statement made in a registration statement or prospectus that is part of the registration statement or made in a document incorporated or deemed incorporated by reference into the registration statement or prospectus that is part of the registration statement will, as to a purchaser with a time of contract of sale prior to such effective date, supersede or modify any statement that was made in the registration statement or prospectus that was part of the registration statement or made in any such document immediately prior to such effective date.

(5) That, for the purpose of determining liability of the registrant under the Securities Act to any purchaser in the initial distribution of the securities, the undersigned registrant undertakes that in a primary offering of securities of the undersigned registrant pursuant to this registration statement, regardless of the underwriting method used to sell the securities to the purchaser, if the securities are offered or sold to such purchaser by means of any of the following communications, the undersigned registrant will be a seller to the purchaser and will be considered to offer or sell such securities to such purchaser:

(i) Any preliminary prospectus or prospectus of the undersigned registrant relating to the offering required to be filed pursuant to Rule 424;

(ii) Any free writing prospectus relating to the offering prepared by or on behalf of the undersigned registrant or used or referred to by the undersigned registrant;

(iii) The portion of any other free writing prospectus relating to the offering containing material information about the undersigned registrant or its securities provided by or on behalf of the undersigned registrant; and

(iv) Any other communication that is an offer in the offering made by the undersigned registrant to the purchaser.

(b) Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers and controlling persons of the registrant pursuant to the foregoing provisions, or otherwise, the registrant has been advised that in the opinion of the SEC such indemnification is against public policy as expressed in the 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.

(c) The undersigned registrant hereby undertakes that, for purposes of determining any liability under the Securities Act of 1933, each filing of the registrant's annual report pursuant to section 13(a) or section 15(d) of the Securities Exchange Act of 1934 (and, where applicable, each filing of an employee benefit plan's annual report pursuant to section 15(d) of the Securities Exchange Act of 1934) that is incorporated by reference in the registration statement shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

EXHIBIT INDEX

Exhibit Number	Exhibit Description	Incorporation By Reference			
		Form	SEC File No.	Exhibit	Filing Date
4.1	<u>Amended and Restated Certificate of Incorporation of the Registrant.</u>	8-K	001-41934	3.1	August 28, 2024
4.2	<u>Amendment to Amended and Restated Certificate of Incorporation of FibroBiologics, Inc.</u>	8-K	001-41934	3.1	June 13, 2025
4.3	<u>Amendment to Amended and Restated Certificate of Incorporation of FibroBiologics, Inc., as amended</u>	8-K	001-41934	3.1	April 3, 2026
4.4	<u>Second Amended and Restated Bylaws of the Registrant.</u>	8-K	001-41934	3.1	April 17, 2026
4.5	<u>Form of Securities Purchase Agreement, dated June 25, 2026, between FibroBiologics, Inc. and the purchaser named therein.</u>	8-K	001-41934	10.1	June 29, 2026
4.6	<u>Form of Registration Rights Agreement, dated June 25, 2026, between FibroBiologics, Inc. and the purchaser named therein.</u>	8-K	001-41934	10.2	June 29, 2026
4.7	<u>Form of Pre-Funded Warrant</u>	8-K	001-41934	4.1	June 29, 2026
4.8	<u>Form of Warrants</u>	8-K	001-41934	4.2	June 29, 2026
4.9	<u>Form of Placement Agent Warrant</u>	8-K	001-41934	4.3	June 29, 2026
5.1	<u>Opinion of Sichenzia Ross Ference Carmel LLP.</u>				
23.1	<u>Consent of Sichenzia Ross Ference Carmel LLP (included in Exhibit 5.1).</u>				
23.2	<u>Consent of WithumSmith+Brown PC.</u>				
24.1	<u>Power of Attorney (included in the signature page hereto).</u>				
107.1	Filing Fee Table.				

SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, the registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-3 and has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the city of Houston, State of Texas, on July 9, 2026.

FibroBiologics, Inc.

By: /s/ Pete O'Heeron
Pete O'Heeron
Chief Executive Officer

POWER OF ATTORNEY

We, the undersigned officers and directors of FibroBiologics, Inc., hereby severally constitute and appoint Pete O'Heeron and Jason D. Davis, and each of them singly (with full power to each of them to act alone), our true and lawful attorneys-in-fact and agents, with full power of substitution and resubstitution in each of them for us and in our name, place and stead, and in any and all capacities, to sign any and all amendments (including post-effective amendments) to this registration statement (or any other registration statement for the same offering that is to be effective upon filing pursuant to Rule 462(b) under the Securities Act of 1933), and to file the same, with all exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite or necessary to be done in and about the premises, as full to all intents and purposes as we might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents or any of them, or their substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

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

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/ Pete O'Heeron</u> Pete O'Heeron	Chairperson and Chief Executive Officer (Principal Executive Officer)	July 9, 2026
<u>/s/ Jason D. Davis</u> Jason D. Davis	Chief Financial Officer (Principal Financial Officer and Principal Accounting Officer)	July 9, 2026
<u>/s/ Robert E. Hoffman</u> Robert E. Hoffman	Director	July 9, 2026
<u>/s/ Victoria Niklas</u> Victoria Niklas, M.D.	Director	July 9, 2026
<u>/s/ Richard Cilento</u> Richard Cilento	Director	July 9, 2026
<u>Kathleen H. Rubins, Ph.D.</u>	Director	July 9, 2026



July 9, 2026

FibroBiologics, Inc.
9350 Kirby Drive, Suite 300
Houston, Texas 77054
Ladies and Gentlemen:

We have acted as counsel to FibroBiologics, Inc., a Delaware corporation (the “Company”), in connection with a Registration Statement on Form S-3 (the “Registration Statement”) for the purpose of registering for resale under the Securities Act of 1933, as amended (the “Securities Act”), by the selling stockholders named in the prospectus contained in the Registration Statement an aggregate of up to 12,530,613 shares (“Shares”) of the Company’s common stock, par value \$0.00001 per share (the “Common Stock”), issued in a private placement that closed on June 29, 2026 consisting of (i) up to 4,081,633 shares of Common Stock issuable upon the exercise of pre-funded warrants (the “Pre-Funded Warrants”), (ii) up to 4,081,633 shares of Common Stock issuable upon the exercise of long-term common warrants (the “Series A Warrants”), (iii) up to 4,081,633 shares of Common Stock issuable upon the exercise of short-term common warrants (the “Series B Warrants” and together with the Pre-Funded Warrants and the Series A Warrants, the “Private Placement Warrants”); and (iv) up to 285,714 shares of Common Stock issuable upon the exercise of placement agent warrants issued concurrently with the Private Placement Warrants (the “Placement Agent Warrants” and, together with the Private Placement Warrants, the “Warrants”).

We have examined the Registration Statement and such documents and records of the Company and other documents as we have deemed necessary for the purposes of this opinion. In such examination, we have assumed the following: (i) the authenticity of original documents and the genuineness of all signatures; (ii) the conformity to the originals of all documents submitted to us as copies; and (iii) the truth, accuracy and completeness of the information, representations and warranties contained in the records, documents, instruments and certificates we have reviewed.

Based upon the foregoing, it is our opinion that the Shares, when issued upon the exercise of the Warrants in accordance with the terms thereof and, if applicable, upon the Company’s receipt of payment of the exercise price therefor, will be validly issued, fully paid and non-assessable.

The opinion expressed herein is limited to the Delaware General Corporation Law and the reported judicial decisions interpreting such statute and provisions, the laws of the state of New York and the federal laws of the United States of America. We are not opining on, and we assume no responsibility for, the applicability to or effect on any of the matters covered herein of (a) any other laws of the State of Delaware; (b) the laws of any other jurisdiction; or (c) the laws of any county, municipality or other political subdivision or local governmental agency or authority.

We hereby consent to the filing of this opinion as Exhibit 5.1 to the Registration Statement with the Commission on or about the date hereof, and any amendments thereto, including any and all post-effective amendments, and to the reference to us under the headings “*Legal Matters*” in the Prospectus. In giving such consent, we do not thereby admit that we are in the category of persons whose consent is required under Section 7 of the Securities Act or related rules and regulations of the Commission issued thereunder.

Very truly yours,

/s/ Sichenzia Ross FERENCE Carmel LLP

Sichenzia Ross FERENCE Carmel LLP

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CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Prospectus constituting a part of this Registration Statement on Form S-3 of our report dated February 24, 2026 (which report includes an explanatory paragraph about the existence of substantial doubt concerning FibroBiologics, Inc.'s ability to continue as a going concern), relating to the consolidated financial statements of FibroBiologics, Inc. as of and for the years ended December 31, 2025 and 2024, which is incorporated by reference in that Prospectus.

We also consent to the reference to our firm under the caption "Experts" in the Prospectus.

/s/ WithumSmith+Brown, PC

East Brunswick, New Jersey
July 9, 2026

Calculation of Filing Fee Tables

S-3

FibroBiologics, Inc.

Table 1: Newly Registered and Carry Forward Securities

☐ Not Applicable

	Security Type	Security Class Title	Fee Calculation or Carry Forward Rule	Amount Registered	Proposed Maximum Offering Price Per Unit	Maximum Aggregate Offering Price	Fee Rate	Amount of Registration Fee	Carry Forward Form Type	Carry Forward File Number	Carry Forward Initial Effective Date	Filing Fee Previously Paid in Connection with Unsold Securities to be Carried Forward
Newly Registered Securities												
Fees to be Paid	1 Equity	Common stock, par value \$0.00001 per share, underlying warrants	457(a)	12,530,613	\$ 0.8326	10,432,988.38	\$ 0.0001381	\$ 1,440.80				
Fees Previously Paid												
Carry Forward Securities												
Carry Forward Securities												
Total Offering Amounts:						\$ 10,432,988.38		\$ 1,440.80				
Total Fees Previously Paid:								\$ 0.00				
Total Fee Offsets:								\$ 0.00				
Net Fee Due:								\$ 1,440.80				

Offering Note

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(1) Pursuant to Rule 416 under the Securities Act of 1933, as amended, or the Securities Act, this Registration Statement on Form S-3 shall be deemed to cover any additional shares of common stock, par value \$0.00001 per share, or the Common Stock, of FibroBiologics, Inc. that may be issued as a result of any stock dividend, stock split, recapitalization or other similar transaction, and any other securities with respect to which the outstanding shares are converted or exchanged.

(2) Estimated solely for purposes of calculating the registration fee in accordance with Rule 457(c) under the Securities Act, based on the average of the high and low sales price of Common Stock as reported on the Nasdaq Capital Market on July 8, 2026.

Table 2: Fee Offset Claims and Sources

☒ Not Applicable

	Registrant or Filer Name	Form or Filing Type	File Number	Initial Filing Date	Filing Date	Fee Offset Claimed	Security Type Associated with Fee Offset Claimed	Security Title Associated with Fee Offset Claimed	Unsold Securities Associated with Fee Offset Claimed	Unsold Aggregate Offering Amount Associated with Fee Offset Claimed	Fee Paid with Fee Offset Source
Rules 457(b) and 0-11(a)(2)											
Fee Offset Claims											
Fee Offset Sources											
Rule 457(p)											
Fee Offset Claims											
Fee Offset Sources											

Table 3: Combined Prospectuses

☒ Not Applicable

	Security Type	Security Class Title	Amount of Securities Previously Registered	Maximum Aggregate Offering Price of Securities Previously Registered	Form Type	File Number	Initial Effective Date
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