

As filed with the Securities and Exchange Commission on September 6, 2022

Registration No. 333-

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

FORM S-3  
REGISTRATION STATEMENT  
UNDER THE SECURITIES ACT OF 1933

**SYNTHETIC BIOLOGICS, INC.**

(Exact Name of Registrant as Specified in Its Charter)

**Nevada**

(State or Other Jurisdiction of  
Incorporation or Organization)

**13-3808303**

(I.R.S. Employer  
Identification Number)

**9605 Medical Center Drive, Suite 270  
Rockville, Maryland 20850  
(734) 332-7800**

(Address, Including Zip Code, and Telephone Number, Including Area Code, of Registrant's Principal Executive Offices)

**Steven A. Shallcross  
Chief Executive Officer and Chief Financial Officer  
Synthetic Biologics, Inc.  
9605 Medical Center Drive, Suite 270  
Rockville, Maryland 20850  
(734) 332-7800**

(Name, Address, Including Zip Code, and Telephone Number, Including Area Code of Agent for Service)

**With copies to:**

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**Approximate date of commencement of proposed sale to the public:** From time to time after the effective date of this registration statement.

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

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

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

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

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

If this Form is a registration statement pursuant to General Instruction I.D. or a post-effective amendment thereto that shall become effective upon filing with the Commission pursuant to Rule 413(b) under the Securities Act, check the following box. "

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

Large accelerated filer	"	Accelerated filer	"
Non-accelerated filer	x	Smaller reporting company	x

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 to Section 7(a)(2)(B) of the Securities Act. ”

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**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 or until the registration statement shall become effective on such date as the Commission, acting pursuant to said Section 8(a), may determine.**

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

**SUBJECT TO COMPLETION, DATED SEPTEMBER 6, 2022**

**PROSPECTUS**



**2,459,017 Shares of Common Stock**

The selling stockholder of Synthetic Biologics, Inc. ("Synthetic," "we," "us" or the "Company") identified in this prospectus, including its pledgees, donees, transferees, assigns or other successors in interest, may offer and resell under this prospectus up to 2,459,017 shares of common stock, par value \$0.001 per share, of the Company (the "Common Stock"). The number of shares offered for sale by the selling stockholder consists of (i) 1,803,279 shares of Common Stock (the "Series C Conversion Shares") issuable upon the conversion of 275,000 shares of the Company's Series C Convertible Preferred Stock, par value \$0.001 per share (the "Series C Preferred Stock"), and (ii) 655,738 shares of Common Stock (the "Series D Conversion Shares") issuable upon the conversion of 100,000 shares of the Company's Series D Convertible Preferred Stock, par value \$0.001 per share (the "Series D Preferred Stock," and together with the Series C Preferred Stock, the "Preferred Stock"). The Series C Conversion Shares and the Series D Conversion Shares are collectively referred to as the "Shares." The Series C Preferred Stock and the Series D Preferred Stock were sold to the selling stockholder in a private placement transaction that closed on July 29, 2022. See "Prospectus Summary—July 2022 Private Placement."

The selling stockholder may sell the Shares through public or private transactions at market prices prevailing at the time of sale or at negotiated prices. The timing and amount of any sale are within the sole discretion of the selling stockholder. The selling stockholder may sell any, all or none of the securities offered by this prospectus and we do not know when or in what amount the selling stockholder may sell its shares of Common Stock hereunder following the effective date of this registration statement. Our registration of the Shares covered by this prospectus does not mean that the selling stockholder will offer or sell any of the Shares. For further information regarding the possible methods by which the Shares may be distributed, see "Plan of Distribution" in this prospectus.

Our Common Stock is listed on the NYSE American LLC under the symbol "SYN." The last reported sale price of our Common Stock on the NYSE American LLC on September 2, 2022 was \$1.44 per share. We urge prospective purchasers of our Common Stock to obtain current information about the market prices of our Common Stock.

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**Investing in our Common Stock involves a high degree of risk. Please consider carefully the risks described in this prospectus under "Risk Factors" beginning on page 6 of this prospectus and in our filings with the Securities and Exchange Commission.**

**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.**

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**The date of this prospectus is \_\_\_\_\_, 2022**

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**You should rely only on the information we have provided or incorporated by reference in this prospectus or in any prospectus supplement. We have not and the selling stockholder has not authorized anyone to provide you with information different from that contained or incorporated by reference in this prospectus or in any prospectus supplement. This prospectus and any prospectus supplement is an offer to sell only the securities offered hereby, but only under circumstances and in jurisdictions where it is lawful to do so. You should assume that the information contained in this prospectus and in any prospectus supplement is accurate only as of their respective dates and that any information we have incorporated by reference is accurate only as of the date of the document incorporated by reference, regardless of the time of delivery of this prospectus or any prospective supplement or any sale of securities. The registration statement, including the exhibits and the documents incorporated herein by reference, can be read at [www.sec.gov](http://www.sec.gov), the Securities and Exchange Commission website. See the information included under the heading “Where You Can Find More Information.”**

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## ABOUT THIS PROSPECTUS

This prospectus is not an offer or solicitation in respect to the Shares in any jurisdiction in which such offer or solicitation would be unlawful. This prospectus is part of a registration statement that we have filed with the Securities and Exchange Commission (the “SEC”) pursuant to which the selling stockholder named herein may, from time to time, offer and sell or otherwise dispose of the Shares covered by this prospectus. You should not assume that the information contained in this prospectus is accurate on any date subsequent to the date set forth on the front cover of this prospectus or that any information we have incorporated by reference is correct on any date subsequent to the date of the document incorporated by reference, even though this prospectus is delivered or Shares are sold or otherwise disposed of on a later date.

This prospectus does not contain all of the information included in the registration statement. For a more complete understanding of the offering of the Shares, you should refer to the registration statement including the exhibits. 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, will be filed or will be incorporated by reference as exhibits to the registration statement of which this prospectus is a part, and you may obtain copies of those documents as described below under the heading “Where You Can Find More Information.” We further note that the representations, warranties and covenants made by us in any agreement that is filed as an exhibit to any document that is incorporated by reference in the accompanying prospectus were made solely for the benefit of the parties to such agreement, including in some cases, for the purpose of allocating risk among the parties to such agreements, and should not be deemed to be a representation, warranty or covenant to you. Moreover, such representations, warranties or covenants were accurate only as of the date when made. Accordingly, such representations, warranties and covenants should not be relied on as accurately representing the current state of our affairs. It is important for you to read and consider all information contained in this prospectus, including the documents incorporated by reference therein, in making your investment decision. You should also read and consider the information in the documents to which we have referred you under “Where You Can Find More Information” and “Incorporation of Certain Documents by Reference” in this prospectus.

We and the selling stockholder have not authorized anyone to give any information or to make any representation to you other than those contained or incorporated by reference in this prospectus. You must not rely upon any information or representation not contained or incorporated by reference in this prospectus. This prospectus does not constitute an offer to sell or the solicitation of an offer to buy any of our shares of Common Stock other than the Shares covered hereby, nor does this prospectus constitute an offer to sell or the solicitation of an offer to buy any securities in any jurisdiction to any person to whom it is unlawful to make such offer or solicitation in such jurisdiction. Persons who come into possession of this prospectus in jurisdictions outside the United States are required to inform themselves about, and to observe, any restrictions as to the offering and the distribution of this prospectus applicable to those jurisdictions.

This prospectus, including the documents incorporated by reference herein, include statements that are based on various assumptions and estimates that are subject to numerous known and unknown risks and uncertainties. Some of these risks and uncertainties are described in the section entitled “Risk Factors” beginning on page 6 of this prospectus and described in described in Part I, Item 1A (Risk Factors) of our most recent Annual Report on Form 10-K for the fiscal year ended December 31, 2021, as well as the other documents that we file with the SEC. These and other important factors could cause our future results to be materially different from the results expected as a result of, or implied by, these assumptions and estimates. You should read the information contained in, or incorporated by reference into, this prospectus completely and with the understanding that future results may be materially different from and worse than what we expect. See the information included under the heading “Special Note Regarding Forward-Looking Statements.”

Unless otherwise stated or the context otherwise requires, references in this prospectus to “Synthetic”, the “Company,” “we,” “our” and “us” refer to Synthetic Biologics, Inc., a Nevada corporation, and its consolidated subsidiaries, unless otherwise specified. When we refer to “you,” we mean the holders of the shares of Common Stock registered hereby.

This prospectus and the information incorporated herein by reference include trademarks, service marks and trade names owned by us or other companies. All trademarks, service marks and trade names included or incorporated by reference into this prospectus, any applicable prospectus supplement or any related free writing prospectus are the property of their respective owners.

## PROSPECTUS SUMMARY

*This summary highlights information contained elsewhere or incorporated by reference in this prospectus. This summary does not contain all the information you should consider before investing in our Common Stock. You should read the following summary together with the more detailed information appearing in this prospectus and the information incorporated by reference and the registration statement of which this prospectus is a part in their entirety, including our consolidated financial statements and related notes as well as the section entitled “Risk Factors” herein and in the documents incorporated by reference, before making any investment decision.*

### Overview

We are a diversified clinical-stage company developing therapeutics in areas of high unmet need. Prior to the acquisition of VCN Biosciences S.L. (“VCN”), our focus was on developing therapeutics designed to treat gastrointestinal (GI) diseases which included our lead clinical development candidates: (1) SYN-004 (ribaxamase) which is designed to degrade certain commonly used intravenous (IV) beta-lactam antibiotics within the GI tract to prevent microbiome damage, *Clostridioides difficile* infection (CDI), overgrowth of pathogenic organisms, the emergence of antimicrobial resistance (AMR), and acute graft-versus-host-disease (aGVHD) in allogeneic hematopoietic cell transplant (HCT) recipients, and (2) SYN-020, a recombinant oral formulation of the enzyme intestinal alkaline phosphatase (IAP) produced under cGMP conditions and intended to treat both local GI and systemic diseases. Upon consummation of the acquisition of VCN, described in more detail below, we are transitioning our strategic focus to oncology, through the development of new oncolytic adenovirus products designed for intravenous and intravitreal delivery to trigger tumor cell death, improve access of co-administered cancer therapies to the tumor, and promote a robust and sustained anti-tumor response by the patient’s immune system.

As part of our strategic transformation into an oncology focused company, we are exploring value creation options around our SYN-020 and SYN-004 assets. SYN-004 and SYN-020 both have significant potential opportunity in non-oncology related indications. Advancement of these products may be better achieved through out-licensing or partnering, and we will explore opportunities for both SYN-004 and SYN-020 moving forward.

### Acquisition of VCN Biosciences, S.L

On March 10, 2022, pursuant to the terms of the Share Purchase Agreement (“Acquisition Agreement”) we entered into with VCN and the shareholders of VCN Biosciences S.L. (the “Sellers”), we completed our acquisition of all the outstanding shares of VCN (the “VCN Shares”) from the shareholders of VCN (“Closing”). Pursuant to the Acquisition Agreement, as consideration for the purchase of the VCN Shares of capital stock, we paid \$4,700,000 (the “Closing Cash Consideration”) to Grifols Innovation and New Technologies Limited (“Grifols”), the owner of approximately 86% of the equity of VCN, and issued to the remaining Sellers 26,395,303 shares of our Common Stock (the “Closing Shares”), representing 19.99% of the outstanding shares of our Common Stock on December 14, 2021, the date of the Acquisition Agreement. As additional consideration for the purchase of the VCN Shares held by Grifols, we also agreed to make certain milestone payments to Grifols. Pursuant to the terms of the Acquisition Agreement we loaned VCN \$417,000 to help finance the costs of certain of VCN’s research and development activities. In addition, at Closing VCN and Grifols entered into a sublease agreement for the sublease by VCN of the laboratory and office space as well as a transitional services agreement. We agreed as a post-Closing covenant to commit to fund VCN’s research and development programs, including but not limited to VCN-01 PDAC phase 2 trial, VCN-01 RB trial and necessary G&A within a budgetary plan of approximately \$27.8 million.

VCN is a private, clinical-stage biopharmaceutical company developing new oncolytic adenoviruses for the treatment of cancer. VCN’s lead product candidate, VCN-01, is being studied in clinical trials for pancreatic cancer and retinoblastoma. VCN-01 is designed to be administered systemically, intratumorally or intravitreally, either as a monotherapy or in combination with standard of care, to treat a wide variety of cancer indications. VCN-01 is designed to replicate selectively and aggressively within tumor cells, and to degrade the tumor stroma barrier that serves as a significant physical and immunosuppressive barrier to cancer treatment. Degrading the tumor stroma has been shown to improve access to the tumor by the virus and additional therapies such as chemo- and immuno-therapies. Importantly, degrading the stroma exposes tumor antigens, turning “cold” tumors “hot” and enabling a sustained anti-tumor immune response. VCN has the rights to four exclusive patents for proprietary technologies, as well as technologies developed in collaboration with the Virotherapy Group of the Catalan Institute of Oncology (ICO-IDIBELL) and with Hospital Sant Joan de Deu (HSJD), with a number of additional patents pending.

## July 2022 Private Placement

On July 29, 2022, we closed a private placement offering pursuant to the terms of a Securities Purchase Agreement (the "Purchase Agreement") dated as of July 28, 2022 entered into with MSD Credit Opportunity Master Fund, L.P. ("MSD" or the "selling stockholder"), pursuant to which we issued and sold 275,000 shares of our Series C Preferred Stock and 100,000 shares of our Series D Preferred Stock at an offering price of \$8.00 per share, for gross proceeds of approximately \$3.0 million in the aggregate, before the deduction of discounts, fees and offering expenses. The shares of Preferred Stock are convertible at a conversion price (the "Conversion Price") of \$1.22 per share (subject in certain circumstances to adjustments), into an aggregate of 2,459,017 shares of Common Stock at the option of the holders of the Preferred Stock and, in certain circumstances, by us. The Purchase Agreement contains customary representations, warranties and agreements.

We intend to include certain proposals at our 2022 annual meeting of stockholders to be held on September 30, 2022, including to consider (i) an amendment to our Articles of Incorporation, as amended (the "Charter"), to change our name to "Theriva Biologics, Inc." (the "Name Change"), (ii) an amendment to the Charter to increase the number of authorized shares of Common Stock from 20,000,000 to 350,000,000 (the "Authorized Common Stock Increase") and (iii) any proposal to adjourn any meeting of stockholders called for the purpose of voting on the Authorized Common Stock Increase (collectively, the "Stockholder Items"). MSD has agreed in the Purchase Agreement, as amended on August 8, 2022 to (i) not transfer, offer, sell, contract to sell, hypothecate, pledge or otherwise dispose of the shares of the Preferred Stock until the earlier of the date that the Authorized Common Stock Increase is effected or October 26, 2022 (which may be extended to December 31, 2022 if certain conditions are met), (ii) submit 1,549,295 of the votes relating to the Series C Preferred Stock that it would otherwise be entitled to vote in favor of the Stockholder Items and (iii) vote the shares of the Series D Preferred Stock in the same proportion as shares of Common Stock and any other shares of our capital stock that are entitled to vote thereon (excluding any shares of Common Stock that are not voted) on the Stockholder Items.

Pursuant to the Purchase Agreement, we filed certificates of designation (the "Certificates of Designation") with the Secretary of the State of Nevada designating the rights, preferences and limitations of the shares of Series C Preferred Stock and Series D Preferred Stock. The Certificate of Designation for the Series C Preferred Stock provides, in particular, that the Series C Preferred Stock will have no voting rights other than the right to vote as a class on the Stockholder Items and the right to cast votes on an as converted to Common Stock basis on the Stockholder Items. The Certificate of Designation for the Series D Preferred Stock provides, in particular, that the Series D Preferred Stock will have no voting rights other than the right to vote as a class on the Stockholder Items and the right to cast 20,000 votes per share (or an aggregate of 2,000,000,000 votes) of Series D Preferred Stock on the Stockholder Items.

The holders of Preferred Stock will be entitled to dividends, on an as-if converted basis, equal to dividends actually paid, if any, on shares of Common Stock. The Conversion Price may be adjusted pursuant to the Certificates of Designation for stock dividends and stock splits, subsequent rights offering, pro rata distributions of dividends or the occurrence of a fundamental transaction (as defined in the applicable Certificate of Designation).

Pursuant to the Purchase Agreement, we are required to file a registration statement with the SEC to register for resale the 2,459,017 shares of Common Stock that are issuable upon the potential conversion of shares of Preferred Stock. The registration statement must be filed with the SEC no later than forty-five (45) days following the date of the Purchase Agreement (the "Filing Deadline") and we are required to use reasonable best efforts to cause such registration statement to be declared effective as soon as possible after filing, but in no event later than sixty (60) days following the Filing Deadline. The registration statement of which this prospectus forms a part is being filed to satisfy the aforementioned registration rights set forth in the Purchase Agreement.

## Summary Risk Factors

Our business faces significant risks and uncertainties of which investors should be aware before making a decision to invest in our Common Stock. If any of the following risks are realized, our business, financial condition and results of operations could be materially and adversely affected. The following is a summary of the more significant risks that we face. See the "Risk Factors" section on page 6 of this prospectus and the risks and uncertainties discussed under Item 1A, "Risk Factors," contained in our most recent Annual Report on Form 10-K as updated by our subsequent filings with the SEC under the Securities Exchange Act of 1934, as amended (the "Exchange Act"), which are incorporated by reference, in this prospectus, and any updates to those risk factors included from time to time in our periodic and current reports filed with the SEC and incorporated by reference in this prospectus.

### ***Risks Related to the Acquisition of VCN***

- The combined company may not experience the anticipated strategic benefits of the acquisition of VCN.
- We may be unable to successfully integrate the VCN businesses with our current management and structure.
- We do not anticipate generating revenue from product or technology sales for many years.
- In order to develop VCN products or technology we will have to devote significant resources to VCN products or technology and will need to raise additional capital to fully develop the newly acquired product candidates.

### ***Risks Related to Our Business***

- We will need to raise additional capital to operate our business and our failure to obtain funding when needed may force us to delay, reduce or eliminate certain of our development programs or commercialization efforts.
- The COVID-19 global health crisis has impacted and could continue to impact our planned operations.
- Business disruptions could seriously harm our future revenue and financial conditions and increase costs.
- We expect to continue to incur significant operating and capital expenditures.
- The actual amount of funds we will need to operate is subject to many risk factors, some of which are beyond our control.
- We currently have no products approved for commercial sale, have no significant source of revenue and may never generate significant revenue.
- To date we have not conducted any cancer research and development activities and there can be no assurance that we will successfully be able to do so.
- In the past Oncolytic Viruses have experienced certain challenges
- Our research and development efforts may not succeed in developing successful products and technologies, which may limit our ability to achieve profitability.
- We may form or seek strategic alliances or enter into additional licensing arrangements in the future, and we may not realize the benefits of such alliances or licensing arrangements.
- We may not be able to retain rights licensed to us by others to commercialize key products and may not be able to establish or maintain the relationships we need to develop, manufacture, and market our products.
- We may incur additional expenses in connection with our licenses and collaboration arrangements and our development of our product candidates.
- Developments by competitors may render our products or technologies obsolete or non-competitive.
- We may seek to selectively establish collaborations, and, if we are unable to establish them on commercially reasonable terms, we may have to alter our development and commercialization plans.
- If the parties we depend on for supplying drug substance, raw materials for our product candidates and certain manufacturing-related services, are insufficient in quality or quantity, it may delay or impair our ability to develop, manufacture and market our product candidates.
- For the proposed Phase 2 clinical trial of VCN-01 in patients with PDAC, we plan to administer our clinical product candidate, VCN-01, in combination with other approved standard of care drugs. Any problems obtaining the standard of care drugs could result in a delay or interruption in our clinical trials.
- We may fail to retain or recruit necessary personnel, and we may be unable to secure the services of consultants.
- We rely extensively on our information technology systems which are vulnerable to damage and interruption.
- Any failure to maintain the security of information relating to our patients, customers, employees and suppliers, whether as a result of cybersecurity attacks or otherwise, could expose us to litigation, government enforcement actions and costly response measures, and could disrupt our operations and harm our reputation.
- We may face particular data protection, data security and privacy risks in connection with the European Union's Global Data Protection Regulation and other privacy regulations.

### ***Regulatory Risks***

- If we do not obtain the necessary regulatory approvals in the U.S. and/or other countries, we may not be able to develop or sell our product candidates.
- Clinical trials are very expensive, time consuming, and difficult to design and implement.
- The results of our clinical trials may not support our proposed product candidate claims and the results of preclinical studies and completed clinical trials are not necessarily predictive of future results.
- Difficulties in enrolling, retaining, or completing patients in our clinical trials or delays in enrollment are expected to result in our clinical development activities being delayed or otherwise adversely affected.
- Patients who are administered our product candidates may experience unexpected side effects or other safety risks that could cause a halt in clinical development, preclude approval or limit the commercial potential of the product candidate.
- Our product candidates, if approved for sale, may not gain acceptance among physicians, patients and the medical community.
- We depend on third parties, including researchers and sublicensees, who are not under our control. If these third parties do not successfully carry out their contractual duties or meet expected deadlines we may not be able to seek or obtain regulatory approval for, or commercialize our product candidates.
- We currently have no marketing, sales or distribution organization and have no experience in marketing products as a company.



- Reimbursement may not be available for our product candidates, which would impede sales.
- Healthcare reform measures could hinder or prevent our product candidates' commercial success.
- If product liability lawsuits are successfully brought against us, we may incur substantial liabilities and may be required to limit commercialization of our product candidates.

### ***Intellectual Property Risks***

- We rely on patent applications and various regulatory exclusivities to protect some of our product candidates and our ability to compete may be limited or eliminated if we are not able to protect our products.
- We may incur substantial costs as a result of litigation or other proceedings relating to protecting our intellectual property rights, as well as costs associated with lawsuits.
- If we infringe the rights of others, we could be prevented from selling products or forced to pay damages.

### ***Risks Related to Our Securities***

- We cannot assure you that our Common Stock will be liquid or that it will remain listed on the NYSE American.
- We expect to seek to raise additional capital in the future, which may be dilutive to stockholders or impose operational restrictions.
- Holders of our warrants issued in our October 2018 offering have no rights as holders of our Common Stock until they exercise their warrants and acquire our Common Stock.
- The market price of our Common Stock has been and may continue to be volatile and adversely affected by various factors.
- Our articles of incorporation and bylaws and Nevada law may have anti-takeover effects that could discourage, delay or prevent a change in control, which may cause our stock price to decline. We do not intend to pay dividends in the foreseeable future on our Common Stock.
- We do not intend to pay dividends in the foreseeable future on our Common Stock.
- Resales of our Common Stock in the public market by our stockholders may cause the market price of our Common Stock to fall.

### **Company History**

Our predecessor, Sheffield Pharmaceuticals, Inc., was incorporated in 1986, and in 2006 engaged in a reverse merger with Pipex Therapeutics, Inc., a Delaware corporation formed in 2001. After the merger, we changed our name to Pipex Pharmaceuticals, Inc., and in October 2008 we changed our name to Adeona Pharmaceuticals, Inc. On October 15, 2009, we engaged in a merger with a wholly owned subsidiary for the purpose of reincorporating in the State of Nevada. After reprioritizing our focus on the emerging area of synthetic biologics and entering into our first collaboration with Intrexon, we amended our Articles of Incorporation to change our name to Synthetic Biologics, Inc. on February 15, 2012.

### **Corporate Information**

Our executive offices are located at 9605 Medical Center Drive, Suite 270, Rockville, Maryland 20850. Our telephone number is (301) 417-4364, and our website address is [www.syntheticbiologics.com](http://www.syntheticbiologics.com). The information contained on our website is not part of and should not be construed as being incorporated by reference into this prospectus supplement.

## THE OFFERING

This prospectus relates to the resale from time to time by the selling stockholder identified herein of up to 2,459,017 shares of our Common Stock. We are not offering any shares for sale under the registration statement of which this prospectus is a part.

Common Stock offered by the selling stockholder hereunder: 2,459,017 shares of our Common Stock

Common Stock to be outstanding after this offering: 18,303,078 shares of our Common Stock<sup>(1)</sup>

Use of Proceeds: We will not receive any proceeds from the sale of the Shares offered pursuant to this prospectus. The selling stockholder will receive all of the proceeds from the sale of the Shares offered by this prospectus.

Offering Price: The selling stockholder may sell all or a portion of the Shares through public or private transactions at prevailing market prices or at privately negotiated prices.

Risk Factors: You should read the "Risk Factors" section of this prospectus and in the documents incorporated by reference in this prospectus for a discussion of factors to consider before deciding to purchase shares of our Common Stock.

NYSE American LLC symbol: Our Common Stock is listed on the NYSE American LLC under the symbol "SYN."

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(1) Based on 15,844,061 shares of Common Stock issued and outstanding on August 29, 2022.

Unless indicated otherwise, all information in this prospectus reflects a one-for-ten reverse stock split of our issued and outstanding shares of Common Stock, options and warrants effected on July 25, 2022.

## **RISK FACTORS**

*An investment in our shares of Common Stock involves a high degree of risk. You should consider carefully the risks discussed under the section captioned "Risk Factors" contained in our most recent annual report on Form 10-K and in our subsequent quarterly reports on Form 10-Q, as updated by our subsequent filings under the Exchange Act, each of which is incorporated by reference in this prospectus in its entirety, together with other information in this prospectus, and the information and documents incorporated by reference in this prospectus, and any free writing prospectus that we have authorized for use in connection with this offering before you make a decision to invest in our securities. If any of these events actually occur, our business, operating results, prospects or financial condition could be materially and adversely affected. This could cause the trading price of our Common Stock to decline and you may lose all or part of your investment.*

## **SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS**

Some of the statements contained or incorporated by reference in this prospectus may include forward-looking statements that reflect our current views with respect to our ongoing and planned clinical trials, business strategy, business plan, financial performance and other future events. These statements include forward-looking statements both with respect to us, specifically, and the biotechnology sector, in general. We make these statements pursuant to the safe harbor provisions of the Private Securities Litigation Reform Act of 1995. Statements that include the words “expect,” “intend,” “plan,” “believe,” “project,” “estimate,” “may,” “should,” “anticipate,” “will” and similar statements of a future or forward-looking nature identify forward-looking statements for purposes of the federal securities laws or otherwise.

All forward-looking statements involve inherent risks and uncertainties, and there are or will be important factors that could cause actual results to differ materially from those indicated in these statements. We believe that these factors include, but are not limited to, those factors set forth under the caption “Risk Factors” in this prospectus and under the captions “Risk Factors,” “Business,” and “Management’s Discussion and Analysis of Financial Condition and Results of Operations,” in our most recent Annual Report on Form 10-K and our subsequent Quarterly Reports on Form 10-Q, all of which you should review carefully. Please consider our forward-looking statements in light of those risks as you read this prospectus. We undertake no obligation to publicly update or review any forward-looking statement, whether as a result of new information, future developments or otherwise.

If one or more of these or other risks or uncertainties materializes, or if our underlying assumptions prove to be incorrect, actual results may vary materially from what we anticipate. All subsequent written and oral forward-looking statements attributable to us or individuals acting on our behalf are expressly qualified in their entirety by this Note. Before purchasing any of our securities, you should carefully consider all of the factors set forth or referred to in this prospectus that could cause actual results to differ.

## **USE OF PROCEEDS**

We will not receive any proceeds from the sale of the Shares offered pursuant to this prospectus. The selling stockholder will receive all of the proceeds from the sale of the Shares offered by this prospectus. For information about the selling stockholder, see the section titled “Selling Stockholders” included in this prospectus. The selling stockholder will pay any underwriting discounts and commissions and expenses incurred by the selling stockholder in disposing of the Shares. We will bear all other costs, fees and expenses incurred in effecting the registration of the Shares covered by this prospectus, including all registration and filing fees and fees and expenses of our counsel and accountants.

## **DIVIDEND POLICY**

We have never paid cash dividends on our Common Stock. Moreover, we do not anticipate paying periodic cash dividends on our Common Stock for the foreseeable future. We intend to use all available cash and liquid assets in the operation and growth of our business, subject to terms of any preferred stock or debt securities. Any future determination about the payment of dividends will be made at the discretion of our board of directors and will be subject to the rights of any outstanding preferred stock and will depend upon our earnings, if any, capital requirements, operating and financial conditions and on such other factors as our board of directors deems relevant.

The holders of our Series C Preferred Stock and Series D Preferred Stock are entitled to dividends, on an as-if converted basis, equal to dividends actually paid, if any, on shares of our Common Stock.

## DESCRIPTION OF OUR CAPITAL STOCK

### ***Authorized Capital***

Our authorized capital consists of 20,000,000 shares of Common Stock and 10,000,000 shares of preferred stock, par value \$0.001 per share. As of August 29, 2022, 15,844,061 shares of Common Stock were issued and outstanding, and no shares of preferred stock were issued and outstanding.

On July 25, 2022, we effected a one-for-ten reverse stock split. All per share numbers reflect the one-for-ten reverse stock split.

### ***Common Stock***

***Authorized Shares of Common Stock.*** We currently have authorized 20,000,000 shares of Common Stock. As of August 29, 2022, we had 15,844,061 shares of Common Stock outstanding.

***Voting Rights.*** The holders of the Common Stock are entitled to one vote for each share held of record on all matters submitted to a vote of the stockholders, including the election of directors, and do not have cumulative voting rights. Accordingly, the holders of a majority of the shares of the Common Stock entitled to vote in any election of directors can elect all of the directors standing for election.

***Dividend Rights.*** Subject to preferences that may be applicable to any then outstanding preferred stock, the holders of Common Stock are entitled to receive dividends, if any, as may be declared from time to time by our board of directors out of legally available funds.

***Liquidation Rights.*** In the event of our liquidation, dissolution or winding up, holders of the Common Stock will be entitled to share ratably in the net assets legally available for distribution to stockholders after the payment of all of our debts and other liabilities, subject to the satisfaction of any liquidation preference granted to the holders of any then outstanding shares of preferred stock.

***Other Rights and Preferences.*** The holders of the Common Stock have no preemptive, conversion or subscription rights, and there are no redemption or sinking fund provisions applicable to the Common Stock. The rights, preferences and privileges of the holders of the Common Stock are subject to, and may be adversely affected by, the rights of the holders of shares of any series of our preferred stock that we may designate and issue in the future.

***Fully Paid and Nonassessable.*** All of our outstanding shares of Common Stock are fully paid and nonassessable.

### ***Preferred Stock***

Our Board of Directors has the authority, without action by our stockholders, to designate and issue up to 10,000,000 shares of preferred stock in one or more series or classes and to designate the rights, preferences and privileges of each series or class, which may be greater than the rights of our Common Stock. It is not possible to state the actual effect of the issuance of any shares of preferred stock upon the rights of holders of our Common Stock until our Board of Directors determines the specific rights of the holders of the preferred stock. However, the effects might include:

- restricting dividends on our Common Stock;
- diluting the voting power of our Common Stock;
- impairing liquidation rights of our Common Stock; or
- delaying or preventing a change in control of us without further action by our stockholders.

The Board of Directors' authority to issue preferred stock without stockholder approval could make it more difficult for a third-party to acquire control of our company and could discourage such attempt. We have no present plans to issue any shares of preferred stock.

### ***Series C Preferred Stock and Series D Preferred Stock***

We currently have 275,000 shares of Series C Preferred Stock and 100,000 Series D Preferred Stock outstanding, which were issued on July 29, 2022, pursuant to the terms the Purchase Agreement entered into with MSD at an offering price of \$8.00 per share, for gross proceeds of approximately \$3.0 million in the aggregate, before the deduction of discounts, fees and offering expenses.

**Voting Rights.** Pursuant to the Purchase Agreement, we filed certificates of designation (the “Certificates of Designation”) with the Secretary of the State of Nevada designating the rights, preferences and limitations of the shares of Series C Preferred Stock and Series D Preferred Stock. The Certificate of Designation for the Series C Preferred Stock provides, in particular, that the Series C Preferred Stock will have no voting rights other than the right to vote as a class on the Stockholder Items and the right to cast votes on an as converted to Common Stock basis on the Stockholder Items (as defined below). The Certificate of Designation for the Series D Preferred Stock provides, in particular, that the Series D Preferred Stock will have no voting rights other than the right to vote as a class on the Stockholder Items and the right to cast 20,000 votes per share (or an aggregate of 2,000,000,000 votes) of Series D Preferred Stock on the Stockholder Items. The Stockholder Items include (i) an amendment to our Articles of Incorporation, as amended (the “Charter”), to change our name to “Theriva Biologics, Inc.” (the “Name Change”), (ii) an amendment to the Charter to increase the number of authorized shares of Common Stock from 20,000,000 to 350,000,000 (the “Authorized Common Stock Increase”) and (iii) any proposal to adjourn any meeting of stockholders called for the purpose of voting on the Authorized Common Stock Increase. MSD has agreed in the Purchase Agreement to (i) not transfer, offer, sell, contract to sell, hypothecate, pledge or otherwise dispose of the shares of the Preferred Stock until the earlier of the date that the Authorized Common Stock Increase is effected or October 26, 2022 (which may be extended to December 31, 2022 if certain conditions are met), (ii) vote the shares of the Series C Preferred Stock in favor of the Stockholder Items and (iii) vote the shares of the Series D Preferred Stock in the same proportion as shares of Common Stock and any other shares of our capital stock that are entitled to vote thereon (excluding any shares of Common Stock that are not voted) on the Stockholder Items.

**Dividend Rights.** The holders of Preferred Stock will be entitled to dividends, on an as-if converted basis, equal to dividends actually paid, if any, on shares of Common Stock. The Conversion Price may be adjusted pursuant to the Certificates of Designation for stock dividends and stock splits, subsequent rights offering, pro rata distributions of dividends or the occurrence of a fundamental transaction (as defined in the applicable Certificate of Designation).

**Liquidation Rights.** Upon our liquidation, dissolution or winding-up, whether voluntary or involuntary (a “Liquidation”), prior and in preference to the Common Stock, the holders of the Preferred Stock shall be entitled to receive out of the assets available for distribution to stockholders an amount in cash equal to the greater of (i) 105% of the Stated Value and (ii) the amount such holder would be entitled to receive on an as-converted basis if such holder elected to convert its Preferred Stock on the date of such Liquidation.

**Conversion Rights.** The shares of Preferred Stock are convertible at a conversion price (the “Conversion Price”) of \$1.22 per share (subject in certain circumstances to adjustments), into an aggregate of 2,459,017 shares of Common Stock at the option of the holders of the Preferred Stock and, in certain circumstances, by us. Our Board of Directors shall have the power, at any time after the sixtieth (60th) day following the Effectiveness Date of the registration statement of which this prospectus forms a part, in its sole and absolute discretion, to convert each of the outstanding shares of Preferred Stock into that number of shares of Common Stock determined by dividing the Stated Value of such share of Preferred Stock by the Conversion Price. No action by the Holder, any other holder of shares of Preferred Stock or any holder of shares of Common Stock shall be required to effectuate the conversion contemplated by this paragraph.

**Adjustments.** The Conversion Price is subject to customary adjustments in the event of a stock split or stock dividend.

**Registration Rights.** Pursuant to the Purchase Agreement, we are required to file a registration statement with the SEC to register for resale the 2,459,017 shares of Common Stock that are issuable upon the potential conversion of shares of Preferred Stock. The registration statement must be filed with the SEC no later than forty-five (45) days following the date of the Purchase Agreement (the “Filing Deadline”) and we are required to use reasonable best efforts to cause such registration statement to be declared effective as soon as possible after filing, but in no event later than sixty (60) days following the Filing Deadline. The registration statement of which this prospectus forms a part is being filed to satisfy the aforementioned registration rights set forth in the Purchase Agreement.

The following summaries of the Certificates of Designation do not purport to be complete and are subject to, and qualified in their entirety by, the forms of such documents attached as Exhibits 4.8 and 4.9, respectively, to the registration statement of which this prospectus forms a part. Prospective investors should carefully review the terms and provisions of the forms of the Certificates of Designation for a complete description of the terms and conditions of the Series C Preferred Stock and the Series D Preferred Stock, respectively.

## **Warrants**

As of August 29, 2022, we had issued and outstanding a total of 634,497 warrants to purchase our Common Stock at a weighted-average exercise price of \$1.22.

## **Options**

As of August 29, 2022, options to purchase an aggregate of 607,335 shares of Common Stock were outstanding under our equity incentive plans at a weighted-average exercise price of \$16.07.

## **Anti-Takeover Effects of Certain Provisions of our Articles of Incorporation and Bylaws**

Our Articles of Incorporation and Bylaws contain certain provisions that may have anti-takeover effects, making it more difficult for or preventing a third party from acquiring control of the Registrant or changing our board of directors and management. According to our Articles of Incorporation and Bylaws, the holders of the Common Stock do not have cumulative voting rights in the election of our directors. The lack of cumulative voting makes it more difficult for other stockholders to replace our board of directors or for a third party to obtain control of our company by replacing its board of directors.

## **Authorized but Unissued Shares**

Our authorized but unissued shares of Common Stock will be available for future issuance without stockholder approval. We may use additional shares of Common Stock for a variety of purposes, including future public offerings to raise additional capital, to fund acquisitions and as employee compensation. The existence of authorized but unissued shares of Common Stock could render more difficult or discourage an attempt to obtain control of us by means of a proxy contest, tender offer, merger or otherwise.

## **Anti-Takeover Effects of Nevada Law**

### ***Business Combinations***

The “business combination” provisions of Sections 78.411 to 78.444, inclusive, of the Nevada Revised Statutes (“NRS”) generally prohibit a Nevada corporation with at least 200 stockholders from engaging in various “combination” transactions with any interested stockholder for a period of two years after the date of the transaction in which the person became an interested stockholder, unless the transaction is approved by the board of directors prior to the date the interested stockholder obtained such status or the combination is approved by the board of directors and thereafter is approved at a meeting of the stockholders by the affirmative vote of stockholders representing at least 60% of the outstanding voting power held by disinterested stockholders, and extends beyond the expiration of the two-year period, unless:

- the combination was approved by the board of directors prior to the person becoming an interested stockholder or the transaction by which the person first became an interested stockholder was approved by the board of directors before the person became an interested stockholder or the combination is later approved by a majority of the voting power held by disinterested stockholders; or
- if the consideration to be paid by the interested stockholder is at least equal to the highest of: (a) the highest price per share paid by the interested stockholder within the two years immediately preceding the date of the announcement of the combination or in the transaction in which it became an interested stockholder, whichever is higher, (b) the market value per share of Common Stock on the date of announcement of the combination and the date the interested stockholder acquired the shares, whichever is higher, or (c) for holders of preferred stock, the highest liquidation value of the preferred stock, if it is higher.

A “combination” is generally defined to include mergers or consolidations or any sale, lease exchange, mortgage, pledge, transfer, or other disposition, in one transaction or a series of transactions, with an “interested stockholder” having: (a) an aggregate market value equal to 5% or more of the aggregate market value of the assets of the corporation, (b) an aggregate market value equal to 5% or more of the aggregate market value of all outstanding shares of the corporation, (c) 10% or more of the earning power or net income of the corporation, and (d) certain other transactions with an interested stockholder or an affiliate or associate of an interested stockholder.

In general, an “interested stockholder” is a person who, together with affiliates and associates, owns (or within two years, did own) 10% or more of a corporation’s voting stock. The statute could prohibit or delay mergers or other takeover or change in control attempts and, accordingly, may discourage attempts to acquire our company even though such a transaction may offer our stockholders the opportunity to sell their stock at a price above the prevailing market price.

### ***Control Share Acquisitions***

The “control share” provisions of Sections 78.378 to 78.3793, inclusive, of the NRS apply to “issuing corporations” that are Nevada corporations with at least 200 stockholders, including at least 100 stockholders of record who are Nevada residents, and that conduct business directly or indirectly in Nevada. The control share statute prohibits an acquirer, under certain circumstances, from voting its shares of a target corporation’s stock after crossing certain ownership threshold percentages, unless the acquirer obtains approval of the target corporation’s disinterested stockholders. The statute specifies three thresholds: one-fifth or more but less than one-third, one-third but less than a majority, and a majority or more, of the outstanding voting power. Generally, once an acquirer crosses one of the above thresholds, those shares in an offer or acquisition and acquired within 90 days thereof become “control shares” and such control shares are deprived of the right to vote until disinterested stockholders restore the right. These provisions also provide that if control shares are accorded full voting rights and the acquiring person has acquired a majority or more of all voting power, all other stockholders who do not vote in favor of authorizing voting rights to the control shares are entitled to demand payment for the fair value of their shares in accordance with statutory procedures established for dissenters’ rights.



A corporation may elect to not be governed by, or “opt out” of, the control share provisions by making an election in its articles of incorporation or bylaws, provided that the opt-out election must be in place on the 10th day following the date an acquiring person has acquired a controlling interest, that is, crossing any of the three thresholds described above. We have not opted out of the control share statutes and will be subject to these statutes if we are an “issuing corporation” as defined in such statutes.

The effect of the Nevada control share statutes is that the acquiring person, and those acting in association with the acquiring person, will obtain only such voting rights in the control shares as are conferred by a resolution of the stockholders at an annual or special meeting. The Nevada control share law, if applicable, could have the effect of discouraging takeovers of our company.

#### **Transfer Agent and Registrar**

The transfer agent and registrar for the Common Stock is Equiniti Trust Company (formerly known as Corporate Stock Transfer, Inc.). The transfer agent’s address is 3200 Cherry Creek Drive South, Suite 430, Denver, Colorado 80209, telephone number (303) 282-4800.

#### **Listing on the NYSE American**

Our Common Stock is listed on the NYSE American LLC under the symbol “SYN.”

## SELLING STOCKHOLDERS

This prospectus covers the resale from time to time by the selling stockholder identified in the table below, including its pledgees, donees, transferees, assigns or other successors in interest, of up to an aggregate 2,459,017 shares of our Common Stock, which includes (i) 1,803,279 Series C Preferred Conversion Shares upon the conversion of 275,000 shares of Series C Preferred Stock and (ii) 655,738 Series D Preferred Conversion Shares upon the conversion of 100,000 shares of Series D Preferred Stock.

Pursuant to the Purchase Agreement, we have filed with the SEC the registration statement of which this prospectus forms a part in order to register such resales of the Shares under the Securities Act. We have also agreed to cause this registration statement to become effective and to keep such registration statement continuously effective. See also “Description of Our Capital Stock—Stockholder Registration Rights.”

The selling stockholder identified in the table below may from time to time offer and sell under this prospectus any or all of the shares of Common Stock described under the column “Number of Shares of Common Stock Being Offered” in the table below. The table below has been prepared based upon information furnished to us by the selling stockholder as of the dates represented in the footnotes accompanying the table. The selling stockholder identified below may have sold, transferred or otherwise disposed of some or all of its shares since the date on which the information in the following table is presented in transactions exempt from or not subject to the registration requirements of the Securities Act. Information concerning the selling stockholder may change from time to time and, if necessary, we will amend or supplement this prospectus accordingly and as required.

The following table and footnote disclosure following the table sets forth the name of the selling stockholder, the nature of any position, office or other material relationship, if any, that the selling stockholder has had within the past three years with us or with any of our predecessors or affiliates, and the number of shares of our Common Stock beneficially owned by the selling stockholder before this offering. The number of shares reflected are those beneficially owned, as determined under applicable rules of the SEC, and the information is not necessarily indicative of beneficial ownership for any other purpose. Under applicable SEC rules, beneficial ownership includes any shares of Common Stock as to which a person has sole or shared voting power or investment power and any shares of Common Stock which the person has the right to acquire within 60 days after August 29, 2022 through the exercise of any option, warrant or right or through the conversion of any convertible security. Unless otherwise indicated in the footnotes to the table below and subject to community property laws where applicable, we believe, based on information furnished to us that the selling stockholder named in this table has sole voting and investment power with respect to the shares indicated as beneficially owned.

Except for the ownership of Series A Preferred Stock and transactions related thereto and the transactions contemplated pursuant to the Purchase Agreement, the selling stockholder has not had any material relationship with us within the past three years.

We have assumed that all Shares reflected in the table as being offered in the offering covered by this prospectus will be sold from time to time in this offering. We cannot provide an estimate as to the number of Shares that will be held by the selling stockholder upon termination of the offering covered by this prospectus because the selling stockholder may offer some, all or none of the Shares being offered in the offering. Information about the selling stockholder may change over time. Any changed information will be set forth in an amendment to the registration statement or supplement to this prospectus, to the extent required by law.

For purposes of the table below, 15,844,061 shares of Common Stock are outstanding as of August 29, 2022.

Selling Stockholder	Shares of Common Stock Beneficially Owned Before this Offering Number	Number of Shares of Common Stock Being Offered	Shares of Common Stock To Be Beneficially Owned Upon Completion of this Offering	
			Number <sup>(1)</sup>	Percentage <sup>(1)</sup>
MSD Credit Opportunity Master Fund, L.P. <sup>(2)</sup>	2,459,017 <sup>(2)</sup>	2,459,017 <sup>(2)</sup>	—	—

(1) Assumes that all Shares being registered under the registration statement of which this prospectus forms a part are sold in this offering, and that the selling stockholder does not acquire additional shares of our Common Stock after the date of this prospectus and prior to completion of this offering.

(2) Includes (i) 1,803,279 shares of our Common Stock issuable upon the conversion of 275,000 Series C Preferred Stock, and (ii) 655,738 shares of our Common Stock issuable upon the conversion of 100,000 Series B Preferred Stock. The Series C Preferred Stock and the Series D Preferred Stock held by the selling stockholder may not be converted if, after such conversion, the selling stockholder and its affiliated entities would beneficially own, as determined in accordance with Section 13(d) of the Exchange Act, more than 4.99% of the number of shares of our Common Stock then issued and outstanding. The number of shares of our Common Stock beneficially owned does not reflect this limitation. MSD Partners, L.P. (“MSD Partners”) is the investment manager of MSD Credit Opportunity Master Fund, L.P. MSD Partners (GP), LLC (“MSD GP”), a Delaware limited liability company, is the general partner of MSD Partners. Each of Gregg R. Lemkau, Marc R. Lisker and Brendan Rogers is a manager of, and may be deemed to beneficially own securities beneficially owned by, MSD GP. The business address of MSD Credit Opportunity Master Fund, L.P. is One Vanderbilt Avenue, 26<sup>th</sup> Floor, New York, New York 10017. The Certificate of Designation for the Series C Preferred Stock provides, in particular, that the Series C Preferred Stock will have no voting rights other than the right to vote as a class on the Stockholder Items on an as converted basis. In order to comply with Section 122 of the NYSE American Company Guide, on August 9, 2022 the selling stockholders and we agreed that the selling stockholder holder may only submit 1,549,295 of the votes relating to the Series C Preferred Stock that it would otherwise be entitled to vote. The Certificate of Designation for the Series D Preferred Stock provides, in particular, that the Series D Preferred Stock will have no voting rights other than the right to vote as a class on the Stockholder Items and the right to cast 20,000 votes per share of Series D Preferred Stock on the Stockholder Items

## PLAN OF DISTRIBUTION

The selling stockholder and any of its pledgees, assignees and successors-in-interest may, from time to time, sell any or all of its securities covered hereby on the NYSE American LLC or any other stock exchange, market or trading facility on which the securities are traded or in private transactions. These sales may be at fixed or negotiated prices. The selling stockholder may use any one or more of the following methods when selling securities:

- ordinary brokerage transactions and transactions in which the broker-dealer solicits purchasers;
- block trades in which the broker-dealer will attempt to sell the securities as agent but may position and resell a portion of the block as principal to facilitate the transaction;
- purchases by a broker-dealer as principal and resale by the broker-dealer for its account;
- an exchange distribution in accordance with the rules of the applicable exchange;
- privately negotiated transactions;
- settlement of short sales;
- in transactions through broker-dealers that agree with the selling stockholder to sell a specified number of such securities at a stipulated price per security;
- through the writing or settlement of options or other hedging transactions, whether through an options exchange or otherwise;
- a combination of any such methods of sale; or
- any other method permitted pursuant to applicable law.

The selling stockholder may also sell securities under Rule 144 or any other exemption from registration under the Securities Act, if available, rather than under this prospectus.

Broker-dealers engaged by the selling stockholder may arrange for other brokers-dealers to participate in sales. Broker-dealers may receive commissions or discounts from the selling stockholder (or, if any broker-dealer acts as agent for the purchaser of securities, from the purchaser) in amounts to be negotiated, but, except as set forth in a supplement to this Prospectus, in the case of an agency transaction not in excess of a customary brokerage commission in compliance with FINRA Rule 2440; and in the case of a principal transaction, a markup or markdown in compliance with FINRA IM-2440.

In connection with the sale of the securities or interests therein, the selling stockholder may enter into hedging transactions with broker-dealers or other financial institutions, which may in turn engage in short sales of the securities in the course of hedging the positions they assume. The selling stockholder may also sell securities short and deliver these securities to close out their short positions, or loan or pledge the securities to broker-dealers that in turn may sell these securities. The selling stockholder may also enter into option or other transactions with broker-dealers or other financial institutions or create one or more derivative securities which require the delivery to such broker-dealer or other financial institution of securities offered by this prospectus, which securities such broker-dealer or other financial institution may resell pursuant to this prospectus (as supplemented or amended to reflect such transaction).

The selling stockholder and any broker-dealers or agents that are involved in selling the securities may be deemed to be “underwriters” within the meaning of the Securities Act in connection with such sales. In such event, any commissions received by such broker-dealers or agents and any profit on the resale of the securities purchased by them may be deemed to be underwriting commissions or discounts under the Securities Act. The selling stockholder has informed the Company that it does not have any written or oral agreement or understanding, directly or indirectly, with any person to distribute the securities.

We are required to pay certain fees and expenses incurred by us incident to the registration of the securities. We have agreed to indemnify the selling stockholder against certain losses, claims, damages and liabilities, including liabilities under the Securities Act.

We agreed to keep this prospectus effective until the selling stockholder does not own any Warrants or any shares of our Common Stock issuable upon exercise of the Warrants. In addition, in certain states, the resale securities covered hereby may not be sold unless they have been registered or qualified for sale in the applicable state or an exemption from the registration or qualification requirement is available and is complied with.

Pursuant to applicable rules and regulations under the Exchange Act, any person engaged in the distribution of the resale securities may not simultaneously engage in market making activities with respect to the Common Stock for the applicable restricted period, as defined in Regulation M, prior to the commencement of the distribution. In addition, the selling stockholder will be subject to applicable provisions of the Exchange Act and the rules and regulations thereunder, including Regulation M, which may limit the timing of purchases and sales of the Common Stock by the selling stockholder or any other person. We will make copies of this prospectus available to the selling stockholder and have informed them of the need to deliver a copy of this prospectus to each purchaser at or prior to the time of the sale (including by compliance with Rule 172 under the Securities Act).

## LEGAL MATTERS

The validity of the Shares being offered by this prospectus is being passed upon by Parsons Behle & Latimer, Reno, Nevada. Blank Rome LLP has acted as securities counsel to Synthetic Biologics, Inc. A partner of Blank Rome LLP has options to purchase shares of stock of Synthetic Biologics, Inc. that represent less than 1% of the outstanding shares of common stock of Synthetic Biologics, Inc.

## EXPERTS

The consolidated financial statements as of December 31, 2021 and 2020, and for the years then ended, incorporated by reference in this prospectus and in the registration statement have been so incorporated in reliance on the report of BDO USA, LLP, an independent registered public accounting firm, incorporated herein by reference, given on the authority of said firm as experts in auditing and accounting.

The financial statements of VCN Biosciences S.L. as of and for the year ended December 2021, included in our Current Report on Form 8-K/A filed with the SEC on May 6, 2022, have been incorporated by reference herein and in the registration statement, in reliance upon the report of KPMG Auditores, S.L., independent auditors, incorporated by reference herein, and upon the authority of said firm as experts in accounting and auditing.

## WHERE YOU CAN FIND MORE INFORMATION

This prospectus is part of a registration statement we filed with the SEC. This prospectus does not contain all of the information set forth in the registration statement and the exhibits to the registration statement. For further information with respect to us and the securities we are offering under this prospectus, we refer you to the registration statement and the exhibits and schedules filed as a part of the registration statement. Neither we nor any agent, underwriter or dealer has authorized any person to provide you with different information. We are not making an offer of these securities in any state where the offer is not permitted. You should not assume that the information in this prospectus is accurate as of any date other than the date on the front page of this prospectus, regardless of the time of delivery of this prospectus or any sale of the securities offered by this prospectus.

We file annual, quarterly and current reports, proxy statements and other information with the SEC. Our SEC filings are available to the public at the SEC's website at [www.sec.gov](http://www.sec.gov). Additional information about Synthetic Biologics, Inc. is contained at our website, [www.syntheticbiologics.com](http://www.syntheticbiologics.com). Information on our website is not incorporated by reference into this prospectus. We make available on our website our SEC filings as soon as reasonably practicable after those reports are filed with the SEC. The following Corporate Governance documents are also posted on our website: Code of Ethics and the Charters for the Audit Committee, Compensation Committee and Nominating and Governance Committee of the Board of Directors.

## INCORPORATION OF CERTAIN DOCUMENTS BY REFERENCE

The SEC allows us to "incorporate by reference" the information we file with it which means that we can disclose important information to you by referring you to those documents instead of having to repeat the information in this prospectus. The information incorporated by reference is considered to be part of this prospectus, and later information that we file with the SEC will automatically update and supersede this information. We incorporate by reference the documents listed below and any future filings made with the SEC (other than any portions of any such documents that are not deemed "filed" under the Exchange Act in accordance with the Exchange Act and applicable SEC rules) under Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act after (i) the date of the initial registration statement and prior to the effectiveness of the registration statement, and (ii) the date of this prospectus and before the completion of the offerings of the shares of our Common Stock included in this prospectus.

- [Our Annual Report on Form 10-K \(File No. 001-12584\) for the fiscal year ended December 31, 2021 filed with the SEC on March 16, 2022;](#)
- Our Quarterly Reports on Form 10-Q (File No. 001-12584) for the fiscal quarters ended March 31, 2022 and June 30, 2022 filed with the SEC on [May 16, 2022](#) and [August 11, 2022](#), respectively;
- Our Current Reports on Form 8-K and Form 8-K/A (File No. 001-12584) filed with the SEC on [January 4, 2022](#), [March 11, 2022](#) (other than as indicated therein), [March 23, 2022](#) (other than as indicated therein), [May 6, 2022](#), [May 10, 2022](#) (other than as indicated therein), [May 16, 2022](#) (other than as indicated therein), [July 14, 2022](#), [July 15, 2022](#), [July 25, 2022](#), [July 29, 2022](#), [August 3, 2022](#), [September 6, 2022](#) (other than as indicated therein) and [September 6, 2022](#); and
- The description of our Common Stock set forth in our registration statement on [Form 8-A12B, filed with the SEC on June 20, 2007 \(File No. 000-12584\)](#), as updated by the description of our Common Stock filed as [Exhibit 4.4 to our Annual Report on Form 10-K \(File No. 001-12584\)](#) for the fiscal year ended December 31, 2021 filed with the SEC on March 16, 2022, including any amendments or reports filed for the purpose of updating such description.

Any statement contained in this prospectus or in a document incorporated or deemed to be incorporated by reference into this prospectus will be deemed to be modified or superseded for purposes of this prospectus to the extent that a statement contained in this prospectus or any other subsequently filed document that is deemed to be incorporated by reference into this prospectus modifies or supersedes the 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 you, on written or oral request, a copy of any or all of the documents that are incorporated by reference into this prospectus and the documents we file with the SEC that are incorporated by reference herein, but not delivered with the prospectus, including exhibits which are specifically incorporated by reference into such documents. You should direct any requests for documents to Synthetic Biologics, Inc., Attn: Steven A. Shallcross, Chief Executive Officer and Chief Financial Officer, 9605 Medical Center Drive, Suite 270, Rockville, Maryland 20850, or telephoning us at (301) 417-4364.

You should rely only on information contained in, or incorporated by reference into, this prospectus and the documents we file with the SEC that are incorporated by reference herein. We have not authorized anyone to provide you with information different from that contained in this prospectus or incorporated by reference in this prospectus. We are not making offers to sell the securities in any jurisdiction in which such an offer or solicitation is not authorized or in which the person making such offer or solicitation is not qualified to do so or to anyone to whom it is unlawful to make such offer or solicitation.

**PART II**  
**INFORMATION NOT REQUIRED IN PROSPECTUS**

**Item 14. Other Expenses of Issuance and Distribution.**

The following sets forth the estimated costs and expenses, all of which shall be borne by the Registrant, in connection with the offering of the securities pursuant to this Registration Statement:

	<b>Amount</b>
SEC registration fee	\$ 324
Legal fees and expenses	20,000
Accountant's fees and expenses	5,000
Printing and engraving expenses	2,000
Miscellaneous	2,676
Total	<u>\$ 30,000</u>

(1) These fees are calculated based on the securities offered and the number of issuances and, accordingly, cannot be estimated at this time.

**Item 15. Indemnification of Directors and Officers.**

Section 78.138 of the Nevada Revised Statute provides that a director or officer is not individually liable to the corporation or its stockholders or creditors for any damages as a result of any act or failure to act in his capacity as a director or officer unless it is proven that (1) his act or failure to act constituted a breach of his fiduciary duties as a director or officer and (2) his breach of those duties involved intentional misconduct, fraud or a knowing violation of law.

This provision is intended to afford directors and officers protection against and to limit their potential liability for monetary damages resulting from suits alleging a breach of the duty of care by a director or officer. As a consequence of this provision, stockholders of our company will be unable to recover monetary damages against directors or officers for action taken by them that may constitute negligence or gross negligence in performance of their duties unless such conduct falls within one of the foregoing exceptions. The provision, however, does not alter the applicable standards governing a director's or officer's fiduciary duty and does not eliminate or limit the right of our company or any stockholder to obtain an injunction or any other type of non-monetary relief in the event of a breach of fiduciary duty.

The Registrant's Articles of Incorporation, as amended, and amended and restated bylaws provide for indemnification of directors, officers, employees or agents of the Registrant to the fullest extent permitted by Nevada law (as amended from time to time). Section 78.7502 of the Nevada Revised Statute provides that such indemnification may only be provided if the person acted in good faith and in a manner he or she reasonably believed to be in, or not opposed to, the best interest of the Registrant and, with respect to any criminal action or proceeding, had no reasonable cause to believe his conduct was unlawful.

**Item 16. Exhibits.**

**(a) Exhibits.**

The following exhibits are either filed as part of this Registration Statement on Form S-3 or are incorporated herein by reference:

<b>Exhibit Number</b>	<b>Description</b>
3.1	Certificate of Incorporation, as amended (Incorporated by reference to (i) <a href="#">Exhibit 3.1 of the Registrant's Current Report on Form 8-K filed October 16, 2008, File No. 001-12584</a> , (ii) <a href="#">Exhibit 3.1 of the Registrant's Quarterly Report on Form 10-Q for the quarterly period ended June 30, 2001 filed August 14, 2001, File No. 001-12584</a> ; and (iii) <a href="#">Exhibits 3.1, 4.1 and 4.2 of the Registrant's Quarterly Report on Form 10-Q for the quarterly period ended June 30, 1998 filed August 14, 1998, File No. 001-12584</a> .)
3.2	<a href="#">Articles of Merger (Incorporated by reference to Exhibit 3.1 of the Registrant's Current Report on Form 8-K filed October 19, 2009, File No. 001-12584.)</a>
3.3	<a href="#">Certificate of Merger filed with the Secretary of State of Delaware (Incorporated by reference to Exhibit 3.2 of the Registrant's Current Report on Form 8-K filed October 19, 2009, File No. 001-12584.)</a>

- 3.4 [Articles of Incorporation filed with the Nevada Secretary of State \(Incorporated by reference to Exhibit 3.3 of the Registrant's Current Report on Form 8-K filed October 19, 2009, File No. 001-12584.\)](#)
- 3.5 [Amended and Restated Bylaws Adopted and Effective October 31, 2011 \(Incorporated by reference to Exhibit 3.1 of the Registrant's Current Report on Form 8-K filed November 2, 2011, File No. 001-12584.\)](#)
- 3.6 [Certificate of Amendment to Articles of Incorporation \(Incorporated by reference to Exhibit 3.1 of the Registrant's Current Report on Form 8-K filed February 16, 2012, File No. 001-12584.\)](#)
- 3.7 [Certificate of Amendment to Certificate of Incorporation. \(Incorporated by reference to Exhibit 3.1 of the Registrant's Current Report on Form 8-K filed May 18, 2015, File No. 001-12584.\)](#)
- 3.8 [Certificate of Amendment to Certificate of Incorporation. \(Incorporated by reference to Exhibit 3.1 of the Registrant's Current Report on Form 8-K filed September 8, 2017, File No. 001-12584.\)](#)
- 3.9 [Certificate of Designations for Series A Preferred Stock to Certificate of Incorporation \(Incorporated by reference to Exhibit 3.1 of the Registrant's Current Report on Form 8-K filed September 12, 2017, File No. 001-12584.\)](#)
- 3.10 [Certificate of Change Pursuant to NRS 78. 209 \(Incorporated by reference to Exhibit 3.1 of the Registrant's Current Report on Form 8-K filed August 13, 2018, File No. 001-12584.\)](#)
- 3.11 [Certificate of Amendment to Articles of Incorporation \(Incorporated by reference to Exhibit 3.1 of the Registrant's Current Report on Form 8-K filed September 26, 2018, File No. 001-12584.\)](#)
- 3.12 [Certificate of Designations for Series B Preferred Stock to Certificate of Incorporation \(Incorporated by reference to Exhibit 3.1 of the Registrant's Current Report on Form 8-K filed October 15, 2018, File No. 001-12584.\)](#)
- 3.13 [Certificate of Amendment to Certificate of Designations for Series B Preferred Stock to Certificate of Incorporation \(Incorporated by reference to Exhibit 3.2 of the Registrant's Current Report on Form 8-K filed October 15, 2018, File No. 001-12584.\)](#)
- 3.14 [Certificate of Amendment to the Certificate of Designation for the Series A Convertible Preferred Stock \(Incorporated by reference to Exhibit 3.1 of the Registrant's Current Report on Form 8-K/A filed on February 1, 2021 File No. 001-12584.\)](#)
- 3.15 [Certificate of Designations of Series C Convertible Preferred Stock \(Incorporated by reference to Exhibit 3.1 of the Registrant's Current Report on Form 8-K filed July 29, 2022, File No. 001-12584.\)](#)
- 3.16 [Certificate of Designations of Series D Convertible Preferred Stock \(Incorporated by reference to Exhibit 3.2 of the Registrant's Current Report on Form 8-K filed July 29, 2022, File No. 001-12584.\)](#)
- 4.1 [Specimen Stock Certificate \(Incorporated by reference to Exhibit 4.1 to the Registrant's Registration Statement on Form S-3 filed on July 3, 2013, File No. 333-189794.\)](#)
- 4.2 [Form of Warrant for Purchasers of Units \(Incorporated by reference to Exhibit 4.1 to the Registrant's Current Report on Form 8-K filed on October 10, 2014, File No. 001-12584.\)](#)
- 4.3 [Form of Series B Warrant to Purchase Common Stock issued November 18, 2016 \(Incorporated by reference to Exhibit 4.2 of the Registrant's Current Report on Form 8-K filed on November 15, 2016, File No. 001-12584.\)](#)
- 4.4 [Form of Warrant Agreement, dated November 18, 2016 between Synthetic Biologics, Inc. and Corporate Stock Transfer, Inc. \(Incorporated by reference to Exhibit 4.3 of the Registrant's Current Report on Form 8-K filed on November 15, 2016, File No. 001-12584.\)](#)
- 4.5 [Form of Warrant issued December 26, 2017 to InSite Communications \(Incorporated by reference to Exhibit 4.1 of the Registrant's Current Report on Form 10-Q filed May 5, 2018, File No. 001-12584.\)](#)
- 4.6 [Warrant Agency Agreement, dated October 15, 2018, by and between Synthetic Biologics, Inc. and Corporate Stock Transfer, Inc. \(including the form of warrant certificate\) \(Incorporated by reference to Exhibit 4.1 of the Registrant's Current Report on Form 8-K filed October 15, 2018, File No. 001-12584.\)](#)
- 4.7 [Description of Securities of Synthetic Biologics, Inc. \(Incorporated by reference to Exhibit 4.7 of the Registrant's Annual Report on Form 10-K for the fiscal year ended December 31, 2020 filed March 4, 2021, File No. 001-12584.\)](#)
- 4.8 [Securities Purchase Agreement between Synthetic Biologics, Inc. and MSD Credit Opportunity Master Fund L.P. dated July 28, 2022 \(Incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed July 29, 2022, File No. 001-12584.\)](#)
- 4.9 [Amendment No. 1 dated as of August 9, 2022 to Securities Purchase Agreement between Synthetic Biologics Inc. and MSD Credit Opportunity Master Fund, L.P., dated as of July 28, 2022 \(Incorporated by reference to Exhibit 10.2 of the Registrant's Quarterly Report on Form 10-Q filed August 11, 2022, File No. 001-12584.\)](#)

5.1*	<a href="#">Legal opinion of Parsons Behle &amp; Latimer</a>
23.1*	<a href="#">Consent of BDO USA, LLP, Independent Registered Public Accounting Firm</a>
23.2*	<a href="#">Consent of KPMG Auditors, S.L.</a>
23.3*	<a href="#">Consent of Parsons Behle &amp; Latimer (included in Exhibit 5.1)</a>
24.1*	<a href="#">Power of Attorney (included on the signature page)</a>
107*	<a href="#">Calculation of Filing Fee Tables</a>

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\* Filed herewith.

#### **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 of 1933;



(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 a 20 percent change in the maximum aggregate offering price set forth in the "Calculation of Registration Fee" table in the effective registration statement; and

(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 the undertakings set forth in paragraphs (1)(i), (1)(ii) and (1)(iii) above 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 Securities Exchange Act of 1934 that are incorporated by reference in the registration statement or is contained in a form of prospectus filed pursuant to Rule 424(b) that is a part of the registration statement.

(2) That, for the purpose of determining any liability under the Securities Act of 1933, 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 of 1933 to any purchaser:

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

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

(iii) 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 of 1933 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) 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 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.

(c) Insofar as indemnification for liabilities arising under the Securities Act of 1933 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 Securities and Exchange Commission such indemnification is against public policy as expressed in the Securities Act of 1933 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 of 1933 and will be governed by the final adjudication of such issue.

## SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, as amended, the Registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-3 and has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Rockville, State of Maryland, September 6, 2022.

### SYNTHETIC BIOLOGICS, INC.

By: /s/ Steven A. Shallcross  
Chief Executive Officer,  
Chief Financial Officer and Director

## POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below hereby constitutes and appoints Steven A. Shallcross, as his true and lawful agent, proxy and attorney-in-fact, with full power of substitution and resubstitution, for him and in his name, place and stead, in any and all capacities, to (i) act on, sign and file with the Securities and Exchange Commission any and all amendments (including post-effective amendments) to this registration statement together with all schedules and exhibits thereto and any subsequent registration statement filed pursuant to Rule 462(b) under the Securities Act of 1933, as amended, together with all schedules and exhibits thereto, (ii) act on, sign and file such certificates, instruments, agreements and other documents as may be necessary or appropriate in connection therewith, (iii) act on and file any supplement to any prospectus included in this registration statement or any such amendment or any subsequent registration statement filed pursuant to Rule 462(b) under the Securities Act of 1933, as amended, and (iv) take any and all actions which may be necessary or appropriate to be done, as fully for all intents and purposes as he might or could do in person, hereby approving, ratifying and confirming all that such agent, proxy and attorney-in-fact or any of his substitutes may lawfully do or cause to be done by virtue thereof.

Pursuant to the requirements of the Securities Act of 1933, as amended, 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/ Steven A. Shallcross</u> Steven A. Shallcross	Chief Executive Officer, Chief Financial Officer and Director <i>(Principal Executive Officer, Principal Financial Officer and Principal Accounting Officer)</i>	September 6, 2022
<u>/s/ Jeffrey J. Kraws</u> Jeffrey J. Kraws	Chairman	September 6, 2022
<u>/s/ Jeffrey Wolf</u> Jeffrey Wolf	Director	September 6, 2022
<u>/s/ John Monahan, Ph.D.</u> John Monahan, Ph.D.	Director	September 6, 2022