

INFINITY PHARMACEUTICALS, INC.

Form 424B5

December 12, 2012

Table of Contents

**Filed Pursuant to Rule 424(b)(5)
Registration File No. 333-184775**

The information in this preliminary prospectus supplement is not complete and may be changed. This preliminary prospectus supplement and the accompanying prospectus are not an offer to sell these securities, and we are not soliciting offers to buy these securities, in any jurisdiction where the offer or sale is not permitted.

(Subject to completion, dated December 12, 2012)

Preliminary Prospectus Supplement

(To Prospectus dated November 6, 2012)

Shares of Common Stock

We are offering up to shares of common stock, par value \$0.001 per share, in this offering.

Our common stock is listed on the NASDAQ Global Select Market under the symbol INFI . On December 11, 2012, the last reported sale price was \$26.01 per share.

Investing in our common stock involves risks that are described in the Risk Factors section beginning on page S-7 of this prospectus supplement and the risk factors described in the other documents incorporated by reference herein.

The Securities and Exchange Commission and state securities regulators have not approved or disapproved of these securities or determined if this prospectus supplement or the accompanying prospectus is truthful or complete. Any representation to the contrary is a criminal offense.

	Per Share	Total
Public offering price	\$	\$
Underwriting discounts and commissions	\$	\$
Proceeds, before expenses, to us	\$	\$

We have granted the underwriters an option for a period of up to 30 days from the date of this prospectus supplement to purchase up to additional shares of common stock at the public offering price less the underwriting discounts and commissions to cover over-allotments, if any. If the underwriters exercise this right in full, the total underwriting discounts and commissions payable by us will be \$, and the total proceeds to us, before expenses, will be \$.

We estimate the expenses of this offering, excluding underwriting discounts and commissions, will be approximately \$250,000.

The underwriters expect to deliver the shares of common stock to purchasers on or about , 2012, subject to the satisfaction of certain conditions.

Joint Book-Running Managers

Morgan Stanley

J.P. Morgan

Co-Lead Managers

BofA Merrill Lynch

Deutsche Bank Securities

Co-Manager

Stifel Nicolaus Weisel

The date of this prospectus supplement is December , 2012

Table of Contents

TABLE OF CONTENTS

Prospectus Supplement

<u>ABOUT THIS PROSPECTUS SUPPLEMENT</u>	S-ii
<u>SUMMARY</u>	S-1
<u>THE OFFERING</u>	S-4
<u>SUMMARY CONSOLIDATED FINANCIAL DATA</u>	S-5
<u>RISK FACTORS</u>	S-7
<u>CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS</u>	S-8
<u>USE OF PROCEEDS</u>	S-9
<u>DILUTION</u>	S-10
<u>UNDERWRITING</u>	S-11
<u>LEGAL MATTERS</u>	S-16
<u>EXPERTS</u>	S-16
<u>WHERE YOU CAN FIND MORE INFORMATION</u>	S-16
<u>INCORPORATION OF CERTAIN INFORMATION BY REFERENCE</u>	S-17

Prospectus

<u>ABOUT THIS PROSPECTUS</u>	1
<u>WHERE YOU CAN FIND MORE INFORMATION</u>	2
<u>INCORPORATION BY REFERENCE</u>	3
<u>FORWARD-LOOKING STATEMENTS</u>	4
<u>ABOUT INFINITY PHARMACEUTICALS, INC.</u>	5
<u>CONSOLIDATED RATIOS OF EARNINGS TO FIXED CHARGES</u>	7
<u>USE OF PROCEEDS</u>	8
<u>DESCRIPTION OF DEBT SECURITIES</u>	9
<u>DESCRIPTION OF CAPITAL STOCK</u>	18
<u>DESCRIPTION OF WARRANTS</u>	28
<u>FORMS OF SECURITIES</u>	29
<u>PLAN OF DISTRIBUTION</u>	31
<u>LEGAL MATTERS</u>	34
<u>EXPERTS</u>	34

Table of Contents

ABOUT THIS PROSPECTUS SUPPLEMENT

This document is in two parts. The first part is this prospectus supplement, which describes the specific terms of this common stock offering and also adds to and updates information contained in the accompanying prospectus and the documents incorporated by reference herein or therein. The second part, the accompanying prospectus, provides more general information. Generally, when we refer to this prospectus, we are referring to both parts of this document combined. To the extent there is a conflict between the information contained in this prospectus supplement and the information contained in the accompanying prospectus or any document incorporated by reference herein or therein filed prior to the date of this prospectus supplement, you should rely on the information in this prospectus supplement; provided that if any statement in one of these documents is inconsistent with a statement in another document having a later date for example, a document incorporated by reference in the accompanying prospectus the statement in the document having the later date modifies or supersedes the earlier statement.

We further note that the representations, warranties and covenants made by us in any agreement that is filed as an exhibit to any document that is incorporated by reference herein or in the accompanying prospectus were made solely for the benefit of the parties to such agreement, including, in some cases, for the purpose of allocating risk among the parties to such agreement, and should not be deemed to be a representation, warranty or covenant to you. Moreover, such representations, warranties or covenants were accurate only as of the date when made. Accordingly, such representations, warranties and covenants should not be relied on as accurately representing the current state of our affairs.

You should rely only on the information contained in this prospectus supplement or the accompanying prospectus, or incorporated by reference herein or therein. We have not authorized, and the underwriters have not authorized, anyone to provide you with information that is different. The information contained in this prospectus supplement or the accompanying prospectus, or incorporated by reference herein or therein, is accurate only as of the respective dates hereof or thereof, regardless of the time of delivery of this prospectus supplement and the accompanying prospectus or of any sale of our common stock. It is important for you to read and consider all information contained in this prospectus supplement and the accompanying prospectus, including the documents incorporated by reference herein and therein, in making your investment decision. You should also read and consider the information in the documents to which we have referred you in the sections entitled *Where You Can Find More Information* and *Incorporation of Certain Information by Reference* in this prospectus supplement and in the sections entitled *Where You Can Find More Information* and *Incorporation by Reference* in the accompanying prospectus.

We are offering to sell, and seeking offers to buy, shares of our common stock only in jurisdictions where offers and sales are permitted. The distribution of this prospectus supplement and the accompanying prospectus and the offering of the common stock in certain jurisdictions may be restricted by law. Persons outside the United States who come into possession of this prospectus supplement and the accompanying prospectus must inform themselves about, and observe any restrictions relating to, the offering of the common stock and the distribution of this prospectus supplement and the accompanying prospectus outside the United States. This prospectus supplement and the accompanying prospectus do not constitute, and may not be used in connection with, an offer to sell, or a solicitation of an offer to buy, any securities offered by this prospectus supplement and the accompanying prospectus by any person in any jurisdiction in which it is unlawful for such person to make such an offer or solicitation.

Unless otherwise stated, all references in this prospectus supplement and the accompanying prospectus to *we*, *us*, *our*, *Infinity*, *the Company* similar designations refer to Infinity Pharmaceuticals, Inc. and its subsidiary. The Infinity logo and all other Infinity product names are trademarks of Infinity or its subsidiary in the United States and in other select countries. We may indicate U.S. trademark registrations and U.S. trademarks with the symbols [®] and [™], respectively. Other third-party logos and product/trade names are registered trademarks or trade names of their respective owners.

Table of Contents

SUMMARY

This summary highlights information contained elsewhere in this prospectus supplement and the accompanying prospectus and in the documents we incorporate by reference herein and therein. This summary does not contain all of the information that you should consider before deciding to invest in our common stock. You should read this entire prospectus supplement and the accompanying prospectus carefully, including the Risk Factors section contained in this prospectus supplement and our consolidated financial statements and the related notes and the other documents incorporated by reference herein or therein.

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, heat shock protein 90, and fatty acid amide hydrolase are evidence of our innovative approach to drug discovery and development. We have worldwide development and commercialization rights to all of our development candidates and early discovery programs, subject to certain 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, cell migration and immunity. PI3K-delta and PI3K-gamma, two of the four isoforms of Class I PI3Ks, 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/or 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 Class I PI3K-delta and PI3K-gamma, which we are investigating in both inflammatory diseases and hematologic malignancies. We believe that IPI-145 is the first delta-gamma inhibitor in clinical development. We completed our Phase 1, randomized, double-blind, placebo-controlled trial of IPI-145 in healthy adult subjects designed to support the development of IPI-145 in inflammatory diseases. IPI-145 was well tolerated in this trial, with no clinically significant changes in clinical laboratory values or vital signs. Data from this study presented at the American College of Rheumatology, or ACR, Annual Meeting in November 2012 showed that IPI-145 was generally well tolerated at all doses studied during the course of the study, with a favorable pharmacokinetic and pharmacodynamic profile. In July 2012, we initiated a Phase 2a randomized, double-blind, placebo-controlled trial of IPI-145 in approximately 30 patients with mild asthma. The endpoints of this multi-dose, two-way, cross-over study include safety, pharmacokinetics and forced expiratory volume, or FEV1, a standard measure of lung function. We are also planning to initiate in the first half of 2013 a Phase 2, randomized, placebo-controlled study to evaluate the safety and activity of multiple doses of IPI-145 in patients with moderate to severe rheumatoid arthritis, subject to receiving applicable regulatory clearances to commence the trial.

In addition, we recently presented data at the Annual Meeting of the American Society for Hematology (ASH) from our Phase 1, open-label, dose-escalation study designed to evaluate the safety, pharmacokinetics and clinical activity of IPI-145 in patients with advanced hematologic malignancies. Data from this study showed that IPI-145 was well tolerated to date, and there have been no dose-related trends in adverse events. Data also showed that IPI-145 was clinically active in both B-cell and T-cell malignancies, including

Table of Contents

partial responses or complete responses in patients with chronic lymphocytic leukemia, indolent non-Hodgkin's lymphoma, mantle cell lymphoma, Hodgkin's lymphoma and T-cell lymphoma. Additionally, clinical activity reported for 16 of 19 responders occurred within the first two cycles of treatment. The maximum tolerated dose had not been reached at doses up to 75 mg BID, and patients are now being enrolled in a dose-escalation cohort evaluating IPI-145 at a dose of 100 mg BID. We are also planning for up to five additional cohort expansions in a range of hematologic malignancies at or below the maximum tolerated dose based on responses observed during the dose-escalation phase of the trial. The malignancies that may be evaluated in these cohort expansions include T-cell lymphomas, diffuse large B-cell lymphoma, acute lymphocytic leukemia and myeloproliferative malignancies.

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. We expect to name our next development candidate in this program by the end of this year and complete non-clinical studies by the end of 2013 that are designed to enable Phase 1 development.

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 in their properly folded functional state 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. We completed patient enrollment in a Phase 2, randomized, double-blind, placebo-controlled clinical trial evaluating retaspimycin HCl 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. We stratified patients in our Phase 2 trial by pathological subtype based on results from our Phase 1b trial in which we observed partial responses in patients with squamous cell carcinoma. In addition, we are prospectively evaluating a novel biomarker that we believe may be predictive of response. We expect to report data from this trial in the first half of 2013.

We are also enrolling patients in a Phase 1b/2 trial to explore the safety and efficacy of retaspimycin HCl in combination with everolimus, an inhibitor of the mammalian target of rapamycin, or mTOR, pathway, in NSCLC patients with a KRAS gene mutation. The objective of this Phase 1b/2 trial is to determine the recommended dose for the combination treatment and to evaluate the safety and clinical activity of retaspimycin HCl in combination with everolimus. We expect to provide top-line data from this Phase 1b/2 trial in the first half of 2013.

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. In October 2010, we reported top-line data from a Phase 1 randomized clinical trial of IPI-940 in 48 healthy adult volunteers demonstrating marked FAAH inhibition and increased anandamide levels. In addition, IPI-940 was well tolerated, with no observed dose-limiting toxicities or clinically significant changes in clinical laboratory values, vital signs or electrocardiogram parameters. We are currently seeking potential partnering opportunities for our FAAH program.

Hedgehog Pathway Inhibitor Program. In June 2012, we voluntarily stopped all company-sponsored clinical trials of saridegib, our lead Hedgehog pathway inhibitor, after a planned futility analysis of interim data from our Phase 2, double-blind, randomized, placebo-controlled study evaluating saridegib in patients with metastatic or locally advanced, inoperable chondrosarcoma showed that treatment with saridegib was similar to

Table of Contents

placebo and, therefore, the trial would not meet its primary endpoint. Following this analysis, we accelerated our review of data from 12 evaluable patients enrolled in our exploratory Phase 2 clinical trial evaluating saridegib in patients with myelofibrosis, which showed that the level of clinical activity observed in these patients did not satisfy our pre-specified criteria for expansion of the trial. Based on these analyses, we voluntarily stopped both trials and are conducting closeout activities. In both trials, saridegib was generally well tolerated. We expect to present the final data from these studies after all analyses are complete.

We are also currently in the process of obtaining and analyzing data from our discontinued randomized, double-blind, placebo-controlled Phase 2 clinical trial evaluating saridegib in combination with gemcitabine, a chemotherapy, in patients with previously untreated, metastatic, pancreatic cancer. The trial was discontinued in January 2012 following a preliminary analysis showing a difference in survival favoring the placebo plus gemcitabine treatment group due to a higher rate of progressive disease in the saridegib plus gemcitabine treatment group, and not a result of the safety profile of saridegib. We expect to present final data from this trial after our analyses are complete.

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.

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 the section entitled Investors/Media, as a source of information about us. We have not incorporated by reference into this prospectus supplement the information on our website and you should not consider it to be a part of this prospectus supplement. Our website address is included as an inactive textual reference only.

Table of Contents

THE OFFERING

Issuer	Infinity Pharmaceuticals, Inc.
Common stock offered in this offering	shares
Common stock to be outstanding after this offering	shares
Use of proceeds	We intend to use the net proceeds from the shares we are offering for research and development expenditures, including costs associated with the continuing clinical development of IPI-145; working capital; capital expenditures; potential acquisitions of new businesses, technologies or products that we believe have the potential to complement or expand our business; and other general corporate purposes. See Use of Proceeds.
Risk factors	See Risk Factors beginning on page S-7 of this prospectus supplement and our Current Report on Form 8-K filed with the Securities and Exchange Commission, or SEC, on December 12, 2012, which is incorporated herein by reference, for a discussion of factors you should carefully consider before deciding to invest in our common stock.
Over-allotment option	We have granted the underwriters an option for a period of up to 30 days from the date of this prospectus supplement to purchase up to additional shares of common stock at the public offering price less the underwriting discounts and commissions to cover over-allotments, if any.
NASDAQ Global Select Market symbol	INFI
The number of shares of our common stock to be outstanding after this offering is based on 39,480,298 shares outstanding as of September 30, 2012, and excludes as of such date:	

7,113,072 shares of common stock issuable upon the exercise of outstanding stock options at a weighted-average exercise price of \$8.95 per share;

an aggregate of 3,471,356 additional shares of common stock reserved for future issuance under our 2010 stock incentive plan; and

136,655 shares of common stock issuable upon the exercise of outstanding warrants at a weighted-average exercise price of \$13.35 per share.

Unless we specifically state otherwise, all information in this prospectus supplement:

assumes that the underwriters do not exercise their over-allotment option; and

assumes no exercise of outstanding options or warrants.

S-4

Table of Contents**SUMMARY CONSOLIDATED FINANCIAL DATA**

You should read the following summary consolidated financial data together with our financial statements and related notes and the Management's Discussion and Analysis of Financial Condition and Results of Operations sections of our periodic reports incorporated by reference in this prospectus supplement. We derived the summary statements of operations and comprehensive income (loss) data for the years ended December 31, 2011, 2010 and 2009 from our audited financial statements incorporated by reference in this prospectus supplement. We derived the summary statements of operations and comprehensive income (loss) data for the nine months ended September 30, 2012 and 2011 and the balance sheet data as of September 30, 2012 from our unaudited financial statements incorporated by reference in this prospectus supplement. Our historical results for any prior period are not necessarily indicative of results to be expected in any future period, and our results for any interim period are not necessarily indicative of results for a full fiscal year.

The pro forma balance sheet data set forth below gives effect to our issuance and sale of _____ shares of common stock in this offering at the public offering price of \$ _____ per share, after deducting underwriting discounts and commissions and estimated offering expenses payable by us.

	Years Ended December 31,			Nine Months Ended September 30,	
	2011	2010	2009	2012	2011
Statement of operations and comprehensive income (loss) data:					
(in thousands, except share and per share data)					
Collaborative research and development revenue from Purdue entities	\$ 92,773	\$ 71,331	\$ 50,765	\$ 47,114	\$ 70,448
Operating expenses:					
Research and development	108,582	99,232	77,857	78,578	78,689
General and administrative	22,719	21,070	19,456	20,771	16,675
Total operating expenses	131,301	120,302	97,313	99,349	95,364
Gain on termination of Purdue entities alliance				46,555	
Loss from operations	(38,528)	(48,971)	(46,548)	(5,680)	(24,916)
Other income (expense):					
Interest expense	(1,841)	(1,910)	(1,300)	(1,908)	(1,299)
Income from NIH reimbursement			1,745		
Income from residual funding after reacquisition of Hsp90 program			12,450		
Income from Massachusetts tax incentive award				193	
Income from Therapeutic Discovery Grants		734			
Interest and investment income	327	463	2,045	416	234
Total other income (expense)	(1,514)	(713)	14,940	(1,299)	(1,065)
Loss before income taxes	(40,042)	(49,684)	(31,608)	(6,979)	(25,981)
Income tax benefit		700	329		
Net loss	\$ (40,042)	\$ (48,984)	\$ (31,279)	\$ (6,979)	\$ (25,981)
Basic and diluted loss per common share	\$ (1.50)	\$ (1.86)	\$ (1.20)	\$ (0.24)	\$ (0.98)
Basic and diluted weighted average number of common shares outstanding	26,620,278	26,321,398	26,096,515	28,638,512	26,590,597

Table of Contents

	Years Ended December 31,			Nine Months Ended September 30,	
	2011	2010	2009	2012	2011
Statement of operations and comprehensive income (loss) data:					
Other comprehensive income (loss):					(Unaudited)
Net unrealized holding gains (losses) on available-for-sale securities arising during the period	\$ (32)	\$ 17	\$ (678)	\$ 87	\$ (38)
Comprehensive loss	\$ (40,074)	\$ (48,967)	\$ (31,957)	\$ (6,892)	\$ (26,019)

	As of September 30, 2012	
	Actual (unaudited)	Pro Forma(1) (in thousands)
Selected Balance Sheet Data:		
Cash, cash equivalents and available-for-sale securities, including long-term	\$ 189,406	\$
Working capital	174,585	
Total assets	198,191	
Long-term debt	0	
Accumulated deficit	(276,031)	
Total stockholders' equity	179,727	

- (1) The pro forma selected balance sheet data gives effect to the issuance and sale of _____ shares of our common stock in this offering at the public offering price of \$ _____ per share, after deducting underwriting discounts and commissions and estimated offering expenses payable by us.

Table of Contents

RISK FACTORS

Investing in our common stock involves significant risks. In addition to the risk factors described below and the other information included or incorporated by reference in this prospectus supplement and the accompanying prospectus, you should carefully consider the risks described in our Current Report on Form 8-K filed with the SEC on December 12, 2012, 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. Actual future results may differ materially from those anticipated in forward-looking 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.

Risks Relating to This Offering

Investors in this offering will pay a much higher price than the book value of our stock.

If you purchase common stock in this offering, you will incur an immediate and substantial dilution in net tangible book value of \$ per share, after giving effect to the sale by us of shares in this offering at the public offering price of \$ per share. In the past, we have issued options to acquire common stock at prices significantly below this offering price. To the extent these outstanding options are ultimately exercised, you will incur additional dilution.

We have broad discretion in how we use the net proceeds of this offering, and we may not use these proceeds effectively or in ways with which you agree.

Our management will have broad discretion as to the application of the net proceeds of this offering and could use them for purposes other than those contemplated at the time of this offering. Our stockholders may not agree with the manner in which our management chooses to allocate and spend the net proceeds. Moreover, our management may use the net proceeds for corporate purposes that may not increase the market price of our common stock.

Table of Contents

CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus supplement, the accompanying prospectus and the documents incorporated by reference herein and therein contain 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 future discovery and development efforts, our collaborations, our future operating results and financial position, our business strategy, and other objectives for future operations. You can identify these forward-looking statements by their use of words such as anticipate, believe, estimate, expect, forecast, intend, plan, project, target, will and other words and terms of similar meaning. 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 our actual results to differ materially from those indicated by forward-looking statements, including the factors referred to under the caption "Risk Factors" in this prospectus supplement and those described in our Current Report on Form 8-K filed with the SEC on December 12, 2012. These important factors include the factors that we identify in the documents we incorporate by reference in this prospectus supplement and the accompanying prospectus. You should read these factors and the other cautionary statements made in this prospectus supplement, the accompanying prospectus and in the documents we incorporate by reference herein and therein as being applicable to all related forward-looking statements wherever they appear in this prospectus supplement, the accompanying prospectus or in the documents incorporated by reference.

You should read these forward-looking statements carefully because they discuss our expectations regarding our future performance, future operating results or future financial condition, or state other forward-looking information. You should be aware that the occurrence of any of the events described under "Risk Factors" herein and in any document incorporated by reference herein and elsewhere in this prospectus supplement, the accompanying prospectus and the documents incorporated by reference therein could substantially harm our business, results of operations and financial condition and that upon the occurrence of any of these events, the price of our common stock could decline.

We cannot guarantee any future results, levels of activity, performance or achievements. Should one or more of these risks or uncertainties materialize, or should underlying assumptions prove incorrect, actual results may vary materially from those described in this prospectus supplement, the accompanying prospectus or the documents incorporated by reference herein or therein as anticipated, believed, estimated or expected. The forward-looking statements contained or incorporated by reference herein represent our expectations as of the date of such statements (unless another date is indicated) and should not be relied upon as representing our expectations as of any other date. While we may elect to update these forward-looking statements, we specifically disclaim any obligation to do so, even if our expectations change.

Table of Contents

USE OF PROCEEDS

We estimate that the net proceeds we will receive from this offering will be approximately \$ million, after deducting the underwriting discounts and commissions and estimated offering expenses payable by us. If the underwriters exercise their over-allotment option in full, we estimate that the net proceeds to us will be approximately \$ million, after deducting the underwriting discounts and commissions and estimated offering expenses payable by us.

We intend to use the net proceeds from this offering for general corporate purposes. Although we have not yet identified specific uses for these proceeds, we currently anticipate using the proceeds for some or all of the following purposes:

research and development expenditures, including costs associated with the continuing clinical development of IPI-145;

working capital;

capital expenditures; and

potential acquisitions of new businesses, technologies or products that we believe have the potential to complement or expand our business.

We have not determined the amounts we plan to spend on any of the areas listed above or the timing of these expenditures. As a result, our management will have broad discretion to allocate the net proceeds from this offering. We have no current commitments or agreements with respect to any acquisitions and may not make any acquisitions. Pending application of the net proceeds as described above, we intend to invest the net proceeds of the offering in money-market funds, U.S. government-sponsored enterprise obligations and corporate obligations.

Table of Contents**DILUTION**

If you purchase our common stock in this offering, your interest will be diluted to the extent of the difference between the public offering price per share and the net tangible book value per share of our common stock after this offering. We calculate net tangible book value per share by subtracting our total liabilities from our total tangible assets and dividing the difference by the number of outstanding shares of our common stock.

Our net tangible book value at September 30, 2012 was \$179.7 million, or \$4.55 per share, based on approximately 39.5 million shares of our common stock then outstanding. After giving effect to the sale of _____ shares of common stock by us at the public offering price of \$ _____ per share, less the underwriting discounts and commissions and estimated offering expenses payable by us, our net tangible book value at September 30, 2012 would be \$ _____ million, or \$ _____ per share. This represents an immediate increase in net tangible book value of \$ _____ per share to existing stockholders and an immediate dilution of \$ _____ per share to investors in this offering. The following table illustrates this per share dilution:

Public offering price per share	\$
Net tangible book value per share as of September 30, 2012	\$ 4.55
Increase per share attributable to new investors purchasing shares in this offering	\$
As adjusted net tangible book value per share after this offering	\$
Dilution per share to new investors	\$

Dilution per share to new investors means the difference between the price per share of common stock of \$ _____ and the as adjusted net tangible book value per share of common stock after giving effect to the sale to the underwriters of the _____ shares offered hereby.

In the discussion and table above, we assume no exercise of outstanding options or warrants as of September 30, 2012. As of September 30, 2012, there were (i) 7,113,072 shares of common stock issuable upon exercise of outstanding options with a weighted average exercise price of \$8.95 per share and (ii) 136,655 shares of common stock issuable upon exercise of outstanding warrants with a weighted average exercise price of \$13.35 per share. To the extent that any of these outstanding options or warrants are exercised, we grant additional options or other awards under our stock incentive plan or issue additional warrants, or we issue additional shares of common stock in the future, there will be further dilution to new investors.

Table of Contents**UNDERWRITING**

Under the terms and subject to the conditions set forth in an underwriting agreement dated the date of this prospectus supplement, the underwriters named below, for whom Morgan Stanley & Co. LLC and J.P. Morgan Securities LLC are acting as representatives, have severally agreed to purchase, and we have agreed to sell to them, the number of shares of our common stock indicated below:

Name	Number of Shares
Morgan Stanley & Co. LLC	
J.P. Morgan Securities LLC	
Merrill Lynch, Pierce, Fenner & Smith Incorporated	
Deutsche Bank Securities Inc.	
Stifel, Nicolaus & Company, Incorporated	
Total:	

The underwriters and the representatives are collectively referred to as the underwriters and the representatives, respectively. The underwriters are offering the shares of common stock subject to their acceptance of the shares from us and subject to prior sale. The underwriting agreement provides that the obligations of the several underwriters to pay for and accept delivery of the shares of common stock offered by this prospectus supplement are subject to the approval of certain legal matters by their counsel and to certain other conditions. The underwriters are obligated to take and pay for all of the shares of common stock offered by this prospectus supplement if any such shares are taken. However, the underwriters are not required to take or pay for the shares covered by the underwriters' option to purchase additional shares described below.

The underwriters initially propose to offer part of the shares of common stock directly to the public at the offering price listed on the cover page of this prospectus supplement and part to certain dealers. After the initial offering of the shares of common stock, the offering price and other selling terms may from time to time be varied by the representatives.

We have granted to the underwriters an option, exercisable for 30 days from the date of this prospectus supplement, to purchase up to additional shares of common stock at the public offering price listed on the cover page of this prospectus supplement, less underwriting discounts and commissions, to cover over-allotments, if any. To the extent the option is exercised, each underwriter will become obligated, subject to certain conditions, to purchase about the same percentage of the additional shares of common stock as the number listed next to the underwriter's name in the preceding table bears to the total number of shares of common stock listed next to the names of all underwriters in the preceding table.

The following table shows the per share and total public offering price, underwriting discounts and commissions, and proceeds before expenses to us. These amounts are shown assuming both no exercise and full exercise of the underwriters' option to purchase up to an additional shares of our common stock.

	Per Share	No Exercise	Total Full Exercise
Public offering price	\$	\$	\$
Underwriting discounts and commissions to be paid by us	\$	\$	\$
Proceeds, before expenses, to us	\$	\$	\$

The estimated offering expenses payable by us, exclusive of the underwriting discounts and commissions, are approximately \$250,000.

Our common stock is listed on the NASDAQ Global Select Market under the trading symbol INFI.

Table of Contents

We and our directors and officers and certain holders of our outstanding stock and stock options have agreed that, without the prior written consent of Morgan Stanley & Co. LLC and J.P. Morgan Securities LLC, we and they will not, during the period ending 180 days after the date of this prospectus supplement (the "restricted period"):

offer, pledge, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, lend or otherwise transfer or dispose of, directly or indirectly, any shares of common stock or any securities convertible into or exercisable or exchangeable for shares of common stock;

in our case, file any registration statement with the SEC relating to the offering of any shares of common stock or any securities convertible into or exercisable or exchangeable for common stock (other than a registration statement on Form S-8 or a successor form); or

enter into any swap or other arrangement that transfers to another, in whole or in part, any of the economic consequences of ownership of our common stock;

whether any such transaction described in the first and third bullets above is to be settled by delivery of common stock or such other securities, in cash or otherwise. In addition, each such director, officer, stockholder and optionholder agrees that, without the prior written consent of Morgan Stanley & Co. LLC and J.P. Morgan Securities LLC, such other person will not, during the restricted period, make any demand for, or exercise any right with respect to, the registration of any shares of common stock or any security convertible into or exercisable or exchangeable for common stock.

The restrictions described in the immediately preceding paragraph do not apply to:

the sale of shares to the underwriters;

in the case of our directors and officers and certain holders of our outstanding stock and stock options, certain bona fide gifts, transfer to affiliates or certain trusts and transfers by will or intestate succession, provided that any transferee, distributee or donee shall sign and deliver a lock-up agreement substantially in the form signed by our directors, officers and certain of our stockholders and optionholders and no filing under Section 16(a) of the Exchange Act shall be required or voluntarily made in connection with such a transaction during the restricted period;

the issuance by us of shares of common stock upon the exercise of an option or a warrant or the conversion of a security outstanding on the date of this prospectus supplement or of which the underwriters have been advised in writing;

the issuance by us of shares of our common stock issued in connection with a transaction with an unaffiliated third party that includes a bona fide commercial relationship with us (including joint ventures, marketing or distribution arrangements, collaboration agreements or intellectual property license agreements) or an acquisition of the business, stock or assets of such unaffiliated third party, provided that the aggregate number of shares of our common stock issued pursuant to this clause during the restricted period shall not exceed 10% of the total number of shares of our common stock issued and outstanding immediately following the closing of this offering and, prior to the issuance of any shares of our common stock pursuant to this clause, the recipient of such shares signs a lock-up agreement substantially in the form of the lock-up agreement signed by our directors, officers and certain of our stockholders and optionholders; or

the establishment of a trading plan pursuant to Rule 10b5-1 under the Exchange Act for the transfer of shares of common stock, provided that such plan does not provide for the transfer of common stock during the restricted period and, to the extent a public

Edgar Filing: INFINITY PHARMACEUTICALS, INC. - Form 424B5

announcement or filing under the Exchange Act, if any, is required or voluntarily made regarding the establishment of such plan, such announcement or filing shall include a statement to the effect that no transfer of common stock may be made under such plan during the restricted period.

S-12

Table of Contents

The restricted period described above will be extended if:

during the last 17 days of the restricted period we issue an earnings release or material news or a material event relating to us occurs, or

prior to the expiration of the restricted period, we announce that we will release earnings results during the 16-day period beginning on the last day of the restricted period or provide notification to Morgan Stanley & Co. LLC and J.P. Morgan Securities LLC of any earnings release or material news or a material event that may give rise to an extension of the initial 180-day restricted period, in which case the restrictions described above will continue to apply until the expiration of the 18-day period beginning on the issuance of the earnings release or the occurrence of the material news or material event.

In order to facilitate the offering of our common stock, the underwriters may engage in transactions that stabilize, maintain or otherwise affect the price of our common stock on the NASDAQ Global Select Market. Specifically, the underwriters may sell more shares than they are obligated to purchase under the underwriting agreement, creating a short position. A short sale is covered if the short position is no greater than the number of shares available for purchase by the underwriters under their option to purchase additional shares described above. The underwriters can close out a covered short sale by exercising the option or purchasing shares in the open market. In determining the source of shares to close out a covered short sale, the underwriters will consider, among other things, the open market price of shares compared to the price available under the option. The underwriters may also sell shares in excess of the option, creating a naked short position. The underwriters must close out any naked short position by purchasing shares in the open market. A naked short position is more likely to be created if the underwriters are concerned that there may be downward pressure on the price of our common stock in the open market after pricing that could adversely affect investors who purchase in this offering. As an additional means of facilitating this offering, the underwriters may bid for, and purchase, shares of common stock in the open market to stabilize the price of our common stock. These activities may raise or maintain the market price of our common stock above independent market levels or prevent or retard a decline in the market price of our common stock. The underwriters are not required to engage in these activities and may end any of these activities at any time.

The underwriters have advised us that, pursuant to Regulation M of the Securities Act, they may also engage in other activities that stabilize, maintain or otherwise affect the price of our common stock, including the imposition of penalty bids. This means that if the representatives of the underwriters purchase common stock in the open market in stabilizing transactions or to cover short sales, the representatives can require the underwriters that sold those shares as part of this offering to repay the underwriting discount received by them.

In addition, in connection with this offering the underwriters may engage in passive market making transactions in our common stock on the NASDAQ Global Select Market prior to the pricing and completion of this offering. Passive market making consists of displaying bids on the NASDAQ Global Select Market no higher than the bid prices of independent market makers and making purchases at prices no higher than these independent bids and effected in response to order flow. Net purchases by a passive market maker on each day are generally limited to a specified percentage of the passive market maker's average daily trading volume in the common stock during a specified period and must be discontinued when such limit is reached. Passive market making may cause the price of our common stock to be higher than the price that otherwise would exist in the open market in the absence of these transactions. If passive market making is commenced, it may be discontinued at any time.

We and the underwriters have agreed to indemnify each other against certain liabilities, including liabilities under the Securities Act.

A prospectus supplement in electronic format may be made available on websites maintained by one or more underwriters, or selling group members, if any, participating in this offering. The representatives may agree

Table of Contents

to allocate a number of shares of common stock to underwriters for sale to their online brokerage account holders. Internet distributions will be allocated by the representatives to underwriters that may make Internet distributions on the same basis as other allocations.

Other Relationships

The underwriters and their affiliates are full service financial institutions engaged in various activities, which may include securities trading, commercial and investment banking, financial advisory, investment management, investment research, principal investment, hedging, financing and brokerage activities. The underwriters and certain of their affiliates have in the past performed and may in the future perform various financial advisory and investment banking services for us, for which they received or will receive customary fees and expenses.

In the ordinary course of their various business activities, the underwriters and their affiliates may make or hold a broad array of investments and actively trade debt and equity securities (or related derivative securities) and financial instruments (including bank loans) for their own account and for the accounts of their customers, and such investment and securities activities may involve securities and/or instruments issued by us. The underwriters and their affiliates may also make investment recommendations and/or publish or express independent research views in respect of such securities or instruments and may at any time hold, or recommend to clients that they acquire, long and/or short positions in such securities and instruments.

Selling Restrictions

European Economic Area

In relation to each Member State of the European Economic Area which has implemented the Prospectus Directive (each, a Relevant Member State) an offer to the public of any shares of our common stock may not be made in that Relevant Member State, except that an offer to the public in that Relevant Member State of any shares of our common stock may be made at any time under the following exemptions under the Prospectus Directive, if they have been implemented in that Relevant Member State:

- (a) to any legal entity which is a qualified investor as defined in the Prospectus Directive;
- (b) to fewer than 100 or, if the Relevant Member State has implemented the relevant provision of the 2010 PD Amending Directive, 150, natural or legal persons (other than qualified investors as defined in the Prospectus Directive), as permitted under the Prospectus Directive; or
- (c) in any other circumstances falling within Article 3(2) of the Prospectus Directive, provided that no such offer of shares of our common stock shall result in a requirement for the publication by us or any underwriter of a prospectus pursuant to Article 3 of the Prospectus Directive.

For the purposes of this provision, the expression an offer to the public in relation to any shares of our common stock in any Relevant Member State means the communication in any form and by any means of sufficient information on the terms of the offer and any shares of our common stock to be offered so as to enable an investor to decide to purchase any shares of our common stock, as the same may be varied in that Member State by any measure implementing the Prospectus Directive in that Member State, the expression Prospectus Directive means Directive 2003/71/EC (and amendments thereto, including the 2010 PD Amending Directive, to the extent implemented in the Relevant Member State), and includes any relevant implementing measure in the Relevant Member State, and the expression 2010 PD Amending Directive means Directive 2010/73/EU.

United Kingdom

Each underwriter has represented and agreed that:

- (a)

Edgar Filing: INFINITY PHARMACEUTICALS, INC. - Form 424B5

it has only communicated or caused to be communicated and will only communicate or cause to be communicated an invitation or inducement to engage in investment activity (within the meaning of

S-14

Table of Contents

Section 21 of the FSMA) received by it in connection with the issue or sale of the shares of our common stock in circumstances in which Section 21(1) of the FSMA does not apply to us; and

- (b) it has complied and will comply with all applicable provisions of the FSMA with respect to anything done by it in relation to the shares of our common stock in, from or otherwise involving the United Kingdom.

Switzerland

The shares may not be publicly offered in Switzerland and will not be listed on the SIX Swiss Exchange (SIX) or on any other stock exchange or regulated trading facility in Switzerland. This document has been prepared without regard to the disclosure standards for issuance prospectuses under art. 652a or art. 1156 of the Swiss Code of Obligations or the disclosure standards for listing prospectuses under art. 27 ff. of the SIX Listing Rules or the listing rules of any other stock exchange or regulated trading facility in Switzerland. Neither this document nor any other offering or marketing material relating to the shares or the offering may be publicly distributed or otherwise made publicly available in Switzerland.

Neither this document nor any other offering or marketing material relating to the offering, the Company, the shares have been or will be filed with or approved by any Swiss regulatory authority. In particular, this document will not be filed with, and the offer of shares will not be supervised by, the Swiss Financial Market Supervisory Authority FINMA (FINMA), and the offer of shares has not been and will not be authorized under the Swiss Federal Act on Collective Investment Schemes (CISA). The investor protection afforded to acquirers of interests in collective investment schemes under the CISA does not extend to acquirers of shares.

Dubai International Financial Centre

This prospectus supplement relates to an Exempt Offer in accordance with the Offered Securities Rules of the Dubai Financial Services Authority (DFSA). This prospectus supplement is intended for distribution only to persons of a type specified in the Offered Securities Rules of the DFSA. It must not be delivered to, or relied on by, any other person. The DFSA has no responsibility for reviewing or verifying any documents in connection with Exempt Offers. The DFSA has not approved this prospectus supplement nor taken steps to verify the information set forth herein and has no responsibility for the prospectus supplement. The shares to which this prospectus supplement relates may be illiquid and/or subject to restrictions on their resale. Prospective purchasers of the shares offered should conduct their own due diligence on the shares. If you do not understand the contents of this prospectus supplement you should consult an authorized financial advisor.

Table of Contents

LEGAL MATTERS

The validity of the shares of common stock offered hereby will be passed upon for us by Wilmer Cutler Pickering Hale and Dorr LLP. Certain legal matters in connection with this offering will be passed upon for the underwriters by Ropes & Gray LLP, Boston, Massachusetts. 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. incorporated herein by reference to Infinity Pharmaceuticals, Inc.'s Annual Report on 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 set forth therein, and incorporated herein by reference. Such consolidated financial statements are incorporated herein in reliance upon such reports given on the authority of such firm as experts in accounting and auditing.

WHERE YOU CAN FIND MORE INFORMATION

We file reports, proxy statements and other information with the SEC as required by the Exchange Act. You can find, copy and inspect information we file at the SEC's public reference room at 100 F Street, N.E., Room 1580, Washington, D.C. 20549. You can call the SEC at 1-800-SEC-0330 for further information about the public reference room. You can review our electronically filed reports, proxy and information statements on the SEC's website at <http://www.sec.gov> or on our website at <http://www.infi.com>. Information included on our website is not a part of this prospectus supplement or the accompanying prospectus.

This prospectus supplement is part of a registration statement that we filed with the SEC. The registration statement contains more information than this prospectus supplement and the accompanying prospectus regarding us and the securities, 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.

Table of Contents

INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

The SEC allows us to incorporate into this prospectus supplement and the accompanying 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 supplement and the accompanying prospectus. Information that we file with the SEC in the future and incorporate by reference in this prospectus supplement and the accompanying 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):

our Annual Report on Form 10-K for the year ended December 31, 2011, 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;

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, (ii) June 30, 2012, as filed with the SEC on August 7, 2012, and (iii) September 30, 2012, as filed with the SEC on November 6, 2012;

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; August 10, 2012; November 6, 2012 (solely with respect to Item 5.02 and Item 8.01 therein); December 10, 2012; and December 12, 2012;

the description of our common stock contained in our Registration Statement on Form 8-A filed with the SEC on July 25, 2000; and

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 by an amendment on Form 8-A/A filed with the SEC on November 20, 2008.

In addition, this prospectus supplement incorporates by reference all documents and reports that we file pursuant to Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act after the date of this prospectus supplement and prior to the completion or termination of this offering of common stock even though they are not specifically identified in this prospectus supplement.

You may request, orally or in writing, a copy of the documents which are incorporated by reference, which will be provided to you at no cost by contacting: Infinity Pharmaceuticals, Inc., 780 Memorial Drive, Cambridge, Massachusetts 02139, Attention: Investor Relations, (617) 453-1000.

Table of Contents

PROSPECTUS

Debt Securities

Common Stock

Preferred Stock

Warrants

We may issue securities from time to time in one or more offerings. This prospectus describes the general terms of these securities and the general manner in which these securities will be offered. We will provide the specific terms of these securities in supplements to this prospectus. The prospectus supplements will also describe the specific manner in which these securities will be offered and may also supplement, update or amend information contained in this document. You should read this prospectus and any applicable prospectus supplement before you invest.

We may offer these securities in amounts, at prices and on terms determined at the time of offering. The securities may be sold directly to you, through agents, or through underwriters and dealers. If agents, underwriters or dealers are used to sell the securities, we will name them and describe their compensation in a prospectus supplement.

Our common stock trades on the Nasdaq Global Select Market under the symbol INFI.

Investing in these securities involves certain risks. See **Risk Factors included in any accompanying prospectus supplement and in the documents incorporated by reference in this prospectus for a discussion of the factors you should carefully consider before deciding to purchase these securities.**

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or passed upon the adequacy or accuracy of this prospectus. Any representation to the contrary is a criminal offense.

The date of this prospectus is November 6, 2012

Table of Contents

TABLE OF CONTENTS

<u>ABOUT THIS PROSPECTUS</u>	1
<u>WHERE YOU CAN FIND MORE INFORMATION</u>	2
<u>INCORPORATION BY REFERENCE</u>	3
<u>FORWARD-LOOKING STATEMENTS</u>	4
<u>ABOUT INFINITY PHARMACEUTICALS, INC.</u>	5
<u>CONSOLIDATED RATIOS OF EARNINGS TO FIXED CHARGES</u>	7
<u>USE OF PROCEEDS</u>	8
<u>DESCRIPTION OF DEBT SECURITIES</u>	9
<u>DESCRIPTION OF CAPITAL STOCK</u>	18
<u>DESCRIPTION OF WARRANTS</u>	28
<u>FORMS OF SECURITIES</u>	29
<u>PLAN OF DISTRIBUTION</u>	31
<u>LEGAL MATTERS</u>	34
<u>EXPERTS</u>	34

Table of Contents

ABOUT THIS PROSPECTUS

This prospectus is part of a registration statement that we filed with the Securities and Exchange Commission, which we refer to as the SEC, utilizing a shelf registration process. Under this shelf registration process, we may from time to time sell any combination of the securities described in this prospectus in one or more offerings.

This prospectus provides you with a general description of the securities we may offer. Each time we sell securities, we will provide one or more prospectus supplements that will contain specific information about the terms of the offering. The prospectus supplement may also add, update or change information contained in this prospectus. You should read both this prospectus and the accompanying prospectus supplement together with the additional information described under the heading "Where You Can Find More Information" beginning on page 2 of this prospectus.

You should rely only on the information contained in or incorporated by reference in this prospectus, any accompanying prospectus supplement or in any related free writing prospectus filed by us with the SEC. We have not authorized anyone to provide you with different information. This prospectus and the accompanying prospectus supplement do not constitute an offer to sell or the solicitation of an offer to buy any securities other than the securities described in the accompanying prospectus supplement or an offer to sell or the solicitation of an offer to buy such securities in any circumstances in which such offer or solicitation is unlawful. You should assume that the information appearing in this prospectus, any prospectus supplement, the documents incorporated by reference and any related free writing prospectus is accurate only as of their respective dates. Our business, financial condition, results of operations and prospects may have changed materially since those dates.

Unless the context otherwise indicates, references in this prospectus to we, our and us refer, collectively, to Infinity Pharmaceuticals, Inc., a Delaware corporation, and its consolidated subsidiaries.

Table of Contents

WHERE YOU CAN FIND MORE INFORMATION

We file annual, quarterly and current reports, proxy statements and other information with the SEC. Our SEC filings are available to the public over the Internet at the SEC's website at <http://www.sec.gov>. Copies of certain information filed by us with the SEC are also available on our website at www.infi.com. Our website is not a part of this prospectus and is not incorporated by reference in this prospectus. You may also read and copy any document we file at the SEC's Public Reference Room, 100 F Street, N.E., Washington, D.C. 20549. Please call the SEC at 1-800-SEC-0330 for further information on the operation of the Public Reference Room.

This prospectus is part of a registration statement we filed with the SEC. This prospectus omits some information contained in the registration statement in accordance with SEC rules and regulations. You should review the information and exhibits in the registration statement for further information on us and our consolidated subsidiaries and the securities we are offering. Statements in this prospectus concerning any document we filed as an exhibit to the registration statement or that we otherwise filed with the SEC are not intended to be comprehensive and are qualified by reference to these filings. You should review the complete document to evaluate these statements.

Table of Contents

INCORPORATION BY REFERENCE

The SEC allows us to incorporate by reference much of the information we file with the SEC, which means that we can disclose important information to you by referring you to those publicly available documents. The information that we incorporate by reference in this prospectus is considered to be part of this prospectus. Because we are incorporating by reference future filings with the SEC, this prospectus is continually updated and those future filings may modify or supersede some of the information included or incorporated in this prospectus. This means that you must look at all of the SEC filings that we incorporate by reference to determine if any of the statements in this prospectus or in any document previously incorporated by reference have been modified or superseded.

This prospectus incorporates by reference the documents listed below (File No. 000-31141) and any future filings we make with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Securities Exchange Act of 1934, as amended, or the Exchange Act (in each case, other than those documents or the portions of those documents not deemed to be filed) until the offering of the securities under the registration statement is terminated or completed:

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;

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, (ii) June 30, 2012, as filed with the SEC on August 7, 2012 and (iii) September 30, 2012, as filed with the SEC on November 6, 2012;

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; August 10, 2012 and November 6, 2012 (solely with respect to Item 5.02 and Item 8.01 therein);

The description of our common stock contained in our Registration Statement on Form 8-A filed with the SEC on July 25, 2000; and

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.

You may request a copy of these filings, at no cost, by writing or telephoning us at the following address or phone number:

Infinity Pharmaceuticals, Inc.

780 Memorial Drive

Cambridge, Massachusetts 02139

Attention: Investor Relations

(617) 453-1000

Table of Contents

FORWARD-LOOKING STATEMENTS

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.

Table of Contents

ABOUT 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, heat shock protein 90, and fatty acid amide hydrolase are evidence of our innovative approach to drug discovery and development. We have worldwide development and commercialization rights to all of our development candidates and early discovery programs, subject to certain 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 of the four 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/or 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 inflammatory diseases and hematologic malignancies. We believe that IPI-145 is the first delta-gamma inhibitor in clinical development. We are also conducting discovery activities to identify additional PI3K-delta and/or PI3K-gamma inhibitors, which we believe has the potential to 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 in their properly folded functional state 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., or Purdue, and Mundipharma International Corporation Limited, or Mundipharma, 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.

Table of Contents

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.

Table of Contents**CONSOLIDATED RATIOS OF EARNINGS TO FIXED CHARGES**

The following table sets forth our ratio of earnings to fixed charges for each of the periods indicated. You should read this table in conjunction with the consolidated financial statements and notes incorporated by reference in this prospectus.

	Nine Months Ended			Fiscal Year Ended		
	September 30, 2012	December 31, 2011	December 31, 2010	December 31, 2009	December 31, 2008	December 31, 2007
Consolidated ratios of earnings to fixed charges	N/A	N/A	N/A	N/A	15.7	N/A

For purposes of calculating the ratio above, earnings consist of income before income taxes plus fixed charges. Fixed charges include interest expense, amortization of debt issuance costs, debt extinguishment charges, the amortization of our loan commitment asset and an estimate of the interest component within rental expense.

We did not record earnings during the nine months ended September 30, 2012 or the years ended December 31, 2011, 2010, 2009 and 2007. Accordingly, our earnings were insufficient to cover fixed charges in such periods and we are unable to disclose a ratio of earnings to fixed charges for such periods. The dollar amount of the deficiency in earnings available for fixed charges for the nine months ended September 30, 2012 and the fiscal years ended December 31, 2011, 2010, 2009 and 2007 was approximately \$6,979,000, \$40,042,000, \$49,684,000, \$31,608,000, and \$16,898,000, respectively.

Table of Contents

USE OF PROCEEDS

We intend to use the net proceeds from the sale of any securities offered under this prospectus for general corporate purposes unless otherwise indicated in the applicable prospectus supplement. General corporate purposes may include working capital and capital expenditures, research and development expenses, including clinical trial costs, general and administrative expenses, potential acquisition of, or investment in, companies, technologies, products or assets that complement our business, and repayment and refinancing of debt. We may temporarily invest the net proceeds in investment-grade, interest-bearing securities until they are used for their stated purpose. We have not determined the amount of net proceeds to be used specifically for such purposes. As a result, management will retain broad discretion over the allocation of net proceeds.

Table of Contents

DESCRIPTION OF DEBT SECURITIES

We may offer debt securities which may be senior or subordinated. We refer to the senior debt securities and the subordinated debt securities collectively as debt securities. The following description summarizes the general terms and provisions of the debt securities. We will describe the specific terms of the debt securities and the extent, if any, to which the general provisions summarized below apply to any series of debt securities in the prospectus supplement relating to the series and any applicable free writing prospectus that we authorize to be delivered. When we refer to the Company, we, our, and us in this section, we mean Infinity Pharmaceuticals, Inc., excluding, unless the context otherwise requires or as otherwise expressly stated, our subsidiaries.

We may issue senior debt securities from time to time, in one or more series under a senior indenture to be entered into between us and a senior trustee to be named in a prospectus supplement, which we refer to as the senior trustee. We may issue subordinated debt securities from time to time, in one or more series under a subordinated indenture to be entered into between us and a subordinated trustee to be named in a prospectus supplement, which we refer to as the subordinated trustee. The forms of senior indenture and subordinated indenture are filed as exhibits to the registration statement of which this prospectus forms a part. Together, the senior indenture and the subordinated indenture are referred to as the indentures and, together, the senior trustee and the subordinated trustee are referred to as the trustees. This prospectus briefly outlines some of the provisions of the indentures. The following summary of the material provisions of the indentures is qualified in its entirety by the provisions of the indentures, including definitions of certain terms used in the indentures. Wherever we refer to particular sections or defined terms of the indentures, those sections or defined terms are incorporated by reference in this prospectus or the applicable prospectus supplement. You should review the indentures that are filed as exhibits to the registration statement of which this prospectus forms a part for additional information.

None of the indentures will limit the amount of debt securities that we may issue. The applicable indenture will provide that debt securities may be issued up to an aggregate principal amount authorized from time to time by us and may be payable in any currency or currency unit designated by us or in amounts determined by reference to an index.

General

The senior debt securities will constitute our unsecured and unsubordinated general obligations and will rank pari passu with our other unsecured and unsubordinated obligations. The subordinated debt securities will constitute our unsecured and subordinated general obligations and will be junior in right of payment to our senior indebtedness (including senior debt securities), as described under the heading **Certain Terms of the Subordinated Debt Securities Subordination**.

The debt securities will be our unsecured obligations. Any secured debt or other secured obligations will be effectively senior to the debt securities to the extent of the value of the assets securing such debt or other obligations.

The applicable prospectus supplement and/or free writing prospectus will include any additional or different terms of the debt securities being offered, including the following terms:

the title and type of the debt securities;

whether the debt securities will be senior or subordinated debt securities, and, with respect to debt securities issued under the subordinated indenture the terms on which they are subordinated;

the aggregate principal amount of the debt securities;

the price or prices at which we will sell the debt securities;

the maturity date or dates of the debt securities and the right, if any, to extend such date or dates;

Table of Contents

the rate or rates, if any, per year, at which the debt securities will bear interest, or the method of determining such rate or rates;

the date or dates from which such interest will accrue, the interest payment dates on which such interest will be payable or the manner of determination of such interest payment dates and the related record dates;

the right, if any, to extend the interest payment periods and the duration of that extension;

the manner of paying principal and interest and the place or places where principal and interest will be payable;

provisions for a sinking fund, purchase fund or other analogous fund, if any;

any redemption dates, prices, obligations and restrictions on the debt securities;

the currency, currencies or currency units in which the debt securities will be denominated and the currency, currencies or currency units in which principal and interest, if any, on the debt securities may be payable;

any conversion or exchange features of the debt securities;

whether and upon what terms the debt securities may be defeased;

any events of default or covenants in addition to or in lieu of those set forth in the indenture;

whether the debt securities will be issued in definitive or global form or in definitive form only upon satisfaction of certain conditions;

whether the series of debt securities will be guaranteed as to payment or performance;

any special tax implications of the debt securities; and

any other material terms of the debt securities.

When we refer to principal in this section with reference to the debt securities, we are also referring to premium, if any.

We may from time to time, without notice to or the consent of the holders of any series of debt securities, create and issue further debt securities of any such series ranking equally with the debt securities of such series in all respects (or in all respects other than (1) the payment of interest accruing prior to the issue date of such further debt securities or (2) the first payment of interest following the issue date of such further debt securities). Such further debt securities may be consolidated and form a single series with the debt securities of such series and have the same terms as to status, redemption or otherwise as the debt securities of such series.

Edgar Filing: INFINITY PHARMACEUTICALS, INC. - Form 424B5

You may present debt securities for exchange and you may present debt securities for transfer in the manner, at the places and subject to the restrictions set forth in the debt securities and the applicable prospectus supplement. We will provide you those services without charge, although you may have to pay any tax or other governmental charge payable in connection with any exchange or transfer, as set forth in the indenture.

Debt securities may bear interest at a fixed rate or a floating rate. Debt securities bearing no interest or interest at a rate that at the time of issuance is below the prevailing market rate (original issue discount securities) may be sold at a discount below their stated principal amount. U.S. federal income tax considerations applicable to any such discounted debt securities or to certain debt securities issued at par which are treated as having been issued at a discount for U.S. federal income tax purposes will be described in the applicable prospectus supplement.

We may issue debt securities with the principal amount payable on any principal payment date, or the amount of interest payable on any interest payment date, to be determined by reference to one or more currency

Table of Contents

exchange rates, securities or baskets of securities, commodity prices or indices. You may receive a payment of principal on any principal payment date, or a payment of interest on any interest payment date, that is greater than or less than the amount of principal or interest otherwise payable on such dates, depending on the value on such dates of the applicable currency, security or basket of securities, commodity or index. Information as to the methods for determining the amount of principal or interest payable on any date, the currencies, securities or baskets of securities, commodities or indices to which the amount payable on such date is linked and certain related tax considerations will be set forth in the applicable prospectus supplement.

Certain Terms of the Senior Debt Securities

Covenants. Unless we indicate otherwise in a prospectus supplement, the senior debt securities will not contain any financial or restrictive covenants, including covenants restricting either us or any of our subsidiaries from incurring, issuing, assuming or guaranteeing any indebtedness secured by a lien on any of our or our subsidiaries' property or capital stock, or restricting either us or any of our subsidiaries from entering into sale and leaseback transactions.

Consolidation, Merger and Sale of Assets. Unless we indicate otherwise in a prospectus supplement, we may not consolidate with or merge into any other person, in a transaction in which we are not the surviving corporation, or convey, transfer or lease our properties and assets substantially as an entirety to any person, in either case, unless:

the successor entity, if any, is a U.S. corporation, limited liability company, partnership or trust (subject to certain exceptions provided for in the senior indenture);

the successor entity assumes our obligations on the senior debt securities and under the senior indenture;

immediately after giving effect to the transaction, no default or event of default shall have occurred and be continuing; and

certain other conditions are met.

No Protection in the Event of a Change in Control. Unless we indicate otherwise in a prospectus supplement with respect to a particular series of senior debt securities, the senior debt securities will not contain any provisions that may afford holders of the senior debt securities protection in the event we have a change in control or in the event of a highly leveraged transaction (whether or not such transaction results in a change in control).

Events of Default. The following are events of default under the senior indenture for any series of senior debt securities:

failure to pay interest on any senior debt securities of such series when due and payable, if that default continues for a period of 90 days (or such other period as may be specified for such series);

failure to pay principal on the senior debt securities of such series when due and payable whether at maturity, upon redemption, by declaration or otherwise (and, if specified for such series, the continuance of such failure for a specified period);

default in the performance of or breach of any of our covenants or agreements in the senior indenture applicable to senior debt securities of such series, other than a covenant breach which is specifically dealt with elsewhere in the senior indenture, and that default or breach continues for a period of 90 days after we receive written notice from the trustee or from the holders of 25% or more in aggregate principal amount of the senior debt securities of such series;

certain events of bankruptcy or insolvency, whether or not voluntary; and

any other event of default provided for in such series of senior debt securities as may be specified in the applicable prospectus supplement.

Table of Contents

The default by us under any other debt, including any other series of debt securities, is not a default under the senior indenture.

If an event of default other than an event of default specified in the fourth bullet point above occurs with respect to a series of senior debt securities and is continuing under the senior indenture, then, and in each such case, either the trustee or the holders of not less than 25% in aggregate principal amount of such series then outstanding under the senior indenture (each such series voting as a separate class) by written notice to us and to the trustee, if such notice is given by the holders, may, and the trustee at the request of such holders shall, declare the principal amount of and accrued interest on such series of senior debt securities to be immediately due and payable, and upon this declaration, the same shall become immediately due and payable.

If an event of default specified in the fourth bullet point above occurs and is continuing, the entire principal amount of and accrued interest on each series of senior debt securities then outstanding shall become immediately due and payable.

Unless otherwise specified in the prospectus supplement relating to a series of senior debt securities originally issued at a discount, the amount due upon acceleration shall include only the original issue price of the senior debt securities, the amount of original issue discount accrued to the date of acceleration and accrued interest, if any.

Upon certain conditions, declarations of acceleration may be rescinded and annulled and past defaults may be waived by the holders of a majority in aggregate principal amount of all the senior debt securities of such series affected by the default, each series voting as a separate class. Furthermore, prior to a declaration of acceleration and subject to various provisions in the senior indenture, the holders of a majority in aggregate principal amount of a series of senior debt securities, by notice to the trustee, may waive an existing default or event of default with respect to such senior debt securities and its consequences, except a default in the payment of principal of or interest on such senior debt securities or in respect of a covenant or provision of the senior indenture which cannot be modified or amended without the consent of the holders of each such senior debt security. Upon any such waiver, such default shall cease to exist, and any event of default with respect to such senior debt securities shall be deemed to have been cured, for every purpose of the senior indenture; but no such waiver shall extend to any subsequent or other default or event of default or impair any right consequent thereto.

The holders of a majority in aggregate principal amount of a series of senior debt securities may direct the time, method and place of conducting any proceeding for any remedy available to the trustee or exercising any trust or power conferred on the trustee with respect to such senior debt securities. However, the trustee may refuse to follow any direction that conflicts with law or the senior indenture, that may involve the trustee in personal liability or that the trustee determines in good faith may be unduly prejudicial to the rights of holders of such series of senior debt securities not joining in the giving of such direction and may take any other action it deems proper that is not inconsistent with any such direction received from holders of such series of senior debt securities. A holder may not pursue any remedy with respect to the senior indenture or any series of senior debt securities unless:

the holder gives the trustee written notice of a continuing event of default;

the holders of at least 25% in aggregate principal amount of such series of senior debt securities make a written request to the trustee to pursue the remedy in respect of such event of default;

the requesting holder or holders offer the trustee indemnity satisfactory to the trustee against any costs, liability or expense;

the trustee does not comply with the request within 60 days after receipt of the request and the offer of indemnity; and

during such 60-day period, the holders of a majority in aggregate principal amount of such series of senior debt securities do not give the trustee a direction that is inconsistent with the request.

Table of Contents

These limitations, however, do not apply to the right of any holder of a senior debt security to receive payment of the principal of and interest on such senior debt security in accordance with the terms of such debt security, or to bring suit for the enforcement of any such payment in accordance with the terms of such debt security, on or after the due date for the senior debt securities, which right shall not be impaired or affected without the consent of the holder.

The senior indenture requires certain of our officers to certify, on or before a fixed date in each year in which any senior debt security is outstanding, as to their knowledge of our compliance with all covenants, agreements and conditions under the senior indenture.

Satisfaction and Discharge. We can satisfy and discharge our obligations to holders of any series of debt securities if:

we pay or cause to be paid, as and when due and payable, the principal of and any interest on all senior debt securities of such series outstanding under the senior indenture; or

all senior debt securities of such series have become due and payable or will become due and payable within one year (or are to be called for redemption within one year) and we deposit in trust a combination of cash and U.S. government or U.S. government agency obligations that will generate enough cash to make interest, principal and any other payments on the debt securities of that series on their various due dates.

Under current U.S. federal income tax law, the deposit and our legal release from the debt securities would be treated as though we took back your debt securities and gave you your share of the cash and debt securities or bonds deposited in trust. In that event, you could recognize gain or loss on the debt securities you give back to us. Purchasers of the debt securities should consult their own advisers with respect to the tax consequences to them of such deposit and discharge, including the applicability and effect of tax laws other than the U.S. federal income tax law.

Defeasance. Unless the applicable prospectus supplement provides otherwise, the following discussion of legal defeasance and discharge and covenant defeasance will apply to any series of debt securities issued under the indentures.

Legal Defeasance. We can legally release ourselves from any payment or other obligations on the debt securities of any series (called legal defeasance) if certain conditions are met, including the following:

We deposit in trust for your benefit and the benefit of all other direct holders of the debt securities of the same series a combination of cash and U.S. government or U.S. government agency obligations that will generate enough cash to make interest, principal and any other payments on the debt securities of that series on their various due dates.

There is a change in current U.S. federal income tax law or an IRS ruling that lets us make the above deposit without causing you to be taxed on the debt securities any differently than if we did not make the deposit and instead repaid the debt securities ourselves when due. Under current U.S. federal income tax law, the deposit and our legal release from the debt securities would be treated as though we took back your debt securities and gave you your share of the cash and debt securities or bonds deposited in trust. In that event, you could recognize gain or loss on the debt securities you give back to us.

We deliver to the trustee a legal opinion of our counsel confirming the tax law change or ruling described above.

If we ever did accomplish legal defeasance, as described above, you would have to rely solely on the trust deposit for repayment of the debt securities. You could not look to us for repayment in the event of any shortfall.

Table of Contents

Covenant Defeasance. Without any change of current U.S. federal tax law, we can make the same type of deposit described above and be released from some of the covenants in the debt securities (called *covenant defeasance*). In that event, you would lose the protection of those covenants but would gain the protection of having money and securities set aside in trust to repay the debt securities. In order to achieve covenant defeasance, we must do the following (among other things):

We must deposit in trust for your benefit and the benefit of all other direct holders of the debt securities of the same series a combination of cash and U.S. government or U.S. government agency obligations that will generate enough cash to make interest, principal and any other payments on the debt securities of that series on their various due dates.

We must deliver to the trustee a legal opinion of our counsel confirming that under current U.S. federal income tax law we may make the above deposit without causing you to be taxed on the debt securities any differently than if we did not make the deposit and instead repaid the debt securities ourselves when due.

If we accomplish covenant defeasance, you can still look to us for repayment of the debt securities if there were a shortfall in the trust deposit. In fact, if one of the Events of Default occurred (such as our bankruptcy) and the debt securities become immediately due and payable, there may be such a shortfall. Depending on the events causing the default, you may not be able to obtain payment of the shortfall.

Modification and Waiver. We and the trustee may amend or supplement the senior indenture or the senior debt securities without the consent of any holder:

to convey, transfer, assign, mortgage or pledge any assets as security for the senior debt securities of one or more series;

to evidence the succession of a corporation, limited liability company, partnership or trust to us, and the assumption by such successor of our covenants, agreements and obligations under the senior indenture;

to add to our covenants such new covenants, restrictions, conditions or provisions for the protection of the holders, and to make the occurrence, or the occurrence and continuance, of a default in any such additional covenants, restrictions, conditions or provisions an event of default;

to cure any ambiguity, defect or inconsistency in the senior indenture or in any supplemental indenture or to conform the senior indenture or the senior debt securities to the description of senior debt securities of such series set forth in this prospectus or any applicable prospectus supplement;

to provide for or add guarantors with respect to the senior debt securities of any series;

to establish the form or forms or terms of the senior debt securities as permitted by the senior indenture;

to evidence and provide for the acceptance of appointment under the senior indenture by a successor trustee, or to make such changes as shall be necessary to provide for or facilitate the administration of the trusts in the senior indenture by more than one trustee;

to add to, delete from or revise the conditions, limitations and restrictions on the authorized amount, terms, purposes of issue, authentication and delivery of any series of senior debt securities;

to make any change to the senior debt securities of any series so long as no senior debt securities of such series are outstanding; or

to make any change that does not adversely affect the rights of any holder in any material respect.

Other amendments and modifications of the senior indenture or the senior debt securities issued may be made, and our compliance with any provision of the senior indenture with respect to any series of senior debt

Table of Contents

securities may be waived, with the consent of the holders of a majority of the aggregate principal amount of the outstanding senior debt securities of all series affected by the amendment or modification (voting together as a single class); provided, however, that each affected holder must consent to any modification, amendment or waiver that:

extends the final maturity of any senior debt securities of such series;

reduces the principal amount of on any senior debt securities of such series;

reduces the rate or extends the time of payment of interest on any senior debt securities of such series;

reduces the amount payable upon the redemption of any senior debt securities of such series;

changes the currency of payment of principal of or interest on any senior debt securities of such series;

reduces the principal amount of original issue discount securities payable upon acceleration of maturity or the amount provable in bankruptcy;

waives a default in the payment of principal of or interest on the senior debt securities;

changes the provisions relating to the waiver of past defaults or changes or impairs the right of holders to receive payment or to institute suit for the enforcement of any payment or conversion of any senior debt securities of such series on or after the due date therefor;

modifies any of the provisions of these restrictions on amendments and modifications, except to increase any required percentage or to provide that certain other provisions cannot be modified or waived without the consent of the holder of each senior debt security of such series affected by the modification; or

reduces the above-stated percentage of outstanding senior debt securities of such series whose holders must consent to a supplemental indenture or to modify or amend or to waive certain provisions of or defaults under the senior indenture.

It shall not be necessary for the holders to approve the particular form of any proposed amendment, supplement or waiver, but it shall be sufficient if the holders' consent approves the substance thereof. After an amendment, supplement or waiver of the senior indenture in accordance with the provisions described in this section becomes effective, the trustee must give to the holders affected thereby certain notice briefly describing the amendment, supplement or waiver. Any failure by the trustee to give such notice, or any defect therein, shall not, however, in any way impair or affect the validity of any such amendment, supplemental indenture or waiver.

No Personal Liability of Incorporators, Stockholders, Officers, Directors. The senior indenture provides that no recourse shall be had under any obligation, covenant or agreement of ours in the senior indenture or any supplemental indenture, or in any of the senior debt securities or because of the creation of any indebtedness represented thereby, against any of our incorporators, stockholders, officers or directors, past, present or future, or of any predecessor or successor entity thereof under any law, statute or constitutional provision or by the enforcement of any assessment or by any legal or equitable proceeding or otherwise. Each holder, by accepting the senior debt securities, waives and releases all such liability.

Edgar Filing: INFINITY PHARMACEUTICALS, INC. - Form 424B5

Concerning the Trustee. The senior indenture provides that, except during the continuance of an event of default, the trustee will not be liable except for the performance of such duties as are specifically set forth in the senior indenture. If an event of default has occurred and is continuing, the trustee will exercise such rights and powers vested in it under the senior indenture and will use the same degree of care and skill in its exercise as a prudent person would exercise under the circumstances in the conduct of such person's own affairs.

The senior indenture and the provisions of the Trust Indenture Act of 1939 incorporated by reference therein contain limitations on the rights of the trustee thereunder, should it become a creditor of ours or any of our subsidiaries, to obtain payment of claims in certain cases or to realize on certain property received by it in respect

Table of Contents

of any such claims, as security or otherwise. The trustee is permitted to engage in other transactions, provided that if it acquires any conflicting interest (as defined in the Trust Indenture Act), it must eliminate such conflict or resign.

We may have normal banking relationships with the senior trustee in the ordinary course of business.

Unclaimed Funds. All funds deposited with the trustee or any paying agent for the payment of principal, premium, interest or additional amounts in respect of the senior debt securities that remain unclaimed for two years after the date upon which such principal, premium or interest became due and payable will be repaid to us. Thereafter, any right of any holder of senior debt securities to such funds shall be enforceable only against us, and the trustee and paying agents will have no liability therefor.

Governing Law. The senior indenture and the senior debt securities will be governed by, and construed in accordance with, the internal laws of the State of New York.

Certain Terms of the Subordinated Debt Securities

Other than the terms of the subordinated indenture and subordinated debt securities relating to subordination or otherwise as described in the prospectus supplement relating to a particular series of subordinated debt securities, the terms of the subordinated indenture and subordinated debt securities are identical in all material respects to the terms of the senior indenture and senior debt securities.

Additional or different subordination terms may be specified in the prospectus supplement applicable to a particular series.

Subordination. The indebtedness evidenced by the subordinated debt securities is subordinate to the prior payment in full of all of our senior indebtedness, as defined in the subordinated indenture. During the continuance beyond any applicable grace period of any default in the payment of principal, premium, interest or any other payment due on any of our senior indebtedness, we may not make any payment of principal of or interest on the subordinated debt securities (except for certain sinking fund payments). In addition, upon any payment or distribution of our assets upon any dissolution, winding-up, liquidation or reorganization, the payment of the principal of and interest on the subordinated debt securities will be subordinated to the extent provided in the subordinated indenture in right of payment to the prior payment in full of all our senior indebtedness. Because of this subordination, if we dissolve or otherwise liquidate, holders of our subordinated debt securities may receive less, ratably, than holders of our senior indebtedness. The subordination provisions do not prevent the occurrence of an event of default under the subordinated indenture.

The term *senior indebtedness* of a person means with respect to such person the principal of, premium, if any, interest on, and any other payment due pursuant to any of the following, whether outstanding on the date of the subordinated indenture or incurred by that person in the future:

all of the indebtedness of that person for money borrowed;

all of the indebtedness of that person evidenced by notes, debentures, bonds or other securities sold by that person for money;

all of the lease obligations which are capitalized on the books of that person in accordance with generally accepted accounting principles;

all indebtedness of others of the kinds described in the first two bullet points above and all lease obligations of others of the kind described in the third bullet point above that the person, in any manner, assumes or guarantees or that the person in effect guarantees through an agreement to purchase, whether that agreement is contingent or otherwise; and

all renewals, extensions or refundings of indebtedness of the kinds described in the first, second or fourth bullet point above and all renewals or extensions of leases of the kinds described in the third or fourth bullet point above;

Table of Contents

unless, in the case of any particular indebtedness, renewal, extension or refunding, the instrument creating or evidencing it or the assumption or guarantee relating to it expressly provides that such indebtedness, renewal, extension or refunding is not superior in right of payment to the subordinated debt securities. Our senior debt securities constitute senior indebtedness for purposes of the subordinated debt indenture.

Table of Contents

DESCRIPTION OF CAPITAL STOCK

The following description of our capital stock is intended as a summary only. This description is based upon, and is qualified by reference to, our certificate of incorporation, our by-laws and applicable provisions of Delaware corporate law. This summary is not complete. You should read our certificate of incorporation and by-laws, which are incorporated by reference into the registration statement, of which this prospectus forms a part, for the provisions that are important to you.

Our authorized capital stock consists of 100,000,000 shares of common stock and 1,000,000 shares of preferred stock.

Common Stock

Annual Meeting. Annual meetings of our stockholders are held on the date designated in accordance with our by-laws. Written notice must be mailed to each stockholder entitled to vote not less than ten nor more than 60 days before the date of the meeting. The presence in person or by proxy of the holders of record of a majority of our issued and outstanding shares entitled to vote at such meeting constitutes a quorum for the transaction of business at meetings of the stockholders. Special meetings of the stockholders, unless otherwise prescribed by statute or by our certificate of incorporation, may be called for any purpose or purposes, by our chief executive officer, the chairman of our board of directors, or a majority of our board of directors. Except as may be otherwise provided by applicable law, our certificate of incorporation or our by-laws, all elections, other than elections of directors, and all other questions shall be decided by the affirmative vote of the holders of a majority in voting power of the shares of our stock which are present in person or by proxy and entitled to vote thereon. Except as may be provided by applicable law, our certificate of incorporation or our by-laws, each director shall be elected by the vote of the majority of the votes cast with respect to that director's election at any meeting for the election of directors at which a quorum is present, except in the case of contested elections, as determined in accordance with our by-laws, in which case directors shall be elected by a plurality of the votes cast.

Voting Rights. Each holder of common stock is entitled to one vote for each share held on all matters to be voted upon by stockholders.

Dividends. The holders of common stock, after any preferences of holders of any preferred stock, are entitled to receive dividends when and if declared by the board of directors out of legally available funds.

Liquidation and Dissolution. If we are liquidated or dissolved, the holders of the common stock will be entitled to share in our assets available for distribution to stockholders in proportion to the amount of common stock they own. The amount available for common stockholders is calculated after payment of liabilities. Holders of any preferred stock will receive a preferential share of our assets before the holders of the common stock receive any assets.

Other Rights. Holders of the common stock have no right to:

convert the stock into any other security;

have the stock redeemed; or

purchase additional stock or to maintain their proportionate ownership interest.

The common stock does not have cumulative voting rights. Holders of shares of the common stock are not required to make additional capital contributions.

Transfer Agent and Registrar. American Stock Transfer & Trust Company is transfer agent and registrar for the common stock.

Table of Contents

Preferred Stock

As of September 30, 2012, no shares of preferred stock were outstanding. Other terms of any series of preferred stock will be described in the prospectus supplement relating to that series of preferred stock. The terms of any series of preferred stock may differ from the terms described below. Certain provisions of the preferred stock described below and in any applicable prospectus supplement are not complete.

We are authorized to issue blank check preferred stock, which may be issued in one or more series upon authorization of our board of directors. Our board of directors is authorized to fix the designation of the series, the number of authorized shares of the series, dividend rights and terms, conversion rights, voting rights, redemption rights and terms, liquidation preferences and any other rights, powers, preferences and limitations applicable to each series of preferred stock. The authorized shares of our preferred stock are available for issuance without further action by our stockholders, unless such action is required by applicable law or the rules of any stock exchange on which our securities may be listed. If the approval of our stockholders is not required for the issuance of shares of our preferred stock, our board may determine not to seek stockholder approval.

Our board of directors has authorized the issuance of Series A junior participating preferred stock which includes terms and conditions which could discourage a takeover or other transaction that holders of some or a majority of our common stock might believe to be in their best interests. Any other series of our preferred stock could also, depending on the terms of such series, impede the completion of a merger, tender offer or other takeover attempt. Our board of directors will make any determination to issue such shares based upon its judgment as to the best interests of our stockholders. Our directors, in so acting, could issue preferred stock having terms that could discourage an acquisition attempt through which an acquirer may be able to change the composition of our board of directors, including a tender offer or other transaction that holders of some or a majority of our common stock might believe to be in their best interests or in which stockholders might receive a premium for their stock over the then-current market price of the stock.

The preferred stock has the terms described below unless otherwise provided in the prospectus supplement relating to a particular series of preferred stock. You should read the prospectus supplement relating to the particular series of preferred stock being offered for specific terms, including:

the designation and stated value per share of the preferred stock and the number of shares offered;

the amount of liquidation preference per share;

the price at which the preferred stock will be issued;

the dividend rate, or method of calculation of dividends, the dates on which dividends will be payable, whether dividends will be cumulative or noncumulative and, if cumulative, the dates from which dividends will commence to accumulate;

any redemption or sinking fund provisions;

if other than the currency of the United States, the currency or currencies including composite currencies in which the preferred stock is denominated and/or in which payments will or may be payable;

any conversion provisions; and

any other rights, preferences, privileges, limitations and restrictions on the preferred stock.

Edgar Filing: INFINITY PHARMACEUTICALS, INC. - Form 424B5

The preferred stock will, when issued, be fully paid and nonassessable. Unless otherwise specified in the prospectus supplement, each series of preferred stock will rank equally as to dividends and liquidation rights in all respects with each other series of preferred stock. The rights of holders of shares of each series of preferred stock will be subordinate to those of our general creditors.

Table of Contents

We may, at our option, with respect to any series of preferred stock, elect to offer fractional interests in shares of preferred stock, and provide for the issuance of depositary receipts representing depositary shares, each of which will represent a fractional interest in a share of the series of preferred stock. The fractional interest will be specified in the prospectus supplement relating to a particular series of preferred stock.

Rank. Unless otherwise specified in the prospectus supplement, the preferred stock will, with respect to dividend rights and rights upon our liquidation, dissolution or winding up of its affairs, rank:

senior to our common stock and to all equity securities ranking junior to such preferred stock with respect to dividend rights or rights upon our liquidation, dissolution or winding up of our affairs;

on a parity with all equity securities issued by us, the terms of which specifically provide that such equity securities rank on a parity with the preferred stock with respect to dividend rights or rights upon our liquidation, dissolution or winding up of our affairs; and

junior to all equity securities issued by us, the terms of which specifically provide that such equity securities rank senior to the preferred stock with respect to dividend rights or rights upon our liquidation, dissolution or winding up of our affairs.

The term equity securities does not include convertible debt securities.

Dividends. Holders of the preferred stock of each series will be entitled to receive, when, as and if declared by our board of directors, cash dividends at such rates and on such dates described in the applicable prospectus supplement. Different series of preferred stock may be entitled to dividends at different rates or based on different methods of calculation. The dividend rate may be fixed or variable or both. Dividends will be payable to the holders of record as they appear on our stock books on record dates fixed by our board of directors, as specified in the applicable prospectus supplement.

Dividends on any series of preferred stock may be cumulative or noncumulative, as described in the applicable prospectus supplement. If our board of directors does not declare a dividend payable on a dividend payment date on any series of noncumulative preferred stock, then the holders of that noncumulative preferred stock will have no right to receive a dividend for that dividend payment date, and we will have no obligation to pay the dividend accrued for that period, whether or not dividends on that series are declared payable on any future dividend payment dates. Dividends on any series of cumulative preferred stock will accrue from the date we initially issue shares of such series or such other date specified in the applicable prospectus supplement.

No dividends may be declared or paid or funds set apart for the payment of any dividends on any parity securities unless full dividends have been paid or set apart for payment on the preferred stock. If full dividends are not paid, the preferred stock will share dividends pro rata with the parity securities.

No dividends may be declared or paid or funds set apart for the payment of dividends on any junior securities unless full dividends for all dividend periods terminating on or prior to the date of the declaration or payment will have been paid or declared and a sum sufficient for the payment set apart for payment on the preferred stock.

Liquidation Preference. Upon any voluntary or involuntary liquidation, dissolution or winding up of our affairs, then, before we make any distribution or payment to the holders of any common stock or any other class or series of our capital stock ranking junior to the preferred stock in the distribution of assets upon any liquidation, dissolution or winding up of our affairs, the holders of each series of preferred stock shall be entitled to receive out of assets legally available for distribution to stockholders, liquidating distributions in the amount of the liquidation preference per share set forth in the applicable prospectus supplement, plus any accrued and unpaid dividends thereon. Such dividends will not include any accumulation in respect of unpaid noncumulative dividends for prior dividend periods. Unless otherwise specified in the applicable prospectus supplement, after payment of the full amount of their liquidating distributions, the holders of preferred stock will have no right or

Table of Contents

claim to any of our remaining assets. Upon any such voluntary or involuntary liquidation, dissolution or winding up, if our available assets are insufficient to pay the amount of the liquidating distributions on all outstanding preferred stock and the corresponding amounts payable on all other classes or series of our capital stock ranking on parity with the preferred stock and all other such classes or series of shares of capital stock ranking on parity with the preferred stock in the distribution of assets, then the holders of the preferred stock and all other such classes or series of capital stock will share ratably in any such distribution of assets in proportion to the full liquidating distributions to which they would otherwise be entitled.

Upon any such liquidation, dissolution or winding up and if we have made liquidating distributions in full to all holders of preferred stock, we will distribute our remaining assets among the holders of any other classes or series of capital stock ranking junior to the preferred stock according to their respective rights and preferences and, in each case, according to their respective number of shares. For such purposes, our consolidation or merger with or into any other corporation, trust or entity, or the sale, lease or conveyance of all or substantially all of our property or assets will not be deemed to constitute a liquidation, dissolution or winding up of our affairs.

Redemption. If so provided in the applicable prospectus supplement, the preferred stock will be subject to mandatory redemption or redemption at our option, as a whole or in part, in each case upon the terms, at the times and at the redemption prices set forth in such prospectus supplement.

The prospectus supplement relating to a series of preferred stock that is subject to mandatory redemption will specify the number of shares of preferred stock that shall be redeemed by us in each year commencing after a date to be specified, at a redemption price per share to be specified, together with an amount equal to all accrued and unpaid dividends thereon to the date of redemption. Unless the shares have a cumulative dividend, such accrued dividends will not include any accumulation in respect of unpaid dividends for prior dividend periods. We may pay the redemption price in cash or other property, as specified in the applicable prospectus supplement. If the redemption price for preferred stock of any series is payable only from the net proceeds of the issuance of shares of our capital stock, the terms of such preferred stock may provide that, if no such shares of our capital stock shall have been issued or to the extent the net proceeds from any issuance are insufficient to pay in full the aggregate redemption price then due, such preferred stock shall automatically and mandatorily be converted into the applicable shares of our capital stock pursuant to conversion provisions specified in the applicable prospectus supplement. Notwithstanding the foregoing, we will not redeem any preferred stock of a series unless:

if that series of preferred stock has a cumulative dividend, we have declared and paid or contemporaneously declare and pay or set aside funds to pay full cumulative dividends on the preferred stock for all past dividend periods and the then current dividend period;

or

if such series of preferred stock does not have a cumulative dividend, we have declared and paid or contemporaneously declare and pay or set aside funds to pay full dividends for the then current dividend period.

In addition, we will not acquire any preferred stock of a series unless:

if that series of preferred stock has a cumulative dividend, we have declared and paid or contemporaneously declare and pay or set aside funds to pay full cumulative dividends on all outstanding shares of such series of preferred stock for all past dividend periods and the then current dividend period; or

if that series of preferred stock does not have a cumulative dividend, we have declared and paid or contemporaneously declare and pay or set aside funds to pay full dividends on the preferred stock of such series for the then current dividend period.

However, at any time we may purchase or acquire preferred stock of that series (1) pursuant to a purchase or exchange offer made on the same terms to holders of all outstanding preferred stock of such series or (2) by conversion into or exchange for shares of our capital stock ranking junior to the preferred stock of such series as to dividends and upon liquidation.

Table of Contents

If fewer than all of the outstanding shares of preferred stock of any series are to be redeemed, we will determine the number of shares that may be redeemed pro rata from the holders of record of such shares in proportion to the number of such shares held or for which redemption is requested by such holder or by any other equitable manner that we determine. Such determination will reflect adjustments to avoid redemption of fractional shares.

Unless otherwise specified in the prospectus supplement, we will mail notice of redemption at least 30 days but not more than 60 days before the redemption date to each holder of record of preferred stock to be redeemed at the address shown on our stock transfer books. Each notice shall state:

the redemption date;

the number of shares and series of preferred stock to be redeemed;

the redemption price;

the place or places where certificates for such preferred stock are to be surrendered for payment of the redemption price;

that dividends on the shares to be redeemed will cease to accrue on such redemption date;

the date on which the holder's conversion rights, if any, as to such shares shall terminate; and

the specific number of shares to be redeemed from each such holder if fewer than all the shares of any series are to be redeemed. If notice of redemption has been given and we have set aside the funds necessary for such redemption in trust for the benefit of the holders of any shares called for redemption, then from and after the redemption date, dividends will cease to accrue on such shares, and all rights of the holders of such shares will terminate, except the right to receive the redemption price.

Voting Rights. Holders of preferred stock will not have any voting rights, except as required by law or as indicated in the applicable prospectus supplement.

Unless otherwise provided for under the terms of any series of preferred stock, no consent or vote of the holders of shares of preferred stock or any series thereof shall be required for any amendment to our certificate of incorporation that would increase the number of authorized shares of preferred stock or the number of authorized shares of any series thereof or decrease the number of authorized shares of preferred stock or the number of authorized shares of any series thereof (but not below the number of authorized shares of preferred stock or such series, as the case may be, then outstanding).

Conversion Rights. The terms and conditions, if any, upon which any series of preferred stock is convertible into our common stock will be set forth in the applicable prospectus supplement relating thereto. Such terms will include the number of shares of common stock into which the shares of preferred stock are convertible, the conversion price, rate or manner of calculation thereof, the conversion period, provisions as to whether conversion will be at our option or at the option of the holders of the preferred stock, the events requiring an adjustment of the conversion price and provisions affecting conversion in the event of the redemption.

Transfer Agent and Registrar. The transfer agent and registrar for the preferred stock will be set forth in the applicable prospectus supplement.

Series A Junior Participating Preferred Stock

Edgar Filing: INFINITY PHARMACEUTICALS, INC. - Form 424B5

Each outstanding share of our common stock has attached to it one preferred share purchase right that entitles the registered holder to purchase from us a unit of one one-thousandth of a share of our Series A junior participating preferred stock, which is referred to herein as the Junior Preferred Stock, at a price of \$76.00 per

-22-

Table of Contents

unit. The description and terms of the rights are set forth in a rights agreement dated as of February 13, 2003 and amended on April 11, 2006 and November 19, 2008, by and between us and American Stock Transfer & Trust Company, as rights agent, which is referred to herein as the Rights Agreement.

Until the earlier to occur of (i) the close of business on the tenth day after a public announcement that a person or group of affiliated or associated persons has acquired beneficial ownership of 15% or more of our outstanding common stock or (ii) ten business days (or such later date as may be determined by action of our board of directors prior to such time as any person becomes an acquiring person) following the commencement of, or announcement of an intention to make, a tender offer or exchange offer the consummation of which would result in the beneficial ownership by a person or group of 15% or more of such outstanding common stock (the earlier of such dates is the distribution date), the rights will be evidenced by our common stock certificates. Notwithstanding the foregoing, Purdue Pharma L.P., or PPLP, and Purdue Pharmaceutical Products L.P., or Purdue, which we refer to collectively as the Purdue Entities, and their associated companies, may own up to 33.3% of our fully-diluted common stock outstanding without such ownership causing such parties to be deemed acquiring persons for purposes of the Rights Agreement (which shares can be comprised of a combination of shares they acquired from us in connection with our 2008 securities purchase agreement with the Purdue Entities, shares acquired upon the exercise of warrants held by the Purdue Entities, and other shares they may acquire as specifically provided for in the securities purchase agreement).

The Rights Agreement provides that, until the distribution date, the rights will be transferred with and only with our common stock. Until the distribution date (or earlier redemption or expiration of the rights), common stock certificates, upon transfer or new issuance of common stock, will contain a notation incorporating the Rights Agreement by reference. Until the distribution date (or earlier redemption or expiration of the rights), the surrender for transfer of any certificates of our common stock will also constitute the transfer of the rights associated with the common stock represented by such certificate. As soon as practicable following the distribution date, if any, separate certificates evidencing the rights will be mailed to holders of record of our common stock as of the close of business on the distribution date and such separate rights certificates alone will evidence the rights.

The rights are not exercisable until the distribution date. The rights will expire at the close of business on February 24, 2013 unless that final expiration date is extended or unless the rights are earlier redeemed or exchanged by us, in each case as described below.

The purchase price payable, and the number of units of Junior Preferred Stock or other securities or property issuable, upon exercise of the rights are subject to adjustment from time to time to prevent dilution (a) in the event of a stock dividend on, or a subdivision, combination or reclassification of, the Junior Preferred Stock, (b) upon the grant to holders of the units of Junior Preferred Stock of certain rights or warrants to subscribe for or purchase units of Junior Preferred Stock at a price, or securities convertible into units of Junior Preferred Stock with a conversion price, less than the then current market price of the units of Junior Preferred Stock or (c) upon the distribution to holders of the units of Junior Preferred Stock of evidences of indebtedness or assets (excluding regular periodic cash dividends paid out of earnings or retained earnings or dividends payable in units of Junior Preferred Stock) or of subscription rights or warrants other than those referred to above.

The number of outstanding rights and the number of units of Junior Preferred Stock issuable upon exercise of each right are also subject to adjustment in the event of a stock split of our common stock or a stock dividend on the common stock payable in common stock or subdivisions, consolidations or combinations of the common stock occurring, in any such case, prior to the distribution date.

The Junior Preferred Stock purchasable upon exercise of the rights will not be redeemable. Each share of Junior Preferred Stock will be entitled to an aggregate dividend of 1,000 times the dividend declared per share of our common stock. In the event of liquidation, the holders of the shares of Junior Preferred Stock will be entitled to an aggregate payment of 1,000 times the payment made per share of our common stock. Each share of Junior

Table of Contents

Preferred Stock will have 1,000 votes, voting together with the common stock. Finally, in the event of any merger, consolidation or other transaction in which shares of our common stock are exchanged, each share of Junior Preferred Stock will be entitled to receive 1,000 times the amount received per share of common stock. These rights are protected by customary anti-dilution provisions.

Because of the nature of the dividend, liquidation and voting rights, the value of each unit of Junior Preferred Stock purchasable upon exercise of each right should approximate the value of one share of common stock.

If, after the rights become exercisable, we are acquired in a merger or other business combination transaction with an acquiring person or one of its affiliates, or 50% or more of our consolidated assets or earning power are sold to an acquiring person or one of its affiliates, proper provision will be made so that each holder of a right will thereafter have the right to receive, upon exercise thereof at the then current exercise price of the right, that number of shares of common stock of the acquiring company which at the time of such transaction will have a market value of two times the exercise price of the right.

If any person or group of affiliated or associated persons becomes the beneficial owner of 15% or more of the outstanding shares of our common stock (33.3% in the case of the Purdue Entities), proper provision will be made so that each holder of a right, other than rights beneficially owned by the acquiring person (which will thereafter be unexercisable), will have the right to receive upon exercise that number of shares of our common stock or units of Junior Preferred Stock (or cash, other securities or property) having a market value of two times the exercise price of the right.

At any time after the acquisition by a person or group of affiliated or associated persons of beneficial ownership of 15% or more of the outstanding shares of our common stock (33.3% in the case of the Purdue Entities) and prior to the acquisition by such person or group of 50% or more of our outstanding common stock, our board of directors may exchange the rights (other than rights owned by such person or group which have become void), in whole or in part, at an exchange ratio per unit of Junior Preferred Stock equal to the purchase price divided by the then current market price per unit of Junior Preferred Stock on the earlier of (i) the date on which any person becomes an acquiring person and (ii) the date on which a tender or exchange offer is announced which, if consummated would result in the offerer being the beneficial owner of 15% or more of the shares of our common stock then outstanding (33.3% in the case of the Purdue Entities).

With certain exceptions, no adjustment in the purchase price will be required until cumulative adjustments require an adjustment of at least 1% in the purchase price. No fractional shares of Junior Preferred Stock will be issued (other than fractions which are integral multiples of one one-thousandth of a share of Junior Preferred Stock, which may, at our election, be evidenced by depositary receipts) and, in lieu thereof, an adjustment in cash will be made based on the market price of the units of Junior Preferred Stock on the last trading day prior to the date of exercise.

At any time on or prior to the earlier of (i) the close of business on the tenth day after a public announcement that a person or group of affiliated or associated persons acquires beneficial ownership of 15% or more of our outstanding common stock (33.3% in the case of the Purdue Entities) (unless the board of directors extends the ten day period) or (ii) the tenth business day after a person commences, or announces its intention to commence, a tender offer or exchange offer that would result in the bidder's beneficial ownership of 15% or more of the shares of our common stock (33.3% in the case of the Purdue Entities), our board of directors may redeem the rights in whole, but not in part, at a price of \$0.01 per right. The redemption of the rights may be made effective at such time, on such basis and with such conditions as the board of directors in its sole discretion may establish. Immediately upon any redemption of the rights, the right to exercise the rights will terminate and the only right of the holders of rights will be to receive the redemption price. The rights are also redeemable under other circumstances as specified in the Rights Agreement.

Table of Contents

The terms of the rights may be amended by our board of directors without the consent of the holders of the rights except that from and after such time that there is an acquiring person no amendment may adversely affect the interests of the holders of the rights.

Until a right is exercised, the holder of a right will have no rights by virtue of ownership as a stockholder of Infinity, including, without limitation, the right to vote or to receive dividends.

The rights have certain anti-takeover effects. The rights will cause substantial dilution to a person or group that attempts to acquire us on terms not approved by our board of directors, except pursuant to an offer conditioned on a substantial number of rights being acquired. The rights should not interfere with any merger or other business combination approved by the board of directors since we may redeem the rights at the redemption price prior to the occurrence of a distribution date.

The Rights Agreement specifying the terms of the rights has been previously filed with the SEC and is incorporated by reference as an exhibit to the registration statement of which this prospectus is a part. The foregoing description of the rights is qualified in its entirety by reference to the Rights Agreement.

Securities Purchase Agreement with BPR Entities

On July 17, 2012, we executed a securities purchase agreement, referred to herein as the securities purchase agreement, with PPLP, Beacon Company, or Beacon, and Rosebay Medical Company L.P., or Rosebay, and collectively, the BRP Entities. Under the Securities Purchase Agreement, we issued and sold 5,416,565 shares, referred to herein as the New Shares, of our common stock to PPLP pursuant to the terms of the securities purchase agreement.

We filed with, and had declared effective by, the Securities and Exchange Commission, a registration statement covering the resale to the public by the BRP Entities of the New Shares and certain other shares we had previously issued and sold to Beacon and Rosebay. In connection therewith, we have agreed to cause such registration statement to remain effective until all shares covered thereby have been sold or may be sold without volume restrictions pursuant to Rule 144 promulgated under the Securities Act of 1933, as amended (the Securities Act).

The securities 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 BRP Entities will have piggyback registration rights, which require us, at the election of the BRP Entities, to use our reasonable best efforts to cause to be included in such underwritten offering, common stock then held by the BRP Entities 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 BRP Entities have agreed 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 BRP Entities will agree not to, among other things, offer, sell or otherwise transfer or dispose of, directly or indirectly, any common stock held by the BRP Entities 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 BRP Entities, for a specified period of time requested by us, the managing underwriters, the placement agents or the initial purchasers.

Through September 6, 2017, the BRP Entities and each associated company holding shares of 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

Table of Contents

that are not new shares 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.

Effects of Authorized but Unissued Stock

We have shares of common stock and preferred stock available for future issuance without stockholder approval, subject to any limitations imposed by the listing standards of The NASDAQ Global Select Market. We may utilize these additional shares for a variety of corporate purposes, including for future public offerings to raise additional capital or facilitate corporate acquisitions or for payment as a dividend on our capital stock. The existence of unissued and unreserved common stock and preferred stock may enable our board of directors to issue shares to persons friendly to current management or to issue preferred stock with terms that could have the effect of making it more difficult for a third party to acquire, or could discourage a third party from seeking to acquire, a controlling interest in our company by means of a merger, tender offer, proxy contest or otherwise. In addition, if we issue preferred stock, the issuance could adversely affect the voting power of holders of common stock and the likelihood that such holders will receive dividend payments and payments upon liquidation.

Provisions of Our Certificate of Incorporation and By-laws and Delaware Law That May Have Anti-Takeover Effects

Board of Directors. We do not have a classified board of directors. All of our directors are elected annually. The number of directors comprising our board of directors is fixed from time to time by the board of directors.

Removal of Directors by Stockholders. Members of our board of directors may be removed from office at any time with or without cause by the affirmative vote of the holders of at least of a majority of the outstanding shares entitled to vote at an election of directors.

Stockholder Nomination of Directors. Our by-laws provide that a stockholder must notify us in writing of any stockholder nomination of a director not earlier than the close of business on the 120th day, and not later than the close of business on the 90th day, prior to the first anniversary of the preceding year's annual meeting; provided, that if the date of the annual meeting is more than 30 days before or more than 70 days after such anniversary date, notice by the stockholder to be timely must be so delivered not earlier than the close of business on the 120th day prior to the date of such annual meeting and not later than the close of business on the 10th day following the day on which public announcement of the date of such annual meeting is first made by us. Our by-laws also provide that, subject to certain limitations, if a stockholder (or a qualified representative of the stockholder) does not appear at a meeting of stockholders to present a nomination, such nomination shall be disregarded, notwithstanding that proxies in respect of such vote may have been received by us.

No Action By Written Consent. Our restated certificate of incorporation provides that our stockholders may not act by written consent and may only act at duly called meetings of stockholders.

Delaware Business Combination Statute. Section 203 of the General Corporation Law of the State of Delaware, which we refer to as the DGCL, is applicable to us. Section 203 of the DGCL restricts some types of transactions and business combinations between a corporation and a 15% stockholder. A 15% stockholder is generally considered by Section 203 to be a person owning 15% or more of the corporation's outstanding voting stock. Section 203 refers to a 15% stockholder as an interested stockholder. Section 203 restricts these transactions for a period of three years from the date the stockholder acquires 15% or more of our outstanding voting stock. With some exceptions, unless the transaction is approved by the board of directors and the holders of at least two-thirds of the outstanding voting stock of the corporation, Section 203 prohibits significant business transactions such as:

a merger with, disposition of significant assets to or receipt of disproportionate financial benefits by the interested stockholder, and

Table of Contents

any other transaction that would increase the interested stockholder's proportionate ownership of any class or series of our capital stock.

The shares held by the interested stockholder are not counted as outstanding when calculating the two-thirds of the outstanding voting stock needed for approval.

The prohibition against these transactions does not apply if:

prior to the time that any stockholder became an interested stockholder, the board of directors approved either the business combination or the transaction in which such stockholder acquired 15% or more of our outstanding voting stock, or

the interested stockholder owns at least 85% of our outstanding voting stock as a result of a transaction in which such stockholder acquired 15% or more of our outstanding voting stock. Shares held by persons who are both directors and officers or by some types of employee stock plans are not counted as outstanding when making this calculation.

Directors' Liability

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

for any breach of the director's legal duty to act in the best interests of us and our stockholders;

for acts or omissions by the director with dishonest intentions or which involve intentional misconduct or an intentional violation of the law;

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

for transactions where the director derived an 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; provided, however, that we may limit the extent of such indemnification by individual contracts with our directors; and, provided, further, that we shall not be required to indemnify any director 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.

Table of Contents

DESCRIPTION OF WARRANTS

We may issue warrants to purchase debt securities, preferred stock or common stock. We may offer warrants separately or together with one or more additional warrants, debt securities, preferred stock or common stock, or any combination of those securities in the form of units, as described in the applicable prospectus supplement. If we issue warrants as part of a unit, the accompanying prospectus supplement will specify whether those warrants may be separated from the other securities in the unit prior to the expiration date of the warrants. The applicable prospectus supplement will also describe the following terms of any warrants:

the specific designation and aggregate number of, and the offering price at which we will issue, the warrants;

the currency or currency units in which the offering price, if any, and the exercise price are payable;

the date on which the right to exercise the warrants will begin and the date on which that right will expire or, if you may not continuously exercise the warrants throughout that period, the specific date or dates on which you may exercise the warrants;

whether the warrants are to be sold separately or with other securities as parts of units;

whether the warrants will be issued in definitive or global form or in any combination of these forms, although, in any case, the form of a warrant included in a unit will correspond to the form of the unit and of any security included in that unit;

any applicable material U.S. federal income tax consequences;

the identity of the warrant agent for the warrants and of any other depositaries, execution or paying agents, transfer agents, registrars or other agents;

the proposed listing, if any, of the warrants or any securities purchasable upon exercise of the warrants on any securities exchange;

the designation and terms of any equity securities purchasable upon exercise of the warrants;

the designation, aggregate principal amount, currency and terms of any debt securities that may be purchased upon exercise of the warrants;

if applicable, the designation and terms of the debt securities, preferred stock, depositary shares or common stock with which the warrants are issued and, the number of warrants issued with each security;

if applicable, the date from and after which any warrants issued as part of a unit and the related debt securities, preferred stock, or common stock will be separately transferable;

Edgar Filing: INFINITY PHARMACEUTICALS, INC. - Form 424B5

the number of shares of preferred stock or the number of shares of common stock purchasable upon exercise of a warrant and the price at which those shares may be purchased;

if applicable, the minimum or maximum amount of the warrants that may be exercised at any one time;

information with respect to book-entry procedures, if any;

the anti-dilution provisions of, and other provisions for changes to or adjustment in the exercise price of, the warrants, if any;

any redemption or call provisions; and

any additional terms of the warrants, including terms, procedures and limitations relating to the exchange or exercise of the warrants.

Table of Contents

FORMS OF SECURITIES

Each debt security and warrant will be represented either by a certificate issued in definitive form to a particular investor or by one or more global securities representing the entire issuance of securities. Unless the applicable prospectus supplement provides otherwise, certificated securities in definitive form and global securities will be issued in registered form. Definitive securities name you or your nominee as the owner of the security, and in order to transfer or exchange these securities or to receive payments other than interest or other interim payments, you or your nominee must physically deliver the securities to the trustee, registrar, paying agent or other agent, as applicable. Global securities name a depository or its nominee as the owner of the debt securities or warrants represented by these global securities. The depository maintains a computerized system that will reflect each investor's beneficial ownership of the securities through an account maintained by the investor with its broker/dealer, bank, trust company or other representative, as we explain more fully below.

Registered Global Securities

We may issue the registered debt securities and warrants in the form of one or more fully registered global securities that will be deposited with a depository or its nominee identified in the applicable prospectus supplement and registered in the name of that depository or nominee. In those cases, one or more registered global securities will be issued in a denomination or aggregate denominations equal to the portion of the aggregate principal or face amount of the securities to be represented by registered global securities. Unless and until it is exchanged in whole for securities in definitive registered form, a registered global security may not be transferred except as a whole by and among the depository for the registered global security, the nominees of the depository or any successors of the depository or those nominees.

If not described below, any specific terms of the depository arrangement with respect to any securities to be represented by a registered global security will be described in the prospectus supplement relating to those securities. We anticipate that the following provisions will apply to all depository arrangements.

Ownership of beneficial interests in a registered global security will be limited to persons, called participants, that have accounts with the depository or persons that may hold interests through participants. Upon the issuance of a registered global security, the depository will credit, on its book entry registration and transfer system, the participants' accounts with the respective principal or face amounts of the securities beneficially owned by the participants. Any dealers, underwriters or agents participating in the distribution of the securities will designate the accounts to be credited. Ownership of beneficial interests in a registered global security will be shown on, and the transfer of ownership interests will be effected only through, records maintained by the depository, with respect to interests of participants, and on the records of participants, with respect to interests of persons holding through participants. The laws of some states may require that some purchasers of securities take physical delivery of these securities in definitive form. These laws may impair your ability to own, transfer or pledge beneficial interests in registered global securities.

So long as the depository, or its nominee, is the registered owner of a registered global security, that depository or its nominee, as the case may be, will be considered the sole owner or holder of the securities represented by the registered global security for all purposes under the applicable indenture or warrant agreement. Except as described below, owners of beneficial interests in a registered global security will not be entitled to have the securities represented by the registered global security registered in their names, will not receive or be entitled to receive physical delivery of the securities in definitive form and will not be considered the owners or holders of the securities under the applicable indenture or warrant agreement. Accordingly, each person owning a beneficial interest in a registered global security must rely on the procedures of the depository for that registered global security and, if that person is not a participant, on the procedures of the participant through which the person owns its interest, to exercise any rights of a holder under the applicable indenture or warrant agreement. We understand that under existing industry practices, if we request any action of holders or if an owner of a beneficial interest in a registered global security desires to give or take any action that a holder is

Table of Contents

entitled to give or take under the applicable indenture or warrant agreement, the depository for the registered global security would authorize the participants holding the relevant beneficial interests to give or take that action, and the participants would authorize beneficial owners owning through them to give or take that action or would otherwise act upon the instructions of beneficial owners holding through them.

Principal, premium, if any, and interest payments on debt securities, and any payments to holders with respect to warrants, represented by a registered global security registered in the name of a depository or its nominee will be made to the depository or its nominee, as the case may be, as the registered owner of the registered global security. None of us, the trustees, the warrant agents, the unit agents or any other agent of ours, agent of the trustees or agent of the warrant agents or unit agents will have any responsibility or liability for any aspect of the records relating to payments made on account of beneficial ownership interests in the registered global security or for maintaining, supervising or reviewing any records relating to those beneficial ownership interests.

We expect that the depository for any of the securities represented by a registered global security, upon receipt of any payment to holders of principal, premium, interest or other distribution of underlying securities or other property on that registered global security, will immediately credit participants' accounts in amounts proportionate to their respective beneficial interests in that registered global security as shown on the records of the depository. We also expect that payments by participants to owners of beneficial interests in a registered global security held through participants will be governed by standing customer instructions and customary practices, as is now the case with the securities held for the accounts of customers or registered in street name, and will be the responsibility of those participants.

If the depository for any of the securities represented by a registered global security is at any time unwilling or unable to continue as depository or ceases to be a clearing agency registered under the Securities Exchange Act of 1934, and a successor depository registered as a clearing agency under the Securities Exchange Act of 1934 is not appointed by us within 90 days, we will issue securities in definitive form in exchange for the registered global security that had been held by the depository. Any securities issued in definitive form in exchange for a registered global security will be registered in the name or names that the depository gives to the relevant trustee, warrant agent, unit agent or other relevant agent of ours or theirs. It is expected that the depository's instructions will be based upon directions received by the depository from participants with respect to ownership of beneficial interests in the registered global security that had been held by the depository.

Table of Contents

PLAN OF DISTRIBUTION

We may sell securities:

through underwriters;

through dealers;

through agents;

directly to purchasers; or

through a combination of any of these methods of sale.

In addition, we may issue the securities as a dividend or distribution or in a subscription rights offering to our existing security holders.

We may directly solicit offers to purchase securities, or agents may be designated to solicit such offers. We will, in the prospectus supplement relating to such offering, name any agent that could be viewed as an underwriter under the Securities Act, and describe any commissions that we must pay. Any such agent will be acting on a best efforts basis for the period of its appointment or, if indicated in the applicable prospectus supplement, on a firm commitment basis. This prospectus may be used in connection with any offering of our securities through any of these methods or other methods described in the applicable prospectus supplement.

The distribution of the securities may be effected from time to time in one or more transactions:

at a fixed price, or prices, which may be changed from time to time;

at market prices prevailing at the time of sale;

at prices related to such prevailing market prices; or

at negotiated prices.

Each prospectus supplement will describe the method of distribution of the securities and any applicable restrictions.

The prospectus supplement with respect to the securities of a particular series will describe the terms of the offering of the securities, including the following:

the name of the agent or any underwriters;

the public offering or purchase price;

any discounts and commissions to be allowed or paid to the agent or underwriters;

all other items constituting underwriting compensation;

any discounts and commissions to be allowed or paid to dealers; and

any exchanges on which the securities will be listed.

If any underwriters or agents are utilized in the sale of the securities in respect of which this prospectus is delivered, we will enter into an underwriting agreement or other agreement with them at the time of sale to them, and we will set forth in the prospectus supplement relating to such offering the names of the underwriters or agents and the terms of the related agreement with them.

If a dealer is utilized in the sale of the securities in respect of which the prospectus is delivered, we will sell such securities to the dealer, as principal. The dealer may then resell such securities to the public at varying prices to be determined by such dealer at the time of resale.

Table of Contents

If we offer securities in a subscription rights offering to our existing security holders, we may enter into a standby underwriting agreement with dealers, acting as standby underwriters. We may pay the standby underwriters a commitment fee for the securities they commit to purchase on a standby basis. If we do not enter into a standby underwriting arrangement, we may retain a dealer-manager to manage a subscription rights offering for us.

Agents, underwriters, dealers and other persons may be entitled under agreements which they may enter into with us to indemnification by us against certain civil liabilities, including liabilities under the Securities Act, and may be customers of, engage in transactions with or perform services for us in the ordinary course of business.

If so indicated in the applicable prospectus supplement, we will authorize underwriters or other persons acting as our agents to solicit offers by certain institutions to purchase securities from us pursuant to delayed delivery contracts providing for payment and delivery on the date stated in the prospectus supplement. Each contract will be for an amount not less than, and the aggregate amount of securities sold pursuant to such contracts shall not be less nor more than, the respective amounts stated in the prospectus supplement. Institutions with whom the contracts, when authorized, may be made include commercial and savings banks, insurance companies, pension funds, investment companies, educational and charitable institutions and other institutions, but shall in all cases be subject to our approval. Delayed delivery contracts will not be subject to any conditions except that:

the purchase by an institution of the securities covered under that contract shall not at the time of delivery be prohibited under the laws of the jurisdiction to which that institution is subject; and

if the securities are also being sold to underwriters acting as principals for their own account, the underwriters shall have purchased such securities not sold for delayed delivery. The underwriters and other persons acting as our agents will not have any responsibility in respect of the validity or performance of delayed delivery contracts.

Certain agents, underwriters and dealers, and their associates and affiliates may be customers of, have borrowing relationships with, engage in other transactions with, and/or perform services, including investment banking services, for us or one or more of our respective affiliates in the ordinary course of business.

In order to facilitate the offering of the securities, any underwriters may engage in transactions that stabilize, maintain or otherwise affect the price of the securities or any other securities the prices of which may be used to determine payments on such securities. Specifically, any underwriters may overallocate in connection with the offering, creating a short position for their own accounts. In addition, to cover overallocations or to stabilize the price of the securities or of any such other securities, the underwriters may bid for, and purchase, the securities or any such other securities in the open market. Finally, in any offering of the securities through a syndicate of underwriters, the underwriting syndicate may reclaim selling concessions allowed to an underwriter or a dealer for distributing the securities in the offering if the syndicate repurchases previously distributed securities in transactions to cover syndicate short positions, in stabilization transactions or otherwise. Any of these activities may stabilize or maintain the market price of the securities above independent market levels. Any such underwriters are not required to engage in these activities and may end any of these activities at any time.

Under Rule 15c6-1 of the Exchange Act, trades in the secondary market generally are required to settle in three business days, unless the parties to any such trade expressly agree otherwise. The applicable prospectus supplement may provide that the original issue date for your securities may be more than three scheduled business days after the trade date for your securities. Accordingly, in such a case, if you wish to trade securities on any date prior to the third business day before the original issue date for your securities, you will be required, by virtue of the fact that your securities initially are expected to settle in more than three scheduled business days after the trade date for your securities, to make alternative settlement arrangements to prevent a failed settlement.

Table of Contents

The securities may be new issues of securities and may have no established trading market. The securities may or may not be listed on a national securities exchange. We can make no assurance as to the liquidity of or the existence of trading markets for any of the securities.

In compliance with the guidelines of the Financial Industry Regulatory Authority, or FINRA, to the extent applicable the aggregate maximum discount, commission or agency fees or other items constituting underwriting compensation to be received by any FINRA member or independent broker-dealer will not exceed 8% of the proceeds from any offering pursuant to this prospectus and any applicable prospectus supplement.

Table of Contents

LEGAL MATTERS

Unless the applicable prospectus supplement indicates otherwise, the validity of the securities in respect of which this prospectus is being delivered will be 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.

Table of Contents

Shares of Common Stock

PROSPECTUS SUPPLEMENT

Morgan Stanley

J.P. Morgan

BofA Merrill Lynch

Deutsche Bank Securities

Stifel Nicolaus Weisel

December , 2012