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**UNITED STATES SECURITIES AND EXCHANGE COMMISSION**

Washington, DC 20549

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**AMENDMENT NO. 3  
TO  
FORM S-4  
REGISTRATION STATEMENT  
UNDER  
THE SECURITIES ACT OF 1933**

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**IDEC PHARMACEUTICALS CORPORATION**

(Exact Name of Registrant as Specified in Its Charter)

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

**2836**  
(Primary Standard Industrial  
Classification Code Number)

**33-0112644**  
(I.R.S. Employer  
Identification Number)

**3030 Callan Road  
San Diego, California 92121  
(858) 431-8500**  
(Address, Including Zip Code, and Telephone Number, Including  
Area Code, of Registrant's Principal Executive Offices)

**John M. Dunn, Esq.  
Senior Vice President and General Counsel  
IDEC Pharmaceuticals Corporation  
3030 Callan Road  
San Diego, California 92121  
(858) 431-8500**  
(Name, Address, Including Zip Code, and Telephone Number,  
Including Area Code, of Agent for Service)

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*Copies to:*

**David R. Snyder, Esq.  
Pillsbury Winthrop LLP  
101 West Broadway, Suite 1800  
San Diego, California 92101-4700  
Phone: (619) 234-5000  
Fax: (619) 236-1995**

**Louis A. Goodman, Esq.  
Skadden, Arps, Slate, Meagher & Flom LLP  
One Beacon Street  
Boston, Massachusetts 02108  
Phone: (617) 573-4800  
Fax: (617) 573-4822**

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**Approximate date of commencement of proposed sale to the public:** As soon as practicable after the effectiveness of this Registration Statement and the effective time of the merger of Bridges Merger Corporation, a wholly owned subsidiary of the Registrant, with and into Biogen, Inc. as described in the Agreement and Plan of Merger, dated as of June 20, 2003, included as Annex A to the joint proxy statement/prospectus forming a part of this Registration Statement.

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If the securities being registered on this form are being offered in connection with the formation of a holding company and are in compliance with General Instruction G, 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, 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(d) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration for the same offering.  \_\_\_\_\_

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**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 BECOME EFFECTIVE IN ACCORDANCE WITH SECTION 8(a) OF THE SECURITIES ACT OR UNTIL THIS REGISTRATION STATEMENT SHALL BECOME EFFECTIVE ON SUCH DATE AS THE SECURITIES AND EXCHANGE COMMISSION, ACTING PURSUANT TO SECTION 8(a), MAY DETERMINE.**

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**PART II**

**INFORMATION NOT REQUIRED IN THE PROSPECTUS**

**Item 20. Indemnification of Directors and Officers**

Article XI of IDEC's certificate of incorporation provides for the indemnification of directors or officers, in accordance with the bylaws, to the fullest extent permitted by the General Corporation Law of the State of Delaware. Article VII of the bylaws of IDEC provides that IDEC shall indemnify and hold harmless, to the fullest extent permitted by law, any person made or threatened to be made a party to any legal action by reason of the fact that such person is or was a director, officer, employee or other corporate agent of IDEC or any subsidiary or constituent corporation or served any other enterprise at the request of IDEC, against

expenses, judgments, fines and amounts paid in settlement actually and reasonably incurred by such person in connection with such action. The General Corporation Law of the State of Delaware provides for the indemnification of directors and officers under certain conditions.

The directors and officers of IDEC are insured under a policy of directors' and officers' liability insurance.

## Item 21. Exhibits and Financial Statement Schedules

(a) The following exhibits are filed herewith or incorporated herein by reference:

| Exhibit No. | Description   |
|-------------|---|
| 2.1         | Agreement and Plan of Merger, dated as of June 20, 2003 by and among IDEC, Bridges Merger Corporation and Biogen <sup>1</sup>                             |
| 3.1         | Form of amendment to the Amended and Restated Certificate of Incorporation of the Registrant <sup>3</sup>   |
| 3.2         | Form of amendment to the Bylaws of the Registrant <sup>3</sup>  |
| 5.1         | Opinion of Pillsbury Winthrop LLP regarding the legality of the securities being registered <sup>3</sup>  |
| 8.1         | Opinion of Pillsbury Winthrop LLP regarding material federal income tax consequences relating to the merger <sup>2</sup>                                  |
| 8.2         | Opinion of Skadden, Arps, Slate, Meagher & Flom LLP regarding material federal income tax consequences relating to the merger <sup>2</sup>                |
| 10.1        | Employment Agreement dated as of June 20, 2003 between IDEC and William H. Rastetter, Ph.D. <sup>3</sup>  |
| 10.2        | Employment Agreement dated as of June 20, 2003 between IDEC and James C. Mullen <sup>3</sup>  |
| 23.1        | Consent of KPMG LLP (for IDEC) <sup>3</sup>   |
| 23.2        | Consent of PricewaterhouseCoopers LLP (for Biogen) <sup>3</sup>   |
| 23.3        | Consent of Pillsbury Winthrop LLP (included in the opinions filed as Exhibit 5.1 and Exhibit 8.1 to this Registration Statement)                          |
| 23.4        | Consent of Skadden, Arps, Slate, Meagher & Flom LLP (filed herewith and also included in the opinion filed as Exhibit 8.2 to this Registration Statement) |

II-1

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|------|---|
| 23.5 | Consent of Merrill Lynch, Pierce, Fenner & Smith Incorporated |
| 23.6 | Consent of Goldman, Sachs & Co.                               |
| 24   | Power of Attorney <sup>3</sup>                                |
| 99.1 | Form of IDEC Proxy Card <sup>3</sup>                          |
| 99.2 | Form of Biogen Proxy Card                                     |

1 Filed as Exhibit 2.1 to the Registrant's Form 8-K filed with the SEC on June 23, 2003 and incorporated herein by reference.

2 To be filed by amendment.

3 Previously filed.

## Item 22. Undertakings.

(a) The undersigned registrant hereby undertakes:

(1) That prior to any public reoffering of the securities registered hereunder through use of a prospectus which is a part of this registration statement, by any person or party who is deemed to be an underwriter within the meaning of Rule 145(c), such reoffering prospectus will contain the information called for by the applicable registration form with respect to reofferings by persons who may be deemed underwriters, in addition to the information called for by the other items of the applicable form.

(2) That every prospectus (i) that is filed pursuant to paragraph (4) immediately preceding, or (ii) that purports to meet the requirements of Section 10(a)(3) of the Securities Act of 1933 and is used in connection with an offering of securities subject to Rule 415, will be filed as a part of an amendment to the registration statement and will not be used until such amendment is effective, and that, for purposes of determining any liability under the Securities Act of 1933, each such post-effective amendment shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

(3) That, for purposes of determining any liability under the Securities Act of 1933, each filing of the registrant's annual report pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934 (and, where applicable, each filing of an employee benefit plan's annual report pursuant to Section 15(d) of the Securities Exchange Act of 1934) that is incorporated by reference in the registration statement shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

(4) To respond to requests for information that is incorporated by reference into the joint proxy statement/prospectus pursuant to Item 4, 10(b), 11 or 13 of this form, within one business day of receipt of such request, and to send the incorporated documents by first class mail or other equally prompt means. This includes information contained in documents filed subsequent to the effective date of the registration statement through the date of responding to the request.

(5) To supply by means of a post-effective amendment all information concerning a transaction, and the company being acquired involved therein, that was not the subject of and included in the registration statement when it became effective.

II-2

(b) Insofar as indemnification for liabilities arising under the Securities Act of 1933 may be permitted to directors, officers and controlling persons of the registrant pursuant to the foregoing provisions, or otherwise, the registrant has been advised that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in the 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 Act and will be governed by the final adjudication of such issue.

II-3

## SIGNATURES

Pursuant to the requirements of the Securities Act, the registrant has duly caused this Registration Statement to be signed by the undersigned, thereunto duly authorized in the city of San Diego, State of California, on the Third day of October 2003.

### IDEC Pharmaceuticals Corporation

By: /s/ WILLIAM H. RASTETTER, PH.D.\*

William H. Rastetter, Ph.D.  
*Chairman and Chief Executive Officer*

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

| <u>Name</u>  | <u>Title</u>   | <u>Date</u>     |
|--|--|-----------------|
| <u>/s/ WILLIAM H. RASTETTER, PH.D.*</u><br>William H. Rastetter, Ph.D. | Chairman and Chief Executive Officer (Principal Executive Officer)                                   | October 3, 2003 |
| <u>/s/ EDWARD M. RODRIGUEZ*</u><br>Edward M. Rodriguez                 | Vice President—Finance and Controller (Principal Financial Officer and Principal Accounting Officer) | October 3, 2003 |
| <u>/s/ HERBERT BOYER, PH.D.*</u><br>Herbert Boyer, Ph.D.               | Director   | October 3, 2003 |
| <u>/s/ ALAN B. GLASBERG, M.D.*</u><br>Alan B. Glasberg, M.D.           | Director   | October 3, 2003 |
| <u>/s/ KAZUHIRO HASHIMOTO*</u><br>Kazuhiro Hashimoto                   | Director   | October 3, 2003 |
| <u>/s/ FRANKLIN P. JOHNSON, JR.*</u><br>Franklin P. Johnson, Jr.       | Director   | October 3, 2003 |

/s/ ROBERT W. PANGIA\*

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Robert W. Pangia

Director

October 3, 2003

/s/ BRUCE R. ROSS\*

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Bruce R. Ross

Director

October 3, 2003

II-4

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/s/ LYNN SCHENK\*

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Lynn Schenk

Director

October 3, 2003

/s/ WILLIAM D. YOUNG\*

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William D. Young

Director

October 3, 2003

\*By:

/s/ JOHN M. DUNN

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John M. Dunn  
*Attorney-in-fact*

II-5

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## QuickLinks

### [PART II INFORMATION NOT REQUIRED IN THE PROSPECTUS](#)

[Item 20. Indemnification of Directors and Officers](#)

[Item 21. Exhibits and Financial Statement Schedules](#)

[Item 22. Undertakings.](#)

### [SIGNATURES](#)

[Skadden, Arps, Slate, Meagher & Flom LLP Letterhead]

October 3, 2003

Biogen, Inc.  
14 Cambridge Center  
Cambridge, MA 02142

Re: IDEC Pharmaceuticals Corporation and Biogen, Inc.  
Registration Statement and Joint Proxy Statement/Prospectus  
on Form S-4 (Reg. No. 333-107098)

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Ladies and Gentlemen:

We hereby consent to the reference to our firm under the caption "Legal Matters" in the Registration Statement and Joint Proxy Statement/Prospectus of IDEC Pharmaceuticals Corporation and Biogen, Inc. on Form S-4 (Reg. No. 333-107098). In giving such consent, we do not thereby 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 promulgated thereunder.

Very truly yours,

/s/ Skadden, Arps, Slate, Meagher & Flom LLP

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CONSENT  
OF  
MERRILL LYNCH, PIERCE, FENNER & SMITH INCORPORATED

We hereby consent to the use of our opinion letter dated June 20, 2003 to the Board of Directors of IDEC Pharmaceuticals Corporation in the joint proxy statement-prospectus constituting a part of the Registration Statement on Form S-4 of IDEC Pharmaceuticals Corporation, and to the references to our firm in such joint proxy statement-prospectus. In giving this consent, we do not admit and we hereby disclaim that we come within the category of persons whose consent is required under Section 7 of the Securities Act of 1933, as amended, or the rules and regulations of the Securities and Exchange Commission promulgated thereunder, nor do we thereby admit that we are experts with respect to any part of such Registration Statement within the meaning of the term "experts" as used in the Securities Act of 1933, as amended, or the rules and regulations of the Securities and Exchange Commission thereunder.

/s/ Merrill Lynch, Pierce, Fenner & Smith Incorporated

MERRILL LYNCH, PIERCE, FENNER & SMITH INCORPORATED

Dated: 10/3/2003

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QuickLinks

[CONSENT OF MERRILL LYNCH, PIERCE, FENNER & SMITH INCORPORATED](#)

[Goldman, Sachs & Co. Letterhead]

**PERSONAL AND CONFIDENTIAL**

October 3, 2003

Board of Directors  
Biogen, Inc.  
14 Cambridge Center  
Cambridge, Massachusetts 02142

Re: Amendment No. 3 to Registration Statement on Form S-4 of  
IDEC Pharmaceuticals Corporation (File No. 333-107098)

Madame and Gentlemen:

Reference is made to our opinion letter, dated June 20, 2003, with respect to the fairness from a financial point of view to the holders of the outstanding shares of Common Stock, par value \$0.01 per share (the "Shares"), of Biogen, Inc. (the "Company") of the exchange ratio of 1.150 shares of Common Stock, par value \$0.0005 per share, of IDEC Pharmaceuticals Corporation ("IDEC") to be received for each Share pursuant to the Agreement and Plan of Merger, dated as of June 20, 2003, by and among IDEC, Bridges Merger Corporation, a direct wholly owned subsidiary of IDEC, and the Company.

The foregoing opinion letter is provided for the information and assistance of the Board of Directors of the Company in connection with its consideration of the transaction contemplated therein and is not to be used, circulated, quoted or otherwise referred to for any other purpose, nor is it to be filed with, included in or referred to in whole or in part in any registration statement, proxy statement or any other document, except in accordance with our prior written consent. We understand that the Company has determined to include our opinion in the above-referenced Registration Statement, as amended.

In that regard, we hereby consent to the reference to our opinion under the captions "Summary—Opinion of Biogen's Financial Advisor," "The Proposed Merger—Background of the Merger," "The Proposed Merger—Reasons of Biogen's Board of Directors for the Merger" and "Opinions of Financial Advisors—Opinion of Biogen's Financial Advisor—Goldman Sachs" and to the inclusion of the foregoing opinion in the Joint Proxy Statement/Prospectus included in the above-mentioned Registration Statement, as amended. Notwithstanding the foregoing, it is understood that our consent is being delivered solely in connection with the filing of the above-mentioned version of the Registration Statement and that our opinion is not to be used, circulated, quoted or otherwise referred to for any other purpose, nor is it to be filed with, included in or referred to in whole or in part in any registration statement (including any subsequent amendments to the above-mentioned Registration Statement), proxy statement or any other document, except in accordance with our prior written consent. In giving such consent, we do not thereby admit that we come within the category of persons whose consent is required under Section 7 of the Securities Act of 1933 or the rules and regulations of the Securities and Exchange Commission thereunder.

Very truly yours,

/s/ Goldman, Sachs & Co.

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(GOLDMAN, SACHS & CO.)

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QuickLinks

[\[Goldman, Sachs & Co. Letterhead\]](#)

PROXY CARD

**BIOGEN, INC.**  
 **PROXY SOLICITED BY THE BOARD OF DIRECTORS OF BIOGEN, INC.**  
 **FOR THE SPECIAL MEETING OF STOCKHOLDERS**  
 **TO BE HELD ON [            ], 2003**

The undersigned hereby acknowledges receipt of the Notice of Special Meeting of Stockholders and Joint Proxy Statement/Prospectus, dated [            ], 2003, in connection with the Special Meeting of Stockholders to be held on [            ], 2003 at 10:00 a.m. at the offices of Biogen, Inc., a Massachusetts corporation ("Biogen"), located at 15 Cambridge Center, Cambridge, MA 02142, and does hereby appoint James C. Mullen, Thomas J. Bucknum and Peter N. Kellogg, and each of them (with full power to act alone), proxies of the undersigned with all the powers the undersigned would possess if personally present and with full power of substitution in each of them, to appear and vote all shares of Common Stock of Biogen which the undersigned would be entitled to vote if personally present at the Special Meeting of Stockholders to be held on [            ], 2003, and at any adjournment or adjournments thereof.

The shares represented hereby will be voted as directed herein. **In each case, if no direction is indicated, such shares will be voted FOR proposals 1 and 2. As to any other matter that may properly come before the meeting or any adjournments thereof, said proxy holders will vote in accordance with their best judgment. This proxy may be revoked in writing at any time prior to the voting thereof.**

**PLEASE VOTE, DATE AND SIGN ON THE REVERSE SIDE AND RETURN PROMPTLY IN THE ENCLOSED ENVELOPE.**

Please date and sign exactly as name appears on this card. Joint owners should each sign. Please give full title when signing as executor, administrator, trustee, attorney, guardian for a minor, etc. Signatures for corporations and partnerships should be in the corporate or firm name by a duly authorized person.

HAS YOUR ADDRESS CHANGED?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**/\*\ FOLD AND DETACH HERE /\*\**

**PLEASE MARK VOTES AS IN THIS EXAMPLE**

**Biogen's Board of Directors recommends a vote FOR Proposals 1 and 2.**

- 1. To approve the Agreement and Plan of Merger, dated as of June 20, 2003, by and among IDEC Pharmaceuticals Corporation, Bridges Merger Corporation and Biogen.  
 FOR       AGAINST       ABSTAIN
- 2. To approve any proposal to adjourn the meeting to a later date, if necessary, to solicit additional proxies if there are not sufficient votes in favor of approval of the Agreement and Plan of Merger.  
 FOR       AGAINST       ABSTAIN

In their discretion, the proxies are also authorized to vote upon such other matters as may properly come before the special meeting.

Mark box at right if you plan to attend the Meeting

Mark box at right if an address change has been noted on the reverse side of the card

Please be sure to sign and date this Proxy.

Date: \_\_\_\_\_, 2003

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature