As filed with the Securities and Exchange Commission on September 7, 2010

Registration No. 333

UNITED STATES SECURITIES AND EXCHANGE COMMISSION WASHINGTON, DC 20549

FORM S-8

REGISTRATION STATEMENT UNDER THE SECURITIES ACT OF 1933

COMPUGEN LTD. (Exact name of registrant as specified in its charter)

Israel (State or other jurisdiction of incorporation or organization) Not Applicable (I.R.S. Employer Identification No.)

72 Pinchas Rosen StreetTel Aviv, Israel(Address of Principal Executive Offices)(Zip Code)

Compugen Ltd. 2010 Share Incentive Plan (Full title of the plan)

Dikla Czaczkes Axselbrad Chief Financial Officer Compugen Ltd. 72 Pinchas Rosen Street Tel Aviv, 69512 Israel (Name and address of agent for service)

+972-3-765-8585 (Telephone number, including area code, of agent for service)

With copies to:

Raanan Lerner, Adv. Meitar Liquornik Geva & Leshem Brandwein, Law Offices 16 Abba Hillel Rd., Ramat Gan 52506, Israel

Tel: +972-3-6103655 Fax: +972-3-6103767

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

Large accelerated filer o Non-accelerated filer x Accelerated filer o Smaller reporting compan o

CALCULATION OF REGISTRATION FEE

		Proposed maximum	Proposed maximum	Amount of registration fee
Title of securities to be registered	Amount to be registered (1) (2)	offering price per share	aggregate offering price	
Ordinary Shares, par value NIS 0.01 per share	8,645,436	\$ 3.66 (3)	\$31,642,295.76	\$2,256.10

- (1) All of the Ordinary Shares being registered hereunder are issuable under the Compugen Ltd. 2010 Share Incentive Plan (the "Plan") and are being rolled over to the Plan from the Compugen Share Option Plan (2000) (the "Previous Plan"), consisting of (i) 1,953,851 Ordinary Shares which were previously available, but were not issued, under the Previous Plan, which were rolled over into and are currently available for issuance under the Plan and (ii) up to 6,691,585 additional Ordinary Shares that may become available for issuance in the future under the Plan due to the potential expiration of unexercised options, and, hence, non-issuance of underlying Ordinary Shares, under the Previous Plan, which would then roll-over into the Plan.
- (2) This Registration Statement shall also cover such indeterminate number of Ordinary Shares as may be issued to prevent dilution resulting from stock dividends, stock splits or similar transactions effected without the registrant's receipt of consideration, which transactions result in an increase in the number of outstanding Ordinary Shares of the registrant, in accordance with Rule 416 under the Securities Act of 1933.
- (3) Estimated in accordance with Rule 457(c) and 457(h) of the Securities Act of 1933, as amended, solely for the purpose of calculating the filing fee on the basis of \$3.66 per share, which represents the average of the high and low prices of the Ordinary Shares as reported on the NASDAQ Capital Market on August 31, 2010, which is within five (5) business days prior to the date of this Registration Statement.

PART I

INFORMATION REQUIRED IN THE SECTION 10(a) PROSPECTUS

This Registration Statement on Form S-8 (this "Registration Statement") registers up to 8,645,436 Ordinary Shares, par value NIS 0.01 per share ("Ordinary Shares"), of Compugen Ltd. ("Compugen," the "Company," "we," or "us,") which m potentially be issued or sold under the Compugen Ltd. 2010 Share Incentive Plan (the "Plan") and which are being rolled over from the Compugen Share Option Plan (2000) (the "Previous Plan"). These shares consist of (i) 1,953,851 Ordinary Shares currently available for issuance under the Plan (as rolled over from the Previous Plan), and (ii) up to 6,691,585 additional Ordinary Shares that may become available for issuance in the future under the Plan due to potential expiration of unexercised options and, hence, non-issuance of underlying Ordinary Shares, under the Previous Plan, which would then roll-over into the Plan.

Item 1. Plan Information.

The documents containing the information concerning the Plan required by Item 1 of this Registration Statement, and the statement of availability of registrant information and other information required by Item 2 of Form S-8, will be sent or given to persons eligible to participate in the Plan as specified by Rule 428(b)(1) under the Securities Act of 1933, as amended (the "Securities Act"). We will maintain a file of such documents in accordance with the provisions of Rule 428 and, upon request, will furnish to the Securities and Exchange Commission (the "Commission") or its staff a copy or copies of documents included in such file. Pursuant to the instructions to Form S-8, these documents are not required to be and are not being filed either as part of this Registration Statement or as prospectuses or prospectus supplements pursuant to Rule 424 under the Securities Act. These documents and the documents incorporated by reference in this Registration Statement pursuant to Item 3 of Part II of Form S-8, taken together, constitute part of a prospectus that meets the requirements of Section 10(a) of the Securities Act.

Item 2. Registrant Information and Employee Plan Annual Information.

Any of the documents incorporated by reference in Item 3 of Part II of this Registration Statement (which documents are incorporated by reference in this prospectus) and the other documents required to be delivered to employees pursuant to Rule 428(b) under the Securities Act, will be available without charge to participants in the Compugen Ltd. 2010 Share Incentive Plan upon written or oral request by contacting:

Compugen Ltd. 72 Pinchas Rosen Street Tel Aviv, 69512 Israel +972-3-765-8585 Attn: Dikla Czaczkes Axselbrad Chief Financial Officer

INFORMATION REQUIRED IN THE REGISTRATION STATEMENT

Item 3. Incorporation of Documents by Reference

We hereby incorporate by reference herein the following documents (or portions thereof) that we have filed with or furnished to the Securities and Exchange Commission:

(a) Our Annual Report on Form 20-F for the year ended December 31, 2009, filed with the Commission on March 11, 2010.

(b)(i) the first, second, and third paragraphs of the press release annexed as Exhibit 1 to our Report on Form 6-K furnished to the Commission on March 2, 2010; and (ii) the GAAP (unaudited) financial statements attached to the press releases annexed as Exhibit 1 to our Reports on Form 6-K furnished to the Commission on April 27, 2010 and July 27, 2010, respectively.

(c) The description of our ordinary shares set forth in our Report on Form 6-K furnished to the Commission on August 11, 2009, as the same may be amended from time to time.

All other documents filed by the Registrant pursuant to Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act and, to the extent designated therein, Reports on Form 6-K furnished by us to the Commission, in each case, subsequent to the effective date of this registration statement and prior to the filing of a post-effective amendment to this registration statement indicating that all securities offered under the registration statement have been sold, or deregistering all securities then remaining unsold, are also incorporated herein by reference and shall be a part hereof from the date of the filing of such documents.

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

Item 4. Description of Securities

Not required.

Item 5. Interests of Named Experts and Counsel

Not applicable.

Item 6. Indemnification of Directors and Officers

The Israeli Companies Law, 5759-1999, or the Companies Law, describes the fiduciary duty of an office holder as a duty to act in good faith and for the benefit of the company, including by refraining from actions in which he has a conflict of interest or that compete with the company's business, refraining from exploiting a business opportunity of the company in order to gain a benefit for himself or for another person, and disclosing to the company any information and documents which are relevant to the company and that were obtained by him in his or her capacity as an office holder. The duty of care is defined as an obligation of caution of an office holder that requires the office holder to act at a level of competence at which a reasonable office holder would have acted in the same position and under the same circumstances, including by adopting reasonable means for obtaining information concerning the profitability of the act brought for his approval.

Under the Companies Law, a company may not exempt an office holder from liability with respect to a breach of his fiduciary duty, but may exempt in advance an office holder from his liability to the company, in whole or in part, with respect to a breach of his duty of care.

Pursuant to the Companies Law, a company may indemnify an office holder against a monetary liability imposed on him by a court including in settlement or arbitration proceedings, and against reasonable legal expenses in a civil proceeding or in a criminal proceeding in which the office holder was found to be innocent or in which he was convicted of an offense which does not require proof of a criminal intent. The indemnification of an office holder must be expressly allowed in the articles of association, under which the company may (i) undertake in advance to indemnify its office holders with respect to categories of events that can be foreseen at the time of giving such undertaking and up to an amount determined by the board of directors to be reasonable under the circumstances, or (ii) provide indemnification retroactively at amounts deemed to be reasonable by the board of directors.

A company may also procure insurance for an office holder's liability in consequence of an act performed in the scope of his office. in the following cases: (a) a breach of the duty of care of such office holder, (b) a breach of the fiduciary duty, only if the office holder acted in good faith and had reasonable grounds to believe that such act would not be detrimental to the company, or (c) a monetary obligation imposed on the office holder for the benefit of another person.

A company may not indemnify an office holder against, nor enter into an insurance contract which would provide coverage for, any monetary liability incurred as a result of any of the following:

- a breach by the office holder of his fiduciary duty unless the office holder acted in good faith and had a reasonable basis to believe that the act would not prejudice the company;
- a breach by the office holder of his duty of care if such breach was done intentionally or recklessly; any act or omission done with the intent to derive an illegal personal gain; or
- any fine or penalty levied against the office holder as a result of a criminal offense.

In addition, under the Companies Law, indemnification of, and procurement of insurance coverage for a company's office holders must be approved by the company's audit committee and board of directors and, in specified circumstances, by the company's shareholders.

Our Articles of Association allow us to exempt any office holder to the maximum extent permitted by law, before or after the occurrence giving rise to such exemption. Our Articles of Association also provide that we may indemnify an office holder to the maximum extent permitted by law, against any liabilities he or she may incur in such capacity, limited with respect (i) to the categories of events that can be foreseen in advance by our board of directors when authorizing such undertaking and (ii) to the amount of such indemnification as determined retroactively by our board of directors to be reasonable in the particular circumstances. Similarly, we may also agree to indemnify an office holder for past occurrences, whether or not we are obligated under any agreement to provide such indemnification. We have obtained directors' and officers' liability insurance covering our officers and directors and those of our subsidiaries for certain claims. In addition, as of July 31, 2007, we received approval of our shareholders authorizing us to provide our directors and officers with letters granting them indemnification to the fullest extent permitted under Israeli law, and we have subsequently provided such letters.

Our Articles of Association also allow us to procure insurance covering any past or present office holder against any liability which he or she may incur in such capacity, to the maximum extent permitted by law. Such insurance may also cover us for indemnifying such office holder.

Item 7. Exemption from Registration Claimed

Not applicable.

Item 8. Exhibits

4.1 Compugen Ltd. 2010 Share Incentive Plan

- 4.2 Specimen Certificate for Ordinary Shares (incorporated by reference to Exhibit 4.1 to the Registrant's Registration Statement on Form F-1/A filed with the Commission on August 2, 2000)
 - 5.1 Opinion of Meitar Liquornik Geva & Leshem Brandwein as to the legality of the securities being issued

23.1 Consent of Kost Forer Gabbay & Kasierer, a member of Ernst & Young Global

23.2 Consent of Kesselman & Kesselman (C.P.A Isr.), a member firm of PricewaterhouseCoopers International Limited

23.3 Consent of Meitar Liquornik Geva & Leshem Brandwein (included in Exhibit 5.1)

24 Power of Attorney (included on the signature page hereof)

Item

9. Undertakings

- (a) The undersigned Registrant hereby undertakes:
- (1)To file, during any period in which offers or sales are being made, a post-effective amendment to this registration statement:
- (i) To include any prospectus required by Section 10(a)(3) of 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 the 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% 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) and (a)(1)(ii) 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 Securities and Exchange Commission by the Registrant pursuant to Section 13 or 15(d) of the Exchange Act that are incorporated by reference in this registration statement.

(2) That, for the purpose 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 that 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.

(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) 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 foregoing provisions, 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, 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 the City of Tel Aviv, State of Israel, on the 2nd day of September, 2010.

Date: September 7, 2010

By:/s/ Anat Cohen-Dayag Name: Anat Cohen-Dayag Title: President and Chief Executive Officer

POWER OF ATTORNEY

That the undersigned officers and directors of Compugen Ltd., an Israeli limited liability company, do hereby constitute and appoint Martin Gerstel, Chairman of the Board, Anat Cohen-Dayag, President and Chief Executive Officer, and Dikla Czaczkes Axselbrad, Chief Financial Officer, and each of them individually, with full powers of substitution and resubstitution, the lawful attorneys-in-fact and agents with full power and authority to do any and all acts and things and to execute any and all instruments which said attorneys and agents, determine may be necessary or advisable or required to enable said company to comply with the Securities Act of 1933, as amended, and any rules or regulations or requirements of the Securities and Exchange Commission in connection with this Registration Statement on Form S-8 (the "Registration Statement"). Without limiting the generality of the foregoing power and authority, the powers granted include the power and authority to sign the names of the undersigned officers and directors in the capacities indicated below to this Registration Statement, to any and all amendments and supplements to the Registration Statement or amendments or supplements thereof, and each of the undersigned hereby ratifies and confirms that said attorneys and agents, shall do or cause to be done by virtue hereof. This Power of Attorney may be signed in several counterparts.

IN WITNESS WHEREOF, each of the undersigned has executed this Power of Attorney as of the date indicated.

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

Signature	Title	Date
/s/ Anat Cohen-Dayag Anat Cohen-Dayag	President and Chief Executive Officer (Principal Executive Officer)	September 7, 2010
/s/ Dikla Czaczkes Axselbrad 		September 7, 2010
Axselbrad /s/ Martin Gerstel	Chairman of the Board of Directors	September 7, 2010
Martin Gerstel	Director	September 7, 2010

/s/ Dov Hershberg

Dov Hershberg

/s/ Yair Aharonowitz	Director	September 7, 2010
Yair Aharonowitz		
/s/Ruth Arnon	Director	September 7, 2010
Ruth Arnon		
/s/Alex Kotzer	Director	September 7, 2010
Alex Kotzer		
/s/ Arie Ovadia	Director	September 7, 2010
Arie Ovadia		
/s/ Joshua Shemer Joshua Shemer	Director	September 7, 2010
COMPUGEN USA, INC. By: /s/ Eli Zangvil Name: Eli Zangvil Title: Authorized Signatory	Authorized U.S. Representative	September 7, 2010
		EXHIBIT INDEX
Exhibit		

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