

**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION**

Washington, D.C. 20549

FORM S-1
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)

**455 E. Medical Center Blvd.
Suite 300
Houston, Texas 77598
(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.
455 E. Medical Center Blvd.
Suite 300
Houston, Texas 77598
(281) 671-5150**

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

Copies to:

**Ruben A. Garcia
General Counsel
FibroBiologics, Inc.
455 E. Medical Center Blvd.
Suite 300
Houston, Texas 77598
(281) 671-5150**

Approximate date of commencement of proposed sale to the public: **As soon as practicable after this registration statement becomes effective.**

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 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 post-effective amendment filed pursuant to Rule 462(d) 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. ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, 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
DECEMBER 23, 2025**



FibroBiologics, Inc.

Up to 22,494,434 Shares of Common Stock

This prospectus relates to the registration of the resale or other disposition, from time to time, of up to 22,494,434 shares of our common stock, par value \$0.00001 per share, or the common stock/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 12,110,203 shares of Common Stock issuable upon the exercise of common warrants issued in a private placement that closed on November 19, 2025, or the November 19 Warrants, (ii) up to 4,477,614 shares of Common Stock issuable upon the exercise of common warrants issued in a private placement that closed on November 25, 2025, or the November 25 Warrants, (iii) up to 313,433 shares of Common Stock issuable upon the exercise of placement agent warrants issued concurrently with the November 25 Warrants, or the November 25 Placement Agent Warrants, (iv) up to 5,227,275 shares of Common Stock issuable upon the exercise of common warrants issued in a private placement that closed on December 16, 2025, or the December 16 Warrants, and (v) up to 365,909 shares of Common Stock issuable upon the exercise of placement agent warrants issued concurrently with the December 16 Warrants, or the December 16 Placement Agent Warrants and, together with the November 19 Warrants, the November 25 Warrants, the November 25 Placement Agent Warrants, and the December 16 Warrants, the 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 private placements, or Private Placements, which were priced at the market at a combined purchase price per share of Common Stock and accompanying Warrant of \$0.3303 with respect to the November 19 Warrants, \$0.335 with respect to the November 25 Warrants, and \$0.33 with respect to the December 16 Warrants. In addition, the Company issued to the placement agent for the Private Placement that closed on November 25, 2025 the November 25 Placement Agent Warrants to purchase up to an aggregate of 313,433 shares of Common Stock, at an exercise price equal to \$0.4188 per share, and for the Private Placement that closed on December 16, 2025 the December 16 Placement Agent Warrants to purchase up to an aggregate of 365,909 shares of Common Stock, at an exercise price equal to \$0.4125 per share. The Warrants will be exercisable upon receipt of the Stockholder Approvals (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 \$7.5 million aggregate gross proceeds upon exercise of the warrants by the Selling Stockholders. See “*Prospectus Summary—The Securities Purchase Agreements*” on page 2 of this prospectus for a description of the securities purchase agreements and 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 December 22, 2025, the last reported sales price of our common stock was \$0.2596 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 , 2025

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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-1 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

This summary highlights select information contained elsewhere in this prospectus and does not contain all the information you should consider before making an investment decision. You should read the entire prospectus carefully, including the sections entitled “Risk Factors,” “Cautionary Note Regarding Forward-Looking Statements,” “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and our financial statements and the accompanying notes included elsewhere in, or incorporated by reference into, this prospectus before making an investment decision. 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 Agreements

November 18 SPA

On November 18, 2025, we entered into a securities purchase agreement, or the November 18 SPA, with a single investor pursuant to which (i) we agreed to issue and sell to the investor in a registered direct offering 3,540,000 shares of our common stock, par value \$0.00001 per share, or the common stock/Common Stock, and pre-funded warrants to purchase up to an aggregate of 8,570,203 shares of Common Stock, or the Pre-Funded Warrants. The price of each share of Common Stock was \$0.3303 per share and the price of each Pre-Funded Warrant was \$0.33029 (equal to the price per share minus \$0.00001, the exercise price of each Pre-Funded Warrant).

Additionally, pursuant to the November 18 SPA, the Company issued and sold to the investor, in a concurrent private placement, warrants to purchase one share of our Common Stock for each share of Common Stock or Pre-Funded Warrant purchased in the registered direct offering, for an aggregate of 12,110,203 shares of Common Stock, or the November 19 Warrants. The November 19 Warrants are subject to stockholder approval as described below. The exercise price of the November 19 Warrants is \$0.3303 per share.

If the holders of the November 19 Warrants exercise such warrants in full for cash following stockholder approval, we would receive additional gross proceeds of approximately \$4.0 million. However, we cannot predict when or if the November 19 Warrants will be exercised for cash or exercised at all. It is possible that the November 19 Warrants may be exercised on a cashless (net) basis as described below or may expire and never be exercised.

Terms of November 19 Warrants

The November 19 Warrants have an exercise price of \$0.3303 per share of Common Stock and will not be exercisable until, and are subject to, approval by our stockholders of the issuance of the shares of Common Stock underlying the warrants, or the November 19 Warrant Shares, and will expire five years following the date of the stockholder approval, if it is obtained. We intend to submit the issuance of the November 19 Warrant Shares upon exercise of the November 19 Warrants for approval of our shareholders, but there can be no assurance that such approval will be obtained. A holder of the November 19 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% of the number of shares of Common Stock outstanding immediately after giving effect to such exercise. We agreed to file this registration statement to register the resale of the November 19 Warrant Shares as soon as practicable (and in any event within 90 days after the date of the November 18 SPA) and to use commercially reasonable efforts to cause such registration statement to become effective within 60 days (90 days in the event the SEC elects to review the registration statement) following the date of the initial filing of the registration statement. If at the time of exercise of the November 19 Warrants there is no effective registration statement registering the November 19 Warrant Shares for resale or the prospectus contained therein is not available for the resale of the November 19 Warrant Shares by the holder of the November 19 Warrants, then the November 19 Warrants may also be exercised, in whole or in part, by cashless (net) exercise. The exercise price of the November 19 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 November 19 Warrants.

November 24 SPA

On November 24, 2025, we entered into a securities purchase agreement, or the November 24 SPA, with certain institutional investors, or the November Purchasers, pursuant to which (i) we agreed to issue and sell to the November Purchasers in a registered direct offering 4,477,614 shares of Common Stock. The price of each share of Common Stock was \$0.335.

Additionally, pursuant to the November 24 SPA, the Company issued and sold to the November Purchasers, in a concurrent private placement, warrants to purchase one share of our Common Stock for each share of Common Stock purchased in the registered direct offering, for an aggregate of 4,477,614 shares of Common Stock, or the November 25 Warrants. The November 25 Warrants are subject to stockholder approval as described below. The exercise price of the November 25 Warrants is \$0.335 per share.

If the holders of the November 25 Warrants exercise such warrants in full for cash following stockholder approval, we would receive additional gross proceeds of approximately \$1.5 million. However, we cannot predict when or if the November 25 Warrants will be exercised for cash or exercised at all. It is possible that the November 25 Warrants may be exercised on a cashless (net) basis as described below or may expire and never be exercised.

Terms of November 25 Warrants

The November 25 Warrants have an exercise price of \$0.335 per share of Common Stock and will not be exercisable until, and are subject to, approval by our stockholders of the issuance of the shares of Common Stock underlying the November 25 Warrants, or the November 25 Warrant Shares, and will expire five years following the date of the stockholder approval, if it is obtained. We intend to submit the issuance of the November 25 Warrant Shares upon exercise of the November 25 Warrants for approval of our shareholders, but there can be no assurance that such approval will be obtained. A holder of the November 25 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 4.99% of the number of shares of Common Stock outstanding immediately after giving effect to such exercise. We agreed to file this registration statement to register the resale of the November 25 Warrant Shares as soon as practicable (and in any event within 45 days following November 25, 2025) and to use commercially reasonable efforts to cause such registration statement to become effective within 60 days (90 days in the event the SEC elects to review the registration statement) following November 25, 2025. If at the time of exercise of the November 25 Warrants there is no effective registration statement registering the November 25 Warrant Shares for resale or the prospectus contained therein is not available for the resale of the November 25 Warrant Shares by the holder of the November 25 Warrants, then the November 25 Warrants may also be exercised, in whole or in part, by cashless (net) exercise. The exercise price of the November 25 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 November 25 Warrants.

H.C. Wainwright & Co., LLC acted as the Company's placement agent in connection with the November 24 SPA, pursuant to that certain engagement letter, dated as of November 10, 2025, between the Company and H.C. Wainwright & Co., LLC, or the Engagement Letter. Pursuant to the Engagement Letter and the November 24 SPA, in connection with the closing of the registered direct offering and concurrent private placement, the Company issued to designees of H.C. Wainwright & Co., LLC the November 25 Placement Agent Warrants to purchase up to an aggregate of 313,433 shares of Common Stock at an exercise price equal to \$0.4188 per share. The November 25 Placement Agent Warrants have substantially the same terms as the November 25 Warrants and will be exercisable upon receipt of stockholder approval.

December 14 SPA

On December 14, 2025, we entered into a securities purchase agreement, or the December 14 SPA, with certain institutional investors, or the December Purchasers, pursuant to which (i) we agreed to issue and sell to the December Purchasers in a registered direct offering 5,227,275 shares of Common Stock. The price of each share of Common Stock was \$0.33.

Additionally, pursuant to the December 14 SPA, the Company issued and sold to the December Purchasers, in a concurrent private placement, warrants to purchase one share of our Common Stock for each share of Common Stock purchased in the registered direct offering, for an aggregate of 5,227,275 shares of Common Stock, or the December 16 Warrants. The December 16 Warrants are subject to stockholder approval as described below. The exercise price of the December 16 Warrants is \$0.33 per share.

If the holders of the December 16 Warrants exercise such warrants in full for cash following stockholder approval, we would receive additional gross proceeds of approximately \$1.7 million. However, we cannot predict when or if the December 16 Warrants will be exercised for cash or exercised at all. It is possible that the December 16 Warrants may be exercised on a cashless (net) basis as described below or may expire and never be exercised.

Terms of December 16 Warrants

The December 16 Warrants have an exercise price of \$0.33 per share of Common Stock and will not be exercisable until, and are subject to, approval by our stockholders of the issuance of the shares of Common Stock underlying the December 16 Warrants, or the December 16 Warrant Shares, and will expire five years following the date of the stockholder approval, if it is obtained. We intend to submit the issuance of the December 16 Warrant Shares upon exercise of the December 16 Warrants for approval of our shareholders, but there can be no assurance that such approval will be obtained. A holder of the December 16 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 4.99% of the number of shares of Common Stock outstanding immediately after giving effect to such exercise. We agreed to file this registration statement to register the resale of the December 16 Warrant Shares as soon as practicable (and in any event within 45 days following November 25, 2025) and to use commercially reasonable efforts to cause such registration statement to become effective within 60 days (90 days in the event the SEC elects to review the registration statement) following November 25, 2025. If at the time of exercise of the December 16 Warrants there is no effective registration statement registering the December 16 Warrant Shares for resale or the prospectus contained therein is not available for the resale of the December 16 Warrant Shares by the holder of the December 16 Warrants, then the December 16 Warrants may also be exercised, in whole or in part, by cashless (net) exercise. The exercise price of the December 16 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 December 16 Warrants.

H.C. Wainwright & Co., LLC acted as the Company's placement agent in connection with the December 14 SPA, pursuant to the Engagement Letter. Pursuant to the Engagement Letter and the December 14 SPA, in connection with the closing of the registered direct offering and concurrent private placement, the Company issued to designees of H.C. Wainwright & Co., LLC the December 16 Placement Agent Warrants to purchase up to an aggregate of 365,909 shares of Common Stock at an exercise price equal to \$0.4125 per share. The December 16 Placement Agent Warrants have substantially the same terms as the December 16 Warrants and will be exercisable upon receipt of stockholder approval.

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 455 E. Medical Center Blvd., Suite 300, Houston, Texas 77598. 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.

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, 2024, or the Annual Report, and in our Quarterly Report on Form 10-Q for the three months ended September 30, 2025, 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

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 22,494,434 shares of Common Stock from time to time after the date of this prospectus. If all of the 22,494,434 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 25% of the total number of outstanding shares of common stock and approximately 27% of the total number of outstanding shares of common stock held by non-affiliates, in each case as of December 22, 2025.

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;
- 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; and
- the impact of laws and regulations.

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 until after we distribute this prospectus, 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.

MARKET AND INDUSTRY DATA

This prospectus includes estimates regarding market and industry data. Unless otherwise indicated, information concerning our industry and the markets in which we operate, including our general expectations, market position, market opportunity, and market size, are based on our management's knowledge and experience in the markets in which we operate, together with currently available information obtained from various sources, including publicly available information, industry reports and publications, surveys, our customers, trade and business organizations, and other contacts in the markets in which we operate. Certain information is based on management estimates, which have been derived from third-party sources, as well as data from our internal research.

In presenting this information, we have made certain assumptions that we believe to be reasonable based on such data and other similar sources and on our knowledge of, and our experience to date in, the markets in which we operate. While we believe the estimated market and industry data included in this prospectus is generally reliable, such information is inherently uncertain and imprecise. Market and industry data is subject to change and may be limited by the availability of raw data, the voluntary nature of the data gathering process, and other limitations inherent in any statistical survey of such data. In addition, projections, assumptions, and estimates of the future performance of the markets in which we operate are necessarily subject to uncertainty and risk due to a variety of factors, including those described in *"Risk Factors"* and *"Cautionary Note Regarding Forward-Looking Statements."* These and other factors could cause results to differ materially from those expressed in the estimates made by third parties and by us. Accordingly, you are cautioned not to place undue reliance on such market and industry data or any other such estimates.

The source of certain statistical data, estimates, and forecasts contained in this prospectus are the following independent industry publications or reports:

- **"Degenerative Disc Disease Therapeutics Global Market Analysis, Insights and Forecast, 2022-2029"** Fortune Business Insights;
- **"Global Regenerative Medicine Market 2022-2029"** Fortune Business Insights;
- **"Global Multiple Sclerosis Drugs Market 2022-2029"** Fortune Business Insights; and
- **"Global Wound Care Market 2022-2029"** Fortune Business Insights.

The content of the above sources, except to the extent specifically set forth in this prospectus, does not constitute a portion of this prospectus and is not incorporated herein.

TRADEMARKS, SERVICE MARKS AND TRADENAMES

We own or otherwise have rights to the trademarks, including those mentioned in this prospectus, used in conjunction with the operation of our business. This prospectus 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 ®, TM or SM 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 Warrants will exercise all, or any part of, their Warrants, the full exercise of the Warrants would result in gross proceeds to the Company of approximately \$7.5 million. In connection with any exercise of Warrants, we currently intend to use the proceeds for working capital and general corporate purposes, as we pursue longer term financing.

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 December 22, 2025, 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 agreements 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 agreements, 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.

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 December 22, 2025. 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) 66,519,722 shares of our common stock outstanding; and (ii) 2,500 shares of our Series C Preferred Stock outstanding, each as of December 22, 2025.

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) 66,519,722 votes, being the total number of votes associated with 66,519,722 shares of our common stock (with each share of common stock having one vote) and (ii) 32,500,000 votes, being the total number of votes associated with 2,500 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., 455 E. Medical Center Blvd., Suite 300, Houston, Texas 77598.

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⁾	7,445,051	10.9%	2,500	100%	39.7%	—
Golden Knight Incorporated, L.P. ⁽³⁾	6,749,835	9.99%	—	—	6.7%	12,110,203
Named Executive Officers and Directors						
Pete O’Heeron, MSHA ⁽²⁾	7,445,051	10.9%	2,500	100%	39.7%	—
Hamid Khoja, Ph.D. ⁽⁴⁾	436,813	*	—	—	*	—
Ruben A. Garcia ⁽⁵⁾	273,970	*	—	—	*	—
Jason D. Davis	—	—	—	—	*	—
Robert E. Hoffman ⁽⁶⁾	160,335	*	—	—	*	—
Victoria Niklas, M.D. ⁽⁷⁾	160,335	*	—	—	*	—
Richard Cilento, Jr., MBA ⁽⁸⁾	246,060	*	—	—	*	—
Stacy Coen, MBA ⁽⁹⁾	160,335	*	—	—	*	—
Matthew Link ⁽¹⁰⁾	160,335	*	—	—	*	—
Directors and Executive Officers as a Group (9 persons) ⁽¹¹⁾	9,043,234	13.0%	2,500	100%	40.7%	—
Selling Stockholders:						
Golden Knight Incorporated, L.P. ⁽³⁾	6,749,835	9.99%	—	—	6.7%	12,110,203
Intracoastal Capital, LLC ⁽¹²⁾	—	—	—	—	—	3,234,963
Lind Global Fund III LP ⁽¹³⁾	—	—	—	—	—	3,234,963
BPY Limited ⁽¹⁴⁾	—	—	—	—	—	1,229,285
Nomis Bay Ltd. ⁽¹⁵⁾	—	—	—	—	—	2,005,678
Augustus Trading LLC ⁽¹⁶⁾	—	—	—	—	—	435,628
Noam Rubinstein ⁽¹⁷⁾ (18)	—	—	—	—	—	149,455
Michael Mirsky ⁽¹⁷⁾ (19)	—	—	—	—	—	64,537
Wilson Drive Holdings LLC ⁽²⁰⁾	—	—	—	—	—	22,927
Charles Worthman ⁽¹⁷⁾ (21)	—	—	—	—	—	6,795
Total Number of Shares Being Registered						22,494,434

Name and address of Beneficial Owner	Beneficial Ownership After the Offering				Percentage of Total Voting Power ⁽¹⁾
	Common Stock		Series C Preferred Stock		
	Shares	%	Shares	%	
5% Stockholders:					
Pete O’Heeron, MSHA ⁽²⁾	7,445,051	8.2%	2,500	100%	32.5%
Golden Knight Incorporated, L.P. ⁽³⁾	9,244,853	9.99%	—	—	7.4%
Named Executive Officers and Directors					
Pete O’Heeron, MSHA ⁽²⁾	7,445,051	8.2%	2,500	100%	32.5%
Hamid Khoja, Ph.D. ⁽⁴⁾	436,813	*	—	—	*
Ruben A. Garcia ⁽⁵⁾	273,970	*	—	—	*
Jason D. Davis	—	—	—	—	—
Robert E. Hoffman ⁽⁶⁾	160,335	*	—	—	*
Victoria Niklas, M.D. ⁽⁷⁾	160,335	*	—	—	*
Richard Cilento, Jr., MBA ⁽⁸⁾	246,060	*	—	—	*
Stacy Coen, MBA ⁽⁹⁾	160,335	*	—	—	*
Matthew Link ⁽¹⁰⁾	160,335	*	—	—	*
Directors and Executive Officers as a Group (9 persons) (11)	9,043,234	11.0%	2,500	100%	33.4%
Selling Stockholders:					
Golden Knight Incorporated, L.P. ⁽³⁾	9,244,853	9.99%	—	—	7.4%
Intracoastal Capital, LLC ⁽¹²⁾	1,742,425	2.0	—	—	1.4
Lind Global Fund III LP ⁽¹³⁾	1,742,425	2.0	—	—	1.4
BPY Limited ⁽¹⁴⁾	—	—	—	—	—
Nomis Bay Ltd. ⁽¹⁵⁾	—	—	—	—	—
Augustus Trading LLC ⁽¹⁶⁾	—	—	—	—	—
Noam Rubinstein ⁽¹⁷⁾⁽¹⁸⁾	—	—	—	—	—
Michael Mirsky ⁽¹⁷⁾⁽¹⁹⁾	—	—	—	—	—
Wilson Drive Holdings LLC ⁽²⁰⁾	—	—	—	—	—
Charles Worthman ⁽¹⁷⁾⁽²¹⁾	—	—	—	—	—

* 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 5,906,647 shares of common stock and 1,538,404 vested stock options to purchase common stock. The 2,500 shares of Series C Preferred Stock held constitute the maximum number of Series C Preferred Stock we are authorized to issue. Each share of Series C Preferred Stock is entitled to 13,000 votes. For as long as they remain outstanding, the shares of Series C Preferred Stock are subject to an irrevocable proxy issued by Pete O'Heeron in favor and for the benefit of the Board, as more particularly described in this prospectus.
- (3) Shares of Common Stock include, before the offering, 5,674,853 shares of Common Stock and 1,075,000 shares of Common Stock issuable upon the exercise of warrants, and after the offering, 5,674,853 shares of Common Stock and 3,570,000 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 31,250 shares of common stock and 405,563 vested stock options to purchase common stock.
- (5) Shares of common stock include 140,000 shares of common stock and 133,970 vested stock options to purchase common stock.
- (6) Shares of common stock include 7,500 shares of common stock and 152,835 vested stock options to purchase common stock.
- (7) Shares of common stock include 7,500 shares of common stock and 152,835 vested stock options to purchase common stock.
- (8) Shares of common stock include 93,225 shares of common stock and 152,835 vested stock options to purchase common stock.
- (9) Shares of common stock include 7,500 shares of common stock and 152,835 vested stock options to purchase common stock.
- (10) Shares of common stock include 7,500 shares of common stock and 152,835 vested stock options to purchase common stock.
- (11) Shares of Common Stock include 6,201,122 shares of Common Stock and 2,842,112 vested stock options to purchase Common Stock. The 2,500 shares of Series C Preferred Stock held constitute the maximum number of Series C Preferred Stock we are authorized to issue. Each share of Series C Preferred Stock is entitled to 13,000 votes. For as long as they remain outstanding, the shares of Series C Preferred Stock are subject to an irrevocable proxy issued by Pete O'Heeron in favor and for the benefit of the Board, as more particularly described in this prospectus.

- (12) Includes 1,492,538 November 25 Warrant Shares that may be issued upon exercise of November 25 Warrants and 1,742,425 December 16 Warrant Shares that may be issued upon exercise of the December 16 Warrants issued to the Selling Stockholder in the Private Placements. Mitchell P. Kopin and Daniel B. Asher, each of whom are managers of Intracoastal Capital, LLC (“Intracoastal”), have shared voting control and investment discretion the securities reported herein that are held by Intracoastal. As a result, each of Mr. Kopin and Mr. Asher may be deemed to have beneficial ownership (as determined under Section 13(d) of the U.S. Exchange Act) of the securities reported herein that are held by Intracoastal. The business address of the Selling Stockholder is 245 Palm Trail, Delray Beach, Florida 33483. Assumes the sale of all shares of our common stock being offered for resale pursuant to this prospectus.
- (13) Includes 1,492,538 November 25 Warrant Shares that may be issued upon exercise of November 25 Warrants and 1,742,425 December 16 Warrant Shares that may be issued upon exercise of the December 16 Warrants issued to the Selling Stockholder in the Private Placements. Jeff Easton, Managing Member of Lind Global Partners III LLC, the general partner of Lind Global Fund III LP, has voting and/or investment control over such securities. Mr. Easton disclaims beneficial ownership of these securities except to the extent of any pecuniary interest therein. The business address of the Selling Stockholder is 444 Madison Ave., 41st Floor, New York, New York, 10022. Assumes the sale of all shares of our common stock being offered for resale pursuant to this prospectus.
- (14) Includes 567,164 November 25 Warrant Shares that may be issued upon exercise of November 25 Warrants and 662,121 December 16 Warrant Shares that may be issued upon exercise of the December 16 Warrants issued to the Selling Stockholder in the Private Placements. James Keyes has voting control and investment discretion over securities beneficially owned directly or indirectly by BPY Limited. Mr. Keyes disclaims any beneficial ownership of the securities beneficially owned directly or indirectly by the Selling Stockholder. The business address of the Selling Stockholder is 5 Reid Street, Hamilton, Bermuda HM 11. Assumes the sale of all shares of our common stock being offered for resale pursuant to this prospectus.
- (15) Includes 925,374 November 25 Warrant Shares that may be issued upon exercise of November 25 Warrants and 1,080,304 December 16 Warrant Shares that may be issued upon exercise of the December 16 Warrants issued to the Selling Stockholder in the Private Placements. James Keyes has voting control and investment discretion over securities beneficially owned directly or indirectly by Nomis Bay Ltd. Mr. Keyes disclaims any beneficial ownership of the securities beneficially owned directly or indirectly by Nomis Bay Ltd. The business address of the Selling Stockholder is 5 Reid Street, Hamilton, Bermuda HM 11. Assumes the sale of all shares of our common stock being offered for resale pursuant to this prospectus.
- (16) Consists of 200,989 shares of common stock issuable upon the exercise of November 25 Placement Agent Warrants and 234,639 shares of common stock issuable upon the exercise of December 16 Placement Agent 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.
- (17) Each of these Selling Stockholders is affiliated with H.C. Wainwright & Co., LLC, the placement agent in connection with the November 24 SPA and December 14 SPA. H.C. Wainwright & Co., LLC is a registered broker dealer with a registered address of 430 Park Ave, 3rd Floor, New York, NY 10022, and each has sole voting and dispositive power over the securities held. Each of these Selling Stockholders acquired the November 25 Placement Agent Warrants and December 25 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.
- (18) Consists of 68,955 shares of common stock issuable upon the exercise of November 25 Placement Agent Warrants and 80,500 shares of common stock issuable upon the exercise of December 16 Placement Agent 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.
- (19) Consists of 29,776 shares of common stock issuable upon the exercise of November 25 Placement Agent Warrants and 34,761 shares of common stock issuable upon the exercise of December 16 Placement Agent 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.
- (20) Consists of 10,578 shares of common stock issuable upon the exercise of November 25 Placement Agent Warrants and 12,349 shares of common stock issuable upon the exercise of December 16 Placement Agent Warrants. Craig Schwabe is the managing member of Wilson Drive Holdings LLC and has the power to vote and dispose the securities held. Mr. Schwabe is affiliated with H.C. Wainwright & Co., 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.
- (21) Consists of 3,135 shares of common stock issuable upon the exercise of November 25 Placement Agent Warrants and 3,660 shares of common stock issuable upon the exercise of December 16 Placement Agent 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.

SHARES ELIGIBLE FOR FUTURE SALE

Sales of a substantial number of shares of our common stock in the public market, or the perception that such sales could occur, could adversely affect the public price of our common stock and may make it more difficult for you to sell your shares at a time and price that you deem appropriate. We will have no input if and when the Selling Stockholder may, or may not, elect to sell the shares of common stock covered by this prospectus or the prices at which any such sales may occur.

As of December 22, 2025, a total of 66,519,722 shares of our common stock were outstanding. All of the shares of common stock being registered for resale under the registration statement of which this prospectus forms a part will be freely tradable in the public market without restriction or further registration under the Securities Act, unless these shares are held by “affiliates,” as that term is defined in Rule 144 under the Securities Act. Any shares not registered hereunder or pursuant to another registration statement will be “restricted securities,” as that term is defined in Rule 144 under the Securities Act. These restricted securities are eligible for public sale only if they are registered under the Securities Act or if they qualify for an exemption from registration, including under Rules 144 or 701 under the Securities Act, which are summarized below. Restricted securities also may be sold outside of the United States to non-U.S. persons in accordance with Rule 904 of Regulation S.

Subject to the provisions of Rule 144 or Regulation S under the Securities Act, as well as our insider trading policy, these restricted securities will be available for sale in the public market after the date of this prospectus.

Rule 144

In general, under Rule 144 as currently in effect, an eligible shareholder is entitled to sell such shares without complying with the manner of sale, volume limitation, or notice provisions of Rule 144, subject to compliance with the public information requirements of Rule 144. To be an eligible shareholder under Rule 144, such shareholder must not be deemed to have been one of our affiliates for purposes of the Securities Act at any time during the 90 days preceding a sale and who has beneficially owned the shares of common stock proposed to be sold for at least six months, including the holding period of any prior owner other than our affiliates. If such a person has beneficially owned the shares of common stock proposed to be sold for at least one year, including the holding period of any prior owner other than our affiliates, then such person is entitled to sell such shares without complying with any of the requirements of Rule 144.

In general, under Rule 144, as currently in effect, our affiliates or persons selling Common Stock on behalf of our affiliates are entitled to sell shares. Within any three-month period, such shareholders may sell a number of shares that does not exceed the greater of:

- 1% of the number of shares of common stock then outstanding, which equals 665,197 shares on December 22, 2025, or
- the average weekly trading volume of our common stock on Nasdaq during the four calendar weeks preceding the filing of a notice on Form 144 with respect to such sale.

Sales under Rule 144 by our affiliates or persons selling shares of common stock on behalf of our affiliates also are subject to certain manner of sale provisions and notice requirements and to the availability of current public information about us.

Rule 701

Rule 701 generally allows a shareholder who was issued shares under a written compensatory plan or contract and who is not deemed to have been our affiliate during the immediately preceding 90 days, to sell these shares in reliance on Rule 144, but without being required to comply with the public information, holding period, volume limitation, or notice provisions of Rule 144. Rule 701 also permits our affiliates to sell their Rule 701 shares under Rule 144 without complying with the holding period requirements of Rule 144.

Registration Statements on Form S-8

We have filed a registration statement on Form S-8 under the Securities Act to register 12,500,000 shares of our common stock subject to outstanding stock options or reserved for issuance under our 2022 Stock Plan. Such registration statement automatically became effective upon filing with the SEC on May 15, 2024. However, shares registered on Form S-8 may be subject to the volume limitations and the manner of sale, notice, and public information requirements of Rule 144.

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 \$100,797.

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.

EXPERTS

The financial statements of FibroBiologics, Inc. as of and for the years ended December 31, 2024 and 2023, 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 financial statements are incorporated herein by reference in reliance upon the report of such firm given upon their authority as experts in accounting and auditing.

WHERE YOU CAN FIND ADDITIONAL INFORMATION

We have filed with the SEC a registration statement on Form S-1 under the Securities Act, with respect to the shares of common stock being offered by this prospectus. This prospectus, which constitutes part of the registration statement, does not contain all of the information set forth in the registration statement or the exhibits and schedules filed therewith. Statements contained in this prospectus regarding the contents of any contract or any other document that is filed as an exhibit to the registration statement are not necessarily complete, and each such statement is qualified in all respects by reference to the full text of such contract or other document filed as an exhibit to the registration statement.

We are subject to the information and reporting requirements of the Exchange Act and, in accordance with such law, will file annual, quarterly and current reports, proxy statements and other information with the SEC. The SEC maintains a website that contains reports, proxy and information statements and other information regarding issuers that file electronically with the SEC. You may obtain documents that we file with the SEC at www.sec.gov. Our website address is www.fibrobiologics.com. We do not incorporate the information on or accessible through our website into this prospectus, and you should not consider any information on, or that can be accessed through, our website as part of this prospectus. Our website address is included in this prospectus as an inactive textual reference only.

INCORPORATION OF CERTAIN DOCUMENTS BY REFERENCE

SEC rules permit us to "incorporate by reference" certain information into this prospectus, which means that we can disclose important information about us by referring you to another document filed separately with the SEC. The information incorporated by reference is considered to be a part of this prospectus, except for information superseded by information contained in this prospectus or in any subsequently filed incorporated document. Because we are incorporating by reference future filings with the SEC, this prospectus is continually updated and those future filings may modify or supersede some of the information included or incorporated in this prospectus. This means that you must carefully review all of the SEC filings that we incorporate by reference to determine if any of the statements in this prospectus or in any document previously incorporated by reference have been modified or superseded. However, we undertake no obligation to update or revise any statements we make, except as required by law.

This prospectus incorporates by reference the documents listed below and any filings we make with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act (in each case, other than those documents or the portions of those documents furnished and not filed with the SEC) on or after the date of this prospectus and prior to the termination of the offering covered by this prospectus:

- our Annual Report on [Form 10-K](#) for the year ended December 31, 2024 filed on March 31, 2025;
- those portions of our Definitive Proxy Statement on [Schedule 14A](#) that was filed on April 23, 2025 that address the disclosure requirements of Part III of Form 10-K;
- our Quarterly Reports on Form 10-Q for the quarterly periods ended [March 31, 2025](#), [June 30, 2025](#), and [September 30, 2025](#) filed on May 14, 2025, July 31, 2025 and October 31, 2025, respectively;
- our Current Reports on Form 8-K filed on [January 24, 2025](#), [February 7, 2025](#), [May 5, 2025](#), [June 9, 2025](#), [June 13, 2025](#), [June 16, 2025](#), [July 3, 2025](#), [July 18, 2025](#), [July 18, 2025 \(8-K/A\)](#), [August 8, 2025](#), [November 19, 2025](#), [November 25, 2025](#), and [December 15, 2025](#) (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 March 31, 2025, and all amendments and reports filed for the purpose of updating that description.

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

We will furnish without charge to each person, including any beneficial owner, to whom a prospectus is delivered, upon written or oral request, a copy of any or all of the documents incorporated by reference, including exhibits to these documents. Any such request may be made by writing or calling us at the following address or phone number:

FibroBiologics, Inc.
455 E. Medical Center Blvd.
Suite 300
Houston, Texas 77598
(281) 671-5150



FibroBiologics, Inc.

Common Stock

PRELIMINARY PROSPECTUS

, 2025

PART II

INFORMATION NOT REQUIRED IN PROSPECTUS

Item 13. *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	\$ 797
Legal fees and expenses	50,000
Accounting fees and expenses	20,000
Miscellaneous expenses	30,000
Total	\$ 100,797

Item 14. *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
- 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 15. *Recent Sales of Unregistered Securities*

The following sets forth information regarding all unregistered securities we have issued in the past three years. Unless stated otherwise, the sale of the securities listed below were deemed to be exempt from registration pursuant to Section 4(a)(2) of the Securities Act, including Regulation D and Rule 506 promulgated thereunder, as transactions by an issuer not involving a public offering.

Series B Preferred Stock

In December 2022, we issued an aggregate of the equivalent of 381,658 shares of Series B Preferred Stock to investors in a private placement, at a price the equivalent of \$6.76 with respect to the equivalent of 318,049 shares, with the remaining equivalent of 63,609 shares being bonus shares.

From February 2023 through April 2023, we issued an aggregate of the equivalent of 890,310 shares of our Series B Preferred Stock to investors in a Regulation Crowdfunding offering, at a price the equivalent of \$6.76 as to the equivalent of 724,937 shares, with the remaining equivalent of 143,225 shares and equivalent of 22,148 shares being bonus and commission shares, respectively. The sales of the foregoing securities were issued pursuant to the exemption provided by Section 4(a)(6) of the Securities Act.

In March and April 2023, we issued an aggregate of the equivalent of 1,680,084 shares of our Series B Preferred Stock to investors in private placements, at a price the equivalent of \$6.76 as to the equivalent of 1,527,349 shares, with the remaining equivalent of 152,735 shares being bonus shares.

Series B-1 Preferred Stock

From April 2023 through September 2023, we issued an aggregate of the equivalent of 74,922 shares of our Series B-1 Preferred Stock to investors in a private placement, at prices ranging from the equivalent of \$18.00 to \$20.00 per share as to the equivalent of 64,070 shares, with the remaining equivalent of 10,852 shares being bonus shares. In connection with a portion of such private placement of our Series B-1 Preferred Stock, we also agreed to issue warrants, exercisable for a period of three years from their issuance date, to purchase an aggregate of the equivalent of an aggregate of 8,890 shares of our common stock at an exercise price of the equivalent of \$20.00 per share. In November 2023, the Company issued a total of 14,859 additional shares of Series B-1 Preferred Stock and 1,431 additional warrants to purchase shares of common stock to investors who subscribed to purchase shares of Series B-1 Preferred Stock at a price per share that exceeded the reference price per share expected in the direct listing of our common stock.

Series C Preferred Stock

In January 2024, in conjunction with the direct listing of our common stock, we issued 2,500 shares of Series C Preferred Stock with super voting rights to our CEO for no consideration.

Common Stock

In February 2024, we issued 142,298 shares of our common stock to GEM Global Yield LLC SCS, or GEM, for approximately \$1.8 million of net proceeds, pursuant to the draw-down notice we issued under the share purchase agreement dated November 12, 2021, with GEM and GEM Yield Bahamas Limited, or the GEM SPA, to have GEM purchase up to 900,000 shares of our common stock at a draw-down threshold price of no less than \$15.00 per share, which was closed after 142,298 shares of our common stock were purchased at \$13.50 per share. We then authorized a reduction of the draw-down threshold price to no less than \$13.50 per share, and GEM submitted one additional closing notice in March 2024 after 84,759 shares of our common stock were purchased pursuant to the GEM SPA at \$12.15 per share for net cash proceeds of approximately \$1.0 million.

On June 27, 2024, we issued 3,000,000 shares of common stock to facilitate a draw-down notice under the GEM SPA. The investor subsequently accepted the draw-down notice for 840,000 shares and sent a closing notice dated July 11, 2024, for the 840,000 shares issued at a net price of \$4.09 per share after applying the 10% discount and remitted \$3,436 thousand gross proceeds to us. Of the remaining 2,160,000 shares, 560,000 shares were returned and canceled and 1,600,000 shares were utilized in a subsequent draw-down notice.

On July 12, 2024, we issued a draw-down notice for 1,600,000 shares. The investor subsequently accepted the draw-down notice for 100,000 shares and sent a closing notice dated August 26, 2024, for the 100,000 shares issued at a net price of \$4.51 per share after applying the 10% discount and remitted \$451 thousand gross proceeds to us. Of the remaining 1,500,000 shares, 500,000 shares were returned and canceled, and 1,000,000 shares were utilized in a subsequent draw-down notice.

On September 12, 2024, we issued a draw-down notice for 1,000,000 shares. The investor subsequently accepted a portion of the draw-down notice for 258,836 shares and sent a closing notice dated September 26, 2024, for the 258,836 shares issued at a net price of \$2.93 per share after applying the 10% discount and remitted \$758 thousand gross proceeds to us. With our consent, the investor submitted a second closing notice dated October 18, 2024 for an additional 15,683 shares issued at a net price of \$2.91 per share after applying the 10% discount and remitted \$46 thousand gross proceeds to us. Of the remaining 725,481 shares, 700,000 shares were returned and canceled, and 25,481 shares were utilized in a subsequent draw-down notice.

On December 19, 2024, we issued a draw-down notice for 1,152,074 shares and the investor concurrently accepted the draw-down notice in full at a purchase price of \$2.17 per share for aggregate gross proceeds of \$2.5 million. The investor satisfied the \$2.5 million payment by (a) waiving the remaining balance of the commitment fee owed to the investor for an aggregate amount of \$1.5 million, and our accepting the investor's waiver of the remaining balance of the commitment fee for an aggregate amount of \$1.5 million; and (b) terminating the warrant previously issued to the investor, in full.

On December 20, 2024, we issued a convertible promissory note to Yorkville in the principal amount of \$5.0 million pursuant to the SEPA. This promissory note is convertible at a conversion price equal to the lower of (i) \$2.41 per share or (ii) 94% of the lowest daily VWAP during the five consecutive trading days immediately preceding the conversion date (but no lower than the floor price then in effect, subject to adjustment from time to time in accordance with the terms contained in this promissory note).

On December 30, 2024, we issued a convertible promissory note to Yorkville in the principal amount of \$5.0 million pursuant to the SEPA. This promissory note is convertible at a conversion price equal to the lower of (i) \$2.84 per share or (ii) 94% of the lowest daily VWAP during the five consecutive trading days immediately preceding the conversion date (but no lower than the floor price then in effect, subject to adjustment from time to time in accordance with the terms contained in this promissory note).

On January 8, 2025, we satisfied the \$250,000 commitment fee due Yorkville under the SEPA by issuing 118,991 shares of our common stock to Yorkville using a \$2.1010 price per share.

Between January 23, 2025 and November 17, 2025, we issued 18,070,124 shares of our common stock upon conversions of the convertible promissory notes we issued to Yorkville at conversion prices between \$0.3115 per share to \$1.63 per share.

Warrants

In January 2024, in accordance with the GEM SPA, we issued a warrant to purchase up to 1,299,783 shares of our common stock with an initial exercise price of \$21.54 per share to GEM Yield Bahamas Limited for no additional consideration.

On November 19, 2025, we issued and sold warrants to purchase up to 12,110,203 shares of our common stock in a private placement concurrent with a registered direct offering in accordance with the Securities Purchase Agreement dated November 18, 2025 between us and the purchaser named therein for an aggregate price of \$0.3303 per share.

On November 25, 2025, we issued and sold warrants to purchase up to 4,477,614 shares of our common stock in a private placement concurrent with a registered direct offering in accordance with the Securities Purchase Agreement dated November 24, 2025 between us and the purchasers named therein for an aggregate price of \$0.335 per share.

On November 25, 2025, we issued warrants to purchase up to 313,433 shares of our common stock to the placement agent under the November 24 SPA in accordance with that certain engagement letter, dated November 10, 2025 between us and the placement agent.

On December 16, 2025, we issued and sold warrants to purchase up to 5,227,275 shares of our common stock in a private placement concurrent with a registered direct offering in accordance with the Securities Purchase Agreement dated December 14, 2025 between us and the purchasers named therein for an aggregate price of \$0.33 per share.

On December 16, 2025, we issued warrants to purchase up to 365,909 shares of our common stock to the placement agent under the December SPA in accordance with that certain engagement letter, dated November 10, 2025 between us and the placement agent.

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.

(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, each prospectus filed pursuant to Rule 424(b) as part of a registration statement relating to an offering, other than registration statements relying on Rule 430B or other than prospectuses filed in reliance on Rule 430A, shall be deemed to be part of and included in the registration statement as of the date it is first used after effectiveness. 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 first use, 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 date of first use.

(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
3.1	Amended and Restated Certificate of Incorporation of the Registrant.	8-K	001-41934	3.1	August 28, 2024
3.2	Amendment to Amended and Restated Certificate of Incorporation of FibroBiologics, Inc.	8-K	001-41934	3.1	June 13, 2025
3.3	Amended and Restated Bylaws of the Registrant.	8-K	001-41934	3.1	June 27, 2024
4.1	Reference is made to exhibits 3.1 through 3.3.				
4.2	Form of Common Stock Purchase Warrant issued November 19, 2025.	8-K	001-41934	10.2	November 19, 2025
4.3	Form of Common Stock Purchase Warrant issued November 25, 2025.	8-K	001-41934	4.1	November 25, 2025
4.4	Form of Placement Agent Warrant issued November 25, 2025.	8-K	001-41934	4.2	November 25, 2025
4.5	Form of Common Stock Purchase Warrant issued December 16, 2025.	8-K	001-41934	4.1	December 16, 2025
4.6	Form of Placement Agent Warrant issued December 16, 2025.	8-K	001-41934	4.2	December 16, 2025
5.1	Opinion of Sichenzia Ross Ferrence Carmel LLP.				
10.1	Intellectual Property Cross-License Agreement dated as of May 17, 2021, between SpinalCyte LLC and FibroBiologics, LLC.	S-1/A	333-275361	10.1	December 4, 2023
10.2	Amendment 1 to the Intellectual Property Cross-License Agreement between SpinalCyte LLC and FibroBiologics, Inc., effective as of May 17, 2021.	10-Q	001-41934	10.1	August 7, 2024
10.3	Patent Assignment Agreement dated May 17, 2021, between SpinalCyte LLC and FibroBiologics, LLC.	S-1/A	333-275361	10.2	November 30 2023
10.4	Amendment 1 to the Patent Assignment Agreement, effective August 2, 2022.	S-1/A	333-275361	10.18	November 30 2023

10.5	<u>Amendment 2 to the Patent Assignment Agreement between SpinalCyte LLC and FibroBiologics, Inc., effective as of May 17, 2021.</u>	10-Q	001-41934	10.2	August 7, 2024
10.6	<u>IP Transfer Agreement between SpinalCyte, LLC and FibroBiologics, LLC, dated as of May 17, 2021.</u>	S-1/A	333-275361	10.17	November 30 2023
10.7	<u>Agreement Regarding Right of First Negotiation dated January 20, 2023.</u>	S-1/A	333-275361	10.19	November 30 2023
10.8	<u>Sublease Agreement between United Fire & Casualty Company and FibroBiologics, Inc., effective October 5, 2022.</u>	S-1/A	333-275361	10.6	December 4, 2023
10.9	<u>2022 Stock Plan.</u>	S-1/A	333-275361	10.12	November 30 2023
10.10	<u>Form of Stock Option Notice and Grant Agreement.</u>	S-1/A	333-275361	10.20	December 4, 2023
10.11	<u>Employment Agreement effective from December 1, 2023, between FibroBiologics, Inc. and Pete O’Heeron.</u>	S-1/A	333-275361	10.22	December 4, 2023
10.12	<u>Employment Agreement effective from July 20, 2021, between FibroBiologics, LLC and Hamid Khoja.</u>	S-1/A	333-275361	10.13	December 4, 2023
10.13	<u>Employment Agreement effective from June 9, 2025, between FibroBiologics, Inc. and Jason D. Davis.</u>	8-K	001-41934	10.1	June 9, 2025
10.14	<u>Employment Agreement effective from March 1, 2024, between FibroBiologics, Inc. and Ruben Garcia.</u>	S-1/A	333-277019	10.24	March 15, 2024
10.15	<u>Offer Letter, dated October 29, 2024, between FibroBiologics, Inc. and Robert E. Hoffman.</u>	S-1	333-284077	10.15	December 30, 2024
10.16	<u>Consulting Agreement, dated May 15, 2025, between FibroBiologics, Inc. and Robert E. Hoffman.</u>	10-Q	001-41934	10.3	July 31, 2025
10.17	<u>Employment Agreement effective from May 31, 2022, between FibroBiologics, Inc. and Mark Andersen.</u>	S-1/A	333-275361	10.14	December 4, 2023
10.18	<u>Separation Letter Agreement, dated October 28, 2024, between FibroBiologics, Inc. and Mark Andersen.</u>	S-1	333-284077	10.14	December 30, 2024

10.19	<u>Form of Indemnification Agreement between the Registrant and each of its Directors and Executive Officers.</u>	S-1/A	333-275361	10.15	December 4, 2023
10.20+	<u>Master Services Agreement, effective September 19, 2024, between FibroBiologics, Inc. and Charles River Laboratories, Inc.</u>	8-K	001-41934	10.1	September 24, 2024
10.21	<u>Standby Equity Purchase Agreement, dated December 20, 2024, between the Registrant and YA II PN, LTD.</u>	8-K	001-41934	10.1	December 23, 2024
10.22	<u>Form of Securities Purchase Agreement, dated November 18, 2025, between FibroBiologics, Inc. and the purchasers named therein.</u>	8-K	001-41934	10.1	November 19, 2025
10.23	<u>Form of Securities Purchase Agreement, dated November 24, 2025, between FibroBiologics, Inc. and the purchasers named therein.</u>	8-K	001-41934	10.1	November 25, 2025
10.24	<u>Form of Securities Purchase Agreement, dated December 14, 2025, between FibroBiologics, Inc. and the purchasers named therein.</u>	8-K	001-41934	10.1	December 16, 2025
23.1	<u>Consent of Sichenzia Ross Ferrence 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	<u>Filing Fee Table.</u>				

+ Portions of this exhibit have been redacted in compliance with Regulation S-K Item 601(b)(10)(iv).

SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, the registrant 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 December 23, 2025.

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)	December 23, 2025
<u>/s/ Jason D. Davis</u> Jason D. Davis	Chief Financial Officer (Principal Financial Officer and Principal Accounting Officer)	December 23, 2025
<u>/s/ Robert E. Hoffman</u> Robert E. Hoffman	Director	December 23, 2025
<u>/s/ Victoria Niklas</u> Victoria Niklas, M.D.	Director	December 23, 2025
<u>/s/ Richard Cilento</u> Richard Cilento	Director	December 23, 2025
<u>/s/ Stacy Coen</u> Stacy Coen	Director	December 23, 2025
<u>/s/ Matthew Link</u> Matthew Link	Director	December 23, 2025



December 23, 2025

FibroBiologics, Inc.
455 E. Medical Center Blvd, Suite 300
Houston, TX 77598

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-1 (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 22,494,434 shares (“Shares”) of the Company’s common stock, par value \$0.00001 per share (the “Common Stock”) consisting of (i) up to 12,110,203 shares of Common Stock issuable upon the exercise of common warrants issued in a private placement that closed on November 19, 2025 (the “November 19 Warrants”), (ii) up to 4,477,614 shares of Common Stock issuable upon the exercise of common warrants issued in a private placement that closed on November 25, 2025 (the “November 25 Warrants”), (iii) up to 313,433 shares of Common Stock issuable upon the exercise of placement agent warrants issued concurrently with the November 25 Warrants (the “November 25 Placement Agent Warrants”), (iv) up to 5,227,275 shares of Common Stock issuable upon the exercise of common warrants issued in a private placement that closed on December 16, 2025 (the “December 16 Warrants”), and (v) up to 365,909 shares of Common Stock issuable upon the exercise of placement agent warrants issued concurrently with the December 16 Warrants (the “December 16 Placement Agent Warrants” and, together with the November 19 Warrants, and the November 25 Warrants, the November 25 Placement Agent Warrants, and the December 16 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-1 of our report dated March 31, 2025 (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 financial statements of FibroBiologics, Inc. as of and for the years ended December 31, 2024 and 2023, 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
December 23, 2025

Calculation of Filing Fee Tables

FORM S-1
(Form Type)

FibroBiologics, Inc.
(Exact Name of Registrant as Specified in its Charter)
Table 1: Newly Registered Securities

Security Type	Security Class Title	Fee Calculation Rule	Amount Registered	(1)	Proposed Maximum Offering Price Per Unit	Maximum Aggregate Offering Price	Fee Rate	Amount of Registration Fee
Fees to be Paid								
Equity	Common stock, par value \$0.00001 per share, underlying warrants	Rule 457(c)	22,494,434	\$	0.2565(2)	\$ 5,769,823	138.10 per 1,000,000	\$ 797
Total Offering Amounts						\$ 5,769,823		\$ 797
Total Fee Offsets								—
Net Fee Due								\$ 797

- (1) Pursuant to Rule 416 under the Securities Act of 1933, as amended, or the Securities Act, this Registration Statement on Form S-1 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 December 19, 2025.