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

**FORM S-8**

**REGISTRATION STATEMENT UNDER**  
**THE SECURITIES ACT OF 1933**

**Idera Pharmaceuticals, Inc.**

(Exact Name of Registrant as Specified in Its Charter)

**Delaware**  
(State or Other Jurisdiction of  
Incorporation or Organization)

**345 Vassar Street**  
**Cambridge, Massachusetts**  
(Address of Principal Executive Offices)

**04-3072298**  
(I.R.S. Employer  
Identification No.)

**02139**  
(Zip Code)

**1995 Employee Stock Purchase Plan**  
(Full Title of the Plan)

**Sudhir Agrawal, D. Phil.**  
**Chief Executive Officer**  
**Idera Pharmaceuticals, Inc.**  
**345 Vassar Street**  
**Cambridge, Massachusetts 02139**  
(Name and Address of Agent For Service)  
**(617) 679-5500**  
(Telephone Number, Including Area Code, of Agent For Service)

**CALCULATION OF REGISTRATION FEE**

<u>Title of Securities to be Registered</u>	<u>Amount to be Registered(1)</u>	<u>Proposed Maximum Offering Price Per Share</u>	<u>Proposed Maximum Aggregate Offering Price</u>	<u>Amount of Registration Fee</u>
Common Stock, \$0.001 par value per share (including the associated Preferred Stock Purchase Rights)	62,500 shares	\$3.43(2)	\$214,375(2)	\$22.94

- (1) In accordance with Rule 416 under the Securities Act of 1933, as amended, this registration statement shall be deemed to cover any additional securities that may from time to time be offered or issued to prevent dilution resulting from stock splits, stock dividends or similar transactions.
  - (2) Estimated solely for the purpose of calculating the registration fee pursuant to Rules 457(c) and 457(h) of the Securities Act of 1933, as amended, and based upon the average of the high and low prices of the Registrant's common stock as reported on the American Stock Exchange on September 26, 2006.
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#### STATEMENT OF INCORPORATION BY REFERENCE

This Registration Statement on Form S-8 is filed to register the offer and sale of an additional 62,500 shares of the Registrant's common stock, \$0.001 par value per share, to be issued under the Registrant's 1995 Employee Stock Purchase Plan. This Registration Statement incorporates by reference the contents of the registration statements on form S-8, File Nos. 333-03896 and 333-116011, filed by the Registrant on April 23, 1996 and May 28, 2004, relating to the Registrant's 1995 Employee Stock Purchase Plan.

##### **Item 5. Interests of Named Experts and Counsel.**

Wilmer Cutler Pickering Hale and Dorr LLP has opined as to the legality of the securities being offered by this registration statement.

##### **Item 8. Exhibits.**

The Exhibit Index immediately preceding the exhibits is incorporated herein by reference.

## 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-8 and has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized, in Cambridge, Massachusetts, on September 21, 2006.

Idera Pharmaceuticals, Inc.

By: /s/ Sudhir Agrawal  
Sudhir Agrawal, D. Phil.  
Chief Executive Officer

## POWER OF ATTORNEY AND SIGNATURES

We, the undersigned officers and directors of Idera Pharmaceuticals, Inc., hereby severally constitute and appoint Robert G. Andersen and Sudhir Agrawal, and each of them singly, our true and lawful attorneys with full power to them, and each of them singly, to sign for us and in our names in the capacities indicated below, the registration statement on Form S-8 filed herewith and any and all subsequent amendments to said registration statement, and generally to do all such things in our names and on our behalf in our capacities as officers and directors to enable Idera 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/ James B. Wyngaarden</u> James B. Wyngaarden, M.D.	Chairman of the Board of Directors	September 21, 2006
<u>/s/ Sudhir Agrawal</u> Sudhir Agrawal, D. Phil.	Chief Executive Officer, Chief Scientific Officer and Director (Principal Executive Officer)	September 21, 2006
<u>/s/ Robert W. Karr</u> Robert W. Karr, M.D.	President and Director	September 21, 2006
<u>/s/ Robert G. Andersen</u> Robert G. Andersen	Chief Financial Officer, Vice President of Operations, Treasurer and Secretary (Principal Financial and Accounting Officer)	September 21, 2006
<u>/s/ Youssef El-Zein</u> Youssef El-Zein	Director	September 21, 2006

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/ C. Keith Hartley</u> C. Keith Hartley	Director	September 21, 2006
<u>/s/ William S. Reardon</u> William S. Reardon	Director	September 21, 2006
<u>/s/ Alison Taunton-Rigby</u> Alison Taunton-Rigby, Ph.D.	Director	September 21, 2006

## INDEX TO EXHIBITS

<u>EXHIBIT NUMBER</u>	<u>DESCRIPTION</u>
4.1 (1)	Restated Certificate of Incorporation of the Registrant, as amended.
4.2 (2)	Amended and Restated By-laws of the Registrant.
4.3 (3)	Rights Agreement dated December 10, 2001 between the Registrant and Mellon Investor Services LLC, as rights agent.
4.4 (4)	Amendment No. 1 to Rights Agreement dated as of August 27, 2003 between the Registrant and Mellon Investor Services LLC.
4.5 (5)	Amendment No. 2 to Rights Agreement dated as of March 24, 2006 between the Registrant and Mellon Investor Services LLC.
5.1	Opinion of Wilmer Cutler Pickering Hale and Dorr LLP.
23.1	Consent of Ernst & Young LLP.
23.2	Consent of Wilmer Cutler Pickering Hale and Dorr LLP, included in Exhibit 5.1 filed herewith.
24.1	Power of Attorney (See signature page of this Registration Statement).
(1)	Previously filed with the Securities and Exchange Commission as an Exhibit to the Registrant's Quarterly Report on Form 10-Q, for the quarter ended June 30, 2006 (File No. 001-31918) and incorporated herein by reference.
(2)	Previously filed with the Securities and Exchange Commission as an Exhibit to the Registrant's Registration Statement on Form S-1, dated November 6, 1995, as amended (File No. 33-99024) and incorporated herein by reference.
(3)	Previously filed with the Securities and Exchange Commission as an Exhibit to the Registrant's Registration Statement on Form S-2, dated October 10, 2003 (File No. 333-109630) and incorporated herein by reference.
(4)	Previously filed with the Securities and Exchange Commission as an Exhibit to the Registrant's Current Report on Form 8-K, dated August 29, 2003 (File No. 000-27352) and incorporated herein by reference.
(5)	Previously filed with the Securities and Exchange Commission as an Exhibit to the Registrant's Current Report on Form 8-K, dated March 29, 2006 (File No. 001-31918) and incorporated herein by reference.

September 29, 2006

Idera Pharmaceuticals, Inc.  
345 Vassar Street  
Cambridge, Massachusetts, 02139

Re: 1995 Employee Stock Purchase Plan

Ladies and Gentlemen:

We have assisted in the preparation of a Registration Statement on Form S-8 (the "Registration Statement") to be filed with the Securities and Exchange Commission (the "Commission") under the Securities Act of 1933, as amended (the "Securities Act"), relating to an aggregate of 62,500 shares of common stock, \$0.001 par value per share (the "Shares"), of Idera Pharmaceuticals, Inc., a Delaware corporation (the "Company"), issuable under the Company's 1995 Employee Stock Purchase Plan (the "Plan").

We have examined the Certificate of Incorporation and By-Laws of the Company, each as amended and restated to date, and originals, or copies certified to our satisfaction, of all pertinent records of the meetings of the directors and stockholders of the Company, the Registration Statement and such other documents relating to the Company as we have deemed material for the purposes of this opinion.

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 certified, photostatic or other copies, the authenticity of the originals of any such documents and the legal competence of all signatories to such documents.

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

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.

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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.

Based on the foregoing, we are of the opinion that the Shares have been duly authorized for issuance and, when the Shares are issued and paid for in accordance with the terms and conditions of the Plan, the Shares will be validly issued, fully paid and nonassessable.

We hereby consent to the filing of this opinion with the Commission in connection with the Registration Statement in accordance with the requirements of Item 601(b)(5) of Regulation S-K under the Securities Act. 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/ Stuart M. Falber  
Stuart M. Falber, Partner

Consent of Independent Registered Public Accounting Firm

We consent to the incorporation by reference in the Registration Statement (Form S-8) pertaining to the 1995 Employee Stock Purchase Plan of our report dated February 24, 2006, except for Notes 1 and 16 as to which the date is March 24, 2006, with respect to the consolidated financial statements of Idera Pharmaceuticals, Inc. included in its Annual Report (Form 10-K) for the year ended December 31, 2005, filed with the Securities and Exchange Commission.

/s/ ERNST & YOUNG LLP

Boston, Massachusetts  
September 27, 2006