

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

SCHEDULE 13G

Under the Securities Exchange Act of 1934  
(Amendment No. 2)

X4 Pharmaceuticals, Inc.  
(Name of Issuer)

Common Stock, par value \$0.001 per share  
(Title of Class of Securities)

98420X103  
(CUSIP Number)

December 31, 2020  
(Date of Event Which Requires Filing of this Statement)

Check the appropriate box to designate the rule pursuant to which this Schedule is filed:

Rule 13d-1(b)

Rule 13d-1(c)

Rule 13d-1(d)

\* The remainder of this cover page shall be filled out for a reporting person's initial filing on this form with respect to the subject class of securities, and for any subsequent amendment containing information which would alter the disclosures provided in a prior cover page.

The information required in the remainder of this cover page shall not be deemed to be "filed" for the purpose of Section 18 of the Securities Exchange Act of 1934 ("Act") or otherwise subject to the liabilities of that section of the Act but shall be subject to all other provisions of the Act (however, see the Notes).

**Potential persons who are to respond to the collection of information contained in this form are not required to respond unless the form displays a currently valid OMB control number.**

1. Names of Reporting Persons.

**EcoR1 Capital, LLC**

2. Check the Appropriate Box if a Member of a Group (See Instructions)

(a)

(b)

3. SEC Use Only

4. Citizenship or Place of Organization **Delaware**

Number of  
Shares  
Beneficially  
Owned by  
Each Reporting  
Person With:

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5. Sole Voting Power **-0-**

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6. Shared Voting Power **600,000**

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7. Sole Dispositive Power **-0-**

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8. Shared Dispositive Power **600,000**

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9. Aggregate Amount Beneficially Owned by Each Reporting Person **600,000**

10. Check if the Aggregate Amount in Row (9) Excludes Certain Shares (See Instructions) \_\_\_\_\_

11. Percent of Class Represented by Amount in Row (9) **3.6%**

12. Type of Reporting Person (See Instructions) **OO, IA**

1. Names of Reporting Persons.

**Oleg Nodelman**

2. Check the Appropriate Box if a Member of a Group (See Instructions)

(a)

(b)

3. SEC Use Only

4. Citizenship or Place of Organization **United States**

Number of  
Shares  
Beneficially  
Owned by  
Each Reporting  
Person With:

---

5. Sole Voting Power **-0-**

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6. Shared Voting Power **600,000**

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7. Sole Dispositive Power **-0-**

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8. Shared Dispositive Power **600,000**

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9. Aggregate Amount Beneficially Owned by Each Reporting Person **600,000**

10. Check if the Aggregate Amount in Row (9) Excludes Certain Shares (See Instructions) \_\_\_\_\_

11. Percent of Class Represented by Amount in Row (9) **3.6%**

12. Type of Reporting Person (See Instructions) **IN, HC**

1. Names of Reporting Persons.

**EcoR1 Capital Fund Qualified, L.P.**

2. Check the Appropriate Box if a Member of a Group (See Instructions)

(a) \_\_\_\_\_

(b) \_\_\_\_\_

3. SEC Use Only

4. Citizenship or Place of Organization **Delaware**

Number of  
Shares  
Beneficially  
Owned by  
Each Reporting  
Person With:

---

5. Sole Voting Power **-0-**

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6. Shared Voting Power **507,789**

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7. Sole Dispositive Power **-0-**

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8. Shared Dispositive Power **507,789**

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9. Aggregate Amount Beneficially Owned by Each Reporting Person **507,789**

10. Check if the Aggregate Amount in Row (9) Excludes Certain Shares (See Instructions) \_\_\_\_\_

11. Percent of Class Represented by Amount in Row (9) **3.0%**

12. Type of Reporting Person (See Instructions) **PN**

**Item 1.**

(a) Name of Issuer

**X4 Pharmaceuticals, Inc.**

(b) Address of Issuer's Principal Executive Offices

**61 North Beacon Street, 4th Floor, Boston, Massachusetts 02134****Item 2.**

(a) The names of the persons filing this statement are:

**EcoR1 Capital Fund Qualified, L.P. ("Qualified Fund"); EcoR1 Capital, LLC ("EcoR1") and Oleg Nodelman ("Nodelman") (collectively, the "Filers").****Qualified Fund is filing this statement jointly with the other Filers, but not as a member of a group and it expressly disclaims membership in a group. In addition, filing this Schedule 13G on behalf of Qualified Fund should not be construed as an admission that it is, and it disclaims that it is, a beneficial owner, as defined in Rule 13d-3 under the Act, of any of the Stock covered by this Schedule 13G.****Each Filer also disclaims beneficial ownership of the Stock except to the extent of that person's pecuniary interest therein.**

(b) The principal business office of the Filers is located at:

**357 Tehama Street #3, San Francisco, CA 94103**

(c) For citizenship of Filers, see Item 4 of the cover sheet for each Filer.

(d) This statement relates to the Issuer's **Common Stock, par value \$0.001 per share** (collectively the "Stock").(e) The CUSIP number of the Issuer is: **98420X103.****Item 3. If this statement is filed pursuant to rule 240.13d-1(b) or 240.13d-2(b) or (c), check whether the person filing is a:**

- (a)  Broker or dealer registered under section 15 of the Act (15 U.S.C. 78o).
- (b)  Bank as defined in section 3(a)(6) of the Act (15 U.S.C. 78c).
- (c)  Insurance company as defined in section 3(a)(19) of the Act (15 U.S.C. 78c).
- (d)  Investment company registered under section 8 of the Investment Company Act of 1940 (15 U.S.C. 80a-8).
- (e)  An investment adviser in accordance with section 240.13d-1(b)(1)(ii)(E) as to EcoR1.
- (f)  An employee benefit plan or endowment fund in accordance with section 240.13d-1(b)(1)(ii)(F).
- (g)  A parent holding company or control person in accordance with 240.13d-1(b)(1)(ii)(G) as to Mr. Nodelman.
- (h)  A savings association as defined in section 3(b) of the Federal Deposit Insurance Act (12 U.S.C. 1813).
- (i)  A church plan that is excluded from the definition of an investment company under section 3(c)(14) of the Investment Company Act of 1940 (15 U.S.C. 80a-3).
- (j)  Group, in accordance with section 240.13d-1(b)(1)(ii)(J).

**Item 4. Ownership.**

See Items 5-9 and 11 of the cover page for each Filer.

**Item 5. Ownership of Five Percent or Less of a Class**If this statement is being filed to report the fact that as of the date hereof the reporting person has ceased to be the beneficial owner of more than five percent of the class of securities, check the following .**Item 6. Ownership of More than Five Percent on Behalf of Another Person.**

The funds managed by EcoR1, including Qualified Fund, hold the Stock for the benefit of their investors and have the right to receive or the power to direct the receipt of dividends from, or the proceeds from the sale of, the Stock.

**Item 7. Identification and Classification of the Subsidiary Which Acquired the Security Being Reported on By the Parent Holding Company.**

Not applicable.

**Item 8. Identification and Classification of Members of the Group.**

EcoR1 is the general partner and investment adviser of investment funds, including Qualified Fund. Mr. Nodelman is the control person of EcoR1.

**Item 9. Notice of Dissolution of Group.**

Not applicable.

**Item 10. Certification.**

**Certification of EcoR1 and Mr. Nodelman:**

By signing below I certify that, to the best of my knowledge and belief, the securities referred to above were acquired and are held in the ordinary course of business and were not acquired and are not held for the purpose of or with the effect of changing or influencing the control of the issuer of the securities and were not acquired and are not held in connection with or as a participant in any transaction having that purpose or effect.

**Certification of Qualified Fund:**

By signing below I certify that, to the best of my knowledge and belief, the securities referred to above were not acquired and are not held for the purpose of or with the effect of changing or influencing the control of the issuer of the securities and were not acquired and are not held in connection with or as a participant in any transaction having that purpose or effect.

SIGNATURE

After reasonable inquiry and to the best of my knowledge and belief, I certify that the information set forth in this statement is true, complete and correct.

Dated: February 12, 2021

**EcoR1 CAPITAL, LLC**

By: /s/ Oleg Nodelman  
Manager

/s/ Oleg Nodelman

**EcoR1 CAPITAL FUND QUALIFIED, L.P.**

By: EcoR1 Capital, LLC, General Partner

By: /s/ Oleg Nodelman  
Manager

EXHIBIT A

AGREEMENT REGARDING JOINT FILING  
OF STATEMENT ON SCHEDULE 13D OR 13G

The undersigned agree to file jointly with the Securities and Exchange Commission (the "SEC") any and all statements on Schedule 13D, Schedule 13G or Forms 3, 4 or 5 (and any amendments or supplements thereto) required under section 13(d) or 16(a) of the Securities Exchange Act of 1934, as amended, in connection with purchases by the undersigned of the securities of any issuer. For that purpose, the undersigned hereby constitute and appoint EcoR1 Capital, LLC a Delaware limited liability company, as their true and lawful agent and attorney-in-fact, with full power and authority for and on behalf of the undersigned to prepare or cause to be prepared, sign, file with the SEC and furnish to any other person all certificates, instruments, agreements and documents necessary to comply with section 13(d) and section 16(a) of the Securities Exchange Act of 1934, as amended, in connection with said purchases, and to do and perform every act necessary and proper to be done incident to the exercise of the foregoing power, as fully as the undersigned might or could do if personally present.

Dated: February 12, 2021

**EcoR1 CAPITAL, LLC**

By: /s/ Oleg Nodelman  
Manager

/s/ Oleg Nodelman

**EcoR1 CAPITAL FUND QUALIFIED, L.P.**

By: EcoR1 Capital, LLC, General Partner

By: /s/ Oleg Nodelman  
Manager