

INFINITY PHARMACEUTICALS, INC.

Form S-3

September 28, 2012

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As filed with the Securities and Exchange Commission on September 28, 2012

Registration No. 333-

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM S-3
REGISTRATION STATEMENT

UNDER

THE SECURITIES ACT OF 1933

INFINITY PHARMACEUTICALS, INC.

(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction of

33-0655706

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incorporation or organization)

(I.R.S. Employer
Identification Number)

780 Memorial Drive

Cambridge, Massachusetts 02139

(617) 453-1000

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

Lawrence E. Bloch, M.D., J.D.

Executive Vice President, Chief Financial Officer and Chief Business Officer

Infinity Pharmaceuticals, Inc.

780 Memorial Drive

Cambridge, Massachusetts 02139

(617) 453-1000

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

Copies to:

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Approximate date of commencement of proposed sale to the public: From time to time after this registration statement becomes effective.

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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.

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, 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. (Check one):

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

CALCULATION OF REGISTRATION FEE

| Title of each class of securities to be registered | Amount to be Registered(1) | Proposed Maximum Offering Price Per Unit(2) | Proposed Maximum Aggregate Offering Price | Amount of Registration Fee |
|--|----------------------------|---|---|----------------------------|
| Common Stock, \$0.001 par value per share (3) | 11,416,565(4) | \$23.54 | \$268,745,941 | \$30,799(5) |

- (1) Pursuant to Rule 416 under the Securities Act, this Registration Statement also covers such additional number of additional shares of common stock issuable upon stock splits, stock dividends, dividends or other distribution, recapitalization or similar events with respect to the 11,416,565 shares of common stock being registered pursuant to this registration statement.
- (2) 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 Rights Market on September 25, 2012.
- (3) The Common Stock includes associated Series A Junior Participating Preferred Stock Rights pursuant to the Rights Agreement between the Registrant and American Stock Transfer & Trust Company dated February 13, 2003, as amended on April 11, 2006 and November 19, 2008.
- (4) Pursuant to Rule 429 under the Securities Act and as further described below under the heading Statement Pursuant to Rule 429(b), 6,000,000 shares of common stock previously registered under the registrant's Registration Statement on Form S-3 filed by the registrant on December 17, 2008 (File No. 333-156246), as amended by Pre-Effective Amendment No. 1 to Form S-3 filed by the registrant on January 9, 2009 (the Prior Registration Statement), which was declared effective on January 13, 2009, have not yet been sold by the selling stockholders described in the Prior Registration Statement and are being included in the prospectus contained herein.

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- (5) Pursuant to Rule 457(p) under the Securities Act, the registrant is applying the registration fee of \$3,300.41 paid in connection with the Prior Registration Statement as all of the securities registered thereunder remain unsold, to partially offset the registration fee due hereunder.

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 or until the registration statement shall become effective on such date as the Commission, acting pursuant to said Section 8(a), may determine.

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STATEMENT PURSUANT TO RULE 429(b)

The registrant is filing a single prospectus in this registration statement pursuant to Rule 429 under the Securities Act, in order to satisfy the requirements of the Securities Act and the rules and regulations thereunder for this offering and the offering of up to 6,000,000 shares of common stock registered on the Prior Registration Statement. Pursuant to Rule 429, the prospectus included in this registration statement relates to: (i) the resale of up to 6,000,000 shares of the registrant's common stock previously registered but not sold by certain named selling stockholders under the Prior Registration Statement and (ii) the resale of up to 5,416,565 shares of the registrant's common stock by a certain other named selling stockholder identified in this registration statement. The combined prospectus in this registration statement, which is a new registration statement, also constitutes a post-effective amendment to the Prior Registration Statement. Such post-effective amendment shall hereafter become effective concurrently with the effectiveness of this registration statement and in accordance with Section 8(c) of, and Rule 429 under, the Securities Act. An aggregate registration fee of \$3,300.41 was paid in connection with the registration of shares on the Prior Registration Statement, and no shares were sold under the Prior Registration Statement. Accordingly, pursuant to Rule 457(p) under the Securities Act, the registrant has used this amount to partially offset the registration fee due hereunder.

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

Subject to completion,

dated September 28, 2012

PROSPECTUS

INFINITY PHARMACEUTICALS, INC.
11,416,565 SHARES OF COMMON STOCK

This prospectus relates to resales of shares of common stock held by (i) Beacon Company, a Delaware general partnership, and Rosebay Medical Company L.P., a Delaware limited partnership, as transferees of Purdue Pharma L.P. and Purdue Pharmaceutical Products L.P., each a Delaware limited partnership, that were issued by Infinity Pharmaceuticals, Inc. in a private placement completed on November 19, 2008 and January 7, 2009, and (ii) Purdue Pharma L.P., a Delaware limited partnership, that were issued by Infinity Pharmaceuticals, Inc. in a private placement completed on September 7, 2012.

We will not receive any proceeds from the sale of the shares.

The selling stockholders identified in this prospectus, or their permitted pledgees, donees, transferees or other successors-in-interest, may offer the shares from time to time through public or private transactions at prevailing market prices, at prices related to prevailing market prices or at privately negotiated prices.

Our common stock is listed on the NASDAQ Global Select Market under the symbol INFI. On September 27, 2012, the reported last sale price of our common stock on the NASDAQ Global Select Market was \$23.29 per share. You are urged to obtain current market quotations for our common stock.

Investing in our common stock involves a high degree of risk. See Risk Factors beginning on page 3 of this prospectus.

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 _____, 2012.

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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 that you should consider before investing in our common stock. You should read the entire prospectus carefully, especially the risks of investing in our common stock discussed under Risk Factors.

INFINITY PHARMACEUTICALS, INC.

Our Business

We are an innovative drug discovery and development company seeking to discover, develop and deliver to patients best-in-class medicines designed to address diseases with significant unmet need. We combine proven scientific expertise with a passion for developing novel small molecule drugs that target emerging disease pathways. Our programs focused on the inhibition of phosphoinositide-3-kinase, the heat shock protein 90 chaperone system, and fatty acid amide hydrolase are evidence of our innovative approach to drug discovery and development. We have worldwide rights to all of our development candidates and early discovery programs, subject to certain financial obligations to our current and former development partners.

PI3K Inhibitor Program. The phosphoinositide-3-kinases, or PI3Ks, are a family of enzymes involved in key immune cell functions, including cell proliferation and survival, cell differentiation and cellular trafficking. PI3K-delta and PI3K-gamma, two isoforms of PI3K, play key roles in inflammatory and autoimmune diseases. Additionally, in certain hematologic malignancies, PI3K-gamma and PI3K-delta contribute to the survival and proliferation of cancer cells. Therefore, inhibition of PI3K-delta and PI3K-gamma may have therapeutic potential across a broad range of inflammatory diseases and hematologic malignancies. Our lead compound in this program is IPI-145, a potent, oral inhibitor of PI3K-delta and PI3K-gamma, for which we are conducting clinical studies in both inflammation and hematologic malignancies. We believe IPI-145 is the first delta-gamma inhibitor in the clinic. We are also conducting discovery activities to identify additional PI3K-delta and/or PI3K-gamma inhibitors, which we believe will optimize the development of our portfolio of PI3K inhibitors across a broad range of indications.

Hsp90 Inhibitor Program. Retaspimycin hydrochloride (HCl), also known as IPI-504, is a novel, potent and selective inhibitor of heat shock protein 90, or Hsp90. Cancer cells depend on Hsp90 to maintain many proteins critical for cancer growth, proliferation and survival in a functional state. Certain anticancer therapies may enhance the dependency of cancer cells on Hsp90. Therefore, combining an Hsp90 inhibitor with another anticancer therapy may enhance cancer cell killing. Retaspimycin HCl is currently being evaluated in two phase 2 clinical studies including a randomized, double-blind, placebo-controlled Phase 2 clinical trial in combination with docetaxel, a chemotherapy, compared to placebo and docetaxel in approximately 200 patients with second- or third-line non-small cell lung cancer, or NSCLC, who are naive to docetaxel treatment and have a history of heavy smoking.

FAAH Inhibitor Program. In July 2012, we reacquired from Purdue Pharmaceutical Products L.P. and its associated company, Mundipharma International Corporation Limited, the global development and commercialization rights for products arising out of a program directed toward fatty acid amide hydrolase, or FAAH. It is believed that inhibition of FAAH may enable the body to bolster its own analgesic and anti-inflammatory response, and may have applicability in a broad range of painful or inflammatory conditions. The lead compound in our FAAH program is IPI-940, a novel, orally available inhibitor of FAAH with potential application for the treatment of a broad range of painful or inflammatory diseases.

Company Information

We were incorporated in California on March 22, 1995, under the name IRORI and, in 1998, we changed our name to Discovery Partners International, Inc., or DPI. In July 2000, we reincorporated in Delaware. On September 12, 2006, DPI completed a merger with Infinity Pharmaceuticals, Inc., or IPI, pursuant to which a wholly-owned subsidiary of DPI merged with and into IPI. IPI was the surviving corporation in the merger, changed its name to Infinity Discovery, Inc. and became a wholly owned subsidiary of DPI. In addition, we changed our corporate name from Discovery Partners International, Inc. to Infinity Pharmaceuticals, Inc., and our ticker symbol on the NASDAQ Global Market to INFI. Our common stock currently trades on the NASDAQ Global Select Market.

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Our principal executive offices are located at 780 Memorial Drive, Cambridge, Massachusetts 02139 and our telephone number at that address is (617) 453-1000. Our website is located at www.infi.com. We regularly use our website to post information regarding our business, product development programs and governance, and we encourage you to use our website, particularly in the section entitled "Investors/Media," as a source of information about us. We have not incorporated by reference into this prospectus the information on our website and you should not consider it to be a part of this document. Our website address is included as an inactive textual reference only.

Unless the context otherwise requires, references in this prospectus to "Infinity," "we," "us," and "our" refer to Infinity Pharmaceuticals, Inc. and its subsidiary.

We have not authorized anyone to provide you with information different from that contained or incorporated by reference in this prospectus. 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 is accurate only as of the date of this prospectus, regardless of the time of delivery of this prospectus or of any sale of common stock.

THE OFFERING

| | |
|--|---|
| Common Stock offered by selling stockholders | 11,416,565 shares |
| Use of proceeds | We will not receive any proceeds from the sale of the shares in the offering. |
| NASDAQ Global Select Market symbol | INFI |

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RISK FACTORS

Investing in our common stock involves significant risks. In addition to the other information included or incorporated by reference in this prospectus, you should carefully consider the risks described in Part II. Item 1A. Risk Factors in our Quarterly Report on Form 10-Q for the quarterly period ended June 30, 2012, which we have filed with the SEC and which is incorporated by reference herein, before making an investment decision. We caution you that the risks and uncertainties we have described, among others, could cause our actual results to differ materially from those expressed in forward-looking statements made by us or on our behalf in filings with the SEC, press releases, communications with investors and oral statements. We undertake no obligation to update any forward-looking statements, whether as a result of new information, future events or otherwise. You are advised, however, to consult any further disclosure we make in our reports filed with the SEC.

SPECIAL NOTE REGARDING FORWARD-LOOKING INFORMATION

This prospectus includes and incorporates forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, or the Securities Act, and Section 21E of the Securities Exchange Act of 1934, as amended, or the Exchange Act. Such forward-looking statements include statements about our expectations with respect to the possible achievement of discovery and development milestones, our future discovery and development efforts, our collaborations, our future operating results and financial position, our business strategy, and other objectives for future operations. We often use words such as anticipate, believe, estimate, expect, intend, may, plan, project, target, potential, will, would, could, should, continue, and other words and terms of similar meaning to help identify forward-looking statements, although not all forward-looking statements contain these identifying words. You also can identify them by the fact that they do not relate strictly to historical or current facts. There are a number of important risks and uncertainties that could cause actual results or events to differ materially from those indicated by forward-looking statements. These risks and uncertainties include those inherent in pharmaceutical research and development, such as adverse results in our drug discovery and clinical development activities, decisions made by the U.S. Food and Drug Administration and other regulatory authorities with respect to the development and commercialization of our drug candidates, our ability to obtain, maintain and enforce intellectual property rights for our drug candidates, our dependence on our alliance partners, our ability to obtain any necessary financing to conduct our planned activities, and other risk factors. Please refer to the section entitled Risk Factors of this prospectus and in any information incorporated by reference in this prospectus for a description of these risks and uncertainties as well as any other risk factors and cautionary statements described in the documents we file from time to time with the SEC, specifically our most recent Annual Report on Form 10-K, our Quarterly Reports on Form 10-Q and our Current Reports on Form 8-K. Unless required by law, we do not undertake any obligation to publicly update any forward-looking statements.

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We are filing the registration statement of which this prospectus is 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 will not receive any proceeds from the resale of shares by the selling stockholders. Each selling stockholder will pay any underwriting discounts and commissions and expenses incurred by such selling stockholder for brokerage, accounting, tax or legal services or any other expenses incurred by such selling stockholder in disposing of the 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 Global Select Market listing fees and fees and expenses of our counsel and our auditors.

SELLING STOCKHOLDERS

On November 19, 2008, we sold 4,000,000 shares of our common stock in a private placement to Purdue Pharma L.P. and Purdue Pharmaceutical Products L.P., which we refer to herein as the 2008 Initial Purchasers, in connection with our execution of a securities purchase agreement with such parties, which we refer to herein as the 2008 Purchase Agreement. Further, on January 7, 2009, we sold 2,000,000 shares of our common stock, and warrants to purchase 6,000,000 shares of our common stock, to the 2008 Initial Purchasers pursuant to the 2008 Purchase Agreement. All of such shares, as well as all of such warrants, were subsequently transferred through associated entities of the 2008 Initial Purchasers to Beacon Company, which we refer to herein as Beacon, and Rosebay Medical Company L.P., which we refer to herein as Rosebay. In accordance with the 2008 Purchase Agreement, we filed a Registration Statement on Form S-3 with the Securities and Exchange Commission on December 17, 2008, as amended by Amendment No. 1 to such Registration Statement on Form S-3 filed on January 9, 2009, to effect the registration of such shares and the shares issuable upon exercise of such warrants held by Beacon and Rosebay, which we refer to as the Prior Registration Statement. The warrants have since expired without having been exercised. We have included 6,000,000 shares of our common stock that remained unsold under the Prior Registration Statement in the number of shares offered by this prospectus.

On September 7, 2012, we sold 5,416,565 shares of our common stock in a private placement to Purdue Pharma L.P., or PPLP, pursuant to a securities purchase agreement we entered into with PPLP, Beacon and Rosebay, on July 17, 2012, which we refer to herein as the 2012 Purchase Agreement.

The table below sets forth, to our knowledge, certain information about PPLP, Beacon and Rosebay, which we refer to herein collectively as the selling stockholders, as of September 7, 2012. On September 7, 2012, 39,294,009 shares of our common stock were outstanding.

We do not know when or in what amounts the selling stockholders may offer shares for sale. The selling stockholders might not sell any or 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 or understandings with respect to the sale of any shares, we cannot estimate the number of shares that will be held by the selling stockholders after completion of this offering. However, for purposes of this table, we have assumed that, after completion of this offering, none of the shares covered by this prospectus will be held by the selling stockholders.

| Name of Selling Stockholder | Shares of Common Stock Beneficially Owned Prior to Offering | | Number of Shares of Common Stock Being Offered | Shares of Common Stock to be Beneficially Owned After Offering | |
|----------------------------------|---|------------|--|--|------------|
| | Number | Percentage | | Number | Percentage |
| Beacon Company (1) | 8,416,565 | 21.4% | 3,000,000 | 0 | * |
| Rosebay Medical Company L.P. (2) | 8,416,565 | 21.4% | 3,000,000 | 0 | * |
| Purdue Pharma L.P. | 5,416,565 | 13.8% | 5,416,565 | 0 | * |

* Less than one percent.

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(1) As of September 7, 2012, Beacon beneficially owned 8,416,565 shares, or 21.4%, of our common stock outstanding, which consists of (i) 3,000,000 shares held directly by Beacon and (ii) 5,416,565 shares held by PPLP. Beacon and Rosebay are the ultimate parents of PPLP, and as such, Beacon and Rosebay share power to vote or direct the vote and dispose or direct the disposition of the 5,416,565 shares held by PPLP. Beacon disclaims beneficial ownership of the securities held by PPLP except to the extent of its pecuniary interest therein.

(2) As of September 7, 2012, Rosebay beneficially owned 8,416,565 shares, or 21.4%, of our common stock outstanding, which consists of (i) 3,000,000 shares held directly by Rosebay and (ii) 5,416,565 shares held by PPLP. Rosebay and Beacon are the ultimate parents of PPLP, and as such, Rosebay and Beacon share power to vote or direct the vote and dispose or direct the disposition of the 5,416,565 shares held by PPLP. Rosebay disclaims beneficial ownership of the securities held by PPLP except to the extent of its pecuniary interest therein.

None of the selling stockholders nor any of their affiliates, officers, directors or holders of 5% or more of their respective share capital had held any position or office with us or any of our subsidiaries within the past three years.

Voting and Observer Rights

Pursuant to the 2012 Purchase Agreement, until September 7, 2017, the selling stockholders and each associated company holding shares of our common stock have agreed to be present at each regular or special meeting of our stockholders and to vote all of their shares of common stock as recommended by our board of directors in the proxy materials mailed to our stockholders in connection with such meeting, except that with respect to any proposal to amend our corporate charter or approve certain extraordinary transactions, all shares of common stock that are owned by those entities that were not acquired pursuant to the 2012 Purchase Agreement will be voted in proportion to the manner in which all of our stockholders (other than those entities) vote in respect of such proposal, regardless of the recommendation of our board of directors.

The 2008 Purchase Agreement gave the 2008 Initial Purchasers the right to appoint one representative to attend regular meetings of our board of directors, which right terminated upon entering into the 2012 Purchase Agreement.

Registration Rights

The 2012 Purchase Agreement also provides that any time in the period beginning January 1, 2013 and ending December 31, 2018, in the event we propose to make an underwritten offering of our common stock, subject to certain limitations, the selling stockholders will have certain rights, which require us, at the election of the selling stockholders, to use our reasonable best efforts to cause to be included in such underwritten offering common stock then held by the selling stockholders representing up to 20% of the total estimated maximum dollar amount of common stock proposed to be sold in such underwritten offering.

In addition, the selling stockholders agreed in the 2012 Purchase Agreement to enter into a lockup agreement if requested by us and/or the managing underwriters, placement agents or initial purchasers for any offering of our stock prior to December 31, 2013, pursuant to which the selling stockholders will agree not to, among other things, offer, sell or otherwise transfer or dispose of, directly or indirectly, any common stock held by the selling stockholders or to enter into any agreement that transfers, in whole or in part, any of the economic consequences of ownership of any common stock held by the selling stockholders, for a specified period of time requested by us, the managing underwriters, the placement agents or the initial purchasers. Pursuant to such provision and as requested by us, the selling stockholders entered into lockup agreements on substantially the terms set forth in an exhibit to the underwriting agreement we entered into on August 9, 2012 in connection with our offering of 6,095,000 shares of common stock.

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Termination and Revised Relationship Agreements

On July 17, 2012, we entered into termination and revised relationship agreements, which we refer to as the Termination and Revised Relationship Agreements, with Mundipharma International Corporation Limited, an associated company of the selling stockholders, or Mundipharma, and Purdue Pharmaceutical Products L.P., an associated company of the selling stockholders, or Purdue. The Termination and Revised Relationship Agreements terminated the strategic alliance agreements, which we refer to as the Strategic Alliance Agreements, that had governed the strategic alliance we had entered into with each of Mundipharma and Purdue in November 2008 to develop and commercialize pharmaceutical products. The agreement with Purdue focused on the development and commercialization in the United States of products targeting fatty acid amide hydrolase, or FAAH. The agreement with Mundipharma focused on the development and commercialization outside of the United States of all products and product candidates covered by the alliance, including those targeting FAAH. The alliance included product candidates that inhibit or target the Hedgehog pathway, FAAH, phosphoinositide-3-kinase and product candidates arising out of our early discovery projects in all disease fields that were conducted during the pendency of the Strategic Alliance Agreements.

Under the terms of the Termination and Revised Relationship Agreements:

all intellectual property rights that we had previously licensed to Mundipharma and Purdue to develop and commercialize products under the Strategic Alliance Agreements terminated, with the result that we have sole, worldwide development and commercialization rights to all product candidates that had previously been covered by the strategic alliance;

Mundipharma has no further obligation to provide research and development funding to us; and

we are obligated to pay Mundipharma and Purdue a 4% royalty in the aggregate (subject to reduction in accordance with the 2012 Purchase Agreement), on worldwide net sales of products that were covered by the alliance until such time as they have recovered all research and development expenses paid to us under the strategic alliance. After this cost recovery, we will owe: (i) Purdue a 1% royalty on net sales in the United States of products targeting FAAH that were subject to the strategic alliance, and (ii) Mundipharma a 1% royalty on net sales in the United States of all products that were subject to the strategic alliance other than those targeting FAAH.

Royalties are payable until the later to occur of the last-to-expire of specified patent rights and the expiration of non-patent regulatory exclusivities in a country, provided that if royalties are payable solely on the basis of non-patent regulatory exclusivity, each of the royalty rates is reduced by one-half. In addition, royalties payable under the Termination and Revised Relationship Agreements after Mundipharma and Purdue have recovered all research and development expenses paid to us are subject to reduction on account of third party royalty payments or patent litigation damages or settlements required to be paid by us, with any such reductions capped at 50% of the amounts otherwise payable during the applicable royalty payment period.

Each of the Termination and Revised Relationship Agreements expires when the parties thereto have no further obligations to each other thereunder.

Line of Credit Agreement

In connection with entering into the Strategic Alliance Agreements, we entered into a line of credit agreement in November 2008 with PPLP and Purdue, which we refer to as the Line of Credit Agreement. In March 2009, Purdue assigned its interest under the Line of Credit Agreement to PPLP. The Line of Credit Agreement provided for the borrowing by us of one or more unsecured loans up to an aggregate maximum principal amount of \$50 million. In November 2011, we borrowed \$50 million under this line of credit. The Line of Credit Agreement terminated in its entirety upon the closing of the private placement with PPLP on September 7, 2012, at which time PPLP converted and cancelled all of the principal and interest we owed to PPLP under the Line of Credit Agreement into shares of our common stock pursuant to the 2012 Purchase Agreement.

Rights Agreement

Under the terms of our Rights Agreement with American Stock Transfer & Trust Company, LLC, dated February 13, 2003, as amended to date, which we refer to as the Rights Agreement, Purdue, PPLP and their associated companies may own up to 33.3% of our fully-diluted common

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stock outstanding (which assumes the exercise or conversion of all exercisable or convertible securities then outstanding) without such ownership causing

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such parties to be deemed Acquiring Persons for purposes of the Rights Agreement and thereby triggering the stockholder rights under the Rights Agreement. Should Purdue, PPLP and their associated companies aggregate ownership percentage exceed 33.3% of our fully-diluted common stock outstanding as a result of an acquisition of common stock by us or the exercise or cancellation of outstanding securities that are exercisable, convertible or exchangeable for shares of common stock, the amendment to the Rights Agreement provides that such excess ownership shall not result in such parties being deemed Acquiring Persons for the purposes of the Rights Agreement.

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PLAN OF DISTRIBUTION

The shares covered by this prospectus may be offered and sold from time to time by the selling stockholders. The term selling stockholders includes donees, pledgees, transferees or other successors-in-interest selling shares received after the date of this prospectus from the selling stockholders as a gift, pledge, distribution or other non-sale related transfer. The selling stockholders will act independently of us in making decisions with respect to the timing, manner and size of each sale. Such sales may be made on one or more exchanges or in the over-the-counter market or otherwise, at prices and under terms then prevailing or at prices related to the then current market price or in negotiated transactions. The selling stockholders may sell their shares by one or more of, or a combination of, the following methods:

purchases by a broker-dealer as principal and resale by such broker-dealer for its own account pursuant to this prospectus;

ordinary brokerage transactions and transactions in which the broker solicits purchasers;

an over-the-counter distribution in accordance with the rules of The Nasdaq Stock Market;

in privately negotiated transactions;

in options transactions;

to or through underwriters;

through dealers or agents;

a block trade in which the broker or dealer so engaged will attempt to sell the securities as an agent but may position and resell a portion of the block as a principal to facilitate the transaction;

through a combination of these methods; and

by any other legally available means.

In addition, any shares that qualify for sale pursuant to Rule 144 may be sold under Rule 144 rather than pursuant to this prospectus.

To the extent required, this prospectus may be amended or supplemented from time to time to describe a specific plan of distribution. In connection with the distributions of shares or otherwise, the selling stockholders may enter into hedging transactions with broker-dealers or other financial institutions. In connection with such transactions, broker-dealers or other financial institutions may engage in short sales of the common stock in the course of hedging the positions they assume with the selling stockholders. The selling stockholders may enter into option or other transactions with broker-dealers or other financial institutions 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). The selling stockholders may also pledge shares to a broker-dealer or other financial institution, and, upon a default, such broker-dealer or other financial institution, may effect sales of the pledged shares pursuant to this prospectus (as supplemented or amended to reflect such transaction).

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In effecting sales, underwriters, broker-dealers or agents engaged by the selling stockholders may arrange for other underwriters or broker-dealers to participate. Underwriters, broker-dealers or agents may receive commissions, discounts or concessions from the selling stockholders in amounts to be negotiated immediately prior to the sale. Such discounts, concessions or commissions as to particular underwriters, broker-dealers or agents may be in excess of those customary on the types of transactions involved.

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In offering the shares covered by this prospectus, the selling stockholders and any broker-dealers who execute sales for the selling stockholders may be deemed to be underwriters within the meaning of the Securities Act in connection with such sales. Any profits realized by the selling stockholders and the compensation of any broker-dealer may be deemed to be underwriting discounts and commissions. Some of the underwriters or deemed underwriters or agents and their associates may be customers of, engage in transactions with, and perform services for, us in the ordinary course of business.

In order to comply with the securities laws of certain states, if applicable, the shares must be sold in such jurisdictions only through registered or licensed brokers or dealers. In addition, in certain states, the shares may not be sold unless they have been registered or qualified for sale in the applicable state or an exemption from the registration or qualification requirement is available and is complied with.

We have advised the selling stockholders that the anti-manipulation rules of Regulation M under the Exchange Act may apply to sales of shares in the market and to the activities of the selling stockholders and their affiliates. In addition, we will make copies of this prospectus 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.

At the time a particular offer of shares is made, if required, a prospectus supplement will be distributed that will set forth the number of shares being offered and the terms of the offering, including the name of any underwriter, dealer or agent, the purchase price paid by any underwriter, any discount, commission and other item constituting compensation, any discount, commission or concession allowed or reallocated or paid to any dealer, and the proposed selling price to the public.

We will pay all expenses of the registration of the shares of common stock pursuant to the 2008 Purchase Agreement and 2012 Purchase Agreement, including, without limitation, Securities and Exchange Commission, or SEC, filing fees and expenses of compliance with state securities or blue sky laws; *provided, however*, that the selling stockholders will pay all underwriting discounts, commissions and concessions and brokers or agents commissions and concessions or selling commissions and concessions, if any. We have agreed to indemnify the selling stockholders against certain liabilities, including certain liabilities under the Securities Act. Underwriters, dealers and agents may be entitled to indemnification by us and the selling stockholders against specific civil liabilities, including liabilities under the Securities Act or to contribution with respect to payments which the underwriters or agents may be required to make in respect thereof, under underwriting or other agreements. The terms of any indemnification provisions will be set forth in a prospectus supplement.

We have agreed with the selling stockholders to keep the registration statement of which this prospectus constitutes a part effective until such time as all of the shares covered by this prospectus have been sold or may be sold without volume restrictions pursuant to Rule 144.

LEGAL MATTERS

The validity of the shares offered by this prospectus has been passed upon by Wilmer Cutler Pickering Hale and Dorr LLP. Partners of Wilmer Cutler Pickering Hale and Dorr LLP beneficially own 9,455 shares of our common stock.

EXPERTS

The consolidated financial statements of Infinity Pharmaceuticals, Inc. appearing in Infinity Pharmaceuticals, Inc.'s Annual Report (Form 10-K) for the year ended December 31, 2011, and the effectiveness of Infinity Pharmaceuticals, Inc.'s internal control over financial reporting as of December 31, 2011 have been audited by Ernst & Young LLP, independent registered public accounting firm, as set forth in their reports thereon, included therein, and incorporated herein by reference. Such consolidated financial statements are incorporated herein by reference in reliance upon such reports given on the authority of such firm as experts in accounting and auditing.

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WHERE YOU CAN FIND MORE INFORMATION

We file reports, proxy statements and other documents with the SEC. You may read and copy any document we file at the SEC's public reference room at 100 F Street, N.E., Room 1580, Washington, D.C. 20549. You should call 1-800-SEC-0330 for more information on the public reference room. Our SEC filings are also available to you on the SEC's Internet site at www.sec.gov.

This prospectus is part of a registration statement that we filed with the SEC. The registration statement contains more information than this prospectus regarding us and our common stock, including certain exhibits and schedules. You can obtain a copy of the registration statement from the SEC at the address listed above or from the SEC's Internet site.

INCORPORATION OF CERTAIN DOCUMENTS BY REFERENCE

The SEC allows us to incorporate into this prospectus information that we file with the SEC in other documents. This means that we can disclose important information to you by referring to other documents that contain that information. The information incorporated by reference is considered to be part of this prospectus. Information that we file with the SEC in the future and incorporate by reference in this prospectus automatically updates and supersedes previously filed information as applicable. The following documents filed with the SEC pursuant to the Exchange Act are incorporated herein by reference (other than, in each case, documents or information deemed to have been furnished and not filed in accordance with SEC rules):

- (1) Our Annual Report on Form 10-K for the year ended December 31, 2011, as filed with the SEC on March 13, 2012, including portions of our definitive Proxy Statement on Schedule 14A, as filed with the SEC on April 4, 2012 in connection with our 2012 annual meeting of stockholders, to the extent specifically incorporated by reference therein;
- (2) Our Quarterly Reports on Form 10-Q for the quarterly periods ended (i) March 31, 2012, as filed with the SEC on May 8, 2012, and (ii) June 30, 2012, as filed with the SEC on August 7, 2012;
- (3) Our Current Reports on Form 8-K filed with the SEC on January 9, 2012 (solely with respect to Item 8.01 therein), January 27, 2012, March 13, 2012 (solely with respect to Item 5.02 therein); May 18, 2012; June 18, 2012; July 2, 2012; July 17, 2012; July 19, 2012; July 25, 2012 and August 10, 2012;
- (4) Any other filings we make pursuant to the Exchange Act after the date of filing the initial registration statement and prior to effectiveness of the registration statement;
- (5) The description of our common stock contained in our Registration Statement on Form 8-A filed with the SEC on July 25, 2000; and
- (6) The description of our preferred stock purchase rights contained in our Registration Statement on Form 8-A filed with the SEC on February 24, 2003, as amended on November 20, 2008, including any amendments or reports filed for the purpose of updating those descriptions.

A statement contained in a document incorporated by reference into this prospectus shall be deemed to be modified or superceded for purposes of this prospectus to the extent that a statement contained in this prospectus, any prospectus supplement or in any other subsequently filed document which is also incorporated in this prospectus modifies or replaces such statement. Any statements so modified or superceded shall not be deemed, except as so modified or superceded, to constitute a part of this prospectus.

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You may request a copy of these documents, which will be provided to you at no cost, by writing or telephoning us using the following contact information:

Infinity Pharmaceuticals, Inc.
780 Memorial Drive
Cambridge, Massachusetts 02139
Attention: Investor Relations
(617) 453-1000

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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 Infinity (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 | \$ 30,799 |
| Legal fees and expenses | \$ 25,000 |
| Accounting fees and expenses | \$ 5,500 |
| Miscellaneous expenses | \$ 3,979 |
| Total expenses | \$ 65,278 |

Item 15. Indemnification of Directors and Officers.

Section 145 of the General Corporation Law of the State of Delaware, or the DGCL, provides, generally, that a corporation shall have the power 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, suit or proceeding (except actions by or in the right of the corporation) by reason of the fact that such person is or was a director, officer, employee or agent of the corporation against all expenses, judgments, fines and amounts paid in settlement actually and reasonably incurred by such person in connection with such action, suit or proceeding if such person acted in good faith and in a manner such 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 his or her conduct was unlawful. A corporation may similarly indemnify such person for expenses actually and reasonably incurred by such person in connection with the defense or settlement of any action or suit by or in the right of the corporation, provided that such person acted in good faith and in a manner he or she reasonably believed to be in or not opposed to the best interests of the corporation, and, in the case of claims, issues and matters as to which such person shall have been adjudged liable to the corporation, provided that a court shall have determined, upon application, that, despite the adjudication of liability but in view of all of the circumstances of the case, such person is fairly and reasonably entitled to indemnity for such expenses which such court shall deem proper.

Section 102(b)(7) of the DGCL provides, generally, that the certificate of incorporation may contain a provision eliminating or limiting the personal liability of a director to the corporation or its shareholders for monetary damages for breach of fiduciary duty as a director, provided that such provision may 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 shareholders, (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 DCGL, or (iv) for any transaction from which the director derived an improper personal benefit. No such provision may eliminate or limit the liability of a director for any act or omission occurring prior to the date when such provision became effective.

Our certificate of incorporation provides that a member of our board of directors will not be personally liable to us or our stockholders for monetary damages for breaches of their fiduciary duties to us or our stockholders as a director, except for liability:

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for any breach of the director's duty of loyalty to us or our stockholders;

for acts or omissions by the director not in good faith or which involve intentional misconduct or a knowing violation of law;

for declaring dividends or authorizing the purchase or redemption of shares in violation of Delaware law; or

for transactions where the director derived any improper personal benefit.

Our certificate of incorporation also allows us to indemnify directors and officers to the fullest extent authorized by Delaware law.

Our by-laws provide that we shall, to the fullest extent authorized by the DGCL, indemnify our directors and executive officers; provided, however, that we may limit the extent of such indemnification by individual contracts with our directors and executive officers; and, provided, further, that we shall not be required to indemnify any director or executive officer in connection with any proceeding (or part thereof) initiated by such person or any proceeding by such person against us or our directors, officers, employees or other agents unless (i) such indemnification is expressly required to be made by law, (ii) the proceeding was authorized by our board of directors, and (iii) such indemnification is provided by us, in our board's sole discretion, pursuant to our powers under the DGCL.

Until September 2012, we must advance expenses to and indemnify each former director and officer of Discovery Partners International, Inc. against costs and damages incurred as a result of such director or officer serving as a director or officer of Discovery Partners International, Inc. to the fullest extent permitted under the DGCL.

We have entered into agreements to indemnify certain of our directors and former executive officers. These agreements, among other things, provide for indemnification of such directors and executive officers for expenses specified in the agreements, including attorneys' fees, judgments, fines and settlement amounts incurred by such directors or former executive officers in any action or proceeding arising out of that person's services as a director or executive officer of ours, any subsidiary of ours or any other entity to which the person provides or provided services at our request.

Our bylaws also permit us to maintain insurance to protect us and any director, officer, employee or agent against any liability with respect to which we would have the power to indemnify such persons under the DGCL. We maintain an insurance policy insuring our directors and officers against certain liabilities.

Item 16. Exhibits

The exhibits to this Registration Statement are listed in the exhibit index, which appears elsewhere herein and is incorporated herein by reference.

Item 17. Undertakings.

Item 512(a) of Regulation S-K. 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 the 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 a 20 percent change in the maximum aggregate offering price set forth in the "Calculation of Registration Fee" table in the effective registration statement; and

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(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;

provided, however, that paragraphs (i), (ii) and (iii) 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 Commission by the registrant pursuant to section 13 or section 15(d) of the Securities Exchange Act of 1934 that are incorporated by reference in the registration statement, or is contained in a form of prospectus filed pursuant to Rule 424(b) that is part of 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 purposes of determining liability under the Securities Act of 1933 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 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 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.

(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 the undersigned registrant; and

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

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Item 512(b) of Regulation S-K. The undersigned registrant hereby undertakes that, for the purpose of determining any liability under the Securities Act of 1933, each filing of the registrant's annual report pursuant to Section 13(a) or Section 15(d) of the Securities Exchange Act of 1934 (and, where applicable, each filing of an employee benefit plan's annual report pursuant to Section 15(d) of the Securities Exchange Act of 1934) 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.

Item 512(h) of Regulation S-K. 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 Securities Act of 1933 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 o