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

**FORM S-3
REGISTRATION STATEMENT**
*UNDER
THE SECURITIES ACT OF 1933*

INFINITY PHARMACEUTICALS, INC.
(Exact Name of Registrant as Specified in Its Charter)

Delaware
(State or Other Jurisdiction of
Incorporation or Organization)

33-0655706
(I.R.S. Employer
Identification Number)

**784 Memorial Drive
Cambridge, Massachusetts 02139
(617) 453-1000**
(Address, Including Zip Code, and Telephone Number, Including Area Code, of Registrant's Principal Executive Offices)

Lawrence E. Bloch, M.D., J.D.
President
Infinity Pharmaceuticals, Inc.
784 Memorial Drive
Cambridge, Massachusetts 02139
(617) 453-1000
(Name, Address, Including Zip Code, and Telephone Number, Including Area Code, of Agent for Service)

Copies to:

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Boston, Massachusetts 02109
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Approximate date of commencement of proposed sale to the public: From time to time after this registration statement becomes effective.

If the only securities being registered on this Form are being offered pursuant to dividend or interest reinvestment plans, please check the following box.

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, other than securities offered only in connection with dividend or interest reinvestment plans, check the following box.

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, please check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

If this Form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act

registration statement number of the earlier effective registration statement for the same offering.

If this Form is a registration statement pursuant to General Instruction I.D. or a post-effective amendment thereto that shall become effective upon filing with the Commission pursuant to Rule 462(e) under the Securities Act, check the following box.

If this Form is a post-effective amendment to a registration statement filed pursuant to General Instruction I.D. filed to register additional securities or additional classes of securities pursuant to Rule 413(b) under the Securities Act, check the following box.

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

Large accelerated filer

Accelerated filer

Non-accelerated filer (Do not check if a smaller reporting company)

Smaller reporting company

Emerging growth company

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 7(a)(2)(B) of the Securities Act.

CALCULATION OF REGISTRATION FEE

Title of Each Class of Securities To Be Registered	Amount to be Registered(1)(2)	Proposed Maximum Offering Price Per Share(3)	Proposed Maximum Aggregate Offering Price(3)	Amount of Registration Fee(3)
Common Stock, par value \$0.001 per share	1,134,689	\$2.18	\$2,473,622.02	\$307.97

- (1) The shares will be offered for resale by a selling stockholder pursuant to the prospectus contained herein.
- (2) Pursuant to Rule 416 under the Securities Act, this registration statement also covers any additional number of shares of common stock issuable upon stock splits, stock dividends, or other distribution, recapitalization or similar events with respect to the shares of common stock being registered pursuant to this registration statement.
- (3) Estimated solely for purposes of calculating the registration fee pursuant to Rule 457(c) under the Securities Act, based on average of high and low price per share of the common stock as reported on the Nasdaq Global Select Market on April 25, 2018.

The Registrant hereby amends this Registration Statement on such date or dates as may be necessary to delay its effective date until the Registrant shall file a further amendment which specifically states that this Registration Statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933 or until the Registration Statement shall become effective on such date as the Commission, acting pursuant to said Section 8(a), may determine.

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

Subject to completion, dated April 30, 2018

PROSPECTUS

1,134,689 Shares



Common Stock

This prospectus relates to the resale of up to 1,134,689 shares of our common stock by the selling stockholder listed on page 6, including its, pledgees, donees, transferees, assignees or other successors-in-interest, which shares were issued to the selling stockholder in a private placement. We are registering these shares on behalf of the selling stockholder, to be offered and sold by it from time to time.

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

The selling stockholder identified in this prospectus, or its pledgees, donees, transferees, assignees or other successors-in-interest, may offer the shares from time to time on terms to be determined at the time of sale through ordinary brokerage transactions or through any other means described in this prospectus under the caption "Plan of Distribution." The shares may be sold at fixed prices, at prevailing market prices, at prices related to prevailing market prices or at negotiated prices.

Our common stock is listed on the Nasdaq Global Select Market ("Nasdaq") under the symbol "INFI." On April 27, 2018, the last reported closing sale price of our common stock on Nasdaq was \$2.21 per share.

Investing in our common stock involves a high degree of risk. These risks are described in the section titled "[Risk Factors](#)" beginning on page 3 of this prospectus.

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

The date of this prospectus is _____, 2018.

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You should rely only on the information contained or incorporated by reference in this prospectus. We have not authorized any other person to provide you with different information. If anyone provides you with different or inconsistent information, you should not rely on it. This prospectus may only be used where it is legal to offer and sell shares of our common stock. If it is against the law in any jurisdiction to make an offer to sell these shares, or to solicit an offer from someone to buy these shares, then this prospectus does not apply to any person in that jurisdiction, and no offer or solicitation is made by this prospectus to any such person. You should assume that the information appearing in this prospectus is accurate only as of the date on the front cover of this prospectus, regardless of the time of delivery of this prospectus or of any sale of common stock. Our business, financial condition, results of operations and prospects may have changed since such date.

PROSPECTUS SUMMARY

This summary highlights, and is qualified in its entirety by, the more detailed information included elsewhere in this prospectus or incorporated by reference in this prospectus. This summary does not contain all of the information that you should consider before investing. You should read and carefully consider the entire prospectus, especially the “Risk Factors” section of this prospectus, before deciding to invest in our common stock.

Overview

We are an innovative biopharmaceutical company dedicated to developing novel medicines for people with cancer. We combine proven scientific expertise with a passion for developing novel small molecule drugs that target disease pathways for potential applications in oncology. We are focusing our efforts on advancing IPI-549, an orally administered, clinical-stage, immuno-oncology product candidate that selectively inhibits the enzyme phosphoinositide-3-kinase-gamma, or PI3K-gamma. We believe IPI-549 is the only selective inhibitor of PI3K-gamma being investigated in clinical trials. We have worldwide commercial rights to IPI-549.

Corporate 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, the surviving corporation in the merger, changed its name to Infinity Discovery, Inc., or IDI, 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 “INFL.” Our common stock currently trades on the Nasdaq Global Select Market.

Our principal executive offices are located at 784 Memorial Drive, Cambridge, Massachusetts 02139, and our telephone number at that address is (617) 453-1000.

The Infinity logo and all other Infinity product names are trademarks of Infinity Pharmaceuticals, Inc. or its subsidiaries 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.

THE OFFERING

Common stock offered by selling stockholders	1,134,689 shares
Terms of the offering	The selling stockholder, including its pledgees, donees, transferees, assignees or other successors-in-interest, may sell, transfer or otherwise dispose of any or all of the shares of common stock offered by this prospectus from time to time on the Nasdaq Global Select Market or any other stock exchange, market or trading facility on which the shares are traded or in private transactions. The shares of common stock may be sold at fixed prices, at prevailing market prices, at prices related to prevailing market prices or at negotiated prices.
Use of proceeds	We will not receive any proceeds from the sale of shares in this offering.
Risk factors	You should read the “Risk Factors” section on page 3 of this prospectus for a discussion of factors to consider carefully before deciding to invest in shares of our common stock.
Nasdaq Global Select Market symbol	“INFI”

RISK FACTORS

Investing in our common stock involves a high degree of risk. Before you decide to invest in our common stock, you should carefully consider the risks described in the section captioned “Risk Factors” in our most recent Annual Report on Form 10-K, our most recent Quarterly Report on Form 10-Q and other filings we make with the Securities and Exchange Commission, or SEC, from time to time, which are incorporated by reference herein in their entirety, together with the other information in this prospectus and documents incorporated by reference in this prospectus. The risks described in our most recent Annual Report on Form 10-K, our most recent Quarterly Report on Form 10-Q and the other filings incorporated by reference herein are not the only ones facing our company. Additional risks and uncertainties may also impair our business operations. If any of the risks described in our most recent Annual Report on Form 10-K, our most recent Quarterly Report on Form 10-Q and the other filings incorporated by reference herein occurs, our business, financial condition, results of operations and future growth prospects could be harmed. In these circumstances, the market price of our common stock could decline, and you may lose all or part of your investment.

CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus and the information incorporated by reference herein include “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 plans and strategy for our business, the possible achievement of development goals and milestones in 2018, our future development efforts, our collaborations, and our future operating results and financial position. We often use words such as “anticipate,” “believe,” “estimate,” “expect,” “intend,” “may,” “plan,” “predict,” “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 can also 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 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 product candidates, our ability to obtain, maintain and enforce intellectual property rights for our product candidates, our dependence on our alliance partners, competition, our ability to obtain any necessary financing to conduct our planned activities, and other risk factors that are referenced in the section entitled “Risk Factors” on page 3 of this prospectus, in Part I, Item 1A “Risk Factors” of our annual report on Form 10-K filed with the SEC on March 15, 2018, and in the other documents we incorporate by reference in this prospectus.

If one or more of these factors materialize, or if any underlying assumptions prove incorrect, our actual results, performance or achievements may vary materially from any future results, performance or achievements expressed or implied by these forward-looking statements.

You should consider these factors and the other cautionary statements made in this prospectus and the documents we incorporate by reference herein as being applicable to all related forward-looking statements wherever they appear in this prospectus, or the documents incorporated by reference. While we may elect to update forward-looking statements wherever they appear in this prospectus, or the documents incorporated by reference herein, we do not assume, and specifically disclaim, any obligation to do so, whether as a result of new information, future events or otherwise, except as required by law.

USE OF PROCEEDS

We are filing the registration statement of which this prospectus is a part to permit the holder of the shares of our common stock described in the section entitled “Selling Stockholder” to resell such shares. We are not selling any securities under this prospectus, and we will not receive any proceeds from the sale of shares by the selling stockholder.

The selling stockholder will pay any underwriting discounts or commissions and fees of underwriters, selling brokers, dealer managers or similar securities industry professionals incurred by the selling stockholder in disposing of the shares. We will bear all other expenses incurred in effecting the registration of the shares covered by this prospectus, including, without limitation, all registration, filing and printing fees, fees and expenses of our counsel and our accountants, costs and expenses associated with clearing the shares for sale under applicable state securities laws, all listing fees, expenses incurred by us (but not the selling stockholder) in connection with any “road show,” and reasonable fees, charges and disbursements of counsel to the selling stockholder.

SELLING STOCKHOLDER

This prospectus relates to the possible sale by Millennium Pharmaceuticals, Inc., who we refer to in this prospectus as Millennium or the “selling stockholder,” of up to 1,134,689 shares of our common stock (plus an indeterminate number of shares of our common stock that may be issued upon stock splits, stock dividends, or similar transactions, in accordance with Rule 416 under the Securities Act) that were issued to the selling stockholder on March 12, 2018, pursuant to a convertible promissory note between us and Intellikine LLC, or Intellikine, dated July 26, 2017 as a component of our prepayment of such note in full, in accordance with the terms therein. Both Millennium and Intellikine are wholly owned subsidiaries of Takeda Pharmaceutical Company Limited, or Takeda. See “Relationship with Selling Stockholder” below for more information regarding the transaction to which these shares of common stock relate.

The table below sets forth, to our knowledge, information concerning the beneficial ownership of shares of our common stock by the selling stockholder as of April 27, 2018. The selling stockholder may sell all, some or none of the shares of common stock subject to this prospectus. See “Plan of Distribution.”

The information in the table below with respect to the selling stockholder has been obtained from the selling stockholder, with beneficial ownership and percentage ownership determined in accordance with the rules and regulations of the SEC and including voting or investment power with respect to shares. Unless otherwise indicated below, to our knowledge, the person named in the table has sole voting and investment power with respect to such person’s shares of common stock. The inclusion of any shares in this table does not constitute an admission of beneficial ownership for the person named below. The percentage of beneficial ownership is based upon 54,829,774 shares of common stock outstanding on April 12, 2018.

To our knowledge and except as noted under the caption titled “Relationship with Selling Stockholder” below, the selling stockholder does not have, and within the past three years has not had, any position, office or other material relationship with us or any of our predecessors or affiliates.

Name of Selling Stockholder	Shares of Common Stock Beneficially Owned Prior to Offering		Number of Shares of Common Stock Being Offered	Shares of Common Stock to be Beneficially Owned After Offering (1)	
	Number	Percentage		Number	Percentage
Millennium Pharmaceuticals, Inc.(2)	1,134,689	2.1%	1,134,689	0	—

- (1) We do not know when or in what amounts the selling stockholder may offer shares for sale. The selling stockholder might not sell any or all of the shares offered by this prospectus. Because the selling stockholder may offer all or some of the shares pursuant to this offering, and because there are currently no agreements, arrangements or understandings with respect to the sale of any of the shares, we cannot estimate the number of the shares that will be held by the selling stockholder after completion of the offering. However, for purposes of this table, we have assumed that, after completion of the offering, none of the shares covered by this prospectus will be held by the selling stockholder.
- (2) The address of Millennium is 40 Landsdowne Street, Cambridge, Massachusetts 02139.

Relationship with Selling Stockholder

Collaboration Agreement

In July 2010, we entered into a development and license agreement with Intellikine, Inc., under which we obtained rights to discover, develop and commercialize pharmaceutical products targeting the delta and/or gamma isoforms of PI3K, including IPI-549 and duvelisib, an oral, dual inhibitor of PI3K delta and gamma. In January 2012, Intellikine, Inc. was acquired by Takeda. In December 2012, we amended and restated our development and license agreement with Intellikine (as successor to Intellikine, Inc.) and further amended the agreement in July 2014, September 2016 and July 2017. We refer to the amended and restated development and license agreement, as amended, as the Takeda Agreement.

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Under the terms of the Takeda Agreement, we are obligated to pay Intellikine up to \$5.0 million in remaining success-based milestone payments for the development of a product candidate other than duvelisib, which could include IPI-549. We are also obligated to pay Intellikine up to \$165.0 million in remaining success-based milestone payments related to the approval and commercialization of one product candidate other than duvelisib, which could be IPI-549.

Due to amendments to the Takeda Agreement described below, we are no longer obligated to pay Intellikine royalties on net sales of IPI-549, other products containing a selective inhibitor of PI3K-gamma, or duvelisib in oncology indications. However, we remain obligated to pay Intellikine tiered royalties ranging from 7% to 11% on worldwide net sales of products containing a selective inhibitor of PI3K-delta or a selective dual inhibitor of PI3K delta and gamma, as described in the Takeda Agreement, including duvelisib if commercialized outside oncology indications. Such royalties are payable until the later to occur of (i) the expiration of specified patent rights and (ii) the expiration of non-patent regulatory exclusivities in a country, subject to reduction of the royalties and, in certain circumstances, limits on the number of products subject to a royalty obligation.

The Takeda Agreement expires on the later of the expiration of certain patents and the expiration of the royalty payment terms for the products, unless earlier terminated in accordance with its terms. Either party may terminate the Takeda Agreement on 75 days' prior written notice if the other party materially breaches the agreement and fails to cure such breach within the applicable notice period, provided that the notice period is reduced to 30 days where the alleged breach is non-payment. Intellikine may also terminate the Takeda Agreement if we are not diligent in developing or commercializing the licensed products and do not, within three months after notice from Intellikine, demonstrate to Intellikine's reasonable satisfaction that we have not failed to be diligent. The foregoing periods are subject to extension in certain circumstances. Additionally, Intellikine may terminate the Takeda Agreement upon 30 days' prior written notice if we or a related party bring an action challenging the validity of any of the licensed patents, provided that we have not withdrawn such action before the end of the 30-day notice period. We may terminate the agreement at any time upon 180 days' prior written notice. The Takeda Agreement also provides for customary reciprocal indemnification obligations of the parties.

July 2014 Amendment

On July 29, 2014, we entered into an amendment to the Takeda Agreement. Under the July 2014 Amendment, we agreed to make a one-time, upfront payment of \$5,000,000 to Intellikine in exchange for the option to terminate our royalty obligations under the Takeda Agreement with respect to worldwide net sales in oncology indications of products containing or comprised of IPI-145. We could exercise the option by payment to Intellikine of a fee of \$52,500,000 on or before March 31, 2015. If we chose not to exercise the option, our royalty obligations with respect to IPI-145 in oncology would have remained in effect. On March 31, 2015, we announced that we had exercised our option.

September 2016 Amendment

On September 27, 2016, we entered into a second amendment to the Takeda Agreement. Under the September 2016 amendment, and in connection with our entry into a qualifying transaction, as defined therein, we were no longer obligated to pay Intellikine any remaining milestone payments for the development, approval or commercialization of duvelisib. In return, we became obligated to pay Intellikine 50% of all revenue arising from certain qualifying transactions for duvelisib, including those under such qualifying transaction, subject to certain exceptions including revenue we receive as reimbursement for duvelisib research and development expenses.

On October 29, 2016, we entered into a license agreement with Verastem Inc., or Verastem, which we and Verastem amended and restated on November 1, 2016, effective as of October 29, 2016. Our amended and restated license agreement with Verastem constituted a qualifying transaction under the Takeda Agreement.

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July 2017 Amendment and Convertible Note

On July 26, 2017, we entered into a third amendment to the Takeda Agreement. The July 2017 amendment to the Takeda Agreement terminated our obligations to pay royalties to Intellikine with respect to worldwide net sales of products containing or comprised of a selective inhibitor of PI3K gamma, including but not limited to IPI-549. In consideration for such termination, we concurrently executed a convertible promissory note, which we refer to as the Takeda Note, which obligated us to pay Intellikine, or its designated affiliate, the principal amount of \$6.0 million together with interest accruing at a rate of 8% per annum on or before July 26, 2018 in cash or in shares of our common stock, at the election of Intellikine. The terms of the Takeda Note included our right to prepay the amount owed thereunder, in full or in part, prior to the maturity date and demand and piggyback registration rights for Intellikine.

On March 12, 2018, we exercised our right to prepay the Takeda Note in full in the principal amount of \$6.0 million together with interest of approximately \$0.3 million. Intellikine elected to receive \$4.0 million of such payment in cash and approximately \$2.3 million of such payment in shares of our common stock. Pursuant to the terms of the Takeda Note, we issued 1,134,689 shares of common stock to Intellikine's designated affiliate, Millennium, at a price of \$2.028 per share.

PLAN OF DISTRIBUTION

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

- purchases by a broker-dealer as principal and resale by such broker-dealer for its own account pursuant to this prospectus;
- ordinary brokerage transactions and transactions in which the broker solicits purchasers;
- block trades in which the broker-dealer so engaged will attempt to sell the shares as agent but may position and resell a portion of the block as principal to facilitate the transaction;
- an over-the-counter distribution in accordance with the rules of the Nasdaq Global Select Market;
- in privately negotiated transactions; and
- in options transactions.

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

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

In effecting sales, broker-dealers or agents engaged by the selling stockholder may arrange for other broker-dealers to participate. Broker-dealers or agents may receive commissions, discounts or concessions from the selling stockholder in amounts to be negotiated immediately prior to the sale.

In offering the shares covered by this prospectus, the selling stockholder and any broker-dealers who execute sales for the selling stockholder may be deemed to be “underwriters” within the meaning of the Securities Act in connection with such sales. Any profits realized by the selling stockholder and the compensation of any broker-dealer may be deemed to be underwriting discounts and commissions.

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

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We have advised the selling stockholder that the anti-manipulation rules of Regulation M under the Exchange Act may apply to sales of shares in the market and to the activities of the selling stockholder and their affiliates. In addition, we will make copies of this prospectus available to the selling stockholder for the purpose of satisfying the prospectus delivery requirements of the Securities Act. The selling stockholder may indemnify any broker-dealer that participates in transactions involving the sale of the shares against certain liabilities, including liabilities arising under the Securities Act.

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

We have agreed to indemnify the selling stockholder against certain liabilities, including certain liabilities under the Securities Act.

We have agreed with the selling stockholder to keep the registration statement of which this prospectus constitutes a part effective until the earlier of (i) such time as all of the shares covered by this prospectus have been disposed of pursuant to and in accordance with the registration statement or (ii) such time as the securities are sold under circumstances in which all of the applicable conditions of Rule 144 of the Securities Act (or any similar provisions then in force) are met, (iii) such time as the securities are otherwise transferred and may be resold without subsequent registration under the Securities Act, or (iv) such time as the securities have ceased to be outstanding.

LEGAL MATTERS

The validity of the shares of our common stock offered hereby is being passed upon for us by Wilmer Cutler Pickering Hale and Dorr LLP.

EXPERTS

Ernst & Young LLP, independent registered public accounting firm, has audited our consolidated financial statements included in our Annual Report on Form 10-K for the year ended December 31, 2017, and the effectiveness of internal control over financial reporting as of December 31, 2017, as set forth in their reports, which are incorporated by reference in this prospectus and elsewhere in the registration statement. Our financial statements are incorporated by reference in reliance on Ernst & Young LLP's reports, given on their authority as experts in accounting and auditing.

WHERE YOU CAN FIND MORE INFORMATION

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

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

INCORPORATION OF CERTAIN DOCUMENTS BY REFERENCE

The SEC requires us to "incorporate" into this prospectus information that we file with the SEC in other documents. This means that we can disclose important information to you by referring to other documents that contain that information. The information incorporated by reference is considered to be part of this prospectus. Information contained in this prospectus and information that we file with the SEC in the future and incorporate by reference in this prospectus automatically updates and supersedes previously filed information. We incorporate by reference the documents listed below and any future filings we make with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act after the date of this prospectus and prior to the sale of all the shares covered by this prospectus.

- (1) Our Annual Report on Form 10-K for the year ended December 31, 2017, filed with the SEC on March 15, 2018;
- (2) Our Current Reports on Form 8-K filed with the SEC on January 8, 2018 (except Item 2.02) and March 8, 2018;
- (3) The description of our common stock contained in our Registration Statement on Form 8-A filed on July 25, 2000, including any amendments or reports filed for the purpose of updating such description; and
- (4) Any other filings we make pursuant to the Exchange Act after the date of filing the registration statement of which this prospectus is a part and prior to effectiveness of the registration statement.

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

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

Infinity Pharmaceuticals, Inc.
784 Memorial Drive
Cambridge, Massachusetts 02139
Attention: Seth A. Tasker, Vice President, General Counsel and Secretary
Telephone: (617) 453-1000

1,134,689 Shares



Common Stock

PROSPECTUS

, 2018

PART II
INFORMATION NOT REQUIRED IN PROSPECTUS

Item 14. Other Expenses of Issuance and Distribution.

Set forth below are estimates (except in the case of the SEC registration fee) of the amount of fees and expenses to be incurred in connection with the issuance and distribution of the offered securities, other than underwriting discounts and commissions.

SEC registration fee	\$ 308
Accounting fees and expenses	10,000
Legal fees and expenses	40,000
Miscellaneous fees and expenses	0
Total	<u>\$50,308</u>

Item 15. Indemnification of Directors and Officers.

Section 145 of the General Corporation Law of the State of Delaware (the “DGCL”), provides, generally, that a corporation shall have the power to indemnify any person who was or is a party or is threatened to be made a party to any threatened, pending or completed action, suit or proceeding (except actions by or in the right of the corporation) by reason of the fact that such person is or was a director, officer, employee or agent of the corporation against all expenses, judgments, fines and amounts paid in settlement actually and reasonably incurred by such person in connection with such action, suit or proceeding if such person acted in good faith and in a manner such person reasonably believed to be in or not opposed to the best interests of the corporation and, with respect to any criminal action or proceeding, had no reasonable cause to believe his or her conduct was unlawful. A corporation may similarly indemnify such person for expenses actually and reasonably incurred by such person in connection with the defense or settlement of any action or suit by or in the right of the corporation, provided that such person acted in good faith and in a manner he or she reasonably believed to be in or not opposed to the best interests of the corporation, and, in the case of claims, issues and matters as to which such person shall have been adjudged liable to the corporation, provided that a court shall have determined, upon application, that, despite the adjudication of liability but in view of all of the circumstances of the case, such person is fairly and reasonably entitled to indemnity for such expenses which such court shall deem proper.

Section 102(b)(7) of the DGCL provides, generally, that our certificate of incorporation may contain a provision eliminating or limiting the personal liability of a director to the corporation or its shareholders for monetary damages for breach of fiduciary duty as a director, provided that such provision may not eliminate or limit the liability of a director (i) for any breach of the director’s duty of loyalty to the corporation or its shareholders, (ii) for acts or omissions not in good faith or which involve intentional misconduct or a knowing violation of law, (iii) under Section 174 of the DGCL, or (iv) for any transaction from which the director derived an improper personal benefit. No such provision may eliminate or limit the liability of a director for any act or omission occurring prior to the date when such provision became effective.

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

- for any breach of the director’s duty of loyalty to us or our stockholders;
- for acts or omissions by the director not in good faith or which involve intentional misconduct or a knowing violation of law;
- for declaring dividends or authorizing the purchase or redemption of shares in violation of Delaware law; or
- for transactions where the director derived any improper personal benefit.

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

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

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

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

Item 16. Exhibits

<u>Exhibit No.</u>	<u>Description</u>
4.1	<u>Restated Certificate of Incorporation of the Registrant (previously filed as Exhibit 3.1 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2007 (File No. 000-31141) and incorporated herein by reference)</u>
4.2	<u>Amended and Restated Bylaws of the Registrant (previously filed as Exhibit 3.1 to the Registrant's Current Report on Form 8-K filed on March 17, 2009 (File No. 000-31141) and incorporated herein by reference)</u>
4.3	<u>Convertible Promissory Note, dated July 26, 2017, by and between the Registrant and Intellikine LLC (previously filed as Exhibit 10.2 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended September 30, 2017 (File No. 000-31141) and incorporated herein by reference)</u>
5.1	<u>Opinion of Wilmer Cutler Pickering Hale and Dorr LLP</u>
23.1	<u>Consent of Ernst & Young LLP, independent registered public accounting firm</u>
23.2	<u>Consent of Wilmer Cutler Pickering Hale and Dorr LLP (included in Exhibit 5.1)</u>
24.1	<u>Powers of Attorney (included in the signature pages to the Registrant's Registration Statement)</u>

Item 17. Undertakings.

The undersigned Registrant hereby undertakes:

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

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- (i) to include any prospectus required by Section 10(a)(3) of the Securities Act of 1933, as amended (the “Securities Act”);
- (ii) to reflect in the prospectus any facts or events arising after the effective date of this registration statement (or the most recent post-effective amendment thereof) which, individually or in the aggregate, represent a fundamental change in the information set forth in this registration statement. Notwithstanding the foregoing, any increase or decrease in volume of securities offered (if the total dollar value of securities offered would not exceed that which was registered) and any deviation from the low or high end of the estimated maximum offering range may be reflected in the form of prospectus filed with the Commission pursuant to Rule 424(b) if, in the aggregate, the changes in volume and price represent no more than a 20 percent change in the maximum aggregate offering price set forth in the “Calculation of Registration Fee” table in the effective registration statement; and
- (iii) to include any material information with respect to the plan of distribution not previously disclosed in this registration statement or any material change to such information in this registration statement;

provided, however, that paragraphs (a)(1)(i), (a)(1)(ii) and (a)(1)(iii) do not apply if the information required to be included in a post-effective amendment by those paragraphs is contained in reports filed with or furnished to the Commission by the Registrant pursuant to Section 13 or Section 15(d) of the Securities Exchange Act of 1934, as amended (the “Exchange Act”), that are incorporated by reference in this registration statement, or is contained in a form of prospectus filed pursuant to Rule 424(b) that is part of this registration statement.

- (2) That, for the purposes of determining any liability under the Securities Act, each such post-effective amendment shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at the time shall be deemed to be the initial *bona fide* offering thereof.
- (3) To remove from registration by means of a post-effective amendment any of the securities being registered which remain unsold at the termination of the offering.
- (4) That, for the purpose of determining liability under the Securities Act to any purchaser:
 - (i) each prospectus filed by the Registrant pursuant to Rule 424(b)(3) shall be deemed to be part of the registration statement as of the date the filed prospectus was deemed part of and included in the registration statement; and
 - (ii) each prospectus required to be filed pursuant to Rule 424(b)(2), (b)(5), or (b)(7) as part of a registration statement in reliance on Rule 430B relating to an offering made pursuant to Rule 415(a)(1)(i), (vii) or (x) for the purpose of providing the information required by Section 10(a) of the Securities Act shall be deemed to be part of and included in the registration statement as of the earlier of the date such form of prospectus is first used after effectiveness or the date of the first contract of sale of securities in the offering described in the prospectus. As provided in Rule 430B, for liability purposes of the issuer and any person that is at that date an underwriter, such date shall be deemed to be a new effective date of the registration statement relating to the securities in the registration statement to which that prospectus relates, and the offering of such securities at that time shall be deemed to be the initial *bona fide* offering thereof; *provided, however*, that no statement made in a registration statement or prospectus that is part of the registration statement or made in a document incorporated or deemed incorporated by reference into the registration statement or prospectus that is part of the registration statement will, as to a purchaser with a time of contract of sale prior to such effective date, supersede or modify any statement that was made in the registration statement or prospectus that was part of the registration statement or made in any such document immediately prior to such effective date.

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(b) That, for purposes of determining any liability under the Securities Act, each filing of the Registrant's annual report pursuant to Section 13(a) or 15(d) of the Exchange Act (and, where applicable, each filing of an employee benefit plan's annual report pursuant to Section 15(d) of the Exchange Act) that is incorporated by reference in this registration statement shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

(c) That, insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers and controlling persons of the Registrant pursuant to the indemnification provisions described herein, or otherwise, the Registrant has been advised that in the opinion of the Commission such indemnification is against public policy as expressed in the Securities Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the Registrant of expenses incurred or paid by a director, officer or controlling person of the Registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the Registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Securities Act and will be governed by the final adjudication of such issue.

SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, as amended, the Registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-3 and has duly caused this Registration Statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Cambridge, Commonwealth of Massachusetts, on April 30, 2018.

INFINITY PHARMACEUTICALS, INC.

By: /s/ Adelene Q. Perkins
Name: Adelene Q. Perkins
Title: Chief Executive Officer

SIGNATURES AND POWER OF ATTORNEY

We, the undersigned officers and directors of Infinity Pharmaceuticals, Inc., hereby severally constitute and appoint Adelene Q. Perkins, Lawrence E. Bloch, M.D., J.D., and Seth A. Tasker, and each of them singly, our true and lawful attorneys with full power to any of them, and to each of them singly, to sign for us and in our names in the capacities indicated below the Registration Statement on Form S-3 filed herewith and any and all pre-effective and post-effective amendments to said Registration Statement and generally to do all such things in our name and behalf in our capacities as officers and directors to enable Infinity Pharmaceuticals, Inc. to comply with the provisions of the Securities Act of 1933, as amended, and all requirements of the Securities and Exchange Commission, hereby ratifying and confirming our signatures as they may be signed by our said attorneys, or any of them, to said Registration Statement and any and all amendments thereto.

Pursuant to the requirements of the Securities Act of 1933, as amended, this Registration Statement has been signed by the following persons in the capacities and on the dates indicated.

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/ Adelene Q. Perkins</u> Adelene Q. Perkins	Chief Executive Officer; Chair of the Board of Directors (principal executive officer)	April 30, 2018
<u>/s/ Lawrence E. Bloch, M.D., J.D.</u> Lawrence E. Bloch, M.D., J.D.	President; Treasurer (principal financial officer; principal accounting officer)	April 30, 2018
<u>/s/ David Beier, J.D.</u> David Beier, J.D.	Director	April 30, 2018
<u>/s/ Jeffrey Berkowitz, J.D.</u> Jeffrey Berkowitz, J.D.	Director	April 30, 2018
<u>/s/ Anthony B. Evnin, Ph.D.</u> Anthony B. Evnin, Ph.D.	Director	April 30, 2018
<u>/s/ Michael G. Kauffman, M.D., Ph.D.</u> Michael G. Kauffman, M.D., Ph.D.	Director	April 30, 2018

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<u>/s/ Norman C. Selby</u> Norman C. Selby	Director	April 30, 2018
<u>/s/ Ian F. Smith</u> Ian F. Smith	Director	April 30, 2018
<u>/s/ Michael C. Venuti, Ph.D.</u> Michael C. Venuti, Ph.D.	Director	April 30, 2018

WILMERHALE

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April 30, 2018

Infinity Pharmaceuticals, Inc.
784 Memorial Drive
Cambridge, MA 02139

Registration Statement on Form S-3

Ladies and Gentlemen:

This opinion is furnished to you in connection with a Registration Statement on Form S-3 (the "Registration Statement") filed with the Securities and Exchange Commission (the "Commission") under the Securities Act of 1933, as amended (the "Securities Act"), for the registration of the resale of an aggregate of 1,134,689 shares (the "Shares") of common stock, \$0.001 par value per share (the "Common Stock"), of Infinity Pharmaceuticals, Inc., a Delaware corporation (the "Company"). All of the Shares are being registered on behalf of a certain stockholder of the Company (the "Selling Stockholder").

We are acting as counsel for the Company in connection with the registration for resale of the Shares. We have examined signed copies of the Registration Statement as filed with the Commission. We have also examined and relied upon minutes of meetings of the stockholders and the Board of Directors of the Company as provided to us by the Company, the Certificate of Incorporation and By-Laws of the Company, each as restated and/or amended to date, and such other documents as we have deemed necessary for purposes of rendering the opinions hereinafter set forth.

In our examination of the foregoing documents, we have assumed the genuineness of all signatures, the authenticity of all documents submitted to us as originals, the conformity to original documents of all documents submitted to us as copies, the authenticity of the originals of such latter documents and the legal competence of all signatories to such documents.

Our opinion below, insofar as it relates to the Shares being fully paid, is based solely on a certificate of the Chief Executive Officer of the Company confirming the Company's receipt of the consideration called for by the applicable resolutions authorizing the issuance of such Shares.

We assume that the appropriate action will be taken, prior to the offer and sale of the Shares by the Selling Stockholder, to register and qualify the Shares for sale under all applicable state securities or "blue sky" laws.

Wilmer Cutler Pickering Hale and Dorr LLP, 60 State Street, Boston, Massachusetts 02109

Beijing Berlin Boston Brussels Denver Frankfurt London Los Angeles New York Palo Alto Washington

We express no opinion herein as to the laws of any state or jurisdiction other than the state laws of the Commonwealth of Massachusetts, the General Corporation Law of the State of Delaware and the federal laws of the United States of America.

Based upon and subject to the foregoing, we are of the opinion that the Shares have been duly authorized for issuance and are validly issued, fully paid and nonassessable.

It is understood that this opinion is to be used only in connection with the offer and sale of the Shares while the Registration Statement is in effect.

Please note that we are opining only as to the matters expressly set forth herein, and no opinion should be inferred as to any other matters. This opinion is based upon currently existing statutes, rules, regulations and judicial decisions, and we disclaim any obligation to advise you of any change in any of these sources of law or subsequent legal or factual developments which might affect any matters or opinions set forth herein.

We hereby consent to the filing of this opinion with the Commission as an exhibit to the Registration Statement in accordance with the requirements of Item 601(b)(5) of Regulation S-K under the Securities Act and to the use of our name therein and in the related Prospectus under the caption "Legal Matters." In giving such consent, we do not hereby admit that we are in the category of persons whose consent is required under Section 7 of the Securities Act or the rules and regulations of the Commission.

Very truly yours,

WILMER CUTLER PICKERING
HALE AND DORR LLP

By: /s/ Cynthia T. Mazareas
Cynthia T. Mazareas, a Partner

Consent of Independent Registered Public Accounting Firm

We consent to the reference to our firm under the caption “Experts” in the Registration Statement (Form S-3) and related Prospectus of Infinity Pharmaceuticals, Inc. for the registration of 1,134,689 shares of its common stock and to the incorporation by reference therein of our reports dated March 15, 2018, with respect to the consolidated financial statements of Infinity Pharmaceuticals, Inc., and the effectiveness of internal control over financial reporting of Infinity Pharmaceuticals, Inc., included in its Annual Report (Form 10-K) for the year ended December 31, 2017, filed with the Securities and Exchange Commission.

/s/ Ernst & Young LLP

Boston, Massachusetts
April 30, 2018