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

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

X4 PHARMACEUTICALS, INC.

(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction of incorporation or organization)

27-3181608
(I.R.S. Employer Identification Number)

**61 North Beacon Street, 4th Floor
Boston, Massachusetts 02134
(857) 529-8300**

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

**Paula Ragan, Ph.D.
Chief Executive Officer
c/o X4 Pharmaceuticals, Inc.
61 North Beacon Street, 4th Floor
Boston, Massachusetts 02134
(857) 529-8300**

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

Copies to:

**Daniel I. Goldberg
Richard C. Segal
Courtney T. Thorne Cooley LLP 55 Hudson Yards
New York, NY 1001-2157
(212) 479 6000**

From time to time after the effective date of this Registration Statement
(Approximate date of commencement of proposed sale to the public)

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

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

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

[Table of Contents](#)

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

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

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

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

Large accelerated filer	<input type="checkbox"/>	Accelerated filer	<input type="checkbox"/>
Non-accelerated filer	<input checked="" type="checkbox"/>	Smaller reporting company	<input checked="" type="checkbox"/>
		Emerging growth company	<input checked="" type="checkbox"/>

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

CALCULATION OF REGISTRATION FEE

Title of each class of securities to be registered	Amount to be Registered (1)(2)	Proposed Maximum Offering Price per share(3)	Proposed Maximum Aggregate Offering Price(3)	Amount of Registration Fee (3)
Common Stock, par value \$0.001 per share	6,321,836	\$7.06	\$44,632,162.16	\$4,869.37

- (1) The shares of common stock will be offered for resale by the selling stockholders pursuant to the prospectus contained herein. Pursuant to Rule 416 under the Securities Act, this registration statement also covers any additional number of shares of common stock issuable upon stock splits, stock dividends, or other distribution, recapitalization or similar events with respect to the shares of common stock being registered pursuant to this registration statement.
- (2) This registration statement registers the resale of (i) 6,271,836 outstanding shares of common stock of the Registrant and (ii) 50,000 shares of common stock of the Registrant issuable upon the exercise of pre-funded warrants issued by the Registrant at an exercise price of \$0.01 per share.
- (3) Estimated solely for purposes of calculating the registration fee pursuant to Rule 457(c) under the Securities Act, based on average of high and low price per share of the common stock as reported on the Nasdaq Global Select Market on June 24, 2021.

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 that specifically states that this registration statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act or until the registration statement shall become effective on such date as the Securities and Exchange Commission, acting pursuant to said Section 8(a), may determine.

The information in this prospectus is not complete and may be changed. The selling stockholders may not sell these securities or accept an offer to buy 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 offers to buy these securities in any jurisdiction where such offer or sale is not permitted.

SUBJECT TO COMPLETION, DATED JUNE 25, 2021

PROSPECTUS



6,321,836 Shares

Common Stock Offered by the Selling Stockholders

This prospectus relates to the resale from time to time of up to 6,321,836 shares of common stock, par value \$0.001 per share, of X4 Pharmaceuticals, Inc. (the “Common Stock”) by the selling stockholders listed on page 7 (the “Selling Stockholders”), including their pledgees, assignees, donees, transferees or their respective successors-in-interest, which consist of 6,271,836 outstanding shares of our Common Stock held by the Selling Stockholders and 50,000 shares of our Common Stock issuable upon the exercise of outstanding pre-funded warrants to purchase shares of our Common Stock held by the Selling Stockholders. We will not receive any proceeds from the sale of the shares offered by this prospectus.

We have agreed, pursuant to a registration rights agreement that we have entered into with the Selling Stockholders, to bear all of the expenses incurred in connection with the registration of these shares. The Selling Stockholders will pay or assume discounts, commissions, fees of underwriters, selling brokers or dealer managers and similar expenses, if any, incurred for the sale of these shares of our Common Stock.

The Selling Stockholders identified in this prospectus, or their pledgees, assignees, donees, transferees or their respective successors-in-interest, may offer the shares from time to time on terms to be determined at the time of sale through ordinary brokerage transactions or through any other means described in this prospectus under the caption “Plan of Distribution.” The shares may be sold at fixed prices, at prevailing market prices, at prices related to prevailing market prices or at negotiated prices. For a list of the Selling Stockholders, see the section entitled “Selling Stockholders” on page 7.

We may amend or supplement this prospectus from time to time by filing amendments or supplements as required. You should read the entire prospectus and any amendments or supplements carefully before you make your investment decision.

Our Common Stock is traded on the Nasdaq Capital Market under the symbol “XFOR.” On June 24, 2021, the last reported sale price of our Common Stock was \$6.97 per share. You are urged to obtain current market quotations for our Common Stock.

We are an “emerging growth company” under applicable Securities and Exchange Commission rules and, as such, have elected to comply with certain reduced public company disclosure requirements for this prospectus and future filings. See “Prospectus Summary—Implications of Being an Emerging Growth Company.”

Investing in our Common Stock involves a high degree of risk. You should carefully read and consider the section entitled “[Risk Factors](#)” on page 5 and the risk factors included in our periodic reports filed with the Securities and Exchange Commission (“SEC”), in any applicable prospectus supplement and in any other documents we file with the SEC.

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.

The date of this prospectus is _____, 2021.

TABLE OF CONTENTS

ABOUT THIS PROSPECTUS	i
CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS	ii
PROSPECTUS SUMMARY	1
RISK FACTORS	5
USE OF PROCEEDS	6
SELLING STOCKHOLDERS	7
PLAN OF DISTRIBUTION	12
LEGAL MATTERS	14
EXPERTS	14
WHERE YOU CAN FIND MORE INFORMATION	14
INCORPORATION OF CERTAIN INFORMATION BY REFERENCE	15

ABOUT THIS PROSPECTUS

We urge you to read carefully this prospectus, together with the information incorporated herein by reference as described under the heading “Where You Can Find Additional Information,” before buying any of the securities being offered.

You should rely only on the information contained or incorporated by reference in this prospectus and the applicable prospectus supplement or in any amendment to this prospectus. Neither we nor the Selling Stockholders have authorized anyone to provide you with different information, and if anyone provides, or has provided you, with different or inconsistent information, you should not rely on it. The Selling Stockholders are offering to sell, and seeking offers to buy, shares of our Common Stock, only in jurisdictions where offers and sales are permitted. The information contained in this prospectus, as well as the information filed previously with the SEC, and incorporated herein by reference, is accurate only as of the date of the document containing the information, regardless of the time of delivery of this prospectus or any applicable prospectus supplement or any sale of our Common Stock.

A prospectus supplement may add to, update or change the information contained in this prospectus. You should read both this prospectus and any applicable prospectus supplement together with additional information described below under the heading “Where You Can Find Additional Information.”

In this prospectus, references to “X4 Pharmaceuticals,” “X4,” the “Company,” the “registrant,” “we,” “us,” and “our” refer to X4 Pharmaceuticals, Inc., formerly Arsanis, Inc., and its subsidiaries. The phrase “this prospectus” refers to this prospectus and any applicable prospectus supplement, unless the context requires otherwise.

CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus and any applicable prospectus supplement or free writing prospectus, including the documents incorporated by reference herein and therein, contain forward-looking statements. These are based on our management's current beliefs, expectations and assumptions about future events, conditions and results and on information currently available to us. Discussions containing these forward-looking statements may be found, among other places, in the sections entitled "Business," "Risk Factors" and "Management's Discussion and Analysis of Financial Condition and Results of Operations" contained in the documents incorporated by reference herein.

Any statements in this prospectus, or incorporated herein, about our expectations, beliefs, plans, objectives, assumptions or future events or performance are not historical facts and are forward-looking statements. Within the meaning of Section 27A of the Securities Act and Section 21E of the Securities Exchange Act of 1934, as amended ("the Exchange Act"), these forward-looking statements include statements regarding:

- our plans to develop and commercialize our product candidates;
- the timing of our planned clinical trials for our product candidates;
- the timing of and our ability to obtain and maintain regulatory approvals for our product candidates;
- the clinical utility of our product candidates;
- our commercialization, marketing and manufacturing capabilities and strategy;
- the impact of the COVID-19 pandemic on our business, operations, strategy, goals and anticipated timelines;
- our intellectual property position;
- our plans to in-license, acquire, develop and commercialize additional product candidates;
- our competitive position and the development of and projections relating to our competitors or our industry;
- our ability to identify, recruit and retain key personnel;
- the impact of laws and regulations;
- our plans to identify additional product candidates with significant commercial potential that are consistent with our commercial objectives;
- our estimates regarding future revenue, expenses and needs for additional financing; and
- other risks and uncertainties, including those listed under the caption "Risk Factors" in our most recent Annual Report on Form 10-K, our most recent Quarterly Report on Form 10-Q, and other filings we make with the SEC.

In some cases, you can identify forward-looking statements by terms such as "may," "will," "intend," "should," "could," "would," "expect," "plan," "anticipate," "believe," "estimate," "project," "predict," "potential," "continue," "likely," and similar expressions (including their use in the negative) intended to identify forward-looking statements. These forward-looking statements reflect our current views with respect to future events and are based on assumptions and subject to risks and uncertainties. Given these risks and uncertainties, you should not place undue reliance on these forward-looking statements. We discuss many of these risks in greater detail under the heading "Risk Factors" in our SEC filings, and may provide additional information in any applicable prospectus supplement. Also, these forward-looking statements represent our estimates and assumptions only as of the date of the document containing the applicable statement.

[Table of Contents](#)

We qualify all of the forward-looking statements in the foregoing documents by these cautionary statements. Unless required by law, we undertake no obligation to update or revise any forward-looking statements to reflect new information or future events or developments. Thus, you should not assume that our silence over time means that actual events are bearing out as expressed or implied in such forward-looking statements. Before deciding to purchase our Common Stock, you should carefully consider the risk factors incorporated by reference herein, in addition to the other information set forth in this prospectus and in the documents incorporated by reference herein.

PROSPECTUS SUMMARY

This summary highlights important features of this offering and the information included or incorporated by reference in this prospectus. This summary does not contain all of the information you should consider before investing in our Common Stock. You should carefully read this prospectus, any applicable prospectus supplement and the information incorporated by reference in this prospectus and any applicable prospectus supplement before you invest in our Common Stock.

Company Overview

We are a late-stage clinical biopharmaceutical company focused on the research, development and commercialization of novel therapeutics for the treatment of rare diseases. Our pipeline is comprised of potentially first-in-class, oral, small molecule antagonists of chemokine receptor CXCR4, which have the potential to treat a broad range of rare diseases, including primary immunodeficiencies and certain types of cancer. Our lead product candidate, mavorixafor, is a potentially first-in-class, oral, allosteric antagonist of the CXCR4 receptor designed to correct the abnormal signaling caused by the receptor/ligand interaction and enable mobilization and trafficking of immune cells.

We have completed the dose-titration portion of the Phase 2 clinical trial of mavorixafor in patients with Warts, Hypogammaglobulinemia, Infections, and Myelokathexis (“WHIM”) syndrome, which is a rare, inherited primary immunodeficiency disease. In June 2019, we initiated 4WHIM, a pivotal, 52-week Phase 3 global clinical trial of mavorixafor for the treatment of patients with WHIM syndrome. The U.S. Food and Drug Administration (“FDA”) has granted Breakthrough Therapy Designation for mavorixafor for the treatment of adults with WHIM. The FDA has also granted Fast Track Designation for mavorixafor for adults with WHIM and Rare Pediatric Designation for mavorixafor for the treatment of WHIM. In November 2019, we initiated a 14-day, proof-of-concept Phase 1b clinical trial of mavorixafor in patients with severe congenital neutropenia, and in December 2019, we initiated a Phase 1b clinical trial of mavorixafor, in combination with ibrutinib, in patients with Waldenström’s macroglobulinemia. We are also investigating mavorixafor in combination with axitinib (Inlyta®) in the Phase 2a portion of an open-label Phase 1/2 clinical trial in clear cell renal cell carcinoma.

We are also advancing two early stage candidates towards the clinic: X4P-003, a second-generation CXCR4 antagonist designed to have an enhanced pharmacokinetic and potency profile relative to mavorixafor, potentially enabling broader opportunities in CXCR4-dependent disorders; and X4P-002, a CXCR4 antagonist designed to cross blood-brain barrier and provide appropriate therapeutic exposures to treat brain cancers and other diseases where exposure in-brain is essential.

To date, we have not generated revenue from product sales and do not expect to generate significant revenue from the sale of our products in the foreseeable future. If our development efforts for our product candidates are successful and result in regulatory approval, we may generate revenue in the future from product sales. We cannot predict if, when, or to what extent we will generate revenue from the commercialization and sale of our product candidates. We may never succeed in obtaining regulatory approval for any of our product candidates.

Private Placement

Securities Purchase Agreement

On March 18, 2021, we entered into a Securities Purchase Agreement (the “Purchase Agreement”) with the purchasers named therein (the “Purchasers”), pursuant to which we agreed to sell and issue an aggregate

of (i) 6,271,836 shares of Common Stock at a purchase price of \$8.70 per share, and (ii) to certain investors pre-funded warrants to purchase an aggregate of 50,000 shares of Common Stock at a price of \$0.01 per share, at a purchase price of \$8.69 per pre-funded warrant (the "Private Placement"). On March 23, 2021, we closed the Private Placement and issued an aggregate of 6,271,836 shares of Common Stock and 50,000 pre-funded warrants to purchase Common Stock to the Purchasers.

The pre-funded warrants are exercisable at any time after their original issuance and will not expire. The pre-funded warrants provide that a holder of such pre-funded warrants will not have the right to exercise any portion of its pre-funded warrants if such holder, together with its affiliates, would beneficially own in excess of 9.99% of the number of shares of our Common Stock outstanding immediately after giving effect to such exercise (the "Beneficial Ownership Limitation"); provided, however, that each holder may increase or decrease the Beneficial Ownership Limitation by giving 61 days' notice to us, but not to any percentage in excess of 19.99%.

The shares of Common Stock issued to the Purchasers, and the shares of Common Stock issuable upon exercise of the pre-funded warrants, were not initially registered under the Securities Act or any state securities laws. We have relied on the exemption from the registration requirements of the Securities Act by virtue of Section 4(a)(2) thereof. In connection with their execution of the Purchase Agreement, each of the Purchasers represented to us that such Purchaser is an "accredited investor" as defined in Regulation D of the Securities Act and that the shares of Common Stock purchased by such Purchaser were being acquired solely for its own account and for investment purposes and not with a view to its future sale or distribution.

Registration Rights Agreement

On March 18, 2021, in connection with the Financing, we entered into a Registration Rights Agreement with the Purchasers (the "Registration Rights Agreement"), pursuant to which we agreed to (i) by no later than June 30, 2021, file a registration statement with the SEC to cover the resale of the shares of Common Stock, including those shares of Common Stock issuable upon exercise of the pre-funded warrants to purchase Common Stock, issued to the Purchasers pursuant to the Purchase Agreement (the "Shares"), (ii) to use commercially reasonable efforts to cause such registration statement to become effective as soon as practicable and (iii) to keep such registration statement effective until the date the Shares covered by such registration statement have been sold or may be resold pursuant to Rule 144 without restriction. In the event that such registration statement is not filed or declared effective within the timeframes set forth in the Registration Rights Agreement or, after the registration statement has been declared effective by the SEC, sales cannot be made pursuant to the registration statement for any reason including by reason of a stop order or our failure to update such registration statement, subject to certain limited exceptions, then we have agreed to make pro rata payments to each Purchaser as liquidated damages in an amount equal to 1% of the aggregate amount invested by each such Investor in the Shares per 30-day period or pro rata for any portion thereof for each such month during which such event continues, subject to certain caps set forth in the registration rights agreement.

The registration statement of which this prospectus is a part relates to the offer and resale of the Shares issued to the Purchasers pursuant to the Purchase Agreement. When we refer to the Selling Stockholder in this prospectus, we are referring to the Purchasers named in this prospectus as the Selling Stockholders and, as applicable, any donees, pledgees, assignees, transferees or other successors-in-interest selling Shares received after the date of this prospectus from the Selling Stockholders as a gift, pledge, or other non-sale related transfer.

Corporate Information

Prior to March 13, 2019, we were a clinical-stage biopharmaceutical company known as Arsanis, Inc. that had historically been focused on applying monoclonal antibody immunotherapies to address serious infectious diseases. Arsanis, Inc. was originally incorporated in the State of Delaware in August 2010.

On March 13, 2019, we completed our business combination with X4 Therapeutics, Inc. (formerly X4 Pharmaceuticals, Inc.) in accordance with the terms of an Agreement and Plan of Merger, dated as of November 26, 2018, as amended on December 20, 2018 and March 8, 2019 (the “Merger Agreement”), that we entered into with X4 Therapeutics, Inc. and Artemis AC Corp., a Delaware corporation and our wholly owned subsidiary (“Merger Sub”). Pursuant to the terms of the Merger Agreement, Merger Sub merged with and into X4 Therapeutics, Inc., with X4 Therapeutics, Inc. continuing as our wholly owned subsidiary and the surviving corporation of the merger, which transaction we refer to as the Merger. At the closing of the Merger, we issued shares of our Common Stock to X4 Therapeutics, Inc. stockholders based on an agreed upon exchange ratio, and each option or warrant to purchase X4 Therapeutics, Inc. capital stock became an option or warrant, respectively, to purchase our Common Stock, subject to adjustment in accordance with the agreed upon exchange ratio. Following the closing of the Merger, we effected a 1-for-6 reverse stock split of our Common Stock, our name was changed to X4 Pharmaceuticals, Inc., the business of X4 Therapeutics, Inc. became our business, and we became a clinical-stage biopharmaceutical company focused on the discovery, development and commercialization of novel therapeutics for the treatment of rare diseases. In connection with the closing of the Merger, our stock began trading on the Nasdaq Capital Market under the symbol “XFOR” on March 14, 2019.

Our principal executive offices are located at 61 North Beacon Street, 4th Floor, Boston, Massachusetts 02134, and our telephone number is (857) 529-8300. Our website is located at <http://www.x4pharma.com>. We do not incorporate by reference into this prospectus the information on, or accessible through, our website, and you should not consider it as part of this prospectus.

THE OFFERING

Common Stock Offered by the Selling Stockholders	6,321,836 Shares
Use of Proceeds	We will not receive any proceeds from the sale of the Shares covered by this prospectus.
Nasdaq Capital Market Symbol	XFOR

RISK FACTORS

An investment in our Common Stock involves a high degree of risk. Prior to making a decision about investing in our Common Stock, you should consider carefully the specific risk factors discussed in the sections entitled “Risk Factors” contained in our most recent Quarterly on Form 10-Q for the quarter ended March 31, 2021, as filed with the SEC on May 6, 2021, which are incorporated in this prospectus by reference in their entirety, as well as any amendment or updates to our risk factors reflected in subsequent filings with the SEC, including any prospectus supplement hereto. These risks and uncertainties are not the only risks and uncertainties we face. Additional risks and uncertainties not presently known to us, or that we currently view as immaterial, may also impair our business. If any of the risks or uncertainties described in our SEC filings or any additional risks and uncertainties actually occur, our business, financial condition, results of operations and cash flow could be materially and adversely affected. In that case, the trading price of our Common Stock could decline and you might lose all or part of your investment.

USE OF PROCEEDS

We are filing the registration statement of which this prospectus forms a part to permit the holders of the Shares of our Common Stock described in the section entitled “Selling Stockholders” to resell such Shares. We are not selling any securities under this prospectus, and we will not receive any proceeds from the sale or other disposition of shares of our Common Stock held by the Selling Stockholders.

The Selling Stockholders will pay any underwriting discounts and commissions and expenses incurred by the Selling Stockholders for brokerage, accounting, tax or legal services or any other expenses incurred by the Selling Stockholders in disposing of these Shares. We will bear all other costs, fees and expenses incurred in effecting the registration of the Shares covered by this prospectus, including, without limitation, all registration and filing fees, Nasdaq listing fees and fees and expenses of our counsel and our accountants.

SELLING STOCKHOLDERS

This prospectus covers the sale or other disposition by the Selling Stockholders of up to the total number of shares of our Common Stock that were issued to the Purchasers pursuant to the Purchase Agreement, plus the total number of shares of our Common Stock issuable upon exercise of the pre-funded warrants issued to the Selling Stockholders, without giving effect to the Beneficial Ownership Limitation described under “Prospectus Summary—Private Placement—Securities Purchase Agreement.” The table below sets forth, to our knowledge, information concerning the beneficial ownership of shares of our Common Stock by the Selling Stockholders as of June 23, 2021. The information in the table below with respect to the selling stockholders has been obtained from the respective Selling Stockholders. When we refer to the “Selling Stockholders” in this prospectus, or, if required, a post-effective amendment to the registration statement of which this prospectus is a part, we mean the Selling Stockholders listed in the table below as offering shares, as well as their respective pledgees, assignees, donees, transferees or successors-in-interest. Throughout this prospectus, when we refer to the shares of our Common Stock being registered on behalf of the Selling Stockholders, we are referring to the shares of our Common Stock and the shares underlying the pre-funded warrants issued to the Selling Stockholders pursuant to the Purchase Agreement, without giving effect to the Beneficial Ownership Limitation described above. The Selling Stockholders may sell all, some or none of the shares of Common Stock subject to this prospectus. See “Plan of Distribution” below as it may be supplemented and amended from time to time.

The number of shares of Common Stock beneficially owned prior to the offering for each Selling Stockholder includes all shares of our Common Stock beneficially held by such Selling Stockholder as of June 23, 2021, which includes (i) all shares of our Common Stock purchased by such Selling Stockholder in the Private Placement and (ii) all shares of Common Stock issuable upon exercise of the pre-funded warrants purchased by such Selling Stockholder in the Private Placement. The percentages of shares owned before and after the offering are based on 24,766,615 shares of Common Stock outstanding as of June 23, 2021, which includes the outstanding shares of Common Stock offered by this prospectus but does not include any shares of Common Stock offered by this prospectus that are issuable pursuant to warrants or pre-funded warrants and are deemed outstanding in the table below because they are beneficially owned by a person.

Beneficial ownership is determined in accordance with the rules of the SEC and includes voting or investment power with respect to our Common Stock. Generally, a person “beneficially owns” shares of our Common Stock if the person has or shares with others the right to vote those shares or to dispose of them, or if the person has the right to acquire voting or disposition rights within 60 days. In computing the number of shares of our Common Stock beneficially owned by a person and the percentage ownership of that person, we deemed outstanding shares of Common Stock issuable upon the exercise of pre-funded warrants or warrants held by that Selling Stockholder that are exercisable within 60 days of June 23, 2021. We did not deem these shares outstanding, however, for the purpose of computing the percentage ownership of any other person. The inclusion of any shares in this table does not constitute an admission of beneficial ownership for any selling stockholder named below.

[Table of Contents](#)

Name of Selling Stockholder	Shares of Common Stock Beneficially Owned Prior to Offering		Number of Shares of Common Stock Being Offered(1)	Shares of Common Stock to be Beneficially Owned After Offering(2)	
	Number	Percentage		Number	Percentage
	Entities affiliated with Ikarian Healthcare Master Fund, LP (3)	2,739,882		11.06%	1,379,310
Entities affiliated with Bain Capital Life Sciences (4)	2,576,472	9.99%	919,540	2,672,980	9.99%
OrbiMed Private Investments IV, LP (5)	1,836,349	7.28%	287,356	1,548,993	6.14%
Altium Growth Fund, LP (6)	804,598	3.25%	804,598	—	—
Entities affiliated with Sio Capital Management, LLC (7)	804,597	3.25%	804,597	—	—
Driehaus Life Sciences Master Fund, L.P. (8)	800,120	3.23%	574,712	225,408	*
Entities affiliated with Monashee Investment Management LLC (9)	574,712	2.32%	574,712	—	—
Lytton-Kambara Foundation (10)	426,731	1.72%	229,885	196,846	*
Hercules Capital, Inc. (11)	306,581	1.23%	114,943	191,638	*
Lincoln Park Capital Fund, LLC (12)	236,085	*	229,885	6,200	*
Abingworth Bioventures 8 LP (13)	229,885	*	229,885	—	—
Hudson Bay Master Fund Ltd. (14)	172,413	*	172,413	—	—

* Less than one percent.

- (1) The number of shares of our Common Stock in the column “Number of Shares of Common Stock Being Offered” represents all of the shares of our Common Stock that a Selling Stockholder may offer and sell from time to time under this prospectus.
- (2) We do not know when or in what amounts a Selling Stockholder may offer shares for sale. The Selling Stockholders might not sell any or might sell all of the shares offered by this prospectus. Because the Selling Stockholders may offer all or some of the shares pursuant to this offering, and because there are currently no agreements, arrangements or understandings with respect to the sale of any of the shares, we cannot estimate the number of the shares that will be held by the Selling Stockholders after completion of the offering. However, for purposes of this table, we have assumed that, after completion of the offering, none of the shares covered by this prospectus will be held by the Selling Stockholders, including Common Stock issuable upon exercise of the pre-funded warrants issued in the Private Placement.
- (3) Consists of (i) the following shares of Common Stock purchased in the Private Placement: (a) 1,204,226 shares held by Ikarian Healthcare Master Fund, LP (the “Ikarian Fund”), (b) 105,821 shares of Common Stock held by Boothbay Absolute Return Strategies, LP (“BBARS”) and (c) 69,263 shares of Common Stock held by Boothbay Diversified Alpha Master Fund, LP (“BBDAMF”), and (ii) 1,360,572 additional shares of Common Stock held of record by the Ikarian Fund and the Ikarian Managed Accounts (as defined below). Ikarian Capital, LLC (“Ikarian Capital”) is the investment manager of, and may be deemed to indirectly beneficially own securities owned by, the Ikarian Fund. Ikarian Healthcare Fund GP, L.P., (“Ikarian GP”) is the general partner of, and may be deemed to indirectly beneficially own securities owned by, the Ikarian Fund. Ikarian Capital is also the general partner of, and may be deemed to indirectly beneficially own, securities beneficially owned by Ikarian GP. Ikarian Capital is a sub-advisor for certain separate managed accounts, including BBARS and BBDAMF, (collectively, the “Ikarian Managed Accounts”) and may be deemed to indirectly beneficially own securities owned by the Ikarian Managed Accounts. Ikarian Capital is ultimately owned and controlled by Chart Westcott Living Trust, of which Chart Westcott serves as the sole trustee (the “Westcott Trust”), and indirectly by Neil Shahrestani. Accordingly, each of Mr. Westcott, as sole trustee of the Westcott Trust, and Mr. Shahrestani may be deemed to indirectly beneficially own securities beneficially owned by Ikarian Capital. The Ikarian Fund disclaims beneficial ownership of the shares held by the Ikarian Managed Accounts. Each of BBARS and

Table of Contents

BBDAMF is managed by Boothbay Fund Management, LLC, (“Boothbay”). Boothbay, in its capacity as the investment manager of BBARS and BBDAMF, has the power to vote and the power to direct the disposition of all securities held by BBARS and BBDAMF. Ari Glass is the managing member of Boothbay. Each of BBARS, BBDAMF, Boothbay and Mr. Glass disclaim beneficial ownership of the shares held by BBARS and BBDAMF, except to the extent of any pecuniary interest therein. The address for each of BBARS, BBDAMF, Boothbay and Mr. Glass is c/o Boothbay Fund Management, LLC, 140 E. 45th Street, 14th Floor, New York, NY 10017. The address for the Ikarian Fund, Ikarian Capital, Ikarian GP, the Westcott Trust, Mr. Westcott and Mr. Shahrestani is 100 Crescent Court, Suite 1620, Dallas, TX 75201.

- (4) The shares reported under “Shares of Common Stock Beneficially Owned Prior to the Offering” consists of (i) the following shares of Common Stock purchased in the Private Placement: (a) 775,133 shares of Common Stock and 44,571 shares of Common Stock issuable upon exercise of pre-funded warrants, in each case held by Bain Capital Life Sciences Fund II, L.P. (“BCLS II”) and (b) 94,407 shares of Common Stock and 5,429 shares of Common Stock issuable upon exercise of pre-funded warrants, in each case held by BCIP Life Sciences Associates, LP (“BCIPLS” and, together with BCLS II, the “Bain Capital Life Science Entities”), (ii) 557,143 additional shares of Common Stock held by BCLS II, (iii) 125,891 additional shares of Common Stock held by BCIPLS, (iv) additional pre-funded warrants to purchase an aggregate of 557,143 shares of Common Stock held by BCLS II, (v) additional pre-funded warrants to purchase an aggregate of 125,891 shares of Common Stock held by BCIPLS, (vi) Class B warrants to purchase an aggregate of 39,082 shares of Common Stock held by BCLS II and (vii) Class B warrants to purchase an aggregate of 251,782 shares of Common Stock held by BCIPLS. In addition to the foregoing shares, as of June 23, 2021, BCLS II held Class B warrants to purchase an aggregate of 1,075,203 additional shares of Common Stock that are not included in the shares reported under “Shares of Common Stock Beneficially Owned Prior to the Offering” because they are subject to limitations on exercisability if such exercise would result in the Bain Capital Life Science Entities beneficially owning more than 9.99% of our outstanding Common Stock. The shares reported under “Number of Shares of Common Stock Being Offered” consist of the shares of Common Stock, including the shares of Common Stock issuable upon exercise of pre-funded warrants, purchased by the Bain Capital Life Science Entities in the Private Placement and included under “Shares of Common Stock Beneficially Owned Prior to the Offering,” without giving effect to the Beneficial Ownership Limitation. The shares reported under “Shares of Common Stock Beneficially Owned After to the Offering” includes an aggregate of 1,016,048 additional shares of Common Stock issuable upon exercise of Class B warrants held by BCLS II that would be exercisable following the disposition by the Bain Capital Life Science Entities of all of the shares registered for sale under this prospectus. Bain Capital Life Sciences Investors, LLC (“BCLSI”), whose managers are Jeffrey Schwartz and Adam Koppel, is the ultimate general partner of BCLS II and governs the investment strategy and decision-making process with respect to investments held by BCIPLS. As a result, each of BCLSI, Mr. Schwartz and Dr. Koppel may be deemed to share voting and dispositive power with respect to the shares of Common Stock held by the Bain Capital Life Sciences Entities. The address of the Bain Capital Life Sciences Entities is c/o Bain Capital Life Sciences, LP, 200 Clarendon Street, Boston, MA 02116.
- (5) The shares reported under “Shares of Common Stock Beneficially Owned Prior to the Offering” consists of (i) 287,356 shares of Common Stock purchased in the Private Placement, (ii) 1,086,493 additional shares of Common Stock held by OrbiMed Private Investments IV, LP (“OPI IV”), and (iii) warrants to purchase an aggregate of 462,500 shares of Common Stock held by OPI IV. OrbiMed Capital GP IV LLC (“GP IV”) is the general partner of OPI IV. OrbiMed Advisors LLC (“OrbiMed Advisors”) is the managing member of GP IV. By virtue of such relationships, GP IV and OrbiMedAdvisors may be deemed to have voting and investment power with respect to the shares held by OPI IV and as a result may be deemed to have beneficial ownership of such shares. OrbiMed Advisors exercises investment and voting power through a management committee comprised of Carl L. Gordon, Sven H. Borho and Jonathan T. Silverstein. Each of GP IV and OrbiMedAdvisors disclaims beneficial ownership of the shares held by OPI IV, except to the extent of its or his pecuniary interest therein if any. The address for each of OPI IV, GP IV, OrbiMed Advisors and Messrs. Gordon, Borho and Silverstein is c/o OrbiMed Private Investments IV, LP, 601 Lexington Avenue, 54th Floor, New York, NY 10022.

Table of Contents

- (6) The shares reported under “Shares of Common Stock Beneficially Owned Prior to the Offering” consists of shares purchased in the Private Placement. The address of Altium Growth Fund, LP is 152 W. 57th St., Floor 20, New York, NY 10019.
- (7) The shares reported under “Shares of Common Stock Beneficially Owned Prior to the Offering” consists of the following shares of Common Stock purchased in the Private Placement: (i) 253,006 shares of Common Stock held by Sio Partners LP (“Partners”), (ii) 136,130 shares of Common Stock held by Sio Partners Offshore LTD (“Offshore”), (iii) 163,591 shares of Common Stock held by Compass MAV LLC (“Compass”), (iv) 104,582 shares of Common Stock held by Compass Offshore MAV LTD (“Compass Offshore”), (v) 58,074 shares of Common Stock held by Walleye Trading LLC (“Walleye Trading”) and (vi) 89,214 shares of Common Stock held by Walleye Opportunities Master Fund Ltd. (Walleye Master”). Sio Capital Management, LLC (“Sio Management”) is the investment manager of Partners, Offshore, Compass, Compass Offshore, Walleye Trading and Walleye Master, and Michael Castor is the sole owner and Managing Member of Sio Management. Sio Management and Mr. Castor may be deemed to beneficially own the securities held by Partners, Offshore, Compass, Compass Offshore, Walleye Trading, and Walleye Master. Each of Sio Management and Mr. Castor disclaim beneficial ownership of any of the shares of our Common Stock they may be deemed to beneficially own except to the extent of their respective pecuniary interest therein. The address for Sio Management, Mr. Castor, Partners, Offshore, Compass, Compass Offshore, Walleye Trading and Walleye Master is 600 Third Avenue, 2nd Floor, New York, New York 10016.
- (8) The shares reported under “Shares of Common Stock Beneficially Owned Prior to the Offering” consists of (i) 574,712 shares of Common Stock purchased in the Private Placement, (ii) 220,600 additional shares of Common Stock, and (iii) warrants to purchase an aggregate of 4,808 shares of Common Stock. The address of Driehaus Life Sciences Master Fund, L.P. is 25 E. Erie St., Chicago, IL 60611.
- (9) The shares reported under “Shares of Common Stock Beneficially Owned Prior to the Offering” consists of the following shares of Common Stock purchased in the Private Placement: (i) 117,471 shares of Common Stock held by Monashee Solitario Fund LP, (ii) 170,115 shares of Common Stock held by DS Liquid DIV RVA MON LLC, (iii) 22,011 shares of Common Stock held by Bespoke Alpha MAC MIM LP, (iv) 25,690 shares of Common Stock held by SFL SPV I LLC, (v) 93,448 shares of Common Stock held by Monashee Pure Alpha SPV I LP and (vi) 145,977 shares of Common Stock held by BEMAP Master Fund Ltd. The address for these affiliated holders is c/o Monashee Investment Management LLC, 75 Park Plaza, 2nd Floor, Boston, MA 02116
- (10) The shares reported under “Shares of Common Stock Beneficially Owned Prior to the Offering” consists of (i) 229,885 shares of Common Stock purchased in the Private Placement and (ii) 196,846 additional shares of Common Stock. Laurence Lytton has voting and investment control over the shares of Common Stock held by the Lytton-Kambara Foundation. The address of the Lytton-Kambara Foundation is c/o Laurence Lytton, 467 Central Park West, 17A, New York, NY 10025.
- (11) The shares reported under “Shares of Common Stock Beneficially Owned Prior to the Offering” consists of (i) 114,943 shares of Common Stock purchased in the Private Placement, (ii) 83,334 additional shares of Common Stock, and (iii) warrants to purchase an aggregate of 108,334 shares of Common Stock. The address of Hercules Capital, Inc. is 400 Hamilton Avenue, Suite 310, Palo Alto, CA 94301.
- (12) The shares reported under “Shares of Common Stock Beneficially Owned Prior to the Offering” consists of (i) 229,885 shares of Common Stock purchased in the Private Placement, (ii) 3,200 additional shares of Common Stock, and (iii) warrants to purchase an aggregate of 3,000 shares of Common Stock. Joshua Scheinfeld and Jonathan Cope, the principals of Lincoln Park Capital Fund, LLC are deemed to be beneficial owners of all of the Common Stock owned by Lincoln Park Capital Fund, LLC, and Messrs. Scheinfeld and Cope have shared disposition power over the shares of Common Stock. The address of Lincoln Park Capital Fund, LLC is 440 N. Wells St., Suite 410, Chicago, IL 60654.
- (13) The shares reported under “Shares of Common Stock Beneficially Owned Prior to the Offering” consists of shares purchased in the Private Placement. Abingworth Bioventures 8 GP LP (“Abingworth GP”) serves as the general partner of Abingworth Bioventures 8 LP (“ABV 8”). Abingworth General Partner 8 LLP, serves as the general partner of Abingworth GP. ABV 8 (acting by its general partner Abingworth GP, acting by its general partner Abingworth General Partner 8 LLP) has delegated to Abingworth LLP, all voting,

[Table of Contents](#)

investment and dispositive power over the securities held by ABV 8. Abingworth LLP has an investment committee which approves investment and voting decisions for ABV 8 by a defined majority vote, and no individual member has the sole control or voting power over the shares held by ABV 8. Each of Abingworth GP, Abingworth GP 8, and each member of the investment committee disclaims beneficial ownership of the shares held by ABV 8 except to the extent of their pecuniary interest therein. The address for ABV8, Abingworth GP, Abingworth General Partner 8 LLP and Abingworth LLP is c/o Abingworth LLP, 38 Jermyn Street, London SW1Y 6 DN, United Kingdom.

- (14) The shares reported under “Shares of Common Stock Beneficially Owned Prior to the Offering” consists of 172,413 shares of Common Stock purchased in the Private Placement. Hudson Bay Capital Management LP, the investment manager of Hudson Bay Master Fund Ltd., has voting and investment power over these securities. Sander Gerber is the managing member of Hudson Bay Capital GP LLC, which is the general partner of Hudson Bay Capital Management LP. Each of Hudson Bay Master Fund Ltd. and Sander Gerber disclaims beneficial ownership over these securities. The address of each of Hudson Bay Master Fund Ltd., Hudson Bay Capital Management LP, Hudson Bay Capital GP LLC and Sander Gerber is c/o Hudson Bay Capital Management LP, 777 Third Avenue, 30th Floor, New York, NY 10017.

Relationships with Selling Stockholders

As discussed in greater detail above under the section titled “*Prospectus Summary—Private Placement*” in March 2021, we entered into the Purchase Agreement with the Selling Stockholders, pursuant to which we sold and issued shares of our Common Stock and pre-funded warrants to purchase our Common Stock, and we also entered into the Registration Rights Agreement with the Selling Stockholders, pursuant to which we agreed to file a registration statement with the SEC to cover the resale by the Selling Stockholders of the shares of our Common Stock, including shares of Common stock issuable upon exercise of the pre-funded warrants, issued pursuant to the Purchase Agreement by the Selling stockholder.

We are also party to an Amended and Restated Loan and Security Agreement, as amended, with Hercules. We are also party to an Option Agreement, as amended, with ABV 8, which Option Agreement provides ABV8 with a right to require us to repurchase the Shares of our Common Stock that ABV 8 purchased from us in the Private Placement (the “Abingworth Shares”). Pursuant to the Option Agreement, as amended, if we and a syndicate, of which an entity affiliated with ABV 8 is a part, do not execute a definitive co-development agreement by July 15, 2021, ABV 8 may, at its option, require us to repurchase the Abingworth Shares at the original purchase price of \$8.70 per share. This option must be exercised, if at all, by August 15, 2021. Other than these relationships with Hercules and Abingworth, none of the Selling Stockholders has had a material relationship with us or any of our predecessors or affiliates within the past three years, other than as a result of the ownership of our shares of Common Stock or other securities.

None of the Selling Stockholders has held any position or office with us or our affiliates within the last three years. Carl Gordon, who serves on the investment committee of OrbiMed Advisors, served on the Board of Directors of Arsanis, Inc., our predecessor, from 2010 to March 13, 2019.

PLAN OF DISTRIBUTION

The Selling Stockholders, which as used herein includes donees, pledgees, transferees or other successors-in-interest selling shares of Common Stock or interests in shares of Common Stock received after the date of this prospectus from a Selling Stockholder as a gift, pledge, partnership distribution or other transfer, may, from time to time, sell, transfer or otherwise dispose of any or all of their shares of Common Stock or interests in shares of Common Stock on any stock exchange, market or trading facility on which the shares are traded or in private transactions. These dispositions may be at fixed prices, at prevailing market prices at the time of sale, at prices related to the prevailing market price, at varying prices determined at the time of sale, or at negotiated prices.

The Selling Stockholders may use any one or more of the following methods when disposing of shares or interests therein:

- ordinary brokerage transactions and transactions in which the broker-dealer solicits purchasers;
- block trades in which the broker-dealer will attempt to sell the shares 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;
- short sales effected after the date the registration statement of which this prospectus is a part is declared effective by the SEC;
- through the writing or settlement of options or other hedging transactions, whether through an options exchange or otherwise;
- broker-dealers may agree with the Selling Stockholders to sell a specified number of such shares at a stipulated price per share;
- a combination of any such methods of sale; and
- any other method permitted by applicable law.

The Selling Stockholders may, from time to time, pledge or grant a security interest in some or all of the shares of Common Stock owned by them and, if they default in the performance of their secured obligations, the pledgees or secured parties may offer and sell the shares of Common Stock, from time to time, under this prospectus, or under an amendment to this prospectus under Rule 424(b)(3) or other applicable provision of the Securities Act of 1933, as amended (the "Securities Act"), amending the list of Selling Stockholders to include the pledgee, transferee or other successors in interest as Selling Stockholders under this prospectus. The Selling Stockholders also may transfer the shares of Common Stock in other circumstances, in which case the transferees, pledgees, donees or other successors in interest will be the selling beneficial owners for purposes of this prospectus.

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

[Table of Contents](#)

The aggregate proceeds to the Selling Stockholders from the sale of the Common Stock offered by them will be the purchase price of the Common Stock less discounts or commissions, if any. Each of the Selling Stockholders reserves the right to accept and, together with their agents from time to time, to reject, in whole or in part, any proposed purchase of Common Stock to be made directly or through agents. We will not receive any of the proceeds from this offering. Upon any exercise of the pre-funded warrants by payment of cash, however, we will receive the exercise price of \$0.01 per share pursuant to the pre-funded warrants.

The Selling Stockholders also may resell all or a portion of the shares in open market transactions in reliance upon Rule 144 under the Securities Act of 1933, provided that they meet the criteria and conform to the requirements of that rule. The Selling Stockholders and any underwriters, broker-dealers or agents that participate in the sale of the Common Stock or interests therein may be “underwriters” within the meaning of Section 2(11) of the Securities Act. Any discounts, commissions, concessions or profit they earn on any resale of the shares may be underwriting discounts and commissions under the Securities Act. Selling Stockholders who are “underwriters” within the meaning of Section 2(11) of the Securities Act will be subject to the prospectus delivery requirements of the Securities Act.

To the extent required, the shares of our Common Stock to be sold, the names of the Selling Stockholders, the respective purchase prices and public offering prices, the names of any agents, dealer or underwriter, and any applicable commissions or discounts with respect to a particular offer will be set forth in an accompanying prospectus supplement or, if appropriate, a post-effective amendment to the registration statement that includes this prospectus.

In order to comply with the securities laws of some states, if applicable, the Common Stock may be sold in these jurisdictions only through registered or licensed brokers or dealers. In addition, in some states the Common Stock may not be sold unless it has been registered or qualified for sale or an exemption from registration or qualification requirements is available and is complied with.

We have advised the Selling Stockholders that the anti-manipulation rules of Regulation M under the Securities Exchange Act of 1934, as amended, may apply to sales of shares in the market and to the activities of the Selling Stockholders and their affiliates. In addition, to the extent applicable, we will make copies of this prospectus (as it may be supplemented or amended from time to time) available to the Selling Stockholders for the purpose of satisfying the prospectus delivery requirements of the Securities Act. The Selling Stockholders may indemnify any broker-dealer that participates in transactions involving the sale of the shares against certain liabilities, including liabilities arising under the Securities Act.

We have agreed to indemnify the Selling Stockholders against liabilities, including liabilities under the Securities Act and state securities laws, relating to the registration of the shares offered by this prospectus.

We have agreed with the Selling Stockholders to use commercially reasonable efforts to cause the registration statement of which this prospectus constitutes a part effective and to remain continuously effective until the earlier of (1) such time as all of the shares covered by this prospectus have been disposed of pursuant to and in accordance with such registration statement or (2) the date on which all of the shares may be sold without restriction pursuant to Rule 144 of the Securities Act.

LEGAL MATTERS

The validity of the Shares to be offered for resale by the Selling Stockholders under this prospectus will be passed upon for us by Cooley LLP, New York, New York.

EXPERTS

The financial statements incorporated in this prospectus by reference to the Annual Report on Form 10-K for the year ended December 31, 2020 have been so incorporated in reliance on the report (which contains an explanatory paragraph relating to our ability to continue as a going concern as described in Note 1 to the financial statements) of PricewaterhouseCoopers LLP, an independent registered public accounting firm, given on the authority of said firm as experts in auditing and accounting.

WHERE YOU CAN FIND MORE INFORMATION

This prospectus is part of a registration statement that we filed with the SEC. This prospectus omits some information contained in the registration statement in accordance with SEC rules and regulations. You should review the information and exhibits in the registration statement for further information about us and our consolidated subsidiaries and our securities. Statements in this prospectus concerning any document we filed as an exhibit to the registration statement or that we otherwise filed with the SEC are not intended to be comprehensive and are qualified by reference to these filings. You should review the complete document to evaluate these statements. You can obtain a copy of the registration statement from the SEC's website.

We file annual, quarterly and current reports, proxy statements and other information with the SEC. Our SEC filings are available to the public over the Internet at the SEC's website at <http://www.sec.gov>.

We make available, free of charge, through our investor relations website, our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, statements of changes in beneficial ownership of securities and amendments to those reports and statements as soon as reasonably practicable after they are filed with the SEC. The address for our website is www.x4pharma.com. Information contained in or accessible through our website does not constitute a part of this prospectus and is not incorporated by reference in this prospectus.

INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

The SEC allows us to “incorporate by reference” information into this prospectus, which means that we can disclose important information to you by referring you to another document filed separately with the SEC. The SEC file number for the documents incorporated by reference in this prospectus is 001-38295. The documents incorporated by reference into this prospectus contain important information that you should read about us.

The following documents are incorporated by reference into this document:

- Our Annual Report on [Form 10-K](#) for the fiscal year ended December 31, 2020 (the “2020 Annual Report”), filed with the SEC on March 19, 2021, including the information specifically incorporated by reference in the 2020 Annual Report from our [definitive proxy statement](#) for the 2021 Annual Meeting of Stockholders, filed with the SEC on April 20, 2021;
- Our Quarterly Report on [Form 10-Q](#) for the fiscal quarter ended March 31, 2021, filed with the SEC on May 6, 2021;
- Our Current Reports on Form 8-K filed with the SEC on [March 19, 2021](#), [June 7, 2021](#) and [June 11, 2021](#) (in each case, except for information contained therein which is furnished rather than filed); and
- The description of our Common Stock set forth in the registration statement on [Form 8-A](#) registering our Common Stock under Section 12 of the Exchange Act, which was filed with the SEC on November 15, 2017, including any amendments or reports filed for purposes of updating such description, including Exhibit 4.12 to the 2020 Annual Report.

We also incorporate by reference into this prospectus all documents (other than current reports furnished under Item 2.02 or Item 7.01 of Form 8-K and exhibits filed on such form that are related to such items) that are filed by us with the SEC pursuant to Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act (i) after the date of the initial filing of the registration statement of which this prospectus forms a part and prior to effectiveness of the registration statement, or (ii) after the date of this prospectus but prior to the termination of the offering. These documents include periodic reports, such as Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q and Current Reports on Form 8-K, as well as proxy statements.

We will provide to each person, including any beneficial owner, to whom a prospectus is delivered, without charge upon written or oral request, a copy of any or all of the documents that are incorporated by reference into this prospectus but not delivered with the prospectus, including exhibits that are specifically incorporated by reference into such documents. You should direct any requests for documents to X4 Pharmaceuticals, Inc., Attn: Investor Relations, 61 North Beacon Street, 4th Floor, Boston, Massachusetts 02134.

Any statement contained in this prospectus or contained in a document incorporated or deemed to be incorporated by reference into this prospectus will be deemed to be modified or superseded to the extent that a statement contained in this prospectus or any subsequently filed supplement to this prospectus, or document deemed to be incorporated by reference into this prospectus, modifies or supersedes such statement.

6,321,836 Shares



Common Stock

PROSPECTUS

, 2021

PART II
INFORMATION NOT REQUIRED IN THE PROSPECTUS

Item 14. Other Expenses of Issuance and Distribution

The following table sets forth the various expenses to be incurred in connection with the sale and distribution of the securities being registered hereby, all of which will be borne by the Registrant (except any underwriting discounts and commissions and expenses incurred by the Selling Stockholders for brokerage, accounting, tax or legal services or any other expenses incurred by the Selling Stockholders in disposing of the shares). All amounts shown are estimates except the SEC registration fee.

SEC registration fee	\$ 4,869.37
Accountants' fees and expenses	15,000
Legal fees and expenses	75,000
Miscellaneous expenses	5,130.63
Total	<u>\$ 100,000</u>

Item 15. Indemnification of Officers and Directors

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

Subsection (b) of Section 145 empowers a corporation to indemnify any person who was or is a party or is threatened to be made a party to any threatened, pending or completed action or suit by or in the right of the corporation to procure a judgment in its favor by reason of the fact that the person acted in any of the capacities set forth above, against expenses (including attorneys' fees) actually and reasonably incurred by the person in connection with the defense or settlement of such action or suit if the person acted in good faith and in a manner the person reasonably believed to be in or not opposed to the best interests of the corporation, except that no indemnification shall be made in respect of any claim, issue or matter as to which such person shall have been adjudged to be liable to the corporation unless and only to the extent that the Court of Chancery or the court in which such action or suit was brought shall determine upon application that, despite the adjudication of liability but in view of all the circumstances of the case, such person is fairly and reasonably entitled to indemnity for such expenses which the Court of Chancery or such other court shall deem proper.

Section 145 further provides that to the extent a director or officer of a corporation has been successful on the merits or otherwise in the defense of any action, suit or proceeding referred to in subsections (a) and (b) of Section 145, or in defense of any claim, issue or matter therein, such person shall be indemnified against expenses (including attorneys' fees) actually and reasonably incurred by such person in connection therewith; that indemnification provided for by Section 145 shall not be deemed exclusive of any other rights to which the indemnified party may be entitled; and the indemnification provided for by Section 145 shall, unless otherwise provided when authorized or ratified, continue as to a person who has ceased to be a director, officer, employee or agent and shall inure to the benefit of such person's heirs, executors and administrators. Section 145 also

[Table of Contents](#)

empowers the corporation to purchase and maintain insurance on behalf of any person who is or was a director, officer, employee or agent of the corporation, or is or was serving at the request of the corporation as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise against any liability asserted against such person and incurred by such person in any such capacity, or arising out of his status as such, whether or not the corporation would have the power to indemnify such person against such liabilities under Section 145.

Section 102(b)(7) of the DGCL provides that a corporation's certificate of incorporation may contain a provision eliminating or limiting the personal liability of a director to the corporation or its stockholders for monetary damages for breach of fiduciary duty as a director, provided that such provision shall not eliminate or limit the liability of a director (i) for any breach of the director's duty of loyalty to the corporation or its stockholders, (ii) for acts or omissions not in good faith or which involve intentional misconduct or a knowing violation of law, (iii) under Section 174 of the DGCL or (iv) for any transaction from which the director derived an improper personal benefit.

We have entered into indemnification agreements with each of our directors and executive officers, in addition to the indemnification provided for in our restated certificate, and intend to enter into indemnification agreements with any new directors in the future.

We have purchased and intend to maintain insurance on behalf of any person who is or was a director or officer of X4 Pharmaceuticals against any loss arising from any claim asserted against him or her and incurred by him or her in any such capacity, subject to certain exclusions. Certain of our non-employee directors may, through their relationships with their employers, be insured and/or indemnified against certain liabilities in their capacity as members of our board of directors.

On March 13, 2019, we completed our business combination with X4 Therapeutics, Inc. (formerly X4 Pharmaceuticals, Inc.) in accordance with the terms of an Agreement and Plan of Merger, dated as of November 26, 2018, as amended on December 20, 2018 and March 8, 2019 (the "Merger Agreement"), that we entered into with X4 Therapeutics, Inc. and Artemis AC Corp., a Delaware corporation and our wholly owned subsidiary ("Merger Sub"). Pursuant to the terms of the Merger Agreement, Merger Sub merged with and into X4 Therapeutics, Inc., with X4 Therapeutics, Inc. continuing as our wholly owned subsidiary and the surviving corporation of the merger, which transaction we refer to as the Merger.

Under the Merger Agreement and subject to applicable law, from the effective time of the Merger (the "Effective Time") through the sixth anniversary of the date on which the Effective Time occurs, we and the corporation surviving the Merger between X4 Therapeutics, Inc. and Merger Sub (the "Surviving Corporation") shall each, jointly and severally, indemnify and hold harmless each person who was, as of the date of the Merger Agreement (November 26, 2018), or has been at any time prior to such date, or who became prior to the Effective Time, a director or officer of our company, X4 Therapeutics, Inc. or any of our or X4 Therapeutics, Inc.'s respective subsidiaries against all claims, losses, liabilities, damages, judgments, fines and reasonable fees, costs and expenses, including attorneys' fees and disbursements, incurred in connection with any claim, action, suit, proceeding or investigation, whether civil, criminal, administrative or investigative, arising out of or pertaining to the fact that such person is or was a director, officer, employee or agent of our company, X4 Therapeutics, Inc., or any of our or X4 Therapeutics, Inc.'s respective subsidiaries (or, while a director or officer of our company, X4 Therapeutics, Inc. or any of our or X4 Therapeutics, Inc.'s respective subsidiaries, is or was serving at the request of us, X4 Therapeutics, Inc. or any of our or X4 Therapeutics, Inc.'s respective subsidiaries as a director, officer, employee or agent of another person), whether asserted or claimed prior to, at or after the Effective Time, in each case, to the fullest extent permitted by applicable law. Subject to applicable law, each such director and officer will be entitled to advancement of expenses (including attorneys' fees) incurred in the defense of any such claim, action, suit, proceeding or investigation from each of us and the Surviving Corporation following receipt by us or the Surviving Corporation from such indemnified person of a request therefor; provided that any such person to whom expenses are advanced provides an undertaking, to the extent then required by the DGCL or the applicable governing document of us or the Surviving Corporation, as applicable, to repay such advances if it is ultimately determined that such person is not entitled to indemnification.

[Table of Contents](#)

Further, pursuant to the Merger Agreement, for a period of six years following the closing of the Merger (the “Closing”), the provisions of the Surviving Corporation’s certificate of incorporation and by-laws will contain provisions at least as favorable as the provisions relating to the indemnification, advancement of expenses and elimination of liability for monetary damages set forth in the certificate of incorporation and by-laws of X4 Therapeutics, Inc. and us immediately before the Effective Time.

Pursuant to the Merger Agreement, we agreed to either (A) maintain in effect for six years after the Closing, our existing directors’ and officers’ insurance policies in place as of the date of the Merger Agreement (November 26, 2018), or (B) prior to the Closing, purchase a six-year “tail” policy under its own existing directors’ and officers’ liability insurance policy, with an effective date as of the Closing (provided, that we may substitute therefor a policy of at least the same coverage containing terms and conditions that are not less favorable in any material respect). In no event, however, will we be required to expend for an annual premium for such policies more than an amount equal to 200% of the annual premiums paid by us for such insurance as of the date of the Merger Agreement. During the term of the “tail” policy, however, neither we nor the Surviving Corporation may take any action following the Closing to cause such “tail” policy to be cancelled or any of its provisions to be amended or waived in any manner that would adversely affect in any material respect the rights of their former and current officers and directors, their heirs or representatives.

From and after the Effective Time, we agreed to pay all expenses, including reasonable attorneys’ fees, that may be incurred by indemnified persons in connection with their successful enforcement of the rights provided to such persons in the Merger Agreement. All rights to exculpation, indemnification and advancement of expenses for acts or omissions occurring at or prior to the Effective Time, whether asserted or claimed prior to, at or after the Effective Time, existing in favor of the current or former directors, officers or employees, as the case may be, of our company, X4 Therapeutics, Inc. or any of our or X4 Therapeutics, Inc.’s respective subsidiaries as provided in their respective certificates of incorporation or by-laws or other organization documents or in any agreement in existence immediately before the Effective Time, will survive the Merger and continue in full force and effect. The director and officer indemnification provisions of the Merger Agreement are intended to be in addition to the rights otherwise available to the current and former officers and directors of our company and X4 Therapeutics, Inc. by law, charter, statute, bylaw or agreement, and shall operate for the benefit of, and will be enforceable by, each of such indemnified persons, their heirs and their representatives.

In the event we or the Surviving Corporation or any of our or its respective successors or assigns (i) consolidates with or merges into any other person and is not be the continuing or surviving corporation or entity of such consolidation or merger, or (ii) transfers all or substantially all of its properties and assets to any person, then, and in each such case, proper provision will be made so that the successors and assigns of us or the Surviving Corporation, as the case may be, will succeed to the indemnification obligations set forth in the Merger Agreement. We will cause the Surviving Corporation to perform all of the director and officer indemnification obligations of the Surviving Corporation under the Merger Agreement.

Insofar as the forgoing provisions permit indemnification of directors, executive officers, or persons controlling us for liability arising under the Securities Act of 1933, as amended (the “Securities Act”), we have been informed that, in the opinion of the Securities and Exchange Commission, such indemnification is against public policy as expressed in the Securities Act and is therefore unenforceable.

Table of Contents

Item 16. Exhibits and Financial Statement Schedules

Exhibit Number	Description of Document
3.1	Restated Certificate of Incorporation, as amended, of the Registrant (incorporated by reference to Exhibit 3.1 to the Registrant's Current Report on Form 8-K (File No. 001-38295), filed with the SEC on June 11, 2020).
3.2	Amended and Restated By-laws of the Registrant (incorporated by reference to Exhibit 3.2 to the Registrant's Current Report on Form 8-K (File No. 001-38295), filed with the SEC on November 20, 2017).
4.1	Reference is made to Exhibits 3.1 and 3.2
4.2	Form of Common Stock Certificate (incorporated by reference to Exhibit 4.1 to the Registrant's Current Report on Form 8-K (File No. 001-38295) filed with the SEC on March 13, 2019).
4.3	Form of Pre-Funded Warrant (incorporated by reference to Exhibit 4.1 to the Registrant's Current Report on Form 8-K (File No. 001-38295) filed with the SEC on March 19, 2021).
4.4	Registration Rights Agreement, dated March 18, 2021, by and among X4 Pharmaceuticals, Inc. and the persons party thereto (incorporated by reference to Exhibit 10.2 to the Registrant's Current Report on Form 8-K (File No. 001-38295) filed with the SEC on March 19, 2021).
5.1	Opinion of Cooley LLP.
10.1	Securities Purchase Agreement, dated March 18, 2021, by and among X4 Pharmaceuticals, Inc. and the persons party thereto.
23.1	Consent of PricewaterhouseCoopers LLP.
23.2	Consent of Cooley LLP (included in Exhibit 5.1).
24.1	Powers of Attorney (included on signature page).

Item 17. Undertakings

The undersigned registrant hereby undertakes:

- (a) (1) To file, during any period in which offers or sales are being made, a post-effective amendment to this registration statement:
- (i) To include any prospectus required by Section 10(a)(3) of the Securities Act;
 - (ii) To reflect in the prospectus any facts or events arising after the effective date of the registration statement (or the most recent post-effective amendment thereof) which, individually or in the aggregate, represent a fundamental change in the information set forth in the registration statement. Notwithstanding the foregoing, any increase or decrease in volume of securities offered (if the total dollar value of securities offered would not exceed that which was registered) and any deviation from the low or high end of the estimated maximum offering range may be reflected in the form of prospectus filed with the SEC pursuant to Rule 424(b) if, in the aggregate, the changes in volume and price represent no more than 20 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;

Table of Contents

provided, however, that the undertakings set forth in paragraphs (a)(1)(i), (a)(1)(ii) and (a)(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, as amended (the “Exchange Act”), that are incorporated by reference in this registration statement or are contained in a form of prospectus filed pursuant to Rule 424(b) that is part of this registration statement.

- (2) That, for the purpose of determining any liability under the Securities Act, each such post-effective amendment shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial *bona fide* offering thereof.
- (3) To remove from registration by means of a post-effective amendment any of the securities being registered which remain unsold at the termination of the offering.
- (4) That, for the purpose of determining liability under the Securities Act to any purchaser:
 - (i) Each prospectus filed by the registrant pursuant to Rule 424(b)(3) shall be deemed to be part of 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 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.
- (b) The Registrant hereby undertakes that, for purposes of determining any liability under the Securities Act, each filing of the registrant’s annual report pursuant to Section 13(a) or 15(d) of the Exchange Act (and, where applicable, each filing of an employee benefit plan’s annual report pursuant to Section 15(d) of the Exchange Act) 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 may be permitted to directors, officers and controlling persons of the registrant pursuant to the foregoing provisions, or otherwise, the registrant has been advised that in the opinion of the SEC such indemnification is against public policy as expressed in the Securities Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the registrant of expenses incurred or paid by a director, officer or controlling person of the registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Securities Act and will be governed by the final adjudication of such issue.

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 Boston, Commonwealth of Massachusetts, on this 25th day of June, 2021.

X4 PHARMACEUTICALS, INC.

By: /s/ Paula Ragan
Paula Ragan, Ph.D.
President, Chief Executive Officer and Secretary

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below hereby constitutes and appoints Paula Ragan, Ph.D. and Adam S. Mostafa, jointly and severally, as his or her true and lawful agent, proxy and attorneys-in-fact, with full power of substitution and resubstitution, for him or her and in his or her 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, (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, 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 or she 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, 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/ Paula Ragan</u> Paula Ragan, Ph.D.	President, Chief Executive Officer, Secretary and Director (<i>Principal Executive Officer</i>)	June 25, 2021
<u>/s/ Adam S. Mostafa</u> Adam S. Mostafa	Chief Financial Officer and Treasurer (<i>Principal Financial Officer and Principal Accounting Officer</i>)	June 25, 2021
<u>/s/ Michael S. Wyzga</u> Michael S. Wyzga	Chairman of the Board of Directors	June 25, 2021
<u>/s/ William E. Aliski</u> William E. Aliski	Director	June 25, 2021
<u>/s/ Gary J. Bridger</u> Gary J. Bridger, Ph.D.	Director	June 25, 2021

[Table of Contents](#)

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/ Alison Lawton</u> Alison Lawton	Director	June 25, 2021
<u>/s/ David McGirr</u> David McGirr, MBA	Director	June 25, 2021
<u>/s/ René Russo</u> René Russo, Pharm.D.	Director	June 25, 2021
<u>/s/ Murray W. Stewart</u> Murray W. Stewart, M.D.	Director	June 25, 2021



Daniel I. Goldberg
+1 212 479 6722
dgoldberg@cooley.com

June 25, 2021

X4 Pharmaceuticals, Inc.
61 North Beacon Street, 4th Floor
Boston, MA 02134

Ladies and Gentlemen:

We have acted as counsel to X4 Pharmaceuticals, Inc., a Delaware corporation (the "**Company**"), in connection with the filing of a Registration Statement on Form S-3 (the "**Registration Statement**") by the Company under the Securities Act of 1933, as amended, covering the resale by certain selling stockholders (the "**Selling Stockholders**") of up to 6,321,836 shares of the Company's Common Stock, par value \$0.001 per share ("**Common Stock**"), consisting of (i) 6,271,836 outstanding shares of Common Stock (the "**Shares**") and (ii) 50,000 shares of Common Stock (the "**Warrant Shares**") issuable upon the exercise of outstanding warrants to purchase shares of Common Stock (the "**Warrants**"). The Shares and the Warrant Shares were issued pursuant to a Securities Purchase Agreement, dated March 18, 2021, by and among the Company and the purchasers named therein (the "**Securities Purchase Agreement**").

In connection with this opinion, we have examined and relied upon the Registration Statement and related prospectus included therein, the Company's Amended and Restated Certificate of Incorporation, as amended, and Bylaws, as amended, each as currently in effect, the Securities Purchase Agreement, the Warrants and such other documents, records, certificates, memoranda and other instruments as in our judgment are necessary or appropriate to enable us to render the opinion expressed below. We have assumed the genuineness of all signatures, the authenticity of all documents submitted to us as originals, the conformity to originals of all documents submitted to us as copies, the accuracy, completeness and authenticity of certificates of public officials and the due authorization, execution and delivery of all documents by all persons other than the Company where execution and delivery are prerequisites to the effectiveness thereof. As to certain factual matters, we have relied upon a certificate of an officer of the Company and have not independently verified such matters.

Our opinion is expressed only with respect to the General Corporation Law of the State of Delaware. We express no opinion as to whether any particular laws other than those identified above are applicable to the subject matter hereof. We are not rendering any opinion as to compliance with any federal or state antifraud law, rule or regulation relating to securities, or to the sale or issuance thereof.

With respect to the Warrant Shares, we express no opinion to the extent that future issuances of securities of the Company, including the Warrant Shares, and/or adjustments to outstanding securities of the Company, including the Warrants, may cause the Warrants to be exercisable for more shares of Common Stock than the number that remain authorized but unissued. Further, we have assumed the Exercise Price (as defined in the Warrants) will not be adjusted to an amount below the par value per share of the Common Stock.

On the basis of the foregoing, and in reliance thereon, we are of the opinion that the Shares have been validly issued and are fully paid, and nonassessable and that the Warrant Shares, when issued upon exercise of the Warrants in accordance with the terms of the Warrants, will be validly issued, fully paid and nonassessable.

Cooley LLP 55 Hudson Yards New York, NY 10001-2157
t: (212) 479-6000 f: (212) 479-6275 cooley.com



X4 Pharmaceuticals, Inc.
June 25, 2021
Page Two

We hereby consent to the reference to our firm under the caption “Legal Matters” in the prospectus included in the Registration Statement and to the filing of this opinion as an exhibit to the Registration Statement.

Cooley LLP 55 Hudson Yards New York, NY 10001-2157
t: (212) 479-6000 f: (212) 479-6275 cooley.com



X4 Pharmaceuticals, Inc.
June 25, 2021
Page Three

Very truly yours,

COOLEY LLP

By: Daniel I. Goldberg
Daniel I. Goldberg, Partner

Cooley LLP 55 Hudson Yards New York, NY 10001-2157
t: (212) 479-6000 f: (212) 479-6275 cooley.com

SECURITIES PURCHASE AGREEMENT

This SECURITIES PURCHASE AGREEMENT (this “**Agreement**”) is made and entered into as of March 18, 2021 by and among X4 Pharmaceuticals, Inc., a Delaware corporation (the “**Company**”), and the Investors identified on **Exhibit A** attached hereto (each an “**Investor**” and collectively the “**Investors**”).

RECITALS

A. The Company and the Investors are executing and delivering this Agreement in reliance upon the exemption from securities registration afforded by the provisions of Section 4(a)(2) of the 1933 Act (as defined below);

B. The Investors wish to purchase from the Company, and the Company wishes to sell and issue to the Investors, upon the terms and subject to the conditions stated in this Agreement, shares (the “**Shares**”) of the Company’s Common Stock, par value \$0.001 per share (the “**Common Stock**”), and/or pre-funded warrants to purchase Common Stock in the form attached hereto as **Exhibit B** (the “**Pre-Funded Warrants**”); and

C. Contemporaneously with the sale of the Shares and the Pre-Funded Warrants, the parties hereto will execute and deliver a Registration Rights Agreement, in the form attached hereto as **Exhibit C** (the “**Registration Rights Agreement**”), pursuant to which the Company will agree to provide certain registration rights in respect of the Shares and the Warrant Shares (as defined below) under the 1933 Act and applicable state securities laws.

In consideration of the mutual promises made herein and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereto agree as follows:

1. **Definitions.** For the purposes of this Agreement, the following terms shall have the meanings set forth below:

“**Affiliate**” means, with respect to any Person, any other Person which directly or indirectly through one or more intermediaries Controls, is controlled by, or is under common Control with such Person.

“**Business Day**” means a day, other than a Saturday or Sunday, on which banks in New York City are open for the general transaction of business.

“**Closing**” has the meaning set forth in Section 3.1.

“**Closing Date**” has the meaning set forth in Section 3.1.

“**Closing Securities**” means the Shares and the Pre-Funded Warrants sold at Closing.

“**Common Stock**” has the meaning set forth in the recitals to this Agreement.

“**Intellectual Property**” has the meaning set forth in Section 4.14.

“**Company’s Knowledge**” means the actual knowledge of the executive officers (as defined in Rule 405 under the 1933 Act) of the Company.

“**Control**” (including the terms “controlling,” “controlled by” or “under common control with”) means the possession, direct or indirect, of the power to direct or cause the direction of the management and policies of a Person, whether through the ownership of voting securities, by contract or otherwise.

“**EDGAR system**” has the meaning set forth in Section 4.9.

“**Environmental Laws**” has the meaning set forth in Section 4.15.

“GAAP” has the meaning set forth in Section 4.17.

“**Governmental Entity**” means any national, federal, state, municipal, local, territorial, foreign or other government or any department, commission, board, bureau, agency, regulatory authority or instrumentality thereof, or any court, judicial, administrative or arbitral body or public or private tribunal.

“**HSR Act**” has the meaning set forth in Section 7.9.

“**Investor Questionnaire**” has the meaning set forth in Section 5.8.

“**Material Adverse Effect**” means a material adverse effect on (i) the assets, liabilities, results of operations, financial condition or business of the Company and its subsidiaries taken as a whole, (ii) the legality or enforceability of any of the Transaction Documents or (iii) the ability of the Company to perform its obligations under the Transaction Documents, except that for purposes of Section 6.1(i) of this Agreement, in no event shall a change in the market price of the Common Stock alone constitute a “Material Adverse Effect”.

“**Material Contract**” means any contract, instrument or other agreement to which the Company is a party or by which it is bound that has been filed or was required to have been filed as an exhibit to the SEC Filings pursuant to Item 601(b)(4) or Item 601(b)(10) of Regulation S-K.

“**Nasdaq**” means the Nasdaq Global Select Market.

“**Person**” means an individual, corporation, partnership, limited liability company, trust, business trust, association, joint stock company, joint venture, sole proprietorship, unincorporated organization, governmental authority or any other form of entity not specifically listed herein.

“**Placement Agent(s)**” shall include each of Citigroup Global Markets Inc., Cowen and Company, LLC and Stifel, Nicolaus & Company, Inc.

“**Pre-Funded Warrants**” has the meaning set forth in the recitals to this Agreement.

“**Press Release**” has the meaning set forth in Section 9.7.

“**Principal Trading Market**” means the Trading Market on which the Common Stock is primarily listed on and quoted for trading, which, as of the date of this Agreement and the Closing Date, shall be the Nasdaq Capital Market.

“**Prior Registration Rights Agreement**” means that certain Registration Rights Agreement, dated October 14, 2020, by and between the Company and Aspire Capital Fund, LLC.

“**Registration Rights Agreement**” has the meaning set forth in the recitals to this Agreement.

“**Regulatory Authorities**” has the meaning set forth in Section 4.30.

“**Required Investors**” has the meaning set forth in the Registration Rights Agreement.

“**SEC**” means the U.S. Securities and Exchange Commission.

“**SEC Filings**” has the meaning set forth in Section 4.8.

“**Securities**” means the Shares, the Pre-Funded Warrants, and the Warrant Shares.

“**Shares**” has the meaning set forth in the recitals to this Agreement.

“**Short Sales**” means all “short sales” as defined in Rule 200 of Regulation SHO under the 1934 Act (but shall not be deemed to include the location and/or reservation of borrowable shares of Common Stock).

“**Trading Day**” means (i) a day on which the Common Stock is listed or quoted and traded on its Principal Trading Market (other than the OTC Bulletin Board), or (ii) if the Common Stock is not listed on a Trading Market (other than the OTC Bulletin Board), a day on which the Common Stock is traded in the over-the-counter market, as reported by the OTC Bulletin Board, or (iii) if the Common Stock is not quoted on any Trading Market, a day on which the Common Stock is quoted in the over-the-counter market as reported in the “pink sheets” by OTC Markets Group Inc. (or any similar organization or agency succeeding to its functions of reporting prices); provided, that in the event that the Common Stock is not listed or quoted as set forth in (i), (ii) or (iii) hereof, then Trading Day shall mean a Business Day.

“**Trading Market**” means whichever of the New York Stock Exchange, the NYSE American, the Nasdaq Global Select Market, the Nasdaq Global Market, the Nasdaq Capital Market or the OTC Bulletin Board on which the Common Stock is listed or quoted for trading on the date in question.

“**Transfer Agent**” has the meaning set forth in Section 7.2(a).

“**Transaction Documents**” means this Agreement, the Pre-Funded Warrants and the Registration Rights Agreement.

“**Warrant Shares**” means the shares of Common Stock issuable upon exercise of the Pre-Funded Warrants.

“**1933 Act**” means the Securities Act of 1933, as amended, or any successor statute, and the rules and regulations promulgated thereunder.

“**1934 Act**” means the Securities Exchange Act of 1934, as amended, or any successor statute, and the rules and regulations promulgated thereunder.

2. Purchase and Sale of the Securities. On the Closing Date, upon the terms and subject to the conditions set forth herein, the Company will issue and sell, and each Investor will purchase, severally and not jointly, (A) the number of Shares set forth opposite the name of such Investor under the heading “Number of Shares” on **Exhibit A** attached hereto and (B) a Pre-Funded Warrant to purchase the number of Warrant Shares set forth opposite the name of such Investor under the heading “Number of Warrant Shares Underlying Pre-Funded Warrant” on **Exhibit A** attached hereto, if any. The purchase price per Share shall be \$8.70. The purchase price per Pre-Funded Warrant shall be \$8.69. The Pre-Funded Warrants shall have an exercise price equal to \$0.01 per Warrant Share.

3. Closing.

3.1 Upon the satisfaction of the conditions set forth in Section 6, the completion of the purchase and sale of the Closing Securities (the “**Closing**”) shall occur remotely via exchange of documents and signatures on March 23, 2021 (the “**Closing Date**”).

3.2 On the Closing Date, each Investor shall deliver or cause to be delivered to the Company, via wire transfer of immediately available funds pursuant to the wire instructions delivered to such Investor by the Company on or prior to the Closing Date, an amount equal to the purchase price to be paid by the Investor for the Closing Securities to be acquired by it as set forth opposite the name of such Investor under the heading “Aggregate Purchase Price of Securities” on **Exhibit A** attached hereto.

3.3 At the Closing, the Company shall deliver or cause to be delivered to each Investor (A) a number of Shares, registered in the name of the Investor (or its nominee in accordance with its delivery instructions), equal to the number of Shares set forth opposite the name of such Investor under the heading “Number of Shares” on **Exhibit A** attached hereto and (B) a Pre-Funded Warrant, registered in the name of the Investor (or its nominee in accordance with its delivery instructions), to purchase up to the number of Warrant Shares set forth opposite the name of such Investor under the heading “Number of Warrant Shares Underlying Pre-Funded Warrant” on **Exhibit A** attached hereto, if any. The Shares shall be delivered via a book-entry record through the Transfer Agent. Unless the Company and an Investor otherwise mutually agree with respect to such Investor’s Shares, at Closing settlement shall occur on a “delivery versus payment” basis.

4. Representations and Warranties of the Company. The Company hereby represents and warrants to the Investors that, except (a) as described in the Company's SEC Filings and (b) as set forth on the disclosure schedule delivered herewith (which is arranged in numbered and lettered sections corresponding to the numbered and lettered sections contained in this Section 4) (the "**Disclosure Schedule**"), each of which qualify these representations and warranties in their entirety.

4.1 Organization, Good Standing and Qualification. The Company is a corporation duly organized, validly existing and in good standing under the laws of the jurisdiction of its incorporation and has all requisite corporate power and authority to carry on its business as now conducted and to own or lease its properties. The Company is duly qualified to do business as a foreign corporation and is in good standing in each jurisdiction in which the conduct of its business or its ownership or leasing of property makes such qualification or leasing necessary unless the failure to so qualify has not had and would not reasonably be expected to have a Material Adverse Effect. X4 Pharmaceuticals Securities Corporation, a Massachusetts corporation; X4 Pharmaceuticals, Inc., a Delaware corporation; X4 Pharmaceuticals (Austria) GmbH, a company incorporated under the laws of Austria; and X4 Therapeutics Inc., a Delaware corporation, are the only subsidiaries of the Company and are wholly-owned by the Company. Each subsidiary of the Company has been duly incorporated or organized and is validly existing and in good standing (or such equivalent concepts to the extent they exist under the law of such jurisdiction) under the laws of the jurisdiction of its incorporation or organization, and have all requisite power and authority to carry on their business as now conducted and to own or lease their properties. The Company's subsidiaries are duly qualified to do business and are in good standing (or such equivalent concept to the extent it exists under the law of such jurisdiction) in each jurisdiction in which the conduct of their business or their ownership or leasing of property makes such qualification necessary unless the failure to so qualify has not had and would not reasonably be expected to have a Material Adverse Effect.

4.2 Authorization. The Company has the requisite corporate power and authority and has taken all requisite corporate action necessary for, and no further action on the part of the Company, its officers, directors and stockholders is necessary for, (i) the authorization, execution and delivery of the Transaction Documents, (ii) the authorization of the performance of all obligations of the Company hereunder or thereunder, and (iii) the authorization, issuance (or reservation for issuance) and delivery of the Securities. The Transaction Documents constitute the legal, valid and binding obligations of the Company, enforceable against the Company in accordance with their terms, subject to bankruptcy, insolvency, fraudulent transfer, reorganization, moratorium and similar laws of general applicability, relating to or affecting creditors' rights generally and to general equitable principles.

4.3 Capitalization. The Company is authorized under its Certificate of Incorporation to issue 125,000,000 shares of Common Stock. The Company's disclosure of its issued and outstanding capital stock in its most recent SEC Filing containing such disclosure was accurate in all material respects as of the date indicated in such SEC Filing. Since the date indicated in such SEC Filing, there has not been any change the Company's capital stock, other than as a result of the exercise of stock options or the award of stock options or restricted stock units in the ordinary course of business pursuant to the Company's stock-based compensation plans described in the SEC Filings. All of the issued and outstanding shares of the Company's capital stock have been duly authorized and validly issued and are fully paid and nonassessable; none of such shares were issued in violation of any preemptive rights; and such shares were issued in compliance in all material respects with applicable state and federal securities law and any rights of third parties. No Person is entitled to preemptive or similar statutory or contractual rights with respect to the issuance by the Company of any securities of the Company, including, without limitation, the Securities. Except for stock options and restricted stock units approved pursuant to Company stock-based compensation plans described in the SEC Filings, warrants and prefunded warrants described in the SEC Filings, and other agreements described in the SEC Filings, there are no outstanding warrants, options, convertible securities or other rights, agreements or arrangements of any character under which the Company is or may be obligated to issue any equity securities of any kind, except as contemplated by this Agreement. Except for the Registration Rights Agreement and the Prior Registration Rights Agreement, there are no voting agreements, buy-sell agreements, option or right of first purchase agreements or other agreements of any kind among the Company and any of the securityholders of the Company relating to the securities of the Company held by them. Except as provided in the Registration Rights

Agreement, and except as provided in the Prior Registration Rights Agreement, no Person has the right to require the Company to register any securities of the Company under the 1933 Act, whether on a demand basis or in connection with the registration of securities of the Company for its own account or for the account of any other Person.

The issuance and sale of the Securities hereunder will not obligate the Company to issue shares of Common Stock or other securities to any other Person (other than the Investors) and, except as described in the SEC Filings, will not result in the adjustment of the exercise, conversion, exchange or reset price of any outstanding security.

The Company does not have outstanding stockholder purchase rights or “poison pill” or any similar arrangement in effect giving any Person the right to purchase any equity interest in the Company upon the occurrence of certain events.

4.4 Valid Issuance. The Shares have been duly and validly authorized and, when issued and paid for pursuant to this Agreement, will be validly issued, fully paid and nonassessable, and shall be free and clear of all encumbrances and restrictions (other than those created by the Investors), except for restrictions on transfer set forth in the Transaction Documents or imposed by applicable securities laws. The Warrant Shares have been duly and validly authorized and reserved for issuance and, upon exercise of the Pre-Funded Warrants in accordance with their terms, including the payment of any exercise price therefor, will be validly issued, fully paid and nonassessable and will be free and clear of all encumbrances and restrictions (other than those created by the Investors), except for restrictions on transfer set forth in the Transaction Documents or imposed by applicable securities laws. Assuming the accuracy of the representations and warranties of each Investor in Section 5 hereof, the Warrant Shares will be issued in compliance with all applicable federal and state securities laws.

4.5 Consents. Subject to the accuracy of the representations and warranties of each Investor set forth in Section 5 hereof, the execution, delivery and performance by the Company of the Transaction Documents and the offer, issuance and sale of the Securities require no consent of, action by or in respect of, or filing with, any Person, governmental body, agency, or official other than (a) filings that have been made pursuant to applicable state securities laws, (b) post-sale filings pursuant to applicable state and federal securities laws, (c) filings pursuant to the rules and regulations of Nasdaq and (d) filing of the registration statement required to be filed by the Registration Rights Agreement, each of which the Company has filed or undertakes to file within the applicable time. Subject to the accuracy of the representations and warranties of each Investor set forth in Section 5 hereof, the Company has taken all action necessary to exempt (i) the issuance and sale of the Securities and (ii) the other transactions contemplated by the Transaction Documents from the provisions of any stockholder rights plan or other “poison pill” arrangement, any anti-takeover, business combination or control share law or statute binding on the Company or to which the Company or any of its assets and properties is subject that is or could reasonably be expected to become applicable to the Investors as a result of the transactions contemplated hereby, including without limitation, the issuance of the Securities and the ownership, disposition or voting of the Shares or the Warrant Shares by the Investors or the exercise of any right granted to the Investors pursuant to this Agreement or the other Transaction Documents.

4.6 Use of Proceeds. The net proceeds of the sale of the Securities hereunder shall be used by the Company for advancement of the Company’s clinical development pipeline, business development activities, working capital and general corporate purposes.

4.7 No Material Adverse Change. Since September 30, 2020, except as identified and described in the SEC Filings filed at least one Trading Day prior to the date hereof, there has not been:

(i) any change in the consolidated assets, liabilities, financial condition or operating results of the Company from that reflected in the financial statements included in the Company’s Quarterly Report on Form 10-Q for the quarter ended September 30, 2020, except for changes in the ordinary course of business which have not had and would not reasonably be expected to have a Material Adverse Effect, individually or in the aggregate;

(ii) any declaration or payment by the Company of any dividend, or any authorization or payment by the Company of any distribution, on any of the capital stock of the Company, or any redemption or repurchase by the Company of any securities of the Company;

- (iii) any material damage, destruction or loss, whether or not covered by insurance, to any assets or properties of the Company;
- (iv) any waiver, not in the ordinary course of business, by the Company of a material right or of a material debt owed to it;
- (v) any satisfaction or discharge of any lien, claim or encumbrance or payment of any obligation by the Company, except in the ordinary course of business and which is not material to the assets, properties, financial condition, operating results or business of the Company (as such business is presently conducted);
- (vi) any change or amendment to the Company's Certificate of Incorporation or Bylaws, or material change to any material contract or arrangement by which the Company is bound or to which any of its assets or properties is subject;
- (vii) any material labor difficulties or, to the Company's Knowledge, labor union organizing activities with respect to employees of the Company;
- (viii) any material transaction entered into by the Company other than in the ordinary course of business;
- (ix) the loss of the services of any key employee, or material change in the composition or duties of the senior management of the Company; or
- (x) any other event or condition of any character that has had or would reasonably be expected to have a Material Adverse Effect.

4.8 SEC Filings. The Company has timely filed all reports, schedules, forms, statements and other documents required to be filed by the Company under the 1933 Act and the 1934 Act, including pursuant to Section 13(a) or 15(d) thereof, for the one year period preceding the date hereof (collectively, the "**SEC Filings**"). At the time of filing thereof, the SEC Filings complied in all material respects with the requirements of the 1933 Act or the 1934 Act, as applicable, and the rules and regulations of the SEC thereunder.

4.9 No Conflict, Breach, Violation or Default. The execution, delivery and performance of the Transaction Documents by the Company and the issuance and sale of the Securities in accordance with the provisions thereof will not, except (solely in the case of clause (i)(b) and clause (ii)) for such violations, conflicts or defaults as would not reasonably be expected, individually or in the aggregate, to have a Material Adverse Effect, (i) conflict with or result in a breach or violation of (a) any of the terms and provisions of, or constitute a default under, the Company's Certificate of Incorporation or the Company's Bylaws, both as in effect on the date hereof (true and complete copies of which have been made available to the Investors through the Electronic Data Gathering, Analysis, and Retrieval system (the "**EDGAR system**")), or (b) assuming the accuracy of the representations and warranties in Section 5, any applicable statute, rule, regulation or order of any governmental agency or body or any court, domestic or foreign, having jurisdiction over the Company or its subsidiaries, or any of their assets or properties, or (ii) conflict with, or constitute a default (or an event that with notice or lapse of time or both would become a default) under, result in the creation of any lien, encumbrance or other adverse claim upon any of the properties or assets of the Company or its subsidiaries or, except as disclosed in the SEC Filings, give to others any rights of termination, amendment, acceleration or cancellation (with or without notice, lapse of time or both) of, any Material Contract. This Section 4.9 does not relate to matters with respect to tax status, which are the subject of Section 4.10, employee relations and labor matters, which are the subject of Section 4.13, or environmental laws, which are the subject of Section 4.15.

4.10 Tax Matters. The Company and its subsidiaries have timely prepared and filed all material tax returns required to have been filed by them with all appropriate governmental agencies and timely paid all material taxes shown thereon or otherwise owed by them. There are no material unpaid assessments against the Company nor, to the Company's Knowledge, any audits by any federal, state or local taxing authority. All material taxes that the Company is required to withhold or to collect for payment have been duly withheld and collected and paid to the proper governmental entity or third party when due. There are no tax liens pending or, to the Company's

Knowledge, threatened against the Company or any of its assets or property. With the exception of agreements or other arrangements that are not primarily related to taxes entered into in the ordinary course of business, there are no outstanding tax sharing agreements or other such arrangements between the Company and any other corporation or entity (other than a subsidiary of the Company).

4.11 Title to Properties. The Company and its subsidiaries have good and marketable title to all real properties and all other material properties and assets owned by them, in each case free from liens, encumbrances and defects, except such as would not reasonably be expected, individually or in the aggregate, to have a Material Adverse Effect; and the Company and its subsidiaries hold any leased real or personal property under valid and enforceable leases with no exceptions, except such as would not reasonably be expected, individually or in the aggregate, to have a Material Adverse Effect.

4.12 Certificates, Authorities and Permits. The Company possesses adequate certificates, authorities or permits issued by appropriate governmental agencies or bodies necessary to conduct the business now operated by it, except where failure to so possess would not reasonably be expected, individually or in the aggregate, to result in a Material Adverse Effect. The Company has not received any written notice of proceedings relating to the revocation or modification of any such certificate, authority or permit that would reasonably be expected to have a Material Adverse Effect, individually or in the aggregate, on the Company.

4.14 Labor Matters.

(a) The Company is not party to or bound by any collective bargaining agreements or other agreements with labor organizations. To the Company's Knowledge, the Company has not violated in any material respect any laws, regulations, orders or contract terms affecting the collective bargaining rights of employees or labor organizations, or any laws, regulations or orders affecting employment discrimination, equal opportunity employment, or employees' health, safety, welfare, wages and hours.

(b) No material labor dispute with the employees of the Company, or with the employees of any principal supplier, manufacturer, customer or contractor of the Company, exists or, to the Company's Knowledge, is threatened or imminent.

4.14 Intellectual Property. The Company owns, possesses, licenses or has other rights to use, all patents, patent applications, trade and service marks, trade and service mark registrations, trade names, copyrights, licenses, inventions, trade secrets, technology, know-how and other intellectual property that are described in the SEC Filings (collectively, the "**Intellectual Property**"); and to the Company's Knowledge, no additional third party intellectual property rights are necessary for the conduct of the Company's business in all material respects as now conducted or as proposed in the SEC Filings to be conducted; and (a) except as described in the SEC filings, there are no rights of third parties to any such Intellectual Property, including no liens, security interests or other encumbrances; (b) to the Company's Knowledge, there is no material infringement by third parties of any such Intellectual Property; (c) there is no pending or, to the Company's Knowledge, threatened action, suit, proceeding or claim by others challenging the Company's or its subsidiaries' rights in or to any such Intellectual Property, and the Company is unaware of any facts, which could form a reasonable basis for any such action, suit, proceeding or claim; (d) such Intellectual Property that is described in the SEC Filings has not been adjudged by a court of competent jurisdiction invalid or unenforceable, in whole or in part; (e) there is no pending or, to the Company's Knowledge, threatened action, suit, proceeding or claim by others challenging the validity or scope of any such Intellectual Property that is owned or licensed by the Company, including interferences, oppositions, reexaminations or government proceedings; (f) there is no pending or, to the Company's Knowledge, threatened action, suit, proceeding or claim by others that the Company and its subsidiaries infringe, misappropriate, or otherwise violate any patent, trademark, copyright, trade secret or other proprietary rights of others; (g) to the Company's Knowledge, there is no third-party U.S. patent or published U.S. patent application which contains claims for which an Interference Proceeding (as defined in 35 U.S.C. § 135) has been commenced against any patent or patent application described in the SEC Filings as being owned by or licensed to the Company; (h) to the Company's Knowledge, the Company and its subsidiaries have complied with the terms of each agreement pursuant to which Intellectual Property has been licensed to the Company or such subsidiary, and all such agreements are in full force and effect; and (i) each key employee of the Company and each Company employee involved with the development of Intellectual Property has entered into an invention assignment agreement with the Company.

4.15 Environmental Matters. The Company is not in violation of any statute, rule, regulation, decision or order of any governmental agency or body or any court, domestic or foreign, relating to the use, disposal or release of hazardous or toxic substances or relating to the protection or restoration of the environment or human exposure to hazardous or toxic substances (collectively, “**Environmental Laws**”), has not released any hazardous substances regulated by Environmental Law onto any real property that it owns or operates, and has not received any written notice or claim it is liable for any off-site disposal or contamination pursuant to any Environmental Laws, which violation, release, notice, claim, or liability would reasonably be expected, individually or in the aggregate, to have a Material Adverse Effect, and to the Company’s Knowledge, there is no pending or threatened investigation that would reasonably be expected to lead to such a claim.

4.16 Legal Proceedings. There are no legal, governmental or regulatory investigations, actions, suits or proceedings pending, or to the Company’s Knowledge, threatened to which the Company or its subsidiaries are a party or to which any property of the Company or its subsidiaries are the subject that, individually or in the aggregate, would reasonably be expected to have a Material Adverse Effect.

4.17 Financial Statements. The financial statements included in each SEC Filing comply in all material respects with applicable accounting requirements and the rules and regulations of the SEC with respect thereto as in effect at the time of filing (or to the extent corrected by a subsequent restatement) and present fairly, in all material respects, the consolidated financial position of the Company as of the dates shown and its consolidated results of operations and cash flows for the periods shown, subject in the case of unaudited financial statements to normal, immaterial year-end audit adjustments, and such consolidated financial statements have been prepared in conformity with United States generally accepted accounting principles applied on a consistent basis during the periods involved (“**GAAP**”) (except as may be disclosed therein or in the notes thereto, and except that the unaudited financial statements may not contain all footnotes required by GAAP, and, in the case of quarterly financial statements, except as permitted by Form 10-Q under the 1934 Act). Except as set forth in the financial statements of the Company included in the SEC Filings or as otherwise disclosed in the SEC Filings filed prior to the date hereof, the Company has not incurred any liabilities, contingent or otherwise, except those incurred in the ordinary course of business, consistent (as to amount and nature) with past practices since the date of such financial statements, none of which, individually or in the aggregate, have had or would reasonably be expected to have a Material Adverse Effect.

4.18 Insurance Coverage. The Company maintains in full force and effect insurance coverage that is customary for comparably situated companies for the business being conducted and properties owned or leased by the Company, and the Company reasonably believes such insurance coverage to be adequate against all liabilities, claims and risks against which it is customary for comparably situated companies to insure.

4.19 Compliance with Nasdaq Continued Listing Requirements. The Company is in compliance with applicable Nasdaq continued listing requirements. There are no proceedings pending or, to the Company’s Knowledge, threatened against the Company relating to the continued listing of the Common Stock on Nasdaq and the Company has not received any notice of, nor to the Company’s Knowledge is there any reasonable basis for, the delisting of the Common Stock from Nasdaq.

4.20 Brokers and Finders. Except for commissions and fees payable by the Company to the Placement Agents pursuant to an engagement letter among the Company and Placement Agents, no Person will have, as a result of the transactions contemplated by the Transaction Documents, any valid right, interest or claim against or upon the Company or an Investor for any commission, fee or other compensation pursuant to any agreement, arrangement or understanding entered into by or on behalf of the Company. No Investor shall have any obligation with respect to any fees, or with respect to any claims made by or on behalf of other Persons for fees, in each case of the type contemplated by this Section 4.20 that may be due in connection with the transactions contemplated by this Agreement or the Transaction Documents.

4.21 No Directed Selling Efforts or General Solicitation. Neither the Company nor any Person acting on its behalf has conducted any general solicitation or general advertising in connection with the offer or sale of any of the Securities.

4.22 No Integrated Offering. Neither the Company nor its subsidiaries nor any Person acting on their behalf has, directly or indirectly, made any offers or sales of any Company security or solicited any offers to buy any Company security, under circumstances that would adversely affect reliance by the Company on Section 4(a)(2) for the exemption from registration for the transactions contemplated hereby or would require registration of the Securities under the 1933 Act.

4.23 Private Placement. Assuming the accuracy of the representations and warranties of the Investors set forth in Section 5, the offer and sale of the Closing Securities to the Investors and the exercise of the Pre-Funded Warrants as contemplated hereby are exempt from the registration requirements of the 1933 Act pursuant to Section (4)(a)(2). The issuance and sale of the Closing Securities and the exercise of the Pre-Funded Warrants do not contravene the rules and regulations of Nasdaq.

4.24 Questionable Payments. Neither the Company nor its subsidiaries nor, to the Company's Knowledge, any of their current or former directors, officers, employees, agents or other Persons acting on behalf of the Company or its subsidiaries, has on behalf of the Company or its subsidiaries in connection with their business: (a) used any corporate funds for unlawful contributions, gifts, entertainment or other unlawful expenses relating to political activity; (b) made any direct or indirect unlawful payments to any governmental officials or employees from corporate funds; (c) established or maintained any unlawful or unrecorded fund of corporate monies or other assets which is in violation of law; (d) made any false or fictitious entries on the books and records of the Company; or (e) made any unlawful bribe, rebate, payoff, influence payment, kickback or other unlawful payment of any nature.

4.25 Transactions with Affiliates. None of the executive officers or directors of the Company and, to the Company's Knowledge, none of the employees of the Company is presently a party to any transaction with the Company (other than as holders of stock options, restricted stock units, warrants and/or restricted stock, and for services as employees, officers and directors), including any contract, agreement or other arrangement providing for the furnishing of services to or by, providing for rental of real or personal property to or from, or otherwise requiring payments to or from any officer, director or such employee or, to the Company's Knowledge, any entity in which any officer, director, or any such employee has a substantial interest or is an officer, director, trustee or partner.

4.26 Internal Controls. The Company has established and maintains disclosure controls and procedures (as defined in Rules 13a-15 and 15d-15 under the 1934 Act), which (a) are designed to ensure that material information relating to the Company, including its subsidiaries, is made known to the Company's principal executive officer and its principal financial officer by others within those entities; (b) have been evaluated by management of the Company for effectiveness as of the end of the Company's most recent fiscal quarter; and (c) are effective in all material respects to perform the functions for which they were established. Since the end of the Company's most recent audited fiscal year, there have been no material weaknesses in the Company's internal control over financial reporting (whether or not remediated) and no change in the Company's internal control over financial reporting that has materially affected, or would reasonably be expected to materially affect, the Company's internal control over financial reporting. The Company is not aware of any change in its internal controls over financial reporting that has occurred during its most recent fiscal quarter that has materially affected, or would reasonably be expected to materially affect, the Company's internal control over financial reporting.

4.27 Disclosures. The Company has provided certain of the Investors or their agents or counsel with information that constitutes or would reasonably be expected to constitute material nonpublic information concerning the Company or its subsidiaries. Such Investors have executed confidentiality agreements with the Company and have agreed not to trade in the Company's securities until such time as the material nonpublic information is publicly disclosed by the Company. Other than the information described in the first sentence of this Section 4.27, the SEC Filings do not contain any untrue statement of a material fact or omit to state a material fact necessary in order to make the statements contained therein, in light of the circumstances under which they were made, not misleading. The Company understands and confirms that the Investors, whether they are a party to the confidentiality agreements with the Company or not, will rely on the foregoing representations in effecting transactions in securities of the Company.

4.28 Required Filings. Except for the transactions contemplated by this Agreement, including the acquisition of the Securities contemplated hereby, and the information described in the first sentence of Section 4.27, no event or circumstance has occurred or information exists with respect to the Company or its business, properties, operations or financial condition, which, under applicable law, rule or regulation, requires public disclosure or announcement by the Company but which has not been so publicly announced or disclosed (assuming for this purpose that the SEC Filings are being incorporated by reference into an effective registration statement filed by the Company under the 1933 Act).

4.29 Investment Company. The Company is not required to be registered as, and immediately following the Closing will not be required to register as, an “investment company” within the meaning of the Investment Company Act of 1940, as amended.

4.30 Tests and Preclinical and Clinical Trials. (i) The preclinical studies and clinical trials conducted by or on behalf of or sponsored by the Company or its subsidiaries, or in which the Company or its subsidiaries have participated, that are described in the SEC Filings, or the results of which are referred to in the SEC Filings, as applicable, were, and if still pending are, being conducted in all material respects in accordance with standard medical and scientific research standards and procedures for products or product candidates comparable to those being developed by the Company and all applicable statutes and all applicable rules and regulations of the U.S. Food and Drug Administration and comparable regulatory agencies outside of the United States to which they are subject, including the European Medicines Agency (collectively, the “**Regulatory Authorities**”) and Good Clinical Practice and Good Laboratory Practice requirements; (ii) the descriptions in the SEC Filings of the results of such studies and trials are accurate and complete descriptions in all material respects and fairly present the data derived therefrom; (iii) to the Company’s Knowledge, there are no other studies or trials not described in the SEC Filings, the results of which the Company believes are inconsistent with or reasonably call into question the results described or referred to in the SEC Filings; (iv) the Company and its subsidiaries have operated at all times and are currently in compliance with all applicable statutes, rules and regulations of the Regulatory Authorities, except where such non-compliance would not, individually or in the aggregate, have a Material Adverse Effect; and (v) neither the Company nor any of its subsidiaries have received any written notices, correspondence or other communications from the Regulatory Authorities or any other governmental agency requiring or threatening the termination, material modification or suspension of any preclinical studies or clinical trials that are described in the SEC Filings or the results of which are referred to in the SEC Filings, other than ordinary course communications with respect to modifications in connection with the design and implementation of such studies or trials.

4.31 Manipulation of Price. The Company has not taken, and, to the Company’s Knowledge, no Person acting on its behalf has taken, directly or indirectly, any action designed to cause or to result in the stabilization or manipulation of the price of any security of the Company to facilitate the sale or resale of any of the Securities.

4.32 Anti-Bribery and Anti-Money Laundering Laws. Each of the Company, its subsidiaries and any of their respective officers, directors, supervisors, managers, agents, or employees, are and have at all times been in compliance with and its participation in the offering will not violate: (A) anti-bribery laws, including but not limited to, any applicable law, rule, or regulation of any locality, including but not limited to any law, rule, or regulation promulgated to implement the OECD Convention on Combating Bribery of Foreign Public Officials in International Business Transactions, signed December 17, 1997, including the U.S. Foreign Corrupt Practices Act of 1977, as amended, the U.K. Bribery Act 2010, or any other law, rule or regulation of similar purposes and scope or (B) anti-money laundering laws, including, but not limited to, applicable federal, state, international, foreign or other laws, regulations or government guidance regarding anti-money laundering, including, without limitation, Title 18 US. Code sections 1956 and 1957, the Patriot Act, the Bank Secrecy Act, and international anti-money laundering principles or procedures by an intergovernmental group or organization, such as the Financial Action Task Force on Money Laundering, of which the United States is a member and with which designation the United States representative to the group or organization continues to concur, all as amended, and any Executive order, directive, or regulation pursuant to the authority of any of the foregoing, or any orders or licenses issued thereunder.

4.33 **No Additional Agreements.** The Company has no other agreements or understandings (including, without limitation, side letters) with any Investor to purchase Securities on terms more favorable to such Investor than as set forth herein.

4.34 **Shell Company Status.** The Company is not, and has never been, an issuer identified in Rule 144(i)(1).

4.35 **Compliance.** The Company is not (i) in default under or in violation of (and no event has occurred that has not been waived that, with notice or lapse of time or both, would result in a default by the Company under), nor has the Company received notice of a claim that it is in default under or that it is in violation of, any indenture, loan or credit agreement or any other agreement or instrument to which it is a party or by which it or any of its properties is bound (whether or not such default or violation has been waived) or (ii) in violation of any judgment, decree or order of any court, arbitrator or governmental body, except in each case as could not have or reasonably be expected to result in a Material Adverse Effect.

5. **Representations and Warranties of the Investors.** Each of the Investors hereby severally, and not jointly, represents and warrants to the Company that:

5.1 **Organization and Existence.** Such Investor is a duly incorporated or organized and validly existing corporation, limited partnership, limited liability company or other legal entity, has all requisite corporate, partnership or limited liability company power and authority to enter into and consummate the transactions contemplated by the Transaction Documents and to carry out its obligations hereunder and thereunder, and to invest in the Securities pursuant to this Agreement, and is in good standing under the laws of the jurisdiction of its incorporation or organization.

5.2 **Authorization.** The execution, delivery and performance by such Investor of the Transaction Documents to which such Investor is a party have been duly authorized and each has been duly executed and when delivered will constitute the valid and legally binding obligation of such Investor, enforceable against such Investor in accordance with their respective terms, subject to bankruptcy, insolvency, fraudulent transfer, reorganization, moratorium and similar laws of general applicability, relating to or affecting creditors' rights generally, and general principles of equity.

5.3 **Purchase Entirely for Own Account.** The Securities to be received by such Investor hereunder will be acquired for such Investor's own account, not as nominee or agent, for the purpose of investment and not with a view to the resale or distribution of any part thereof in violation of the 1933 Act, and such Investor has no present intention of selling, granting any participation in, or otherwise distributing the same in violation of the 1933 Act without prejudice, however, to such Investor's right at all times to sell or otherwise dispose of all or any part of such Securities in compliance with applicable federal and state securities laws. The Securities are being purchased by such Investor in the ordinary course of its business. Nothing contained herein shall be deemed a representation or warranty by such Investor to hold the Securities for any period of time. Such Investor is not a broker-dealer registered with the SEC under the 1934 Act or an entity engaged in a business that would require it to be so registered.

5.4 **Investment Experience.** Such Investor acknowledges that it can bear the economic risk and complete loss of its investment in the Securities and has such knowledge and experience in financial or business matters that it is capable of evaluating the merits and risks of the investment contemplated hereby.

5.5 **Disclosure of Information.** Such Investor has had an opportunity to receive, review and understand all information related to the Company requested by it and to ask questions of and receive answers from the Company regarding the Company, its business and the terms and conditions of the offering of the Securities, and has conducted and completed its own independent due diligence. Such Investor acknowledges that copies of the SEC Filings are available on the EDGAR system. Based on the information such Investor has deemed appropriate, it has independently made its own analysis and decision to enter into the Transaction Documents. Such Investor is relying exclusively on its own investment analysis and due diligence (including professional advice it deems appropriate) with respect to the execution, delivery and performance of the Transaction Documents, the Securities and the business, condition (financial and otherwise), management, operations, properties and prospects of the Company,

including but not limited to all business, legal, regulatory, accounting, credit and tax matters. Neither such inquiries nor any other due diligence investigation conducted by such Investor shall modify, limit or otherwise affect such Investor's right to rely on the Company's representations and warranties contained in this Agreement. Each Investor acknowledges that none of the Placement Agents has acted as such Investor's financial advisor or fiduciary and such Investor is not relying on any of the Placement Agents for any accounting, legal or tax advice in connection with making an investment decision in the Securities.

5.6 Restricted Securities. Such Investor understands that the Securities are characterized as "restricted securities" under the U.S. federal securities laws inasmuch as they are being acquired from the Company in a transaction not involving a public offering and that under such laws and applicable regulations such securities may be resold without registration under the 1933 Act only in certain limited circumstances.

5.7 Legends. It is understood that, except as provided below, certificates or book-entry positions evidencing the Securities may bear the following or any similar legend:

(a) "These securities represented hereby [and the securities issuable upon exercise of these securities] have not been registered with the Securities and Exchange Commission or the securities commission of any state but have been [or will be] issued in reliance upon an exemption from registration under the Securities Act of 1933, as amended, and, accordingly, may not be transferred unless (i) such securities have been registered for sale pursuant to the Securities Act of 1933, as amended, (ii) such securities may be sold pursuant to Rule 144, (iii) the Company has received an opinion of counsel reasonably satisfactory to it that such transfer may lawfully be made without registration under the Securities Act of 1933, as amended, or (iv) the securities are transferred without consideration to an affiliate of such holder or a custodial nominee (which for the avoidance of doubt shall require neither consent nor the delivery of an opinion)."

(b) If required by the authorities of any state in connection with the issuance of sale of the Securities, the legend required by such state authority.

5.8 Accredited Investor. Such Investor is an "accredited investor" within the meaning of Rule 501(a) of the 1933 Act. Such Investor has executed and delivered to the Company a questionnaire in substantially the form attached hereto as **Exhibit E** (the "**Investor Questionnaire**"), which such Investor represents and warrants is true, correct and complete. Such investor is a sophisticated institutional investor with sufficient knowledge and experience in investing in private equity transactions to properly evaluate the risks and merits of its purchase of the Securities. Such Investor has determined based on its own independent review and such professional advice as it deems appropriate that its purchase of the Securities and participation in the transactions contemplated by the Transaction Documents (i) are fully consistent with its financial needs, objectives and condition, (ii) comply and are fully consistent with all investment policies, guidelines and other restrictions applicable to such Investor, (iii) have been duly authorized and approved by all necessary action, (iv) do not and will not violate or constitute a default under such Investor's charter, bylaws or other constituent document or under any law, rule, regulation, agreement or other obligation by which such Investor is bound and (v) are a fit, proper and suitable investment for such Investor, notwithstanding the substantial risks inherent in investing in or holding the Securities. Furthermore, each such Investor is an "Institutional Account" as defined in FINRA Rule 4512(c).

5.9 No General Solicitation. Such Investor did not learn of the investment in the Securities as a result of any general or public solicitation or general advertising, or publicly disseminated advertisements or sales literature, including (a) any advertisement, article, notice or other communication published in any newspaper, magazine, website, or similar media, or broadcast over television or radio, or (b) any seminar or meeting to which such Investor was invited by any of the foregoing means of communications.

5.10 Brokers and Finders. No Person will have, as a result of the transactions contemplated by the Transaction Documents, any valid right, interest or claim against or upon the Company or an Investor for any commission, fee or other compensation pursuant to any agreement, arrangement or understanding entered into by or on behalf of such Investor.

5.11 Short Sales and Confidentiality Prior to the Date Hereof. Other than consummating the transactions contemplated hereunder, such Investor has not, nor has any Person acting on behalf of or pursuant to any

understanding with such Investor, directly or indirectly executed any purchases or sales, including Short Sales, of the securities of the Company during the period commencing as of the time that such Investor was first contacted by the Company or any other Person regarding the transactions contemplated hereby and ending immediately prior to the date hereof. Notwithstanding the foregoing, in the case of an Investor that is a multi-managed investment vehicle whereby separate portfolio managers manage separate portions of such Investor's assets and the portfolio managers have no direct knowledge of the investment decisions made by the portfolio managers managing other portions of such Investor's assets, the representation set forth above shall only apply with respect to the portion of assets managed by the portfolio manager that made the investment decision to purchase the Securities covered by this Agreement. Other than to other Persons party to this Agreement and other than to such Person's outside attorney, accountant, auditor or investment advisor only to the extent necessary to permit evaluation of the investment, and the performance of the necessary or required tax, accounting, financial, legal, or administrative tasks and services and other than as may be required by law, such Investor has maintained the confidentiality of all disclosures made to it in connection with this transaction (including the existence and terms of this transaction). Notwithstanding the foregoing, for avoidance of doubt, nothing contained herein shall constitute a representation or warranty, or preclude any actions, with respect to the identification of the availability of, or securing of, available shares to borrow in order to effect Short Sales or similar transactions in the future.

5.12 No Government Recommendation or Approval. Such Investor understands that no United States federal or state agency, or similar agency of any other country, has reviewed, approved, passed upon, or made any recommendation or endorsement of the Company or the purchase of the Securities.

5.13 No Intent to Effect a Change of Control. Such Investor has no present intent to effect a "change of control" of the Company as such term is understood under the rules promulgated pursuant to Section 13(d) of the 1934 Act.

5.14 Residency. Such Investor's office in which its investment decision with respect to the Securities was made is located at the address immediately below such Investor's name on its signature page hereto.

5.15 No Conflicts. The execution, delivery and performance by such Investor of the Transaction Documents and the consummation by such Investor of the transactions contemplated hereby and thereby will not (i) result in a violation of the organizational documents of such Investor or (ii) conflict with, or constitute a default (or an event which with notice or lapse of time or both would become a default) under, or give to others any rights of termination, amendment, acceleration or cancellation of, any agreement, indenture or instrument to which such Investor is a party, or (iii) result in a violation of any law, rule, regulation, order, judgment or decree (including federal and state securities laws) applicable to such Investor, except in the case of clauses (ii) and (iii) above, for such conflicts, defaults, rights or violations which would not, individually or in the aggregate, reasonably be expected to have a material adverse effect on the ability of such Investor to perform its obligations hereunder.

5.16. Reliance on Representations and Warranties. Each Investor acknowledges and agrees that the Placement Agents are entitled to rely on the accuracy of these representations.

6. Conditions to Closing.

6.1 Conditions to the Investors' Obligations. The obligation of each Investor to purchase Closing Securities at the Closing is subject to the fulfillment to such Investor's satisfaction, on or prior to the Closing Date, of the following conditions, any of which may be waived by such Investor (as to itself only):

(a) The representations and warranties made by the Company in Section 4 hereof, as qualified by the Disclosure Schedule and the SEC Filings, shall be true and correct in all material respects, except for those representation and warranties qualified by materiality or Material Adverse Effect, which shall be true and correct in all respects, as of the date hereof and as of the Closing Date, as though made on and as of such date, except to the extent any such representation or warranty expressly speaks as of an earlier date, in which case such representation or warranty shall be true and correct in all material respects as of such earlier date. The Company shall have performed in all material respects all obligations and covenants herein required to be performed by it on or prior to the Closing Date.

(b) The Company shall have obtained any and all consents, permits, approvals, registrations and waivers necessary for the consummation of the purchase and sale of the Closing Securities and the consummation of the other transactions contemplated by the Transaction Documents, all of which shall be in full force and effect.

(c) The Company shall have executed and delivered the Registration Rights Agreement.

(d) The Company shall have filed with Nasdaq a Notification Form: Listing of Additional Shares for the listing of the Shares and the Warrant Shares, and Nasdaq shall have raised no objection to the consummation of the transactions contemplated by the Transaction Documents.

(e) No judgment, writ, order, injunction, award or decree of or by any court, or judge, justice or magistrate, including any bankruptcy court or judge, or any order of or by any governmental authority, shall have been issued, and no action or proceeding shall have been instituted by any governmental authority, enjoining or preventing the consummation of the transactions contemplated hereby or in the other Transaction Documents.

(f) The Company shall have delivered a Certificate, executed on behalf of the Company by its Chief Executive Officer or its Chief Financial Officer, dated as of the Closing Date, certifying to the fulfillment of the conditions specified in subsections (a), (b), (d), (e) and (j) of this Section 6.1.

(g) The Company shall have delivered a Certificate, executed on behalf of the Company by its Secretary, dated as of the Closing Date, certifying the resolutions adopted by the Board of Directors of the Company approving the transactions contemplated by this Agreement, the other Transaction Documents, the issuance of the Securities, certifying the current versions of the Certificate of Incorporation and Bylaws of the Company and certifying as to the signatures and authority of persons signing the Transaction Documents and related documents on behalf of the Company.

(h) The Investors shall have received an opinion from Cooley LLP, the Company's counsel, dated as of the Closing Date, in form and substance reasonably acceptable to the Investors, on which opinion the Placement Agents may rely or, if the Placement Agents so request, of which opinion the Placement Agents may be specifically named as addressees.

(i) There shall have been no Material Adverse Effect with respect to the Company since the date hereof.

(j) No stop order or suspension of trading shall have been imposed by Nasdaq, the SEC or any other governmental or regulatory body with respect to public trading in the Common Stock.

6.2 Conditions to Obligations of the Company. The Company's obligation to sell and issue Closing Securities at the Closing is subject to the fulfillment to the satisfaction of the Company on or prior to the Closing Date of the following conditions, any of which may be waived by the Company:

(a) The representations and warranties made by the Investors in Section 5 hereof shall be true and correct in all material respects as of the date hereof, and shall be true and correct as of the Closing Date with the same force and effect as if they had been made on and as of such date, except to the extent any such representation or warranty expressly speaks as of an earlier date, in which case such representation or warranty shall be true and correct in all material respects as of such earlier date. The Investors shall have performed in all material respects all obligations and covenants herein required to be performed by them on or prior to the Closing Date.

(b) Each Investor shall have executed and delivered the Registration Rights Agreement and an Investor Questionnaire.

(c) Any Investor purchasing Closing Securities at the Closing shall have paid in full its purchase price to the Company.

6.3 Termination of Obligations to Effect Closing; Effects.

(a) The obligations of the Company, on the one hand, and the Investors, on the other hand, to effect the Closing shall terminate as follows:

(i) Upon the mutual written consent of the Company and Investors that agreed to purchase a majority of the Shares to be issued and sold pursuant to this Agreement; or

(ii) By either the Company or any Investor (with respect to itself only) if the Closing has not occurred on or prior to March 24, 2021; provided, however, that, except in the case of clause (i) above, the party seeking to terminate its obligation to effect the Closing shall not then be in breach of any of its representations, warranties, covenants or agreements contained in this Agreement or the other Transaction Documents if such breach has resulted in the circumstances giving rise to such party's seeking to terminate its obligation to effect the Closing.

(b) In the event of termination by the Company or any Investor of its obligations to effect the Closing pursuant to Section 6.3(a)(ii), written notice thereof shall be given to the other Investors by the Company and the other Investors shall have the right to terminate their obligations to effect the Closing upon written notice to the Company and the other Investors. Nothing in this Section 6.3 shall be deemed to release any party from any liability for any breach by such party of the terms and provisions of this Agreement or the other Transaction Documents or to impair the right of any party to compel specific performance by any other party of its obligations under this Agreement or the other Transaction Documents.

7. Covenants and Agreements of the Parties

7.1 Nasdaq Listing. The Company will use commercially reasonable efforts to continue the listing and trading of its Common Stock on Nasdaq and, in accordance therewith, will use commercially reasonable efforts to comply in all material respects with the Company's reporting, filing and other obligations under the bylaws or rules of such market or exchange, as applicable.

7.2 Removal of Legends.

(a) In connection with any sale, assignment, transfer or other disposition of the Shares or Warrant Shares by an Investor pursuant to Rule 144 or pursuant to any other exemption under the 1933 Act such that the purchaser acquires freely tradable shares and upon compliance by the Investor with the requirements of this Agreement, if requested by the Investor, the Company shall request the transfer agent for the Common Stock (the "**Transfer Agent**") to remove any restrictive legends related to the book entry account holding such shares and make a new, unlegended entry for such book entry shares sold or disposed of without restrictive legends within two (2) Trading Days of any such request therefor from such Investor, provided that the Company has timely received from the Investor customary representations and other documentation reasonably acceptable to the Company in connection therewith.

(b) Subject to receipt from the Investor by the Company and the Transfer Agent of customary representations and other documentation reasonably acceptable to the Company and the Transfer Agent in connection therewith, upon the earliest of such time as the Shares or Warrant Shares (i) have been registered under the 1933 Act pursuant to an effective registration statement, (ii) have been sold pursuant to Rule 144, or (iii) are eligible for resale under Rule 144(b)(1) or any successor provision, the Company shall, in accordance with the provisions of this Section 7.2(b) and within two (2) Trading Days of any request therefor from an Investor accompanied by such customary and reasonably acceptable documentation referred to above, (A) deliver to the Transfer Agent irrevocable instructions that the Transfer Agent shall make a new, unlegended entry for such book entry shares, and (B) cause its counsel to deliver to the Transfer Agent one or more opinions to the effect that the removal of such legends in such circumstances may be effected under the 1933 Act if required by the Transfer Agent to effect the removal of the legend in accordance with the provisions of this Agreement. Any shares subject to legend removal under this Section 7.2 may be transmitted by the Transfer Agent to the Investor by crediting the account of the Investor's prime broker with the DTC System as directed by such Investor. The Company shall be responsible for the fees of its Transfer Agent and all DTC fees associated with such issuance.

7.3 Transfer Restrictions. Each Investor agrees that it will sell, transfer or otherwise dispose of the Securities only in compliance with all applicable state and federal securities laws and that any Securities sold by such Investor pursuant to an effective registration statement will be sold in compliance with the plan of distribution set forth therein.

7.4 Subsequent Equity Sales by the Company. The Company shall not, and shall use its commercially reasonable efforts to ensure that no Affiliate of the Company shall, sell, offer for sale or solicit offers to buy or otherwise negotiate in respect of any security (as defined in Section 2 of the 1933 Act) that will be integrated with the offer or sale of the Securities in a manner that would require the registration under the 1933 Act of the sale of the Securities to the Investors, or that will be integrated with the offer or sale of the Securities for purposes of the rules and regulations of any trading market such that it would require stockholder approval prior to the closing of such other transaction unless stockholder approval is obtained before the closing of such subsequent transaction. The Company shall not take any action or steps that would adversely affect reliance by the Company on Section 4(a)(2) for the exemption from registration for the transactions contemplated hereby or require registration of the Securities under the 1933 Act.

7.5 Fees. The Company shall be responsible for the payment of any placement agent's fees, financial advisory fees, or broker's commissions (other than for Persons engaged by any Investor) relating to or arising out of the transactions contemplated hereby.

7.6 Reservation of Common Stock. As of the date hereof, the Company has reserved and the Company shall continue to reserve and keep available at all times, free of preemptive rights, a sufficient number of shares of Common Stock for the purpose of enabling the Company to issue all of the Warrant Shares upon conversion of any Pre-Funded Warrant.

7.7 Short Sales and Confidentiality After the Date Hereof. Each Investor covenants that it will not, nor will it cause any Affiliates acting on its behalf or pursuant to any understanding with it to, execute any Short Sales during the period from the date hereof until the earlier of such time as (i) the transactions contemplated by this Agreement are first publicly announced or (ii) this Agreement is terminated in full. Notwithstanding the foregoing, in the case of an Investor that is a multi-managed investment vehicle whereby separate portfolio managers manage separate portions of such Investor's assets and the portfolio managers have no direct knowledge of the investment decisions made by the portfolio managers managing other portions of such Investor's assets, the covenant set forth above shall only apply with respect to the portion of assets managed by the portfolio manager that made the investment decision to purchase the Securities covered by this Agreement. Each Investor covenants that until such time as the transactions contemplated by this Agreement are publicly disclosed by the Company, such Investor will maintain the confidentiality of all disclosures made to it in connection with this transaction (including the existence and terms of this transaction), other than to such Person's outside attorney, accountant, auditor or investment advisor only to the extent necessary to permit evaluation of the investment, and the performance of the necessary or required tax, accounting, financial, legal, or administrative tasks and services and other than as may be required by law. Each Investor understands and acknowledges that the SEC currently takes the position that coverage of Short Sales of shares of the Common Stock "against the box" prior to effectiveness of a resale registration statement with securities included in such registration statement would be a violation of Section 5 of the 1933 Act, as set forth in Item 239.10 of the Securities Act Rules Compliance and Disclosure Interpretations compiled by the Office of Chief Counsel, Division of Corporation Finance.

7.8 Tax Matters. The parties agree that the Pre-Funded Warrants are intended to and shall be treated as stock in the Company for U.S. federal, state and local income tax purposes, and the parties shall file their tax returns and otherwise act consistently with such treatment except as otherwise required by a final determination within the meaning of Section 1313 of the Internal Revenue Code of 1986, as amended.

7.9 Filings. The Company shall make all filings with the SEC and its Trading Market as required by the transactions contemplated hereby. With respect to any exercise of a Pre-Funded Warrant or Warrant into Common Stock, the Company and each Investor (i) shall use their respective commercially reasonable efforts to promptly file or cause to be filed, (x) within 10 Business Days from the date that either the Company or any Investor provides any notice of exercise (for which within five Business Days the Investor determines that a filing under the Hart Scott-Rodino Antitrust Improvements Act of 1976, as amended (the "**HSR Act**"), is required, and so notifies the Company), all

required filings under the HSR Act and, (y) as promptly as reasonably practicable, all required filings under other applicable antitrust laws that the Company or any Investor reasonably determines in good faith to be necessary or appropriate to effect the transactions contemplated by this Agreement including but not limited to, the exercise of any Pre-Funded Warrant or Warrant into Common Stock, (ii) shall consult and cooperate with each other in the preparation of such filings, and (iii) shall promptly inform the other parties of any material communication received by such party from any Governmental Entity regarding the transactions contemplated by this Agreement and shall enable the other party to participate in any communications and meetings with any Governmental Entity regarding the transactions contemplated by this Agreement unless prohibited by the Governmental Entity. Each of the Company and any Investor that files such notice pursuant to the HSR Act or any other applicable antitrust law in accordance with the preceding sentence acknowledges that no exercise of any Pre-Funded Warrant or Warrant into Common Stock will be consummated until any waiting period prescribed under the HSR Act or any other applicable antitrust law has elapsed.

8. Survival and Indemnification.

8.1 Survival. The representations, warranties, covenants and agreements contained in this Agreement shall survive the Closing of the transactions contemplated by this Agreement for the applicable statute of limitations.

8.2 Indemnification. The Company agrees to indemnify and hold harmless each Investor and its Affiliates, and their respective directors, officers, trustees, members, managers, employees, investment advisers and agents, from and against any and all losses, claims, damages, liabilities and expenses (including without limitation reasonable and documented attorney fees and disbursements and other documented out-of-pocket expenses reasonably incurred in connection with investigating, preparing or defending any action, claim or proceeding, pending or threatened and the costs of enforcement thereof) to which such Person may become subject as a result of any breach of representation, warranty, covenant or agreement made by or to be performed on the part of the Company under the Transaction Documents, and will reimburse any such Person for all such amounts as they are incurred by such Person solely to the extent such amounts have been finally judicially determined not to have resulted from such Person's fraud or willful misconduct.

8.3 Conduct of Indemnification Proceedings. Any person entitled to indemnification hereunder shall (i) give prompt written notice to the indemnifying party of any claim with respect to which it seeks indemnification and (ii) permit such indemnifying party to assume the defense of such claim with counsel reasonably satisfactory to the indemnified party; *provided* that any person entitled to indemnification hereunder shall have the right to employ separate counsel and to participate in the defense of such claim, but the fees and expenses of such counsel shall be at the expense of such person unless (a) the indemnifying party has agreed in writing to pay such fees or expenses, (b) the indemnifying party shall have failed to assume the defense of such claim and employ counsel reasonably satisfactory to such person or (c) in the reasonable judgment of any such person, based upon written advice of its counsel, a conflict of interest exists between such person and the indemnifying party with respect to such claims (in which case, if the person notifies the indemnifying party in writing that such person elects to employ separate counsel at the expense of the indemnifying party, the indemnifying party shall not have the right to assume the defense of such claim on behalf of such person); and *provided, further*, that the failure of any indemnified party to give written notice as provided herein shall not relieve the indemnifying party of its obligations hereunder, except to the extent that such failure to give notice shall materially adversely affect the indemnifying party in the defense of any such claim or litigation. It is understood that the indemnifying party shall not, in connection with any proceeding in the same jurisdiction, be liable for fees or expenses of more than one separate firm of attorneys at any time for all such indemnified parties. No indemnifying party will, except with the consent of the indemnified party, which consent shall not be unreasonably withheld, conditioned or delayed, consent to entry of any judgment or enter into any settlement that does not include as an unconditional term thereof the giving by the claimant or plaintiff to such indemnified party of a release from all liability in respect of such claim or litigation. No indemnified party will, except with the consent of the indemnifying party, which consent shall not be unreasonably withheld, conditioned or delayed, consent to entry of any judgment or enter into any settlement.

9. Miscellaneous.

9.1 Successors and Assigns. This Agreement may not be assigned by a party hereto without the prior written consent of the Company or each of the Investors, as applicable, provided, however, that an Investor may assign its

rights and delegate its duties hereunder in whole or in part to an Affiliate or to a third party acquiring some or all of its Securities in a transaction complying with applicable securities laws without the prior written consent of the Company or the other Investors, provided such assignee agrees in writing to be bound by the provisions hereof that apply to Investors. The provisions of this Agreement shall inure to the benefit of and be binding upon the respective permitted successors and assigns of the parties. Without limiting the generality of the foregoing, in the event that the Company is a party to a merger, consolidation, share exchange or similar business combination transaction in which the Common Stock is converted into the equity securities of another Person, from and after the effective time of such transaction, such Person shall, by virtue of such transaction, be deemed to have assumed the obligations of the Company hereunder, the term "Company" shall be deemed to refer to such Person and the term "Securities" shall be deemed to refer to the securities received by the Investors in connection with such transaction. Nothing in this Agreement, express or implied, is intended to confer upon any party other than the parties hereto or their respective permitted successors and assigns any rights, remedies, obligations, or liabilities under or by reason of this Agreement, except as expressly provided in this Agreement.

9.2 Counterparts. This Agreement may be executed in one or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. Counterparts may be delivered via facsimile, electronic mail (including pdf or any electronic signatures complying with the U.S. federal ESIGN Act of 2000, e.g., www.docusign.com) or other transmission method and any counterpart so delivered shall be deemed to have been duly and validly delivered and be valid and effective for all purposes.

9.3 Titles and Subtitles. The titles and subtitles used in this Agreement are used for convenience only and are not to be considered in construing or interpreting this Agreement.

9.4 Notices. Unless otherwise provided, any notice required or permitted under this Agreement shall be given in writing and shall be deemed effectively given as hereinafter described (i) if given by personal delivery, then such notice shall be deemed given upon such delivery, (ii) if given by e-mail, then such notice shall be deemed given upon receipt of confirmation of receipt of an e-mail transmission, (iii) if given by mail, then such notice shall be deemed given upon the earlier of (A) receipt of such notice by the recipient or (B) three days after such notice is deposited in first class mail, postage prepaid, and (iv) if given by an internationally recognized overnight air courier, then such notice shall be deemed given one Business Day after delivery to such carrier. All notices shall be addressed to the party to be notified at the address as follows, or at such other address as such party may designate by ten days' advance written notice to the other party:

If to the Company:

X4 Pharmaceuticals, Inc.
61 North Beacon Street, 4th Floor
Boston, MA 02134
Telephone: 857-529-8300
Attention: Derek Meisner
Email: derek.meisner@x4pharma.com

With a copy (which shall not constitute notice) to:

Cooley LLP
55 Hudson Yards
New York, NY 10001
Telephone: (212) 479-5000
Facsimile: (212) 479-6275
Attention: Daniel I. Goldberg
Email: dgoldberg@cooley.com

If to the Investors:

Only to the addresses set forth on the signature pages hereto.

9.5 Expenses. The parties hereto shall pay their own costs and expenses in connection herewith regardless of whether the transactions contemplated hereby are consummated; it being understood that each of the Company and each Investor has relied on the advice of its own respective counsel.

9.6 Amendments and Waivers. Prior to Closing, no amendment or waiver of any provision of this Agreement will be effective with respect to any party unless made in writing and signed by a duly authorized representative of such party. Following the Closing, any term of this Agreement may be amended and the observance of any term of this Agreement may be waived (either generally or in a particular instance and either retroactively or prospectively), only with the written consent of the Company and the Required Investors. Notwithstanding the foregoing, this Agreement may not be amended and the observance of any term of this Agreement may not be waived with respect to any Investor without the written consent of such Investor unless such amendment or waiver applies to all Investors in the same fashion. Any amendment or waiver effected in accordance with this paragraph shall be binding upon (i) prior to Closing, each Investor that signed such amendment or waiver and (ii) following the Closing, each holder of any Securities purchased under this Agreement at the time outstanding, and in each case, each future holder of all such Securities and the Company.

9.7 Publicity. Except as set forth below, no public release or announcement concerning the transactions contemplated hereby shall be issued by the Investors without the prior consent of the Company, except as such release or announcement may be required by law or the applicable rules or regulations of any securities exchange or securities market, in which case the Investors shall allow the Company reasonable time to comment on such release or announcement in advance of such issuance. Notwithstanding the foregoing, each Investor may identify the Company and the value of such Investor's security holdings in the Company in accordance with applicable investment reporting and disclosure regulations or internal policies without prior notice to or consent from the Company (including, for the avoidance of doubt, filings pursuant to Sections 13 and 16 of the 1934 Act). The Company shall not include the name of any Investor or any Affiliate or investment adviser of such Investor in any press release or public announcement (which, for the avoidance of doubt, shall not include any SEC Filing to the extent such disclosure is required by SEC rules and regulations) without the prior written consent of such Investor. No later than the Business Day immediately following the date this Agreement is executed, the Company shall issue a press release disclosing all material terms of the transactions contemplated by this Agreement (the "**Press Release**"). In addition, the Company will make such other filings and notices in the manner and time required by the SEC or Nasdaq. From and after the issuance of the Press Release, only those Investors who have entered into separate confidentiality agreements with the Company shall be in possession of any material non-public information received from the Company, its subsidiaries or any of their respective officers, directors, employees or agents in connection with the transactions contemplated by this Agreement. Prior to the effectiveness of the Registration Statement (as defined in the Registration Rights Agreement) covering the resale of the Registrable Securities (as defined in the Registration Statement), the Company shall disclose any material non-public information in the possession of any Investors who have entered into separate confidentiality agreements with the Company, disclosed by the Company to the Investors pursuant to such separate confidentiality agreements.

9.8 Severability. Any provision of this Agreement that is prohibited or unenforceable in any jurisdiction shall, as to such jurisdiction, be ineffective to the extent of such prohibition or unenforceability without invalidating the remaining provisions hereof but shall be interpreted as if it were written so as to be enforceable to the maximum extent permitted by applicable law, and any such prohibition or unenforceability in any jurisdiction shall not invalidate or render unenforceable such provision in any other jurisdiction. To the extent permitted by applicable law, the parties hereby waive any provision of law which renders any provision hereof prohibited or unenforceable in any respect.

9.9 Entire Agreement. This Agreement, including the signature pages, Exhibits, the other Transaction Documents and any confidentiality agreement between the Company and each Investor constitute the entire agreement among the parties hereof with respect to the subject matter hereof and thereof and supersede all prior agreements and understandings, both oral and written, between the parties with respect to the subject matter hereof and thereof.

9.10 Further Assurances. The parties shall execute and deliver all such further instruments and documents and take all such other actions as may reasonably be required to carry out the transactions contemplated hereby and to evidence the fulfillment of the agreements herein contained.

9.11 **Governing Law.** This Agreement shall be governed by, and construed in accordance with, the laws of the State of Delaware. Service of process in connection with any such suit, action or proceeding may be served on each party hereto anywhere in the world by the same methods as are specified for the giving of notices under this Agreement.

9.12 **Independent Nature of Investors' Obligations and Rights.** The obligations of each Investor under any Transaction Document are several and not joint with the obligations of any other Investor, and no Investor shall be responsible in any way for the performance of the obligations of any other Investor under any Transaction Document. The decision of each Investor to purchase Closing Securities pursuant to the Transaction Documents has been made by such Investor independently of any other Investor. Nothing contained herein or in any Transaction Document, and no action taken by any Investor pursuant thereto, shall be deemed to constitute the Investors as a partnership, an association, a joint venture or any other kind of entity, or create a presumption that the Investors are in any way acting in concert or as a group with respect to such obligations or the transactions contemplated by the Transaction Documents. Each Investor acknowledges that no other Investor has acted as agent for such Investor in connection with making its investment hereunder and that no Investor will be acting as agent of such Investor in connection with monitoring its investment in the Securities or enforcing its rights under the Transaction Documents. Each Investor shall be entitled to independently protect and enforce its rights, including, without limitation, the rights arising out of this Agreement or out of the other Transaction Documents, and it shall not be necessary for any other Investor to be joined as an additional party in any proceeding for such purpose. The Company acknowledges that each of the Investors has been provided with the same Transaction Documents for the purpose of closing a transaction with multiple Investors and not because it was required or requested to do so by any Investor. It is expressly understood and agreed that each provision contained in this Agreement is between the Company and an Investor, solely, and not between the Company and the Investors collectively and not between and among the Investors.

[remainder of page intentionally left blank]

IN WITNESS WHEREOF, the parties have executed this Agreement or caused their duly authorized officers to execute this Agreement as of the date first above written.

COMPANY:

X4 PHARMACEUTICALS, INC.

By: /s/ Adam S. Mostafa

Name: Adam S. Mostafa

Title: Chief Financial Officer

[Signature Page to Securities Purchase Agreement]

INVESTOR:

**ABINGWORTH BIOVENTURES 8 LP
acting by its Manager Abingworth LLP**

By: /s/ John Heard

Name: John Heard

Title: Partner, General Counsel

[Signature Page to Securities Purchase Agreement]

INVESTOR:

ALTIUM GROWTH FUND, LP

By: /s/ Mark Gottlieb

Name: Mark Gottlieb

Title: Authorized Signatory

[Signature Page to Securities Purchase Agreement]

INVESTOR:

DRIEHAUS LIFE SCIENCES MASTER FUND, L.P.

By: Driehaus Capital Management LLC, its Investment
Adviser

By: /s/ Janet McWilliams

Name: Janet McWilliams

Title: General Counsel of Driehaus Capital Management
LLC

[Signature Page to Securities Purchase Agreement]

INVESTOR:

HERCULES CAPITAL, INC.

By: /s/ Jennifer Choe

Name: Jennifer Choe

Title: Associate General Counsel

[Signature Page to Securities Purchase Agreement]

INVESTOR:

HUDSON BAY MASTER FUND LTD.

By: /s/ Richard Allison

Name: Richard Allison

Title: Authorized Signatory *

*** Authorized Signatory**

Hudson Bay Capital Management LP

Not individually, but solely as

Investment Advisor to Hudson Bay Master Fund Ltd

[Signature Page to Securities Purchase Agreement]

INVESTOR:

IKARIAN HEALTHCARE MASTER FUND, LP

By: /s/ Chart Westcott

Name: Chart Westcott

Title: COO, Ikarian Capital, LLC, Investment Adviser

BOOTHBAY ABSOLUTE RETURN STRATEGIES, LP

By: /s/ Daniel Bloom

Name: Daniel Bloom

Title: CFO & COO

**BOOTHBAY DIVERSIFIED ALPHA MASTER FUND,
LP**

By: /s/ Daniel Bloom

Name: Daniel Bloom

Title: CFO & COO

[Signature Page to Securities Purchase Agreement]

INVESTOR:

Lincoln Park Capital Fund, LLC

By: Lincoln Park Capital, LLC

By: Rockledge Capital Corporation

By: /s/ Joshua Scheinfeld

Name: Joshua Scheinfeld

Title: President

[Signature Page to Securities Purchase Agreement]

INVESTOR:

LYTTON-KAMBARA FOUNDATION

By: /s/ Laurence Lytton

Name: Laurence Lytton

Title: President

[Signature Page to Securities Purchase Agreement]

INVESTOR:

MONASHEE SOLITARIO FUND LP

By: /s/ Jeff Muller
Name: Jeff Muller
Title: CCO, Monashee Investment Management LLC
Address: c/o Monashee Investment Management LLC
75 Park Plaza, 2nd Floor
Boston, MA 02116
Phone:
Email:

[Signature Page to Securities Purchase Agreement]

INVESTOR:

DS LIQUID DIV RVA MON LLC

By: /s/ Jeff Muller
Name: Jeff Muller
Title: CCO, Monashee Investment Management LLC
Address: c/o Monashee Investment Management LLC
75 Park Plaza, 2nd Floor
Boston, MA 02116
Phone:
Email:

[Signature Page to Securities Purchase Agreement]

INVESTOR:

BESPOKE ALPHA MAC MIM LP

By: /s/ Jeff Muller

Name: Jeff Muller

Title: CCO, Monashee Investment Management LLC

Address: c/o Monashee Investment Management LLC

75 Park Plaza, 2nd Floor

Boston, MA 02116

Phone:

Email:

[Signature Page to Securities Purchase Agreement]

INVESTOR:

SFL SPV I LLC

By: /s/ Jeff Muller

Name: Jeff Muller

Title: CCO, Monashee Investment Management LLC

Address: c/o Monashee Investment Management LLC

75 Park Plaza, 2nd Floor

Boston, MA 02116

Phone:

Email:

INVESTOR:

MONASHEE PURE ALPHA SPV I LP

By: /s/ Jeff Muller

Name: Jeff Muller

Title: CCO, Monashee Investment Management LLC

Address: c/o Monashee Investment Management LLC

75 Park Plaza, 2nd Floor

Boston, MA 02116

Phone:

Email:

INVESTOR:

BEMAP MASTER FUND LTD

By: /s/ Jeff Muller

Name: Jeff Muller

Title: CCO, Monashee Investment Management LLC

Address: c/o Monashee Investment Management LLC

75 Park Plaza, 2nd Floor

Boston, MA 02116

Phone:

Email:

INVESTOR:

ORBIMED PRIVATE INVESTMENTS IV, LP

By: OrbiMed Capital GP IV LLC, its General Partner

By: OrbiMed Advisors LLC, its Managing Member

By: /s/ Carl Gordon

Name: Carl Gordon

Title Member

Address: Attention: General Counsel
601 Lexington Avenue, 54th Floor
New York, NY 10022

Phone:

Email:

INVESTOR:

**INVESTMENT MANAGER
SIO CAPITAL MANAGEMENT LLC
ON BEHALF OF:**

Sio Partners LP
Sio Partners Offshore LTD
Compass MAV LLC
Compass Offshore MAV LTD
Walleye Trading LLC
Walleye Opportunities Master Fund Ltd

By: /s/ Michael Castor

Name: Michael Castor

Title: Managing Member

EXHIBIT A

Schedule of Investors

Investor Name	Shares	Number of Warrant Shares Underlying Pre-Funded Warrant	Aggregate Purchase Price of Securities
Abingworth Bioventures 8 LP	229,885	—	\$ 1,999,999.50
Altium Growth Fund, LP	804,598	—	\$ 7,000,002.60
Bain Capital Life Sciences Fund II, L.P.	775,133	44,571	\$ 7,130,979.09
BCIP Life Sciences Associates, LP	94,407	5,429	\$ 868,518.91
Driehaus Life Sciences Master Fund, L.P.	574,712	—	\$ 4,999,994.40
Hercules Capital, Inc.	114,943	—	\$ 1,000,004.10
Hudson Bay Master Fund Ltd.	172,413	—	\$ 1,499,993.10
Ikarian Healthcare Master Fund, LP	1,204,226	—	\$10,476,766.20
Boothbay Absolute Return Strategies, LP	105,821	—	\$ 920,642.70
Boothbay Diversified Alpha Master Fund, LP	69,263	—	\$ 602,588.10
Lincoln Park Capital Fund, LLC	229,885	—	\$ 1,999,999.50
Lytton-Kambara Foundation	229,885	—	\$ 1,999,999.50
Monashee Solitario Fund LP	117,471	—	\$ 1,021,997.70
DS Liquid DIV RVA MON LLC	170,115	—	\$ 1,480,000.50
Bespoke Alpha MAC MIM LP	22,011	—	\$ 191,495.70
SFL SPV I LLC	25,690	—	\$ 223,503.00
Monashee Pure Alpha SPV I LP	93,448	—	\$ 812,997.60
BEMAP Master Fund Ltd	145,977	—	\$ 1,269,999.90
OrbiMed Private Investments IV, LP	287,356	—	\$ 2,499,997.20
Sio Partners LP	253,006	—	\$ 2,201,152.20
Sio Partners Offshore LTD	136,130	—	\$ 1,184,331.00
Compass MAV LLC	163,591	—	\$ 1,423,241.70
Compass Offshore MAV LTD	104,582	—	\$ 909,863.40
Walleye Trading LLC	58,074	—	\$ 505,243.80
Walleye Opportunities Master Fund Ltd.	89,214	—	\$ 776,161.80
TOTAL	6,271,836	50,000	\$54,999,473.20

EXHIBIT B

Form of Pre-Funded Warrant

EXHIBIT C

Registration Rights Agreement

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in this Registration Statement on Form S-3 of X4 Pharmaceuticals, Inc. of our report dated March 19, 2021 relating to the financial statements, which appears in X4 Pharmaceuticals, Inc.'s Annual Report on Form 10-K for the year ended December 31, 2020.

/s/ PricewaterhouseCoopers LLP
Boston, Massachusetts
June 25, 2021