COMPUGEN LTD
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January 16, 2013

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Registration No. 333-185910

Prospectus

$100,000,000

Ordinary Shares
Debt Securities
Rights
Warrants
Units

We may offer and sell from time to time in one or more offerings our ordinary shares, debt securities, rights, warrants and units having an aggregate offering price up to $100,000,000.

Each time we sell securities pursuant to this prospectus, we will provide in a supplement to this prospectus the price and any other material terms of any such offering and the securities offered. Any prospectus supplement may also add, update or change information contained in the prospectus. You should read this prospectus and any applicable prospectus supplement, as well as the documents incorporated by reference or deemed incorporated by reference into this prospectus, carefully before you invest in any securities.

Our ordinary shares are traded on The NASDAQ Capital Market and on the Tel Aviv Stock Exchange under the symbol “CGEN.” The closing sale price of our ordinary shares on The NASDAQ Capital Market and on the Tel Aviv Stock Exchange Ltd. (the "TASE") on January 15, 2013, was $5.52 and $5.65 per share, respectively. The currency in which our stock is traded on the TASE is the New Israeli Shekel, or NIS. The above closing price on the TASE represents a conversion from NIS to dollar amounts in accordance with the dollar - NIS conversion rate as of such date.

AN INVESTMENT IN OUR SECURITIES INVOLVES RISKS. SEE THE SECTION ENTITLED “RISK FACTORS” BEGINNING ON PAGE 3.

Neither the Securities and Exchange Commission nor any state or other securities commission has approved or disapproved of these securities or determined if this prospectus is truthful or complete. Any representation to the contrary is a criminal offense.

This prospectus may not be used to consummate sales of securities unless it is accompanied by a prospectus supplement.

The date of this prospectus is January 16, 2013

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ABOUT THIS PROSPECTUS

This prospectus is part of a registration statement that we filed with the Securities and Exchange Commission, or the SEC, using a “shelf” registration process. Under this shelf registration process, we may from time to time sell ordinary shares, debt securities, rights, warrants or units, or any combination of these securities, in one or more offerings up to a total dollar amount of $100,000,000. We have provided to you in this prospectus a general description of the securities we may offer. Each time we sell securities, we will, to the extent required by law, provide a prospectus supplement that will contain specific information about the terms of the offering. We may also add, update or change in any accompanying prospectus supplement or any free writing prospectus we may authorize to be delivered to you any of the information contained in this prospectus. To the extent there is a conflict between the information contained in this prospectus and the prospectus supplement, you should rely on the information in the prospectus supplement, provided that if any statement in one of these documents is inconsistent with a statement in another document having a later date—for example, a document incorporated by reference in this prospectus or any prospectus supplement—the statement in the document having the later date modifies or supersedes the earlier statement. This prospectus, together with any accompanying prospectus supplement and any free writing prospectus we may authorize to be delivered to you, includes all material information relating to the offering of our securities.

As permitted by the rules and regulations of the SEC, the registration statement, of which this prospectus forms a part, includes additional information not contained in this prospectus. You may read the registration statement and the other reports we file with the SEC at the SEC's web site or at the SEC's offices described below under the heading "Where You Can Find Additional Information."

In this prospectus, unless otherwise stated or the context otherwise requires, references to "Compugen," "the Company," "we," "us", "our" and similar references refer to Compugen Ltd. and our subsidiaries.

You should rely only on the information contained or incorporated by reference in this prospectus, any accompanying prospectus supplement or any "free writing prospectus" we may authorize to be delivered to you. We have not authorized anyone to provide you with different information. If anyone provides you with different or inconsistent information, you should not rely on it. You should assume that the information appearing in this prospectus, any prospectus supplement and the documents incorporated by reference herein and therein are accurate only as of their respective dates. Our business, financial condition, results of operations and prospects may have changed since those dates.

Neither this prospectus nor any accompanying prospectus supplement shall constitute an offer or solicitation by anyone in any jurisdiction in which such offer or solicitation is not authorized or in which the person making such offer or solicitation is not qualified to do so or to anyone to whom it is unlawful to make such offer or solicitation.

PROSPECTUS SUMMARY

This summary highlights only some of the information included or incorporated by reference in this prospectus. You should carefully read this prospectus together with the additional information about us described in the sections entitled "Where You Can Find Additional Information" and "Incorporation of Certain Information by Reference" before purchasing our securities.

Compugen Ltd.

Compugen is a leading drug discovery company focused on therapeutic proteins and monoclonal antibodies ("mAbs") to address important unmet needs in the fields of immunology and oncology. We utilize a broad and continuously growing integrated infrastructure of proprietary scientific understandings and predictive platforms, algorithms, machine learning systems and other computational biology capabilities for the in silico (by computer) prediction and selection of novel drug targets and drug candidates. Selected candidates are then incorporated to our Pipeline Program for in vitro and/or in vivo validation testing and preclinical drug development studies. Our business model includes collaborations covering the further development and commercialization of selected candidates from our Pipeline Program and various forms of research and discovery agreements, in both cases providing Compugen with potential milestone payments and royalties on product sales or other forms of revenue sharing. In 2012, we established operations in California to develop oncology and immunology mAb drug candidates against certain drug targets already discovered, and others expected to be discovered in the future, by the Company.

Research and Discovery

For over a decade, most of our R&D efforts were directed towards establishing a unique predictive discovery infrastructure that would enable accurate and broadly applicable in silico drug, drug target, and diagnostic candidate prediction and selection. An important aspect of our infrastructure development was the creation of our core infrastructure platforms, LEADS, MED and NexGen, which integrate our scientific understandings and predictive models. LEADS provides a comprehensive predictive view of the human transcriptome and proteome and enables the discovery of novel genes and proteins. MED provides a broad analysis of the expression levels of genes across a wide variety of tissues and disease states; and NexGen is designed to efficiently and accurately integrate and analyze a vast amount of Next Generation Sequencing data. We believe these infrastructure platforms, together with our other computational biology capabilities and platforms, now provide us with substantial advantages in the predictive discovery of potential targeted medicines. Following the establishment of an integrated "critical mass" of capabilities for predictive discovery, an increasing portion of our R&D activities has been committed to utilizing these capabilities for the discovery of such targeted medicines, while continuing to expand and enhance our discovery infrastructure.

Pipeline Program

During 2010, we broadened our approach to drug target and drug discovery, moving from a "technology driven" individual platform capability approach to a "market-need driven" approach. In this "market-need driven" approach we harness all of our relevant platforms and other capabilities towards a selected unmet need in order to predict and validate novel molecules that we believe have the highest probability of leading to successful targeted medicines for that need. At the same time we chose, as a focus for our discovery efforts, the therapeutic fields of oncology and immunology, both highly complex areas with major unmet needs. Within these fields, we elected to primarily pursue therapeutic proteins and mAbs which represent the fastest growing segment in therapeutics. Based on these changes, in late 2010 we initiated our Pipeline Program, pursuant to which we have both (i) accelerated the number of predicted and selected product candidates being evaluated by us, primarily in our fields of focus, and (ii) taken selected product candidates further beyond their proof of concept into preclinical activities.

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Our first "market-need driven" discovery effort within our chosen fields of focus was aimed at the discovery of immune checkpoint regulatory proteins, and this effort has successfully yielded a significant number of such proteins which were previously unknown. In general, each of these novel immune checkpoint proteins has the potential to serve as (i) a drug target for monoclonal antibodies for cancer immunotherapy, and (ii) the basis for Fc fusion proteins for the treatment of autoimmune diseases, both areas of very high interest to the medical community and biopharma industry:

At present, among the product candidates included in our Pipeline Program are the following molecules, which are at various stages from and validation to preclinical studies:

- CGEN-15001 - a novel fusion protein which has shown potential for the treatment of autoimmune diseases;
- CGEN-15021 - a novel fusion protein which has shown potential for the treatment of autoimmune diseases;
- CGEN-15091 - a novel fusion protein which has shown potential for the treatment of multiple sclerosis;
- CGEN-15001T - a novel mAb drug target candidate for cancer immunotherapy;
- CGEN- 15022 – a novel mAb drug target candidate for cancer immunotherapy;
- CGEN-671 – a novel mAb drug target candidate for treatment of multiple epithelial tumors;
- CGEN-928 – a novel mAb drug target candidate for the treatment of multiple myeloma;
- CGEN 15092 - a novel mAb drug target candidate for cancer immunotherapy.

Consistent with the initiation of our Pipeline Program, in 2010 we began to build in-house preclinical development capabilities that would allow us to further advance our drug candidates prior to entering into collaborations for their final development and commercialization. Our initial efforts resulted in the establishment of capabilities to advance therapeutic proteins at Compugen Ltd. More recently, in March 2012, we established operations in South San Francisco, California for the development of oncology and immunology monoclonal antibody drug candidates against novel mAb drug targets discovered and validated by us.

Opportunities in Non-focus Areas

In view of the wide applicability of our predictive biology capabilities, we have in the past formed, or participated in the formation, of companies to utilize certain of these capabilities in other fields, and have entered into other arrangements for the further development and commercialization of various non-focus specific discoveries of interest, most of which resulted from our infrastructure development and validation activities. In all such cases, these arrangements provide the potential for future financial gain to Compugen without any further financial commitment for either development or commercialization from us. Two such arrangements were concluded during 2012: (i) the joint establishment of a new Israeli company, Neviah Genomics Ltd., with Merck Serono, a division of Merck, Darmstadt, Germany, in the field of toxicity biomarkers, and (ii) a financing arrangement with a United States investment company to allow the further development of Keddem Bioscience Ltd., previously a wholly owned, but inactive, subsidiary of Compugen, in the field of small molecule drugs.

Corporate Information

We were incorporated under the laws of the State of Israel on February 10, 1993 as Compugen Ltd, which is both our legal and commercial name. We have operated under the laws of the State of Israel since 1993 and in particular the Israeli Companies Ordinance (New Version) 1983, as amended, which was largely replaced by the Israeli Companies Law, 5759-1999, as amended (the "Companies Law"). Compugen Inc., a wholly owned subsidiary, was incorporated in Delaware in March 1997 and is qualified to do business in California.

Our principal executive offices are located at 72 Pinchas Rosen Street, Tel Aviv, Israel 69512. Our telephone number is +972-3-765-8585 and our website address is www.cgen.com. The information on our website is not incorporated by reference into this prospectus, is not considered a part of this prospectus and should not be relied upon with respect

to any offering.

RISK FACTORS

Investing in our securities involves risks. Before making an investment decision, you should carefully consider the risks described under "Risk Factors" in the applicable prospectus supplement and in our most recent Annual Report on Form 20-F, or any updates in our Reports on Form 6-K, together with all of the other information appearing in this prospectus or incorporated by reference into this prospectus and any applicable prospectus supplement, in light of your particular investment objectives and financial circumstances. The risks so described are not the only risks facing our company. Additional risks not presently known to us or that we currently deem immaterial may also impair our business operations. Our business, financial condition and results of operations could be materially adversely affected by any of these risks. The trading price of our securities could decline due to any of these risks, and you may lose part or all of your investment.

NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus contains, and any accompanying prospectus supplement will contain, forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, or the Securities Act, and Section 21E of the Securities Exchange Act of 1934, as amended, or the Exchange Act, and the Private Securities Litigation Reform Act of 1995. Also, documents that we incorporate by reference into this prospectus, including documents that we subsequently file with the Commission, and any "free writing prospectus" that may be provided by us, will contain forward-looking statements. Forward-looking statements are those that predict or describe future events or trends and that do not relate solely to historical matters. You can generally identify forward-looking statements as statements containing the words "may," "will," "could," "should," "might," "expect," "anticipate" "objective," "goal," "intend," "estimate "project," "plan," "assume" or other similar expressions, or negatives of those expressions, although not all forward-looking statements contain these identifying words. All statements contained or incorporated by reference in this prospectus and any prospectus supplement or in any "free writing prospectus" regarding our future strategy, future operations, timing of possible future events, projected financial position, proposed products, anticipated collaborations, estimated future revenues, projected costs, future prospects, the future of our industry and results that might be obtained by pursuing management's current plans and objectives are forward-looking statements.

You should not place undue reliance on our forward-looking statements because the matters they describe are subject to certain risks, uncertainties and assumptions, including in many cases decisions or actions by third parties, that are difficult to predict. Our forward-looking statements are based on the information currently available to us and speak only as of the date on the cover of this prospectus, the date of any prospectus supplement, or, in the case of forward-looking statements incorporated by reference, the date of the filing that includes the statement. Over time, our actual results, performance or achievements may differ from those expressed or implied by our forward-looking statements, and such difference might be significant and materially adverse to our security holders. We undertake no obligation to update publicly any forward-looking statements, whether as a result of new information, future events or otherwise.

We have identified some of the important factors that could cause future events to differ from our current expectations and they are described in this prospectus and supplements to this prospectus under the caption "Risk Factors," as well as in our most recent Annual Report on Form 20-F, including without limitation under the captions "Risk Factors" and "Operating and Financial Review and Prospects," and in other documents that we may file with the Commission, all of which you should review carefully. Please consider our forward-looking statements in light of those risks as you read this prospectus and any prospectus supplement.

OFFER STATISTICS AND EXPECTED TIMETABLE

We may sell from time to time pursuant to this prospectus (as may be detailed in prospectus supplements) an indeterminate number of securities as shall have a maximum aggregate offering price of $100,000,000. The actual number of securities and price of the securities that we will offer pursuant hereto will depend on a number of factors that may be relevant as of the time of offer (see “Plan of Distribution” below).

CAPITALIZATION AND INDEBTEDNESS

The table below sets forth our unaudited capitalization and indebtedness as of September 30, 2012.

	September 30, 2012 (in thousands, except share and per share data)
Indebtedness:	
Research and development funding arrangements	$5,811
Total Indebtedness	5,811
Shareholder's Equity:	
Ordinary Shares, NIS 0.01 nominal value:	
100,000,000 shares authorized and 35,995,311 shares issued and outstanding (1)	97
Additional paid in capital	202,916
Accumulated other comprehensive income	4,424
Accumulated deficit	(188,746)
Total Shareholders' Equity	$18,691

(1) Does not include as of September 30, 2012 (i) outstanding options to purchase a total of 6,592,211 ordinary shares, at a weighted average exercise price of $3.31per share, (ii) outstanding warrants to purchase a total of 500,000 ordinary shares at an exercise price of $6.00 per share; (iii) 833,334 shares issuable upon the possible forfeiture by Baize of its rights to receive future research and development payments under the funding agreement entered into on December 31, 2010; and , (iv) ordinary shares issuable upon the possible forfeiture by Baize of its right to receive future research and development payments under the funding agreement entered into on December 20, 2011 and amended on July 24, 2012 and December 27, 2012.

PRICE RANGE OF OUR ORDINARY SHARES

Our ordinary shares were listed on The NASDAQ Global Market from August 15, 2000 through June 16, 2009. On June 17, 2009, we transferred the listing of our ordinary shares from The NASDAQ Global Market to The NASDAQ Capital Market. The high and low sales prices per share of our ordinary shares for the periods indicated are set forth below:

Year Ended	High*	Low*
December 31, 2008	$2.80	$0.34
December 31, 2009	$5.86	$0.39
December 31, 2010	$5.32	$3.04
December 31, 2011	$5.80	$3.32
December 31, 2012	$6.47	$2.96
Quarter Ended		

March 31, 2011	$5.80	$4.64
June 30, 2011	$5.15	$3.75
September 30, 2011	$4.67	$3.32
December 31, 2011	$5.35	$3.78
March 31, 2012	$6.47	$4.96
June 30, 2012	$6.19	$3.33
September 30, 2012	$4.50	$2.96
December 31, 2012	$5.86	$3.53
Month Ended		
July 31, 2012	$3.99	$3.08
August 31, 2012	$3.82	$2.96
September 30, 2012	$4.50	$3.45
October 31, 2012	$4.43	$3.53
November 30, 2012	$4.60	$3.59
December 31, 2012	$5.86	$4.50

On January 15, 2013, the closing price of our ordinary shares on The NASDAQ Capital Market was $5.52.

The high and low sales prices per share of our ordinary shares on the Tel Aviv Stock Exchange for the periods indicated are set forth below. The currency in which our stock is traded on the Tel Aviv Stock Exchange is the New Israeli Shekel, or NIS. The below dollar amounts represent a conversion from NIS to dollar amounts in accordance with the dollar - NIS conversion rate as of the relevant date of trade.

Year Ended	High*	Low*
December 31, 2008	$2.81	$0.41
December 31, 2009	$6.06	$0.42
December 31, 2010	$5.64	$3.08