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SECURITIES AND EXCHANGE COMMISSION  
Washington, D.C. 20549

SCHEDULE 13D

Under the Securities Exchange Act of 1934  
(Amendment \_\_\_)\*

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**Vor Biopharma Inc.**  
(Name of Issuer)

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**Common Stock, par value \$0.0001 per share**  
(Title of Class of Securities)

**929033108**

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(CUSIP Number)

**RA Capital Management, L.P.**  
**200 Berkeley Street, 18<sup>th</sup> Floor**  
**Boston, MA 02116**  
**Attn: Peter Kolchinsky**  
**Telephone: 617.778.2500**

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(Name, Address and Telephone Number of Person  
Authorized to Receive Notices and Communications)

**February 9, 2021**

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(Date of Event Which Requires Filing of this Statement)

If the filing person has previously filed a statement on Schedule 13G to report the acquisition that is the subject of this Schedule 13D, and is filing this schedule because of §§ 240.13d-1(e), 240.13d-1(f) or 240.13d-1(g), check the following box.

**Note:** Schedules filed in paper format shall include a signed original and five copies of the schedule, including all exhibits. See Section 240.13d-7 for other parties to whom copies are to be sent.

\* 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 disclosures provided in a prior cover page.

The information required on 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, as amended ("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).

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1. Names of Reporting Persons.

**RA Capital Management, L.P.**

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

(a)

(b)

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3. SEC Use Only

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4. Source of Funds (See Instructions)

**AF**

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5. Check if Disclosure of Legal Proceedings Is Required Pursuant to Items 2(d) or 2(e)

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6. Citizenship or Place of Organization

**Delaware**

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7. Sole Voting Power

**0**

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Number of  
Shares  
Beneficially  
Owned by  
Each  
Reporting  
Person With

8. Shared Voting Power

**11,120,973**

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9. Sole Dispositive Power

**0**

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10. Shared Dispositive Power

**11,120,973**

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11. Aggregate Amount Beneficially Owned by Each Reporting Person

**11,120,973**

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12. Check if the Aggregate Amount in Row (11) Excludes Certain Shares (See Instructions)

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13. Percent of Class Represented by Amount in Row (11)

**30.0%**

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14. Type of Reporting Person (See Instructions)

**IA, PN**

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1. Names of Reporting Persons.

**Peter Kolchinsky**

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

(a)

(b)

---

3. SEC Use Only

---

4. Source of Funds (See Instructions)

**AF**

---

5. Check if Disclosure of Legal Proceedings Is Required Pursuant to Items 2(d) or 2(e)

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6. Citizenship or Place of Organization

**United States**

---

7. Sole Voting Power

**0**

---

Number of  
Shares  
Beneficially  
Owned by  
Each  
Reporting  
Person With

8. Shared Voting Power

**11,120,973**

---

9. Sole Dispositive Power

**0**

---

10. Shared Dispositive Power

**11,120,973**

---

11. Aggregate Amount Beneficially Owned by Each Reporting Person

**11,120,973**

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12. Check if the Aggregate Amount in Row (11) Excludes Certain Shares (See Instructions)

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13. Percent of Class Represented by Amount in Row (11)

**30.0%**

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14. Type of Reporting Person (See Instructions)

**HC, IN**

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1. Names of Reporting Persons.

**Rajeev Shah**

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

(a)

(b)

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3. SEC Use Only

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4. Source of Funds (See Instructions)

**AF**

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5. Check if Disclosure of Legal Proceedings Is Required Pursuant to Items 2(d) or 2(e)

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6. Citizenship or Place of Organization

**United States**

---

7. Sole Voting Power

**0**

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Number of  
Shares  
Beneficially  
Owned by  
Each  
Reporting  
Person With

8. Shared Voting Power

**11,120,973**

---

9. Sole Dispositive Power

**0**

---

10. Shared Dispositive Power

**11,120,973**

---

11. Aggregate Amount Beneficially Owned by Each Reporting Person

**11,120,973**

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12. Check if the Aggregate Amount in Row (11) Excludes Certain Shares (See Instructions)

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13. Percent of Class Represented by Amount in Row (11)

**30.0%**

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14. Type of Reporting Person (See Instructions)

**HC, IN**

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1. Names of Reporting Persons.

**RA Capital Healthcare Fund, L.P.**

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

(a)

(b)

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3. SEC Use Only

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4. Source of Funds (See Instructions)

**WC**

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5. Check if Disclosure of Legal Proceedings Is Required Pursuant to Items 2(d) or 2(e)

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6. Citizenship or Place of Organization

**Delaware**

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7. Sole Voting Power

**0**

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Number of  
Shares  
Beneficially  
Owned by  
Each  
Reporting  
Person With

8. Shared Voting Power

**8,297,265**

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9. Sole Dispositive Power

**0**

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10. Shared Dispositive Power

**8,297,265**

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11. Aggregate Amount Beneficially Owned by Each Reporting Person

**8,297,265**

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12. Check if the Aggregate Amount in Row (11) Excludes Certain Shares (See Instructions)

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13. Percent of Class Represented by Amount in Row (11)

**22.4%**

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14. Type of Reporting Person (See Instructions)

**PN**

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<b>Item 1.</b>	<b>Security and Issuer</b>
<p>This Schedule 13D relates to the shares of common stock, \$0.0001 par value per share ("<u>Common Stock</u>"), of Vor Biopharma Inc., a Delaware corporation (the "<u>Issuer</u>"), which has its principal executive offices at 100 Cambridgepark Drive, Suite 400, Cambridge, MA 02140.</p>	
<b>Item 2.</b>	<b>Identity and Background</b>
<p>(a) This Schedule 13D is being filed on behalf of RA Capital Management, L.P. ("<u>RA Capital</u>"), Peter Kolchinsky, Rajeev Shah, and RA Capital Healthcare Fund, L.P. (the "<u>Fund</u>") and are collectively referred to herein as the "<u>Reporting Persons</u>". The agreement among the Reporting Persons to file this Schedule 13D jointly in accordance with Rule 13d-1(k) of the Securities Exchange Act of 1934, as amended, is attached hereto as Exhibit 1.</p> <p>The Common Stock reported herein includes 8,297,265 shares held by the Fund, 998,382 shares held in a separately managed account (the "<u>Account</u>"), and 1,825,326 shares held by RA Capital Nexus Fund, L.P. (the "<u>Nexus Fund</u>"). RA Capital Healthcare Fund GP, LLC is the general partner of the Fund and RA Capital Nexus Fund GP, LLC is the general partner of the Nexus Fund. The general partner of RA Capital is RA Capital Management GP, LLC, of which Dr. Kolchinsky and Mr. Shah are the controlling persons. RA Capital serves as investment adviser for the Fund, the Account, and the Nexus Fund and may be deemed a beneficial owner, for purposes of Section 13(d) of the Securities Exchange Act of 1934 (the "<u>Act</u>"), of any securities of the Issuer held by the Fund, the Account, or the Nexus Fund. The Fund and the Nexus Fund have delegated to RA Capital the sole power to vote and the sole power to dispose of all securities held in the Fund's and the Nexus Fund's portfolio, including the shares of the Issuer's Common Stock reported herein. Because the Fund and the Nexus Fund have divested themselves of voting and investment power over the reported securities they hold and may not revoke that delegation on less than 61 days' notice, the Fund and the Nexus Fund disclaim beneficial ownership of the securities they hold for purposes of Section 13(d) of the Act and therefore disclaim any obligation to report ownership of the reported securities under Section 13(d) of the Act. As managers of RA Capital, Dr. Kolchinsky and Mr. Shah may be deemed beneficial owners, for purposes of Section 13(d) of the Act, of any securities of the Issuer beneficially owned by RA Capital. RA Capital, Dr. Kolchinsky, and Mr. Shah disclaim beneficial ownership of the securities reported in this Schedule 13D Statement (the "<u>Statement</u>") other than for the purpose of determining their obligations under Section 13(d) of the Act, and the filing of the Statement shall not be deemed an admission that either RA Capital, Dr. Kolchinsky, or Mr. Shah is the beneficial owner of such securities for any other purpose.</p> <p>(b) The address of the principal business office of each of the Reporting Persons is 200 Berkeley Street, 18th Floor, Boston, MA 02116.</p> <p>(c) The Fund is a private investment vehicle. RA Capital provides investment management services to the Fund, the Account, and the Nexus Fund. The principal occupation of Dr. Kolchinsky and Mr. Shah is investment management.</p> <p>(d) During the last five years, none of the Reporting Persons, nor to the Reporting Persons' knowledge, any of the persons listed in Schedule A, has been convicted in a criminal proceeding (excluding traffic violations or similar misdemeanors).</p> <p>(e) During the last five years, none of the Reporting Persons, nor to the Reporting Persons' knowledge, any of the persons listed in Schedule A, has been a party to a civil proceeding of a judicial or administrative body of competent jurisdiction and as a result of such proceeding was or is subject to a judgment, decree of final order enjoining future violations of, or prohibiting or mandating activities subject to, federal or state securities laws or finding any violation with respect to such laws.</p> <p>(f) See Item 6 of the cover pages.</p>	

<b>Item 3.</b>	<b>Source and Amount of Funds or Other Consideration</b>
<p>The Reporting Persons acquired beneficial ownership of the shares of the Common Stock in the transactions and at the prices described in Item 5(c). Prior to the Issuer's initial public offering (the "IPO"), the Reporting Persons caused the Fund, the Account, and the Nexus Fund to purchase equity interests in the Issuer's predecessor in a private placement, and those interests automatically converted into 7,898,751 shares of Common Stock immediately upon completion of the IPO. The Fund, the Account, and the Nexus Fund also purchased 3,222,222 shares of Common Stock from the underwriters of the IPO. All purchases were for cash and were funded by working capital of the Fund, the Account, and the Nexus Fund.</p>	
<b>Item 4.</b>	<b>Purpose of Transaction</b>
<p>The Reporting Persons acquired the Common Stock reported herein for investment purposes and not with an intent, purpose or effect of changing control of the Issuer. Although the Reporting Persons currently have no plan or proposal to acquire any additional Common Stock or to dispose of any of the Common Stock reported herein, the Reporting Persons may acquire additional Common Stock from time to time or dispose of Common Stock they beneficially own, consistent with their investment purposes and in amounts to be determined by the Reporting Persons based upon a number of factors, including, without limitation, their ongoing assessment of the Issuer's business prospects, prevailing market conditions, the availability of other investment opportunities, and/or other considerations.</p> <p>In addition, consistent with their investment purpose, the Reporting Persons may engage in communications with persons associated with the Issuer, including shareholders of the Issuer, officers of the Issuer and/or members of the board of directors of the Issuer, to discuss matters regarding the Issuer, including but not limited to its operations and strategic direction. Dr. Joshua Resnick, a managing director of RA Capital, currently serves as a director of the Issuer and therefore will engage in regular discussions with the Issuer's board of directors and management as part of his duties as a director.</p> <p>The Reporting Persons have no plans or proposals that relate to, or could result in, any of the matters referred to in paragraphs (a) through (j), inclusive, of the instructions to Item 4 of Schedule 13D.</p> <p>The Reporting Persons may, however, change their purpose and formulate and implement plans or proposals with respect to the Issuer at any time and from time to time. Any such action may be made by the Reporting Persons alone or in conjunction with other shareholders, potential acquirers, financing sources and/or other third parties and could include one or more purposes, plans or proposals that relate to or would result in actions required to be reported herein in accordance with Item 4 of Schedule 13D.</p>	

<b>Item 5.</b>	<b>Interest in Securities of the Issuer</b>
<p>(a) The information set forth in rows 11 and 13 of the cover pages to this Schedule 13D is incorporated by reference. The percentage set forth in row 13 is based on 37,120,049 outstanding shares of Common Stock, as reported by the Issuer in its prospectus supplement filed with the Securities and Exchange Commission on February 8, 2021 and giving effect to an additional 1,474,202 shares issued and sold pursuant to the underwriters' option.</p> <p>(b) The information set forth in rows 7 through 10 of the cover pages to this Schedule 13D and Item 2 above is incorporated by reference.</p> <p>(c) Schedule A sets forth all transactions with respect to the shares of Common Stock effected during the past sixty days by any Reporting Person and is incorporated herein by reference.</p> <p>(d) No person (other than the Reporting Persons) is known to have the right to receive or the power to direct the receipt of dividends from, or the proceeds from the sale of, the shares of Common Stock subject to this Schedule 13D.</p> <p>(e) Not applicable.</p>	
<b>Item 6.</b>	<b>Contracts, Arrangements, Understandings or Relationships with Respect to Securities of the Issuer</b>
<p><b>Lock-up Agreement</b></p> <p>Pursuant to lock-up agreements signed in connection with the Issuer's initial public offering, the Fund, certain other stockholders of the Issuer and each director and officer of the Issuer agreed with the representatives of the underwriters in the initial public offering (the "<u>Representatives</u>"), subject to certain exceptions, not to offer, sell, contract to sell, pledge, grant any option to purchase, lend or otherwise dispose of or transfer any shares of Common Stock, or any securities convertible into, exchangeable for or that represent the right to receive shares of Common Stock, or enter into any swap or other agreement that transfers to another, in whole or in part, directly or indirectly, the economic consequence of ownership of the Common Stock, for a period ending on the date that is 180 days after the date of the prospectus in connection with the Issuer's initial public offering, except with the prior written consent of the Representatives.</p> <p><b>Investor Rights Agreement</b></p> <p>On June 30, 2020, the Issuer, the Fund and certain other parties entered into investors' rights agreement (the "<u>Investor Rights Agreement</u>"). Beginning 180 days after the effectiveness of the Issuer's registration statement filed in connection with its initial public offering, the Investor Rights Agreement provides the Fund and other parties thereto with certain demand registration rights, including shelf registration rights, in respect of the shares of Common Stock issued to it upon conversion of the Preferred Shares, subject to certain conditions. The stockholders may only require two registration statements on Form S-3 in a 12-month period. In addition, in the event that the Issuer registers additional shares of Common Stock for sale to the public, it will be required to give notice of such registration to the Fund and certain other parties of its intention to effect such a registration, and, subject to certain limitations, include the shares of Common Stock held by them in such registration. The registration rights will expire, with respect to any particular holder, the earlier of i) five years following the Issuer's initial public offering or ii) such time as Rule 144 (or similar exemption) is available for the sale of all of such holder's shares without limitation during a three-month period without registration. The Investor Rights Agreement contains customary cross-indemnification provisions, pursuant to which the Issuer is obligated to indemnify the Fund and other parties in the event of material misstatements or omissions in the registration statement attributable to the Issuer or any violation or alleged violation whether by action or inaction by the Issuer under certain securities laws and the Fund is obligated to indemnify the Issuer for material misstatements or omissions in the registration statement attributable to it.</p> <p>The description of the Investor Rights Agreement contained in this Item 6 is qualified in its entirety by reference to the full text of the agreement (incorporated by reference to Exhibit 4.2 to the Issuer's Registration Statement on Form S-1 (File No. 333-252175))</p>	
<b>Item 7.</b>	<b>Material to be Filed as Exhibits</b>
<p>Exhibit 1      Joint Filing Agreement</p>	



**SIGNATURES**

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 19, 2021

RA CAPITAL MANAGEMENT, L.P.

By: /s/ Peter Kolchinsky

Name: Peter Kolchinsky

Title: Authorized Signatory

PETER KOLCHINSKY

/s/ Peter Kolchinsky

RAJEEV SHAH

/s/ Rajeev Shah

RA CAPITAL HEALTHCARE FUND, L.P.

By: RA Capital Healthcare GP, LLC

By: /s/ Peter Kolchinsky

Name: Peter Kolchinsky

Title: Manager

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**Schedule A**

<b>Name</b>	<b>Date of Transaction</b>	<b>Number of Shares Acquires / (Disposed)</b>	<b>Transaction</b>	<b>Price per Share</b>
RA Capital Healthcare Fund, L.P.	1/8/21	25,732,018 Series B Preferred	Purchase	\$ 0.52
RA Capital Healthcare Fund, L.P.	2/9/21	5,448,669 Common Stock	Conversion	(1)
RA Capital Healthcare Fund, L.P.	2/9/21	2,848,596 Common Stock	Purchase	\$ 18.00
RA Capital Nexus Fund, L.P.	1/8/21	9,615,385 Series B Preferred	Purchase	\$ 0.52
RA Capital Nexus Fund, L.P.	2/9/21	1,694,356 Common Stock	Conversion	(1)
RA Capital Nexus Fund, L.P.	2/9/21	130,970 Common Stock	Purchase	\$ 18.00
Account	1/8/21	3,114,135 Series B Preferred	Purchase	\$ 0.52
Account	2/9/21	755,726 Common Stock	Conversion	(1)
Account	2/9/21	242,656 Common Stock	Purchase	\$ 18.00

(1) Each share of Series A-2 Preferred Stock and Series B Preferred Stock automatically converted into shares of Common Stock upon the closing of the Issuer's initial public offering for no additional consideration, on a 13.6-for-one basis.

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**JOINT FILING AGREEMENT**

This Joint Filing Agreement, dated as of February 19, 2021, is by and among RA Capital Management, L.P., Peter Kolchinsky, Rajeev Shah, and RA Capital Healthcare Fund, L.P. (the foregoing are collectively referred to herein as the "Filers").

Each of the Filers may be required to file with the United States Securities and Exchange Commission a statement on Schedule 13G and/or 13D with respect to Common Stock, par value \$0.0001 per share of Vor Biopharma, Inc. beneficially owned by them from time to time.

Pursuant to and in accordance with Rule 13(d)(1)(k) promulgated under the Securities Exchange Act of 1934, as amended, the Filers hereby agree to file a single statement on Schedule 13G and/or 13D (and any amendments thereto) on behalf of each of such parties, and hereby further agree to file this Joint Filing Agreement as an exhibit to such statement, as required by such rule.

This Joint Filing Agreement may be terminated by any of the Filers upon one week's prior written notice or such lesser period of notice as the Filers may mutually agree.

Executed and delivered as of the date first above written.

RA CAPITAL MANAGEMENT, L.P.

By: /s/ Peter Kolchinsky

Name: Peter Kolchinsky

Title: Authorized Signatory

PETER KOLCHINSKY

/s/ Peter Kolchinsky

RAJEEV SHAH

/s/ Rajeev Shah

RA CAPITAL HEALTHCARE FUND, L.P.

By: RA Capital Healthcare GP, LLC

By: /s/ Peter Kolchinsky

Name: Peter Kolchinsky

Title: Manager

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