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

**POST-EFFECTIVE AMENDMENT NO. 3
to
FORM S-1
REGISTRATION STATEMENT
UNDER THE SECURITIES ACT OF 1933**

ADVENTRX Pharmaceuticals, Inc.

(Exact name of registrant as specified in its charter)

Delaware
*(State or other jurisdiction of
incorporation or organization)*

2834
*(Primary Standard Industrial
Classification Code Number)*

84-1318182
*(I.R.S. Employer
Identification Number)*

**12390 El Camino Real, Suite 150
San Diego, CA 92130
(858) 552-0866**
*(Address, including zip code, and telephone number, including
area code, of registrant's principal executive offices)*

**Patrick L. Keran
President and Chief Operating Officer
ADVENTRX Pharmaceuticals, Inc.
12390 El Camino Real, Suite 150
San Diego, CA 92130
Telephone: (858) 552-0866**
*(Name, address, including zip code, and telephone number,
including area code, of agent for service)*

With a Copy to:

**Michael S. Kagnoff
DLA Piper LLP (US)
4365 Executive Drive, Suite 1100
San Diego, CA 92121
Telephone: (858) 677-1400
Facsimile: (858) 677-1401**

**Robert F. Charron, Esq.
Weinstein Smith LLP
420 Lexington Ave.
New York, NY 10170
Telephone: (212) 616-3007
Facsimile: (212) 869-2249**

**Harvey J. Keshner, Esq.
Sichenzia Ross Friedman Ference LLP
61 Broadway, Suite 3200
New York, NY 10006
Telephone: (212) 930-9700
Facsimile: (212) 930-9725**

Approximate date of commencement of proposed sale to the public: As soon as practicable after the effective date of this Registration Statement.

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 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.

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

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

Large accelerated filer

Accelerated filer

Non-accelerated filer

Smaller reporting company

The registrant hereby amends this registration statement on such date or dates as may be necessary to delay its effective date until the registrant shall file a further amendment which specifically states that this registration statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933, as amended, 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.

EXPLANATORY NOTE

This Post-Effective Amendment No. 3 to the Registration Statement on Form S-1 (File No. 333-160778) and the Registration Statement on Form S-1 (File No. 333-162361), which were amended by Post-Effective Amendment No. 1, declared effective on March 23, 2010 (together, the "Registration Statement"), of ADVENTRX Pharmaceuticals, Inc. (the "Company") is being filed pursuant to the undertakings in Item 17 of the Registration Statement to update and supplement the information contained in the Registration Statement, as originally declared effective by the Securities and Exchange Commission (the "SEC") on October 6, 2009, to include the information contained and incorporated by reference in the Company's Annual Report on Form 10-K for the fiscal year ended December 31, 2010 that was filed with the SEC on March 10, 2011 and the Company's current reports on Form 8-K that have been filed with the SEC since December 31, 2010. No changes have been made to the prospectus contained in the Registration Statement (which prospectus continues to form a part of this Registration Statement) and, accordingly, such prospectus has not been reprinted in Part I of this filing. No additional securities are being registered under this Post-Effective Amendment No. 3. All applicable registration fees were paid at the time of the original filing of the Registration Statement.

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

Prospectus Supplement No. 12
(to Prospectus dated October 6, 2009)

Filed pursuant to Rule 424(b)(3)
Registration Statement Nos. 333-160778
333-162361

PRELIMINARY AND SUBJECT TO COMPLETION, DATED APRIL 28, 2011

ADVENTRX PHARMACEUTICALS, INC.

**11,283 shares of 4.25660% Series D Convertible Preferred Stock
Warrants to Purchase up to 792,000 shares of Common Stock
3,192,000 shares of Common Stock Underlying the Convertible Preferred Stock and the Warrants**

Pursuant to the prospectus dated October 6, 2009, we offered up to \$11,283,000 of our 4.25660% Series D Convertible Preferred Stock, or 11,283 shares based on a stated value of \$1,000 per share, and warrants to purchase up to 792,000 shares of our common stock. Delivery of the convertible preferred stock and warrants was made on or about October 9, 2009. In addition, pursuant to that prospectus, as subsequently supplemented, 3,192,000 shares of our common stock issuable upon conversion of the convertible preferred stock and exercise of the warrants were registered to permit their issuance by us to the purchasers of our convertible preferred stock and warrants. All 11,283 shares of the convertible preferred stock have been converted into shares of our common stock and we did not receive any proceeds upon conversion of the convertible preferred stock. Holders of the warrants have exercised warrants for 576,000 shares of our common stock, and these warrants are no longer outstanding. Warrants to purchase up to 216,000 shares of our common stock remain outstanding as of the date of this prospectus supplement. The warrants, which have an exercise price of \$3.67 per share, are currently exercisable and may be exercised at any time on or before October 9, 2014.

We have incorporated by reference into this prospectus supplement the Annual Report on Form 10-K of ADVENTRX Pharmaceuticals, Inc. for the fiscal year ended December 31, 2010 (the "Annual Report") and our current reports on Form 8-K that have been filed with the SEC since December 31, 2010. This prospectus supplement should be read in conjunction with the prospectus dated October 6, 2009 (the "Prospectus"), which is to be delivered with this prospectus supplement. This prospectus supplement updates and supplements the information in the Prospectus. If there is any inconsistency between the information in the Prospectus and this prospectus supplement, you should rely on the information in this prospectus supplement.

Investing in our securities involves a high degree of risk. Before buying any of our securities, you should read the discussion of material risks of investing in our securities in "Risk Factors" beginning on page 6 of the Prospectus and beginning on page 21 of the Annual Report.

You should rely only on the information contained in the Prospectus, any free writing prospectus prepared by us or on our behalf and this prospectus supplement. We have not authorized anyone to provide you with different or additional information. If anyone provides you with different or additional information, you should not rely on it.

Our common stock is listed on the NYSE Amex under the symbol "ANX." The last reported sale price of our common stock on the NYSE Amex on April 27, 2011 was \$2.59 per share. All common stock share and per share amounts in this prospectus supplement have been adjusted to reflect the effect of the 1-for-25 reverse split of our common stock, effected on April 23, 2010. We do not intend to list the convertible preferred stock or warrants on any securities exchange.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or determined if this prospectus supplement is truthful or complete. Any representation to the contrary is a criminal offense.

The date of this prospectus supplement is _____, 2011.

INCORPORATION BY REFERENCE OF CERTAIN DOCUMENTS

The Securities and Exchange Commission (the "SEC") allows us to incorporate by reference the information contained in documents that we file with them. We are incorporating by reference into this prospectus supplement the documents listed below:

- our Annual Report on Form 10-K for the fiscal year ended December 31, 2010 filed with the SEC on March 10, 2011; and
- our current reports on Form 8-K filed with the SEC on January 6, 2011 (File No. 001-32157-11512917), January 7, 2011 (File No. 001-32157-11515655), January 7, 2011 (File No. 001-32157-11515695), January 19, 2011 (File No. 001-32157-11536324), February 14, 2011 (File No. 001-32157-11604349), February 15, 2011 (File No. 001-32157-11613491), March 22, 2011 (File No. 001-32157-11704394) and April 11, 2011 (File No. 001-32157-11752769).

By incorporating by reference our Annual Report on Form 10-K and our current reports on Form 8-K, we can disclose important information to you by referring to those reports, which are considered part of this prospectus supplement.

Any statement contained in a document incorporated or deemed to be incorporated by reference into this prospectus supplement will be deemed to be modified or superseded for purposes of this prospectus supplement to the extent that a statement contained in this prospectus supplement or any other subsequently filed document that is deemed to be incorporated by reference into this prospectus supplement modifies or supersedes the statement. Any statement so modified or superseded will not be deemed, except as so modified or superseded, to constitute a part of this prospectus supplement.

We will provide each person, including any beneficial owner, to whom a prospectus is delivered, a copy of any or all of the reports or documents that have been incorporated by reference into this prospectus supplement but not delivered with this prospectus supplement upon written or oral request at no cost to the requester. Requests should be directed to: ADVENTRX Pharmaceuticals, Inc., 12390 El Camino Real, Suite 150, San Diego, California 92130, Attn: Investor Relations, telephone: (858) 552-0866. The reports and documents that have been incorporated by reference into this prospectus supplement also may be accessed through our website at <http://www.adventrx.com>.

You may read and copy any materials we file with the SEC at the SEC's Public Reference Room at 100 F Street, N.E., Washington, DC 20549. This prospectus supplement is part of post-effective amendment No. 3 to a registration statement on Form S-1 that we filed with the SEC. That post-effective amendment No. 3 to the registration statement on Form S-1 contains more information than this prospectus supplement regarding us and the securities we offered pursuant to the prospectus, including certain exhibits and schedules. You may obtain information on the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330. The SEC also maintains an Internet site that contains reports, proxy and information statements, and other information regarding ADVENTRX at <http://www.sec.gov>.

You should rely only on the information contained in this prospectus supplement or to which we have referred you. We have not authorized any person to provide you with different information or to make any representation not contained in this prospectus.

EXPERTS

The consolidated financial statements of ADVENTRX Pharmaceuticals, Inc. as of December 31, 2010 and 2009, and the related consolidated statements of operations, stockholders' equity (deficit) and comprehensive loss and cash flows for the years then ended and for the period from January 1, 2002 through December 31, 2010 are incorporated by reference herein and in the registration statement in reliance upon the report of J.H. Cohn LLP, an independent registered public accounting firm, given on the authority of said firm as experts in accounting and auditing.

PART II

INFORMATION NOT REQUIRED IN THE PROSPECTUS

ITEM 13. OTHER EXPENSES OF ISSUANCE AND DISTRIBUTION

The following table sets forth the fees and expenses incurred or expected to be incurred by us in connection with the issuance and distribution of the securities being registered hereby, other than placement agent fees. All of the amounts shown are estimated except the SEC registration fee. Estimated fees and expenses can only reflect information that is known at the time of filing this registration statement and are subject to future contingencies, including additional expenses for future offerings.

Securities and Exchange Commission registration fee	\$	629
Transfer agent fees and expenses		15,000
Printing and engraving expenses		30,000
Legal fees and expenses		150,000
Accounting fees and expenses		15,000
Miscellaneous expenses		4,371
Total	\$	<u>215,000</u>

ITEM 14. INDEMNIFICATION OF DIRECTORS AND OFFICERS

Section 145 of the Delaware General Corporation Law authorizes a corporation to indemnify its directors and officers against liabilities arising out of actions, suits and proceedings to which they are made or threatened to be made a party by reason of the fact of their prior or current service to the Company as a director or officer, in accordance with the provisions of Section 145, which are sufficiently broad to permit indemnification under certain circumstances for liabilities arising under the Securities Act of 1933, as amended (the "Securities Act"). The indemnity may cover expenses (including attorneys' fees) judgments, fines and amounts paid in settlement actually and reasonably incurred by the director or officer in connection with any such action, suit or proceeding. Section 145 permits corporations to pay expenses (including attorneys' fees) incurred by directors and officers in advance of the final disposition of such action, suit or proceeding. In addition, Section 145 provides that a corporation has the power to purchase and maintain insurance on behalf of its directors and officers against any liability asserted against them and incurred by them in their capacity as a director or officer, or arising out of their status as such, whether or not the corporation would have the power to indemnify the director or officer against such liability under Section 145.

Our amended and restated certificate of incorporation provides that, to the fullest extent permitted by the Delaware General Corporation Law, (1) a director shall not be personally liable to ADVENTRX or its stockholders for monetary damages for breach of fiduciary duty as a director, and (2) we shall indemnify any director or officer made a party to an action or proceeding, whether criminal, civil, administrative or investigative, by reason of the fact of such person's current or prior service as a director or officer of ADVENTRX, any predecessor of ADVENTRX or any other enterprise per ADVENTRX's or any predecessor to ADVENTRX's request.

Our amended and restated bylaws provide that (a) we shall indemnify our directors and officers to the maximum extent and in the manner permitted by the Delaware General Corporation Law against expenses (including attorneys' fees), judgments, fines, ERISA excise taxes, settlements and other amounts actually and reasonably incurred in connection with any proceeding, whether civil, criminal, administrative or investigative, arising by reason of the fact that such person is or was an agent of the corporation, subject to certain limited exceptions, (b) we shall advance expenses incurred by any director or officer prior to the final disposition of any proceeding to which the director or officer was or is or is threatened to be made a party promptly following a request therefore, subject to certain limited exceptions, and (c) the rights conferred in our bylaws are not exclusive.

We have entered into indemnification agreements with each of our directors and executive officers to give such directors and officers additional contractual assurances regarding the scope of the indemnification set forth in our certificate of incorporation and bylaws and to provide additional procedural protections. These agreements, among other things, provide that we will indemnify our directors and executive officers for expenses (including attorneys' fees), judgments, fines, penalties and amounts paid in settlement (including all interest, assessments and other charges paid or payable in connection therewith) actually and reasonably incurred by a director or executive officer in connection with any action or proceeding to which such person was, is or is threatened to be made a party, a witness or other participant by reason of such person's services as a director or executive officer of ADVENTRX, any of ADVENTRX's subsidiaries or any other company or enterprise to which the person provides services at ADVENTRX's request, and any federal, state, local or foreign taxes imposed on the director or executive officer as a result of the actual or deemed receipt of any payments under the indemnification agreements.

In addition, the indemnification agreements provide that, upon the request of a director or executive officer, we shall advance expenses (including attorneys' fees) to the director or officer. We intend to enter into indemnification agreements with any new directors and executive officers in the future.

We have also obtained an insurance policy covering our directors and officers with respect to certain liabilities, including liabilities arising under the Securities Act.

ITEM 15. RECENT SALES OF UNREGISTERED SECURITIES

During the three-year period preceding the date of the filing of this registration statement, we have issued securities in the transactions described below without registration under the Securities Act. These securities were offered and sold by us in reliance upon exemptions from the registration statement requirements provided by Section 4(2) of the Securities Act or Regulation D under the Securities Act as transactions by an issuer not involving a public offering. All common stock share and per share amounts in this prospectus supplement have been adjusted to reflect the effect of the 1-for-25 reverse split of our common stock, effected on April 23, 2010.

On June 12, 2009, in connection with the closing of our registered direct offering of convertible preferred stock and warrants to purchase common stock, we issued to Rodman & Renshaw, LLC, or its designee, as partial consideration for its services as placement agent, warrants to purchase an aggregate of up to 36,071 shares of our common stock at an exercise price of \$3.75 per share. The warrants became exercisable on December 13, 2009 and may be exercised at any time on or before June 12, 2014.

On July 6, 2009, in connection with the closing of our registered direct offering of convertible preferred stock, we issued to Rodman & Renshaw, LLC, or its designee, as partial consideration for its services as placement agent, warrants to purchase an aggregate of up to 19,007 shares of our common stock at an exercise price of \$4.475 per share. The warrants became exercisable on January 7, 2010 and are exercisable at any time on or before July 6, 2014.

On August 10, 2009, in connection with the closing of our registered direct offering of convertible preferred stock, we issued to Rodman & Renshaw, LLC, or its designee, as partial consideration for its services as placement agent, warrants to purchase an aggregate of up to 14,183 shares of our common stock at an exercise price of \$4.0625 per share. The warrants became exercisable on February 10, 2010 and are exercisable at any time beginning on or before August 10, 2014.

On October 9, 2009, in connection with the closing of our registered direct offering of convertible preferred stock and warrants to purchase common stock, we issued to Rodman & Renshaw, LLC, or its designee, as partial consideration for its services as placement agent, warrants to purchase an aggregate of up to 144,000 shares of our common stock at an exercise price of \$5.875 per share. The warrants are exercisable at any time on or after April 7, 2010 and on or before October 6, 2014.

On January 7, 2010, in connection with the closing of our registered direct offering of convertible preferred stock and warrants to purchase common stock, we issued to Rodman & Renshaw, LLC, or its designee, as partial consideration for its services as placement agent, warrants to purchase an aggregate of up to 99,696 shares of our common stock at an exercise price of \$11.9125 per share. The warrants are exercisable at any time on or after July 7, 2010 and on or before June 3, 2014.

On January 11, 2011, in connection with the closing of our registered direct offering of convertible preferred stock and warrants to purchase common stock, we issued to Rodman & Renshaw, LLC, or its designee, as partial consideration for its services as placement agent, warrants to purchase an aggregate of up to 409,228 shares of our common stock at an exercise price of \$3.44 per share. The warrants were exercisable upon issuance and are exercisable at any time on or before April 1, 2015.

ITEM 16. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES

(a) Exhibits

A list of exhibits filed herewith is contained in the exhibit index that immediately precedes such exhibits and is incorporated herein by reference.

(b) Financial Statement Schedules

All financial statement schedules are omitted because they are not applicable, the amounts involved are not significant or the required information is shown in the financial statements or notes thereto.

ITEM 17. UNDERTAKINGS

(a) The undersigned registrant hereby undertakes:

(1) To file, during any period in which offers or sales are being made, a post-effective amendment to this registration statement:

(i) To include any prospectus required by Section 10(a)(3) of the Securities Act of 1933;

(ii) To reflect in the prospectus any facts or events arising after the effective date of the registration statement (or the most recent post-effective amendment thereof) which, individually or in the aggregate, represent a fundamental change in the information set forth in the registration statement. Notwithstanding the foregoing, any increase or decrease in volume of securities offered (if the total dollar value of securities offered would not exceed that which was registered) and any deviation from the low or high end of the estimated maximum offering range may be reflected in the form of prospectus filed with the Commission 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;

(2) That, for the purpose of determining any liability under the Securities Act of 1933, each such post-effective amendment shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial *bona fide* offering thereof;

(3) To remove from registration by means of a post-effective amendment any of the securities being registered which remain unsold at the termination of the offering;

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

(A) 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

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

(5) That, for the purpose of determining liability of the registrant under the Securities Act of 1933 to any purchaser in the initial distribution of the securities, the undersigned registrant undertakes that in a primary offering of securities of the undersigned registrant pursuant to this registration statement, regardless of the underwriting method used to sell the securities to the purchaser, if the securities are offered or sold to such purchaser by means of any of the following communications, the undersigned registrant will be a seller to the purchaser and will be considered to offer or sell such securities to such purchaser:

(i) Any preliminary prospectus or prospectus of the undersigned registrant relating to the offering required to be filed pursuant to Rule 424;

(ii) Any free writing prospectus relating to the offering prepared by or on behalf of the undersigned Registrant or used or referred to by the undersigned registrant;

(iii) The portion of any other free writing prospectus relating to the offering containing material information about the undersigned registrant or its securities provided by or on behalf of an undersigned registrant; and

(iv) Any other communication that is an offer in the offering made by the undersigned registrant to the purchaser.

(b) Insofar as indemnification for liabilities arising under the Securities Act of 1933 may be permitted to directors, officers and controlling persons of the registrant pursuant to the foregoing provisions, or otherwise, the registrant has been advised that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in the 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 Act and will be governed by the final adjudication of such issue.

SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, the registrant has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized in the City of San Diego, State of California, on April 28, 2011.

ADVENTRX PHARMACEUTICALS, INC.

By: /s/ Patrick L. Keran
Patrick L. Keran
President and Chief Operating Officer

Pursuant to the requirements of the Securities Act of 1933, 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/ Brian M. Culley</u> Brian M. Culley	Chief Executive Officer (Principal Executive Officer)	April 28, 2011
<u>/s/ Patrick L. Keran</u> Patrick L. Keran	President and Chief Operating Officer (Principal Financial Officer)	April 28, 2011
<u>/s/ Brandi L. Roberts</u> Brandi L. Roberts	Vice President, Finance (Principal Accounting Officer)	April 28, 2011
<u>*</u> Jack Lief	Chair of the Board	April 28, 2011
<u>*</u> Michael M. Goldberg	Director	April 28, 2011
<u>Odysseas D. Kostas</u>	Director	
<u>*</u> Mark J. Pykett	Director	April 28, 2011
<u>*</u> Eric K. Rowinsky	Director	April 28, 2011
<u>Lewis J. Shuster</u>	Director	
<u>*By: /s/ Patrick L. Keran</u> Patrick L. Keran, Attorney-in-Fact		

EXHIBIT INDEX

Exhibit	Description
2.1(1)	Agreement and Plan of Merger, dated April 7, 2006, among the registrant, Speed Acquisition, Inc., SD Pharmaceuticals, Inc. and certain individuals named therein (including exhibits thereto)
2.2+(2)	Agreement and Plan of Merger, dated February 12, 2011, by and among the registrant, SRX Acquisition Corporation, SynthRx, Inc. and, solely with respect to Sections 2 and 8, the Stockholders' Agent
3.1(3)	Amended and Restated Certificate of Incorporation of the registrant
3.2(4)	Certificate of Amendment to the Amended and Restated Certificate of Incorporation of the registrant dated October 5, 2009
3.3(5)	Certificate of Amendment to the Amended and Restated Certificate of Incorporation of the registrant, dated April 23, 2010
3.4(6)	Certificate of Designation of Preferences, Rights and Limitations of 0% Series A Convertible Preferred Stock
3.5(7)	Certificate of Designation of Preferences, Rights and Limitations of 5% Series B Convertible Preferred Stock
3.6(8)	Certificate of Designation of Preferences, Rights and Limitations of 5% Series C Convertible Preferred Stock
3.7(9)	Certificate of Designation of Preferences, Rights and Limitations of 4.25660% Series D Convertible Preferred Stock
3.8(10)	Certificate of Designation of Preferences, Rights and Limitations of 3.73344597664961% Series E Convertible Preferred Stock
3.9(11)	Certificate of Designation of Preferences, Rights and Limitations of 2.19446320054018% Series F Preferred Stock
3.10(12)	Amended and Restated Bylaws of the registrant (formerly known as Biokeys Pharmaceuticals, Inc.)
4.1(9)	Form of Securities Purchase Agreement, dated October 6, 2009, governing the issuance and sale of the registrant's 4.25660% Series D Convertible Preferred Stock and 5-year common stock purchase warrants
4.2(9)	Form of Common Stock Purchase Warrant issued on October 9, 2009 by the registrant to the purchasers of the registrant's 4.25660% Series D Convertible Preferred Stock
5.1(17)	Opinion of DLA Piper LLP (US)
10.1(13)	Securities Purchase Agreement, dated July 21, 2005, among the registrant and the Purchasers (as defined therein)
10.2(13)	Rights Agreement, dated July 27, 2005, among the registrant, the Icahn Purchasers and Viking (each as defined therein)
10.3(14)	First Amendment to Rights Agreement, dated September 22, 2006, among the registrant and the Icahn Purchasers (as defined therein)
10.4(15)	Second Amendment to Rights Agreement, dated February 25, 2008, among the registrant and the Icahn Purchasers (as defined therein)
10.5(16)	Third Amendment to Rights Agreement, dated August 26, 2009, among the registrant and Icahn Purchasers (as defined therein)
10.6(13)	Form of \$2.26 Common Stock Warrant issued on July 27, 2005 to Icahn Partners LP, Icahn Partners Master Fund LP, High River Limited Partnership, Viking Global Equities LP and VGE III Portfolio Ltd.
10.7(13)	Form of \$2.26 Common Stock Warrant issued on July 27, 2005 to North Sound Legacy Institutional Fund LLC and North Sound Legacy International Ltd.

Exhibit	Description
10.8(6)	Engagement Letter Agreement, dated June 7, 2009, by and between the registrant and Rodman & Renshaw, LLC
10.9(6)	Securities Purchase Agreement, date June 8, 2009, governing the issuance and sale of the registrant's 0% Series A Convertible Preferred Stock and 5-year common stock purchase warrants
10.10(6)	Form of Common Stock Purchase Warrant issued on June 12, 2009 by the registrant to the purchasers of the registrant's 0% Series A Convertible Preferred Stock and to Rodman & Renshaw, LLC
10.11(7)	Engagement Letter Agreement, dated June 26, 2009, by and between the registrant and Rodman & Renshaw, LLC
10.12(7)	Securities Purchase Agreement, dated June 29, 2009, governing the issuance and sale of the registrant's 5% Series B Convertible Preferred Stock
10.13(7)	Form of Common Stock Purchase Warrant issued on July 6, 2009 by the registrant to Rodman & Renshaw, LLC
10.14(8)	Engagement Letter Agreement, dated August 4, 2009, by and between the registrant and Rodman & Renshaw, LLC
10.15(8)	Securities Purchase Agreement, dated August 5, 2009, governing the issuance and sale of the registrant's 5% Series C Convertible Preferred Stock
10.16(8)	Form of Common Stock Purchase Warrant issued on August 10, 2009 by the registrant to Rodman & Renshaw, LLC
10.17(17)	Engagement Letter Agreement, dated September 24, 2009, by and between the registrant and Rodman & Renshaw, LLC
10.18(9)	Engagement Letter Agreement, dated September 29, 2009, by and between the registrant and Rodman & Renshaw, LLC
10.19(9)	Form of Common Stock Purchase Warrant issued on October 9, 2009 by the registrant to Rodman & Renshaw, LLC
10.20(10)	Engagement Letter Agreement, dated January 3, 2010, by and between the registrant and Rodman & Renshaw, LLC
10.21(10)	Securities Purchase Agreement, dated as of January 4, 2010, governing the issuance and sale of the registrant's 3.73344597664961% Series E Convertible Preferred Stock and 30-month common stock purchase warrants
10.22(10)	Form of Common Stock Purchase Warrant issued on January 7, 2010 by the registrant to the purchasers of the registrant's 3.73344597664961% Series E Convertible Preferred Stock and to Rodman & Renshaw, LLC
10.23(5)	Engagement Letter Agreement, dated April 29, 2010, by and between the registrant and Rodman & Renshaw, LLC
10.24(5)	Form of Securities Purchase Agreement, dated May 2, 2010 governing the issuance and sale of the registrant's 2.19446320054018% Series F Convertible Preferred Stock and 5-year and 1-year common stock purchase warrants
10.25(5)	Form of Series A and B Common Stock Purchase Warrants issued on May 6, 2010 by the registrant to the purchasers of the registrant's 2.19446320054018% Series F Convertible Preferred Stock
10.26(18)	Engagement Letter Agreement, dated January 5, 2011, by and between the registrant and Rodman & Renshaw, LLC
10.27(18)	Form of Securities Purchase Agreement, dated January 6, 2011 governing the issuance and sale of the registrant's common stock and 5-year and 1-year common stock purchase warrants

Exhibit	Description
10.28(18)	Form of [Series A/B] Common Stock Purchase Warrant issued on January 11, 2011 by the registrant to the purchasers of the registrant's common stock and to Rodman & Renshaw, LLC
10.29(19)	2005 Equity Incentive Plan
10.30(20)	Form of Stock Option Agreement under the 2005 Equity Incentive Plan
10.31(21)	Form of Stock Option Agreement under the 2005 Equity Incentive Plan (for director option grants beginning in 2008)
10.32(22)	Form of Stock Option Agreement under the 2005 Equity Incentive Plan (for option grants to employees approved in March 2008)
10.33(3)	Form of Restricted Share Award Agreement under the 2005 Equity Incentive Plan
10.34(23)	2008 Omnibus Incentive Plan
10.35(24)	Form of Notice of Grant of Restricted Stock Units under the 2008 Omnibus Incentive Plan (for grants to employees in January 2009)
10.36(24)	Form of Restricted Stock Units Agreement under the 2008 Omnibus Incentive Plan
10.37(25)	Form of Non-Statutory Stock Option Grant Agreement (for directors) under the 2008 Omnibus Incentive Plan
10.38(25)	Form of Non-Statutory/Incentive Stock Option Grant Agreement (for consultants/employees) under the 2008 Omnibus Incentive Plan
10.39(26)	Form of Incentive Stock Option Grant Agreement under the 2008 Omnibus Incentive Plan (for grant to Brian M. Culley in July 2009)
10.40(26)	Form of Incentive Stock Option Grant Agreement under the 2008 Omnibus Incentive Plan (for grant to Patrick L. Keran in July 2009)
10.41(27)	Form of letter, dated January 20, 2010, modifying options granted to Brian M. Culley and Patrick L. Keran in July 2009
10.42(27)	Form of Incentive Stock Option Grant Agreement under the 2008 Omnibus Incentive Plan (for grant to Brian M. Culley in January 2010)
10.43(27)	Form of Incentive Stock Option Grant Agreement under the 2008 Omnibus Incentive Plan (for grant to Patrick L. Keran in January 2010)
10.44(21)	License Agreement, dated December 10, 2005, among SD Pharmaceuticals, Latitude Pharmaceuticals and Andrew Chen, including a certain letter, dated November 20, 2007, clarifying the scope of rights thereunder
10.45(28)	License Agreement, dated March 25, 2009, among the registrant, SD Pharmaceuticals, Inc. and Shin Poong Pharmaceutical Co., Ltd.
10.46(29)	Standard Multi-Tenant Office Lease — Gross, dated June 3, 2004, between the registrant and George V. Casey & Ellen M. Casey, Trustees of the Casey Family Trust dated June 22, 1998
10.47(3)	First Amendment to the Standard Multi-Tenant Office Lease — Gross, dated June 3, 2004 between the registrant and George V. & Ellen M. Casey, Trustees of the Casey Family Trust dated June 22, 1998
10.48(30)	Second Amendment to Standard Mutli-Tenant Office Lease — Gross, dated July 22, 2009, by and among Westcore Mesa View, LLC, DD Mesa View LLC and the registrant
10.49(31)	Third Amendment to Standard Multi-Tenant Office Lease — Gross, dated December 10, 2009, by and among Westcore Mesa View, LLC, DD Mesa View, LLC and the registrant
10.50(32)	Fourth Amendment to Standard Multi-Tenant Office Lease — Gross, dated February 4, 2010, by and among Westcore Mesa View, LLC, DD Mesa View, LLC and the registrant
10.51(33)	Offer letter, dated November 15, 2004, to Brian M. Culley
10.52(24)	Retention and Incentive Agreement, dated January 28, 2009 between the registrant and Brian M. Culley



Exhibit	Description
10.53#(28)	Retention and Incentive Agreement, dated January 28, 2009, between the registrant and Patrick L. Keran
10.54#(32)	Consulting Agreement, effective as of July 15, 2009, and Amendment to Consulting Agreement, effective as of December 31, 2009, between the registrant and Michele L. Yelmene
10.55#(26)	2009 Mid-Year Incentive Plan for Brian M. Culley and Patrick L. Keran
10.56#(26)	Retention and Severance Plan (as of July 21, 2009) for Brian M. Culley and Patrick L. Keran
10.57#(27)	2010 Incentive Plan for Brian M. Culley and Patrick L. Keran
10.58#(32)	Consulting Agreement, effective as of November 23, 2009, between the registrant and Eric K. Rowinsky
10.59#(34)	Director Compensation Policy, adopted June 21, 2006
10.60#(32)	Director Compensation Policy, adopted January 25, 2010
10.61(35)	Form of Director and Officer Indemnification Agreement
10.62#(36)	Offer letter, dated February 11, 2011, to Brandi L. Roberts
10.63†(2)	Stockholders' Voting and Transfer Restriction Agreement, dated February 12, 2011, by and among the registrant, each of the principal stockholders of SynthRx, Inc. and, solely with respect to Section 3(c), the Stockholders' Agent
10.64†(2)	License Agreement, dated June 8, 2004, between SynthRx, Inc. and CytRx Corporation, as amended by that certain Letter Agreement Re: Amendment to License Agreement, dated August 3, 2006, and that certain Agreement and Amendment No. 2 to License Agreement, dated December 1, 2010
21.1	List of Subsidiaries
23.1	Consent of J.H. Cohn LLP, Independent Registered Public Accounting Firm
23.2	Consent of DLA Piper LLP (US) (included in Exhibit 5.1)

† Indicates that confidential treatment has been requested or granted to certain portions, which portions have been omitted and filed separately with the SEC

Indicates management contract or compensatory plan

- (1) Filed with the registrant's Amendment No. 1 to Current Report on Form 8-K/A on May 1, 2006 (SEC file number 001-32157-06796248)
- (2) Filed with the registrant's Current Report on Form 8-K on April 11, 2011 (SEC file number 001-32157-11752769)
- (3) Filed with the registrant's Annual Report on Form 10-K on March 16, 2006 (SEC file number 001-32157-06693266)
- (4) Filed with the registrant's Current Report on Form 8-K on October 13, 2009 (SEC file number 001-32157-091115090)
- (5) Filed with the registrant's Current Report on Form 8-K on April 26, 2010 (SEC file number 001-32157-10769058)
- (6) Filed with the registrant's Current Report on Form 8-K on June 8, 2009 (SEC file number 001-32157-09878961)
- (7) Filed with the registrant's Current Report on Form 8-K on June 30, 2009 (SEC file number 001-32157-09917820)
- (8) Filed with the registrant's Current Report on Form 8-K on August 5, 2009 (SEC file number 001-32157-09989205)
- (9) Filed with the registrant's Amendment No. 3 to the Registration Statement on Form S-1 on October 5, 2009 (SEC file number 333-160778-091107945)
- (10) Filed with the registrant's Current Report on Form 8-K on January 4, 2010 (SEC file number 001-32157- 10500379)
- (11) Filed with the registrant's Current Report on Form 8-K on May 3, 2010 (SEC file number 001-32157-10790486)
- (12) Filed with the registrant's Current Report on Form 8-K on December 15, 2008 (SEC file number 001-32157-081249921)

- (13) Filed with the registrant's Quarterly Report on Form 10-Q on August 12, 2005 (SEC file number 001-32157-051022046)
- (14) Filed with the registrant's Current Report on Form 8-K on September 22, 2006 (SEC file number 001-32157-061103268)
- (15) Filed with the registrant's Current Report on Form 8-K on February 25, 2008 (SEC file number 001-32157 08638638)
- (16) Filed with the registrant's Current Report on Form 8-K on September 1, 2009 (SEC file number 001-32157-091049161)
- (17) Filed with the registrant's Amendment No. 2 to the Registration Statement on Form S-1 on September 25, 2009 (SEC file number 333-160778-091087750)
- (18) Filed with the registrant's Current Report on Form 8-K on January 7, 2011 (SEC file number 001-32157-11515655)
- (19) Filed with the registrant's Annual Report on Form 10-K on March 15, 2007 (SEC file number 001-32157-07697283)
- (20) Filed with the registrant's Registration Statement on Form S-8 on July 13, 2005 (SEC file number 333-126551-05951362)
- (21) Filed with registrant's Annual Report on Form 10-K on March 17, 2008 (SEC file number 001-32157-08690952)
- (22) Filed with the registrant's Quarterly Report on Form 10-Q on May 12, 2008 (SEC file number 001-32157-08820541)
- (23) Filed with the registrant's Current Report on Form 8-K on June 2, 2008 (SEC file number 001-32157-08874724)
- (24) Filed with the registrant's Current Report on Form 8-K on February 2, 2009 (SEC file number 001-32157- 09561715)
- (25) Filed with the registrant's Quarterly Report on Form 10-Q on August 11, 2008 (SEC file number 001-32157-081005744)
- (26) Filed with the registrant's Current Report on Form 8-K on July 22, 2009 (SEC file number 001-32157-09957353)
- (27) Filed with the registrant's Current Report on Form 8-K on January 26, 2010 (SEC file number 001-32157- 10547818)
- (28) Filed with the registrant's Quarterly Report on Form 10-Q on May 15, 2009 (SEC file number 001-32157-09878961)
- (29) Filed with the registrant's Quarterly Report on Form 10-QSB on August 10, 2004 (SEC file number 001-32157-04963741)
- (30) Filed with the registrant's Current Report on Form 8-K on August 20, 2009 (SEC file number 001-32157-091025631)
- (31) Filed with the registrant's Current Report on Form 8-K on December 24, 2009 (SEC file number 001-32157-091260100)
- (32) Filed with the registrant's Annual Report on Form 10-K on March 18, 2010 (SEC file number 001-32157-10692317)
- (33) Filed with the registrant's Annual Report on Form 10-KSB on March 31, 2005 (SEC file number 001-32157-05719975)
- (34) Filed with the registrant's Current Report on Form 8-K on June 23, 2006 (SEC file number 001-32157-06922676)
- (35) Filed with the registrant's Current Report on Form 8-K on October 23, 2006 (SEC file number 001-32157-061156993)
- (36) Filed with the registrant's Current Report on Form 8-K on March 22, 2011 (SEC file number 001-32157-11704394)

SUBSIDIARIES

Subsidiary	Jurisdiction of Incorporation
SD Pharmaceuticals, Inc. SynthRx, Inc.	Delaware Delaware

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in this Post-Effective Amendment No. 3 to the Registration Statements on Form S-1 (No. 333-160778 and No. 333-162361) and related Prospectus of our report dated March 10, 2011 on our audits of the consolidated financial statements of ADVENTRX Pharmaceuticals, Inc. and Subsidiaries (a development stage enterprise) as of December 31, 2010 and 2009 and for the years then ended and for the period from January 1, 2002 through December 31, 2010, which report appears in the Annual Report on Form 10-K of ADVENTRX Pharmaceuticals, Inc. and Subsidiaries for the year ended December 31, 2010. We also consent to the reference to our firm under the caption "Experts."

/s/ J.H. COHN LLP
San Diego, California
April 28, 2011