

IDERA PHARMACEUTICALS, INC.

Form 424B3

October 05, 2016

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Filed Pursuant to Rule 424(b)(3)  
Registration No. 333-195896

The information in this preliminary prospectus supplement and the accompanying prospectus, relating to an effective registration statement under the Securities Act of 1933, as amended, is not complete and may be changed. This preliminary prospectus supplement and the accompanying prospectus are not an offer to sell nor do they seek an offer to buy these securities in any jurisdiction where the offer or sale is not permitted.

Subject to completion, dated October 5, 2016

Prospectus Supplement to Prospectus dated May 22, 2014.

***\$50,000,000***

## **Idera Pharmaceuticals, Inc.**

### ***Common Stock***

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We are offering \$50,000,000 of shares of our common stock.

Our common stock is listed on The Nasdaq Capital Market under the symbol "IDRA." The last sale price of our common stock on October 4, 2016, as reported by The Nasdaq Capital Market, was \$2.55 per share.

Entities affiliated with two of our directors, Julian C. Baker and Dr. Kelvin M. Neu, and entities affiliated with one of our directors, Youssef El Zein, have indicated an interest in purchasing up to an aggregate of \$8,750,000 of shares of the common stock offered in this offering at the price offered to the public. Because these indications are not binding agreements or commitments to purchase, any or all of these entities may elect not to purchase any shares in this offering, or the underwriters may elect not to sell any shares in this offering to any or all of these entities.

**Investing in our securities involves a high degree of risk. See "Risk Factors," beginning on page S-12 of this prospectus supplement, as well as in the documents incorporated or deemed to be incorporated by reference into this prospectus supplement and the accompanying prospectus, for a discussion of the factors you should carefully consider before deciding to purchase our securities.**

Neither the Securities and Exchange Commission nor any state securities commission has 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.

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	<b>Per share</b>	<b>Total</b>
Public offering price	\$	\$
Underwriting discount(1)	\$	\$
Proceeds, before expenses, to Idera	\$	\$

(1) See "Underwriting" beginning on page S-54 for additional information regarding underwriting compensation.

We have granted the underwriters a 30-day option to purchase up to an additional \$7,500,000 of shares of our common stock at the public offering price less the underwriting discount.

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The underwriters expect to deliver the shares of common stock against payment on or about \_\_\_\_\_, 2016.

**J.P. Morgan**

**Goldman, Sachs & Co.**

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The date of this prospectus supplement \_\_\_\_\_, 2016.

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## **About this prospectus supplement**

This document is in two parts. The first part is the prospectus supplement, including the documents incorporated or deemed to be incorporated herein by reference, which describes the specific terms of this offering. The second part, the accompanying prospectus, including the documents incorporated or deemed to be incorporated therein by reference, provides more general information about us and our securities. Generally, when we refer to this prospectus, we are referring to both parts of this document combined together with all documents incorporated or deemed incorporated by reference. Before you invest, you should carefully read this prospectus supplement, the accompanying prospectus, all information incorporated or deemed to be incorporated by reference herein and therein, as well as the additional information described under "Where You Can Find More Information" on page S-60 of this prospectus supplement. These documents contain information you should consider when making your investment decision. This prospectus supplement may add, update or change information contained in the accompanying prospectus. To the extent there is a conflict between the information contained in this prospectus supplement, on the one hand, and the information contained in the accompanying prospectus or any document incorporated or deemed to be incorporated by reference therein filed prior to the date of this prospectus supplement, on the other hand, you should rely on the information in this prospectus supplement. If any statement in one of these documents is inconsistent with a statement in another document having a later date for example, a document filed after the date of this prospectus supplement and deemed to be incorporated by reference in this prospectus supplement and the accompanying prospectus the statement in the document having the later date modifies or supersedes the earlier statement.

You should rely only on the information contained in or incorporated or deemed to be incorporated by reference in this prospectus supplement, the accompanying prospectus and in any free writing prospectuses we may provide to you in connection with this offering. We have not, and the underwriters have not, authorized any other person to provide you with any information that is different. If anyone provides you with different or inconsistent information, you should not rely on it. 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 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 must inform themselves about, and observe any restrictions relating to, the offering of the common stock and the distribution of this prospectus supplement outside the United States. This prospectus supplement does 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 by any person in any jurisdiction in which it is unlawful for such person to make such an offer or solicitation.

We further note that the representations, warranties and covenants made by us in any agreement that is filed as an exhibit to any filing that is incorporated or deemed to be incorporated by reference into this prospectus supplement or 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 agreements, 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.

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## Prospectus supplement summary

*This summary highlights selected information about us, this offering and information appearing elsewhere in this prospectus supplement, in the accompanying prospectus and in the documents we incorporate by reference. This summary is not complete and does not contain all the information you should consider before investing in our common stock pursuant to this prospectus supplement and the accompanying prospectus. Before making an investment decision, to fully understand this offering and its consequences to you, you should carefully read this entire prospectus supplement and the accompanying prospectus, including "Risk Factors" beginning on page S-12 of this prospectus supplement and the financial statements and related notes and the other information that we incorporated by reference herein, including our Annual Report on Form 10-K and Quarterly Reports on Form 10-Q, that we file from time to time.*

### **Idera Pharmaceuticals, Inc.**

#### ***Overview***

We are a clinical-stage biopharmaceutical company focused on the discovery, development and commercialization of novel oligonucleotide therapeutics for oncology and rare diseases. We use two distinct proprietary drug discovery technology platforms to design and develop drug candidates: our Toll-like receptor, or TLR, targeting technology and our third-generation antisense, or 3GA, technology. We developed these platforms based on our scientific expertise and pioneering work with synthetic oligonucleotides as therapeutic agents. Using our TLR targeting technology, we design synthetic oligonucleotide-based drug candidates to modulate the activity of specific TLRs. Using our 3GA technology, we are developing drug candidates to turn off the messenger RNA, or mRNA, associated with disease causing genes. We believe that our 3GA technology may potentially reduce the immunotoxicity and increase the potency of earlier generation antisense and RNA interference, or RNAi, technologies.

Our business strategy focuses on the clinical development of drug candidates for oncology and rare diseases characterized by small, well-defined patient populations with serious unmet medical needs. We believe we can develop and commercialize these targeted therapies on our own. To the extent we seek to develop drug candidates for broader disease indications, we plan to execute early-stage development through proof-of-concept clinical trials and explore potential collaborative alliances to support late-stage development and commercialization.

Our TLR-targeted clinical-stage drug candidates are IMO-2125 and IMO-8400. IMO-2125 is an agonist of TLR9 and IMO-8400 is an antagonist of TLR7, TLR8 and TLR9.

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Drug candidate(s)	Indication / Application	Development status
<b>Programs for the Modulation of Specific Toll-like Receptors</b>		
<i>Immuno-Oncology</i>		
IMO-2125	Intra-tumoral injection in combination with checkpoint inhibitors for the treatment of metastatic melanoma (anti-PD1 refractory)	Phase 1/2 clinical trial Anticipated completion of enrollment in Phase 2 portion of the trial in the second half of 2017. Phase 1 monotherapy trial in multiple tumor types Anticipated initiation in the first quarter of 2017. Phase 2 trial in combination with checkpoint inhibitors in multiple tumor types Anticipated initiation in the second half of 2017.
<i>Rare Diseases</i>		
IMO-8400	Dermatomyositis	Phase 2 clinical trial Anticipated completion of trial enrollment in the second half of 2017. Data anticipated to be available in early 2018.
<b>Third-Generation Antisense (3GA)</b>		
Discovery Candidates	Inhibition of Gene Expression by Targeting RNA	Research / IND-enabling activities underway Anticipated IND submission in 2017 for first compound. Phase 1 clinical trial expected to initiate in the second half of 2017. Collaboration with GSK for undisclosed renal targets entered into in 2015.

*TLR modulation technology platform*

TLRs are key receptors of the immune system and play a role in innate and adaptive immunity. As a result, we believe TLRs are potential therapeutic targets for the treatment of a broad range of diseases. Using our chemistry-based platform, we have designed TLR agonists and antagonists to act by modulating the activity

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of targeted TLRs. A TLR agonist is a compound that stimulates an immune response through the targeted TLR. A TLR antagonist is a compound that inhibits an immune response by blocking the targeted TLR.

Our TLR agonist lead drug candidate IMO-2125 is an agonist of TLR9. Our TLR antagonist lead drug candidate is IMO-8400, which is an antagonist of TLR7, TLR8 and TLR9. We also have created compounds that are agonists of TLR3, TLR7, TLR8 and TLR9 as well as additional antagonist candidates.

We are evaluating IMO-2125 for the treatment by intra-tumoral injection of multiple oncology indications both in combination with checkpoint inhibitors and as monotherapy. In addition, we are developing IMO-8400 for the treatment of a rare disease called dermatomyositis.

*Intra-tumoral IMO-2125 development program in immuno-oncology*

Recent advancements in cancer immunotherapy have included the approval and late-stage development of multiple checkpoint inhibitors, which are therapies that target mechanisms by which tumor cells evade detection by the immune system. Despite these advancements, many patients fail to respond to these therapies. For instance, approximately fifty percent of patients with melanoma fail to respond to therapy with approved checkpoint inhibitors. Current published data suggests that the lack of response to checkpoint inhibition is related to a non-immunogenic tumor micro environment. Because TLR9 agonists stimulate the immune system, we believe that there is a scientific rationale to evaluate the combination of intra-tumoral injection of our TLR9 agonists with checkpoint inhibitors. Specifically, we believe that intra-tumoral injection of our TLR9 agonists activates a local immune response in the injected tumor, which complements the effect of the systemically administered checkpoint inhibitors. In studies in preclinical cancer models conducted in our laboratories, intra-tumoral injection of TLR9 agonists has potentiated the anti-tumor activity of multiple checkpoint inhibitors in multiple tumor models. These data have been presented at a number of scientific conferences from 2014 through 2016. We believe that these data support evaluation of combination regimens including a TLR9 agonist and a checkpoint inhibitor for the treatment of cancer.

We are initially developing IMO-2125 for use in combination with checkpoint inhibitors for the treatment of anti-PD1 refractory metastatic melanoma. We believe, based on internal commercial research that we conducted, that in the United States, by 2025, approximately 20,000 people will have metastatic melanoma and approximately 13,000 of those people will have metastatic melanoma that is anti-PD1 refractory. We also believe that TLR9 agonists may be useful in other tumor types that are unaddressable with current immunotherapy due in part to low mutation load and low dendritic cell infiltration, which include non-small cell lung cancer, head and neck cancer, renal cell cancer and bladder cancer. We believe, based on internal commercial research that we conducted, that in the United States, by 2025, approximately 160,000 people will have tumor types that are addressable with current immunotherapy and approximately 70,000 of those people will have tumor types that are anti-PD1 refractory.

In June 2015, we entered into a strategic research alliance with the University of Texas, MD Anderson Cancer Center, or MD Anderson, to commence clinical development of IMO-2125 in combination with checkpoint inhibitors. In December 2015, we initiated a Phase 1/2 clinical trial to assess the safety and efficacy of IMO-2125, administered intra-tumorally, in combination with ipilimumab, a CTLA4 antibody marketed as Yervoy® by Bristol-Myers Squibb Company, in patients with metastatic melanoma (refractory to treatment with a PD1 inhibitor, also referred to as anti-PD1 refractory). We recently amended the trial protocol to enable an additional arm to study the combination of IMO-2125 with pembrolizumab, an anti-PD1 antibody marketed as Keytruda® by Merck & Co. in the same patient population. In the Phase 1 portion of this clinical trial, escalating doses of IMO-2125 ranging from 4 mg through 32 mg in the ipilimumab arm and ranging from 8 mg through 32 mg in the pembrolizumab arm are being administered

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intra-tumorally into a selected tumor lesion, together with the standard dosing regimen of ipilimumab or pembrolizumab, administered intravenously. The primary objectives of the Phase 1 portion of the trial include characterizing the safety of the combinations and determining the recommended Phase 2 dose. A secondary objective of the Phase 1 portion of the trial is describing the anti-tumor activity of IMO-2125 when administered intra-tumorally in combination with ipilimumab or pembrolizumab. The primary objectives of the Phase 2 portion of the trial will be to characterize the safety of the combinations and determine the activity of the combinations utilizing immune-related response criteria. Additionally, a secondary objective of the Phase 2 portion of the trial is to assess treatment response using traditional RECIST criteria. Serial biopsies will be taken of selected injected and non-injected tumor lesions to assess immune changes and response assessments. We anticipate that the trial may enroll approximately 60 patients.

In September 2016, we disclosed early clinical results from the 4 mg and 8 mg dosing cohorts of the Phase 1 ipilimumab combination portion of the trial in which three of six evaluable patients demonstrated clinical responses (one complete response and two partial responses). We also disclosed that the drug was well tolerated through the initial dosing of the 16 mg dosing cohort. We are currently enrolling the 32 mg dosing cohort in the ipilimumab arm of the trial as well as the 8 mg dosing cohort in the pembrolizumab arm of the trial. We will be presenting available translational, efficacy and safety data findings from the 4 mg, 8 mg and 16 mg dosing cohorts in the ipilimumab arm during an oral presentation at the Society for Immunotherapy of Cancer (SITC) Annual Meeting in November 2016.

We plan to transition to the Phase 2 portion of the clinical trial upon completion of both the ipilimumab and pembrolizumab dose finding arms. In the Phase 2 portion of the trial, patients will be randomized to receive intra-tumoral IMO-2125 in combination with either ipilimumab or pembrolizumab at the recommended dose determined by the Phase 1 portion of the trial. The Phase 2 portion of the trial will be conducted at multiple clinical sites.

We expect to have data from each of the cohorts in the ipilimumab arm of the Phase 1 portion of the trial by the end of 2016 and plan to then request an End-of-Phase 1 meeting with the U.S. Food and Drug Administration, or the FDA, to discuss the regulatory pathway for IMO-2125 in the anti-PD1 refractory metastatic melanoma population.

Additionally, we are planning to initiate a Phase 1 trial with IMO-2125 administered as a single agent intra-tumorally in multiple tumor types during the first quarter of 2017. We are also planning to initiate a Phase 2 clinical trial with IMO-2125 administered intra-tumorally together with other checkpoint inhibitors in multiple tumor types in the second half of 2017.

***IMO-8400 in rare diseases***

We have initiated clinical development of IMO-8400 for the treatment of rare diseases. We have selected dermatomyositis as the first rare disease for which we are developing IMO-8400. We selected this indication for development based on the reported increase in TLR expression in this disease state, expression of cytokines indicative of key TLR-mediated pathways and the presence of auto-antibodies that can induce TLR-mediated immune responses.

We considered that multiple independent research studies across a broad range of autoimmune diseases, including both dermatomyositis and psoriasis, have demonstrated that the over-activation of TLRs plays a critical role in disease maintenance and progression. In autoimmune diseases, endogenous nucleic acids released from damaged or dying cells initiate signaling cascades through TLRs, leading to the induction of multiple pro-inflammatory cytokines. This inflammation causes further damage to the body's own tissues

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and organs and the release of more self-nucleic acids, creating a self-sustaining autoinflammatory cycle that contributes to chronic inflammation in the affected tissue, promoting disease progression.

We believe that we demonstrated proof of concept for our approach of using TLRs to inhibit the over-activation of specific TLRs for the treatment of psoriasis and potentially other autoimmune diseases in a randomized, double-blind, placebo-controlled Phase 2 clinical trial of IMO-8400 that we conducted in patients with moderate to severe plaque psoriasis, a well-characterized autoimmune disease. In this trial, we evaluated IMO-8400 at four subcutaneous dose levels of 0.075 mg/kg, 0.15 mg/kg, 0.3 mg/kg, and 0.6 mg/kg, versus placebo, administered once weekly for 12 weeks in 46 patients. The trial met its primary objective as IMO-8400 was well tolerated at all dose levels with no treatment-related discontinuations, treatment-related serious adverse events or dose reductions. The trial also met its secondary objective of demonstrating clinical activity in psoriasis patients, as assessed by the Psoriasis Area Severity Index.

Dermatomyositis is a rare, debilitating, inflammatory muscle and skin disease associated with significant morbidity, decreased quality of life and an increased risk of premature death. While the cause of dermatomyositis is not well understood, the disease process involves immune system attacks against muscle and skin that lead to inflammation and tissue damage. Major symptoms can include progressive muscle weakness, severe skin rash, calcium deposits under the skin (calcinosis), difficulty swallowing (dysphagia) and interstitial lung disease. We believe, based on internal commercial research that we conducted, that dermatomyositis affects approximately 25,000 people in the United States, and is about twice as common in women as men, with a typical age of onset between 45 and 65 years in adults. Dermatomyositis represents one form of myositis, a spectrum of inflammatory muscle diseases that also includes juvenile dermatomyositis, polymyositis and inclusion body myositis.

In August 2014, we initiated a collaboration with The Myositis Association, or TMA, a leading U.S. patient advocacy organization focused on myositis, to advance the clinical development of IMO-8400 for the treatment of dermatomyositis. Under the collaboration, we and TMA agreed to develop educational programs for patients and healthcare providers on TLR antagonism and opportunities to participate in clinical research. In addition, we formed an advisory committee of leading independent experts in the treatment of dermatomyositis to advise us on the development of IMO-8400 in dermatomyositis.

In December 2015, we initiated a Phase 2, randomized, double-blind, placebo-controlled clinical trial designed to assess the safety, tolerability and treatment effect of IMO-8400 in adult patients with dermatomyositis. Eligibility criteria include evidence of active skin and muscle involvement. Patients in the trial are randomized to one of three groups to receive once weekly subcutaneous injections of: placebo, 0.6 mg/kg or 1.8 mg/kg of IMO-8400 for a period of 24 weeks. The trial is expected to enroll approximately 36 patients and is being conducted at approximately 22 centers in the United States, the United Kingdom and Sweden. The primary efficacy endpoint is the change from baseline in the Cutaneous Dermatomyositis Disease Area and Severity Index (CDASI), a validated outcome measure of skin disease. Additional exploratory endpoints include muscle strength and function (which are among the International Myositis Assessment & Clinical Studies Group (IMACS) core set measures), patient-reported quality of life and biochemical markers of disease activity. We expect to complete enrollment of this trial in the second half of 2017 with data available in early 2018.

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***Third-generation antisense (3GA)***

***Third-generation antisense (3GA) technology to target mRNA***

We are developing our 3GA technology to "turn off" the mRNA associated with disease causing genes. We have designed 3GA oligonucleotides to specifically address challenges associated with earlier generation antisense and RNAi technologies.

Our focus is on creating 3GA candidates targeted to specific genes to treat cancer and rare diseases. Our key considerations in identifying disease indications and gene targets in our 3GA program include: strong evidence that the disease is caused by a specific protein; clear criteria to identify a target patient population; biomarkers for early assessment of clinical proof of concept; a targeted therapeutic mechanism of action; unmet medical need to allow for a rapid development path to approval and commercial opportunity. Based on these criteria, we are developing 3GA compounds against multiple gene targets, including NLRP3 (NOD-like receptor family, pyrin domain containing protein 3) and DUX4 (Double Homeobox 4). Potential disease indications include, but are not limited to, interstitial cystitis, lupus nephritis, uveitis and facioscapulohumeral muscular dystrophy (FSHD).

We are currently conducting clinical, regulatory and commercial analysis activities of these compounds, including IND-enabling studies of a compound against NLRP3, and plan to submit an investigational new drug application, or IND, for one of these compounds in 2017 and initiate a Phase 1 human clinical proof-of-concept trial in the second half of 2017. We plan to announce the first disease indication for which we plan to develop one of our 3GA compounds in January 2017. During the first half of 2016, we generated 3GA compounds for a series of additional gene targets. We expect that these will enable us to continue to expand our pipeline opportunities for both internal development as well as collaborations in areas outside of our focus. We have recently presented several pre-clinical data updates at significant oligonucleotide medical and scientific conferences.

***Collaboration with GlaxoSmithKline Intellectual Property Development Limited***

In November 2015, we entered into a collaboration and license agreement with GlaxoSmithKline Intellectual Property Development Limited, or GSK, to license, research, develop and commercialize pharmaceutical compounds from our 3GA technology for the treatment of selected targets in renal disease, which we refer to as the GSK Agreement. The initial collaboration term is currently anticipated to last between two and four years. In connection with the GSK Agreement, GSK identified an initial target for us to attempt to identify a potential population of development candidates to address such target under a mutually agreed upon research plan, currently estimated to take 27 months to complete. From the population of identified development candidates, GSK may designate one development candidate in its sole discretion to move forward into clinical development. Once GSK designates a development candidate, GSK would be solely responsible for the development and commercialization activities for that designated development candidate.

At any time during the first two years of the GSK Agreement, GSK has the option to select up to two additional targets, for further research under mutually agreed upon research plans. GSK may then designate one development candidate for each additional target, at which time GSK would have sole responsibility to develop and commercialize each such designated development candidate.

Under the terms of the GSK Agreement, we received a \$2.5 million upfront, non-refundable, non-creditable cash payment upon the execution of the GSK Agreement. We are eligible to receive up to approximately \$100.0 million in license, research, clinical development and commercialization milestone payments, including the \$2.5 million upfront payment. Approximately \$9.0 million of these milestone payments are

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payable by GSK upon the identification of additional targets, the completion of current and future research plans and the designation of development candidates. Approximately \$89.0 million is payable by GSK upon the achievement of clinical milestones and commercial milestones. In addition, we are eligible to receive royalty payments based on net sales of licensed products following commercialization at varying rates of up to five percent on annual net sales, as defined in the GSK Agreement.

***Additional programs***

*IMO-9200 for Autoimmune Disease.* We have developed a second novel synthetic oligonucleotide antagonist of TLR7, TLR8, and TLR9, IMO-9200, as a drug candidate for potential use in selected autoimmune disease indications. In 2015, we completed a Phase 1 clinical trial of IMO-9200 in healthy subjects as well as additional preclinical studies of IMO-9200 for autoimmune diseases. In 2015, we determined not to proceed with the development of IMO-9200 because the large autoimmune disease indications for which IMO-9200 had been developed did not fit within the strategic focus of our company. We continue to explore and pursue strategic alternatives for IMO-9200.

*IMO-8400 for B-Cell Lymphomas.* In December 2013, we initiated a Phase 1/2 clinical trial of IMO-8400 in patients with Waldenström's macroglobulinemia, and in March 2014, we initiated a Phase 1/2 clinical trial of IMO-8400 in diffuse large B-cell lymphoma, or DLBCL, harboring the MYD88 L265P oncogenic mutation.

In December 2015, we presented interim clinical data from the Phase 1/2 clinical trial of IMO-8400 in Waldenström's macroglobulinemia, which showed signals of positive clinical activity as well as safety in the first three dosing cohorts of the trial. For much of 2016, we continued dose escalation to a higher dose level to determine if stronger activity would be observed.

In September 2016, we announced that we had suspended the clinical development of IMO-8400 for B-cell lymphomas, including our ongoing trials in Waldenström's macroglobulinemia and DLBCL, and will explore strategic alternatives for IMO-8400 in these indications. This decision was based upon our prioritization of the clinical development plans for IMO-2125 and our assessment that the level of clinical activity seen in the Waldenström's macroglobulinemia trial would not support the development of IMO-8400 for these indications as a monotherapy, the very slow enrollment rate in DLBCL and our commercial assessment. No patients are currently enrolled in the trial of IMO-8400 in DLBCL, and we will not enroll any additional patients in that trial. We plan to finish treating patients in the trial of IMO-8400 in Waldenström's macroglobulinemia but enrollment of new patients has been suspended. In these trials under our B-cell lymphoma program, IMO-8400 was generally well tolerated at all dose levels evaluated, with only one treatment-related discontinuation due to adverse events and no dose reductions. The treatment-related discontinuation involved a single patient who experienced a serious adverse event that was possibly related to IMO-8400.

***Cash position and funding requirements***

We had cash, cash equivalents and investments of approximately \$64.1 million as of June 30, 2016.

We believe that the net proceeds to us from this offering, together with our existing cash, cash equivalents and investments, will enable us to fund our operations into the first quarter of 2018. We intend to use the net proceeds to us from this offering, together with our existing cash, cash equivalents and investments, to advance the development of IMO-2125 in our immuno-oncology program, the development of IMO-8400 in rare diseases and the development of our 3GA platform and for working capital and other general corporate purposes.

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This expected use of net proceeds represents our intentions based upon our current plans and business conditions. Our actual expenditures may vary significantly depending on a number of factors, including the status of and results from nonclinical and clinical trials of our drug candidates and the clinical trials that regulatory authorities require us to perform in order to obtain market approval.

We believe that our available funds following this offering will be sufficient to enable us to:

participate in an FDA End-of-Phase 1 meeting to obtain FDA feedback on the regulatory pathway for IMO-2125;

complete our ongoing Phase 1/2 clinical trial of IMO-2125 in combination with ipilimumab or pembrolizumab in anti-PD1 refractory metastatic melanoma;

prepare for the initiation of a pivotal Phase 3 clinical trial of IMO-2125 in combination with a checkpoint inhibitor for the treatment of anti-PD1 refractory metastatic melanoma;

initiate a Phase 1 intra-tumoral monotherapy clinical trial of IMO-2125 in multiple refractory tumor types;

initiate a Phase 2 multi-arm clinical trial of IMO-2125 in combination with a checkpoint inhibitor in multiple refractory tumor types;

complete our ongoing Phase 2 clinical trial of IMO-8400 in patients with dermatomyositis; and

submit an IND and initiate a Phase 1 human clinical proof-of-concept trial for one of our 3GA compounds.

We expect that we will need to raise additional funds in order to conduct any other clinical development of our TLR drug candidates or to conduct any other development of our 3GA technology.

***Corporate information***

Our offices are located at 167 Sidney Street, Cambridge, Massachusetts 02139 and 505 Eagleview Boulevard, Suite 212, Exton, Pennsylvania 19341, our telephone number is (617) 679-5500 and our Internet address is [www.iderapharma.com](http://www.iderapharma.com). The information on our Internet website is not incorporated by reference in this prospectus and should not be considered to be part of this prospectus. Our website address is included in this prospectus as an inactive technical reference only. Unless the context otherwise requires, references in this prospectus to "Idera Pharmaceuticals," "we," "us," and "our" refer to Idera Pharmaceuticals, Inc.

Idera® and IMO® are our trademarks. All other trademarks and service marks appearing in this prospectus are the property of their respective owners.

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## The offering

<b>Common stock offered by us</b>	\$50,000,000 of shares.
<b>Common stock to be outstanding after this offering</b>	140,946,587 shares, which is based on an aggregate offering of \$50,000,000 of our common stock at an assumed public offering price of \$2.55 per share (the last reported sale price of our common stock on The Nasdaq Capital Market on October 4, 2016).
<b>Underwriters' option</b>	The underwriters have a 30-day option to purchase up to an additional \$7,500,000 of shares of our common stock from us.
<b>Use of proceeds</b>	We estimate that the net proceeds to us from this offering, after deducting the estimated underwriting discounts and commissions and estimated offering expenses payable by us, will be approximately \$46,599,000, or approximately \$53,649,000 if the underwriters exercise their option to purchase additional shares from us in full. We plan to use the net proceeds from this offering, together with our existing cash, cash equivalents and investments, to advance the development of our TLR clinical candidates and our 3GA platform; and for working capital and other general corporate purposes. Please see "Use of Proceeds" on page S-44.
<b>Risk factors</b>	See "Risk Factors" beginning on page S-12 of this prospectus supplement, as well as the other information included in or incorporated by reference in this prospectus supplement and the accompanying prospectus, for a discussion of risks you should carefully consider before investing in our securities.
<b>Nasdaq Capital Market listing</b>	IDRA
The number of shares of our common stock to be outstanding after this offering set forth above is based on 121,338,744 shares of our common stock outstanding as of June 30, 2016.	

Unless otherwise indicated, all information in this prospectus, including the number of shares of our common stock to be outstanding after this offering set forth above, excludes the following:

18,847,816 shares of common stock issuable upon exercise of stock options outstanding as of June 30, 2016, at a weighted-average exercise price of \$3.32 per share;

5,709,838 shares of common stock reserved as of June 30, 2016 for future issuance under our equity incentive plans;

1,926 shares of common stock reserved as of June 30, 2016 for issuance upon any conversion of our outstanding Series A convertible preferred stock, or Series A preferred stock;

32,369,058 shares of common stock issuable upon exercise of warrants outstanding as of June 30, 2016, at a weighted average exercise price of \$0.61 per share; and

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22,151,052 shares of common stock issuable upon exercise of pre-funded warrants outstanding as of June 30, 2016, at an exercise price of \$0.01 per share.

In addition, this prospectus reflects and assumes no exercise of outstanding options or warrants since June 30, 2016. Warrants to purchase 2,810,650 shares of common stock described above expire in November 2016. As of October 4, 2016, the exercise price of these warrants, \$1.46, is lower than the current market price of our stock. As a result, we expect these warrants to be exercised prior to their expiration. Unless we specifically state otherwise, all information in this prospectus supplement assumes that the underwriters do not exercise the option to purchase up to \$7,500,000 of additional shares of our common stock.

Entities affiliated with two of our directors, Julian C. Baker and Dr. Kelvin M. Neu, and entities affiliated with one of our directors, Youssef El Zein, have indicated an interest in purchasing up to an aggregate of \$8,750,000 of shares of the common stock offered in this offering at the price offered to the public. Because these indications are not binding agreements or commitments to purchase, any or all of these entities may elect not to purchase any shares in this offering, or the underwriters may elect not to sell any shares in this offering to any or all of these entities.

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## **Risk factors**

*Investing in our securities involves a high degree of risk. You should carefully consider the risks and uncertainties described below in addition to the other information included or incorporated by reference in this prospectus supplement, the accompanying prospectus and the documents we incorporate by reference, before making an investment decision. Our business, financial condition and results of operations could be materially and adversely affected by any of these and currently unknown risks or uncertainties. In that case, the market price of our common stock could decline, and you may lose all or part of your investment in our securities.*

### **Risks relating to our financial results and need for financing**

*We will need additional financing, which may be difficult to obtain. Our failure to obtain necessary financing or doing so on unattractive terms could result in the termination of our operations and the sale and license of our assets or otherwise adversely affect our research and development programs and other operations.*

We had cash, cash equivalents and investments of approximately \$64.1 million at June 30, 2016. We believe that, based on our current operating plan, the net proceeds of this offering, together with our existing cash, cash equivalents and investments, will enable us to fund our operations into the first quarter of 2018. Specifically, we believe that our available funds following this offering will be sufficient to enable us to:

participate in an FDA End-of-Phase 1 meeting to obtain FDA feedback on the regulatory pathway for IMO-2125;

complete our ongoing Phase 1/2 clinical trial of IMO-2125 in combination with ipilimumab or pembrolizumab in anti-PD1 refractory metastatic melanoma;

prepare for the initiation of a pivotal Phase 3 clinical trial of IMO-2125 in combination with a checkpoint inhibitor for the treatment of anti-PD1 refractory metastatic melanoma;

initiate a Phase 1 intra-tumoral monotherapy clinical trial of IMO-2125 in multiple refractory tumor types;

initiate a Phase 2 multi-arm clinical trial of IMO-2125 in combination with a checkpoint inhibitor in multiple refractory tumor types;

complete our ongoing Phase 2 clinical trial of IMO-8400 in patients with dermatomyositis; and

submit an IND and initiate a Phase 1 human clinical proof-of-concept trial for one of our 3GA compounds.

We expect that we will need to raise additional funds beyond the proceeds of this offering in order to conduct any other clinical development of our TLR drug candidates or to conduct any other development of our 3GA technology. We are seeking and expect to continue to seek additional funding through collaborations, the sale or license of assets or financings of equity or debt securities. We believe that the key factors that will affect our ability to obtain funding are:

the results of our clinical and preclinical development activities in our rare disease program, our immuno-oncology program and our 3GA program, and our ability to advance our drug candidates and 3GA technology on the timelines anticipated;

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the cost, timing, and outcome of regulatory reviews;

competitive and potentially competitive products and technologies and investors' receptivity to our drug candidates and the technology underlying them in light of competitive products and technologies;

the receptivity of the capital markets to financings by biotechnology companies generally and companies with drug candidates and technologies such as ours specifically; and

our ability to enter into additional collaborations with biotechnology and pharmaceutical companies and the success of such collaborations.

In addition, increases in expenses or delays in clinical development may adversely impact our cash position and require additional funds or cost reductions.

Additional financing may not be available to us when we need it or may not be available to us on favorable or acceptable terms or at all. We could be required to seek funds through collaborative alliances or through other means that may require us to relinquish rights to some of our technologies, drug candidates or drugs that we would otherwise pursue on our own. In addition, if we raise additional funds by issuing equity securities, our then existing stockholders will experience dilution. The terms of any financing may adversely affect the holdings or the rights of existing stockholders. An equity financing that involves existing stockholders may cause a concentration of ownership. Debt financing, if available, may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures or declaring dividends, and are likely to include rights that are senior to the holders of our common stock. Any additional debt or equity financing may contain terms which are not favorable to us or to our stockholders, such as liquidation and other preferences, or liens or other restrictions on our assets. As discussed in Note 10 to the financial statements appearing in our Annual Report on Form 10-K for the year ended December 31, 2015 that was filed with the SEC, additional equity financings may also result in cumulative changes in ownership over a three-year period in excess of 50% which would limit the amount of net operating loss and tax credit carryforwards that we may utilize in any one year.

If we are unable to obtain adequate funding on a timely basis or at all, we will be required to terminate, modify or delay preclinical or clinical trials of one or more of our drug candidates, significantly curtail or terminate discovery or development programs for new drug candidates or relinquish rights to portions of our technology, drug candidates and/or products.

***We have incurred substantial losses and expect to continue to incur losses. We will not be successful unless we reverse this trend.***

We have incurred losses in every year since our inception, except for 2002, 2008, and 2009 when our recognition of revenues under license and collaboration agreements resulted in our reporting net income for those years. As of June 30, 2016, we had an accumulated deficit of \$526.4 million. Since January 1, 2001, we have primarily been involved in the development of our TLR pipeline. From January 1, 2001 to June 30, 2016, we incurred losses of \$266.2 million. We incurred losses of \$260.2 million prior to December 31, 2000, during which time we were primarily involved in the development of earlier generation antisense technology. These losses, among other things, have had and will continue to have an adverse effect on our stockholders' equity, total assets, and working capital.

We have never had any products of our own available for commercial sale and have received no revenues from the sale of drugs. As of June 30, 2016, substantially all of our revenues have been from collaborative and license agreements. We have devoted substantially all of our efforts to research and development,

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including clinical trials, and have not completed development of any drug candidates. Because of the numerous risks and uncertainties associated with developing drugs, we are unable to predict the extent of any future losses, whether or when any of our drug candidates will become commercially available, or when we will become profitable, if at all. We expect to incur substantial operating losses in future periods.

**Risks relating to our business, strategy and industry**

*We are depending heavily on the development of TLR-targeted drug candidates for the treatment of certain rare diseases and in our immuno-oncology program and on the development of our 3GA technology. If we terminate the development of any of our programs or any of our drug candidates in such programs, are unable to successfully develop and commercialize any of our drug candidates, or experience significant delays in doing so, our business may be materially harmed.*

We have invested a significant portion of our time and financial resources in the development of TLR-targeted clinical-stage drug candidates as part of our rare disease program. In the future, we intend to invest a significant portion of our time and financial resources in the development of our TLR-targeted candidates for the treatment of certain rare diseases and in our immuno-oncology program. We also plan to invest substantial time and resources to further advance the development of drug candidates under our 3GA program. For instance:

we are conducting a Phase 1/2 clinical trial of IMO-2125, administered intra-tumorally, in combination with ipilimumab or pembrolizumab in patients with anti-PD1 refractory metastatic melanoma;

we plan to conduct additional clinical trials of IMO-2125 in our immuno-oncology program both as a monotherapy and in combination with checkpoint inhibitors for the treatment of multiple tumor types;

we are conducting a Phase 2 clinical trial of IMO-8400 in patients with dermatomyositis; and

we are developing compounds in our 3GA program and plan to initiate a clinical trial of one of these compounds in the second half of 2017.

We anticipate that our ability to generate product revenues will depend heavily on the successful development and commercialization of our TLR drug candidates in our rare disease and immuno-oncology programs, and the successful identification, development and commercialization of drug candidates in our 3GA program.

Our ability to generate milestone and royalty revenues under our collaborations with Merck & Co. and GSK, and under any other collaboration that we enter into with respect to our other programs, will depend on the development and commercialization of the drug candidates being developed under the collaborations.

Our efforts, and the efforts of Merck & Co. and GSK, to develop and commercialize compounds are at an early stage and are subject to many challenges. For instance, we previously experienced a setback with respect to our program for IMO-2125 for hepatitis C. In April 2011, we chose to delay initiation of our planned 12-week Phase 2 randomized clinical trial of IMO-2125 plus ribavirin in treatment-naïve, genotype 1 hepatitis C virus, or HCV, patients based on observations of lymphoproliferative malignancies in an ongoing 26-week chronic nonclinical toxicology study of IMO-2125 in rodents. We subsequently completed a 39-week chronic nonclinical toxicology study of IMO-2125 in non-human primates in which there were no similar observations. Additionally, in September 2016, we discontinued our development program of IMO-8400 for the treatment of B-cell lymphomas and suspended our ongoing Phase 1/2 clinical trials of IMO-8400 in patients with Waldenström's macroglobulinemia and in patients with DLBCL harboring the MYD88 L265P

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oncogenic mutation due to several factors, including the lack of a strong clinical signal for Waldenström's macroglobulinemia patients and the inability to adequately enroll patients with DLBCL.

We have entered into and expect to continue to seek to enter into collaborative alliances with pharmaceutical companies to advance our TLR antagonist candidates in broader autoimmune disease indications and with respect to additional applications of our 3GA technology program. Our previous setbacks with respect to our program for IMO-2125 in patients with chronic hepatitis C virus and our program for IMO-8400 in patients with B-cell lymphomas could negatively impact our ability to license any of such compounds, or any of our other compounds, particularly related compounds, to a third party.

Our ability to successfully develop and commercialize these drug candidates, or other potential candidates, will depend on our ability to overcome these recent challenges and on several factors, including the following:

the drug candidates demonstrating activity in clinical trials;

the drug candidates demonstrating an acceptable safety profile in nonclinical toxicology studies and during clinical trials;

timely enrollment in clinical trials of IMO-8400, IMO-2125 and other drug candidates, which may be slower than anticipated, potentially resulting in significant delays;

satisfying conditions imposed on us and/or our collaborators by the FDA or equivalent foreign regulatory authorities regarding the scope or design of clinical trials;

the ability to demonstrate to the satisfaction of the FDA, or equivalent foreign regulatory authorities, the safety and efficacy of the drug candidates through current and future clinical trials;

timely receipt of necessary marketing approvals from the FDA and equivalent foreign regulatory authorities;

the ability to combine our drug candidates and the drug candidates being developed by Merck & Co. and any other collaborators safely and successfully with other therapeutic agents;

achieving and maintaining compliance with all regulatory requirements applicable to the products;

establishment of commercial manufacturing arrangements with third-party manufacturers;

the ability to secure orphan drug exclusivity for our drug candidates either alone or in combination with other products;

the successful commercial launch of the drug candidates, assuming FDA approval is obtained, whether alone or in combination with other products;

acceptance of the products as safe and effective by patients, the medical community, and third-party payors;

competition from other companies and their therapies;

changes in treatment regimens;

favorable market conditions in which to raise additional capital;

the strength of our intellectual property portfolio in the United States and abroad; and

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a continued acceptable safety and efficacy profile of the drug candidates following marketing approval.

***We are in the early stages of developing our TLR9 agonists in combination with checkpoint inhibitors, which is a novel technology, and our efforts may not be successful or result in any approved and marketable products.***

In June 2015, we entered into a strategic clinical research alliance with MD Anderson to advance clinical development of TLR9 agonists in combination with checkpoint inhibitors. We initiated the first trial from the research alliance, a Phase 1/2 clinical trial to assess the safety and efficacy of IMO-2125, administered intra-tumorally in combination with ipilimumab, a CTLA4 antibody, in patients with metastatic melanoma (anti-PD1 refractory) in the fourth quarter of 2015. While we have evaluated the safety profile of IMO-2125 in previous trials, in those trials we evaluated the safety profile of IMO-2125 by subcutaneous injection and not by intra-tumoral injection. In addition, while, as a marketed product, the safety profile of ipilimumab is known, the safety profile of the combination of IMO-2125 and ipilimumab has not been evaluated in previous trials. These factors may result in participating subjects experiencing serious adverse events or undesirable side effects or exposure to unacceptable health risks requiring us to suspend or terminate any clinical trials that we may conduct of IMO-2125 in combination with ipilimumab, or any other checkpoint inhibitor. Furthermore, we have expanded the Phase 1/2 clinical trial to include the assessment of safety and efficacy of IMO-2125, administered intra-tumorally in combination with pembrolizumab, an anti-PD1 antibody in patients with metastatic melanoma (anti-PD1 refractory). While, as a marketed product, the safety profile of pembrolizumab is known, the safety profile of the combination of IMO-2125 and pembrolizumab has not been evaluated in previous trials and may result in participating subjects experiencing serious adverse events or undesirable side effects or exposure to unacceptable health risks requiring us to suspend or terminate any clinical trials that we may conduct of IMO-2125 in combination with pembrolizumab, or any other checkpoint inhibitor.

In September 2016, we disclosed early clinical results from the Phase 1 portion of our ongoing Phase 1/2 clinical trial of IMO-2125. It is important to note that the clinical responses reported from the first two dosing cohorts of the Phase 1 portion of the trial were observed in only three of the patients enrolled through the second cohort, were achieved in an open-label setting, are not statistically significant, and might not be achieved by any other patient treated with IMO-2125. Moreover, we expect to release additional interim results from this trial as early as November 2016. These additional interim results as well as final results from this trial and results of future trials may not be positive or consistent with the results of this trial we have observed to date.

***We are in the early stages of developing our 3GA program, which is a novel technology, and our efforts may not be successful or result in any approved and marketable products.***

We are in the early stages of developing our 3GA technology program, and the scientific evidence to support the feasibility of developing drugs based on this technology is preliminary. Further, neither we nor any other company has received regulatory approval to market therapeutics utilizing 3GA drug candidates.

The future success of our 3GA technology program depends on our success in identifying and developing marketable products based on such technology. Although the results of our preclinical studies to date have been supportive of the viability of this technology, it is unknown whether these results are indicative of results that may be obtained in any future clinical trials that we may conduct. We are currently undertaking an analysis of priority oncology and rare disease indications for development of drug candidates generated from our 3GA technology. We are developing 3GA compounds against two gene targets, NLRP3 and DUX4, and are conducting IND-enabling studies of a 3GA compound against NLRP3. We are also conducting preliminary analysis of 3GA compounds for other undisclosed potential gene targets.

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However, many steps must be successfully achieved prior to the declaration of a 3GA drug candidate and the initiation of clinical development. Given the level of uncertainty of our ability to successfully achieve these many steps and the uncertainty of the drug discovery and clinical development processes in general, there can be no assurance that we will succeed in developing any marketable products as a result of our efforts with respect to our 3GA technology program.

*If we experience delays or difficulties in the enrollment of patients in clinical trials, our receipt of necessary regulatory approvals could be delayed or prevented.*

We may not be able to initiate or continue clinical trials for our drug candidates if we are unable to locate and enroll a sufficient number of eligible patients to participate in these trials as required by the FDA or similar regulatory authorities outside the United States. For example, we recently suspended our clinical trial of IMO-8400 in patients with DLBCL harboring the MYD88 L265P oncogenic mutation due to difficulty in enrolling patients. Additionally, because there are a limited number of patients with dermatomyositis, or other rare diseases having indications for which we may determine to develop our TLR antagonists, our ability to enroll eligible patients in any clinical trials for these indications may be limited or may result in slower enrollment than we anticipated. In addition, some of our competitors have ongoing clinical trials for drug candidates that