

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

SCHEDULE 13G
Under the Securities Exchange Act of 1934

(Amendment No. __)*

ADVENTRX Pharmaceuticals, Inc.

(Name of Issuer)

Common Stock, \$0.001 par value per share

(Title of Class of Securities)

00764X202

(CUSIP Number)

January 06, 2011

(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).

1. Names of Reporting Persons.
I.R.S. Identification Nos. of above persons (entities only).

RA Capital Management, 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 **Massachusetts**

Number of Shares Beneficially Owned by Each Reporting Person With

5. Sole Voting Power **2,365,000**

6. Shared Voting Power **0**

7. Sole Dispositive Power **2,365,000**

8. Shared Dispositive Power **0**

9. Aggregate Amount Beneficially Owned by Each Reporting Person
2,365,000

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

11. Percent of Class Represented by Amount in Row (9)
9.9%

12. Type of Reporting Person (See Instructions)
IA

1. Names of Reporting Persons.
I.R.S. Identification Nos. of above persons (entities only).

Peter Kolchinsky

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 **2,365,000**

6. Shared Voting Power **0**

7. Sole Dispositive Power **2,365,000**

8. Shared Dispositive Power **0**

9. Aggregate Amount Beneficially Owned by Each Reporting Person
2,365,000

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

11. Percent of Class Represented by Amount in Row (9)
9.9%

12. Type of Reporting Person (See Instructions)
IN

1. Names of Reporting Persons.
I.R.S. Identification Nos. of above persons (entities only).
RA Capital Healthcare Fund, 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	1,182,500
	6. Shared Voting Power	0
	7. Sole Dispositive Power	1,182,500
	8. Shared Dispositive Power	0

9. Aggregate Amount Beneficially Owned by Each Reporting Person
1,182,500

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

11. Percent of Class Represented by Amount in Row (9)
5.0%

12. Type of Reporting Person (See Instructions)
PN

Item 1.

- (a) **Name of Issuer:** ADVENTRX Pharmaceuticals, Inc. (the “Issuer”).
- (b) **Address of the Issuer’s Principal Executive Offices:** 6725 Mesa Ridge Road, Suite 100, San Diego, CA 92121.

Item 2.

- (a) **Name of Person Filing:** This joint statement on Schedule 13G is being filed by Peter Kolchinsky, RA Capital Management, LLC, and RA Capital Healthcare Fund, L.P., who are collectively referred to herein as the “Reporting Persons.” Mr. Kolchinsky (the “Manager”) is the manager of RA Capital Management, LLC (“Capital”), which is the investment adviser and sole general partner of RA Capital Healthcare Fund, L.P. (“Fund”) and serves as the investment adviser to a separate discretionary account. The Reporting Persons have entered into a Joint Filing Agreement, dated as of the date hereof, a copy of which is filed with this Schedule 13G as Exhibit 1 (which is incorporated herein by reference), pursuant to which the Reporting Persons have agreed to file this statement jointly in accordance with the provisions of Rule 13d-1(k) under the Act.
- (b) **Address of Principal Business Office:** The principal business office of the Reporting Persons with respect to the shares reported hereunder is 20 Park Plaza, Suite 905, Boston, MA 02116.
- (c) **Citizenship:** Capital is a Massachusetts limited liability company. The Fund is a Delaware limited partnership. The Manager is a United States citizen.
- (d) **Title and Class of Securities:** Common stock (“Common Stock”).
- (e) **CUSIP Number:** 00764X202.

Item 3. If this statement is filed pursuant to §§240.13d-1(b) or 240.13d-2(b) or (c), check whether the person filing is a:

Not applicable.

Item 4. Ownership:

In the aggregate, the Reporting Persons beneficially own 2,365,000 shares of the Common Stock of the Issuer, representing approximately 9.9% of such class of securities. The Reporting Persons have the right to purchase an additional 591,250 shares of Common Stock pursuant to the terms of common stock purchase warrants issued on January 6, 2011, which are not exercisable except upon sixty-one (61) days prior written notice to the Issuer.

The beneficial ownership of each Reporting Person is as follows: (i) Fund beneficially owns 1,182,500 shares of Common Stock representing approximately 5.0% of the class and (ii) Capital, as the investment adviser and sole general partner of the Fund and investment adviser to an account owned by a separate investment vehicle which holds shares of the Issuer’s Common Stock, and Mr. Kolchinsky as the manager of Capital, each beneficially own 2,365,000 shares of Common Stock of the Issuer representing approximately 9.9% of the class. The percentage of Common Stock beneficially owned by each Reporting Person is based on a total of 23,664,858 shares of Common Stock of the Issuer outstanding as of January 19, 2011.

The Fund has the power to vote and dispose of the shares of Common Stock beneficially owned by such entity (as described above). Capital, as the investment adviser and sole general partner of the Fund and as the investment adviser to an account owned by a separate investment vehicle which holds shares of the Issuer's Common Stock, has the sole authority to vote and dispose of all of the shares of Common Stock reported in this Schedule 13G. The Manager, by virtue of his position as manager of Capital, has the sole authority to vote and dispose of all of the shares of Common Stock reported in this Schedule 13G.

Item 5. Ownership of Five Percent or Less of a Class:

Not applicable.

Item 6. Ownership of More than Five Percent on Behalf of Another Person:

Not applicable.

Item 7. Identification and Classification of the Subsidiary Which Acquired the Security Being Reported on By the Parent Holding Company or Control Person:

Not applicable.

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

Not applicable.

Item 9. Notice of Dissolution of Group:

Not applicable.

Item 10. Certification:

By signing below I hereby 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.

DATE: January 19, 2011

RA CAPITAL HEALTHCARE FUND, L.P.

By: RA Capital Management, LLC
General Partner

By: /s/ Peter Kolchinsky

Peter Kolchinsky
Manager

RA CAPITAL MANAGEMENT, LLC

By: /s/ Peter Kolchinsky

Peter Kolchinsky
Manager

PETER KOLCHINSKY

/s/ Peter Kolchinsky

Exhibit 1

JOINT FILING AGREEMENT

Pursuant to Rule 13d-1(k)(1) under the Securities Exchange Act of 1934, as amended, the undersigned hereby agrees, as of January 19, 2011, that only one statement containing the information required by Schedule 13G, and each amendment thereto, need be filed with respect to the ownership by each of the undersigned of shares of Common Stock of ADVENTRX Pharmaceuticals, Inc., and such statement to which this Joint Filing Agreement is attached as Exhibit 1 is filed on behalf of each of the undersigned.

RA CAPITAL HEALTHCARE FUND, L.P.

By: RA Capital Management, LLC
General Partner

By: /s/ Peter Kolchinsky

Peter Kolchinsky
Manager

RA CAPITAL MANAGEMENT, LLC

By: /s/ Peter Kolchinsky

Peter Kolchinsky
Manager

PETER KOLCHINSKY

/s/ Peter Kolchinsky
