

SECURITIES AND EXCHANGE COMMISSION  
WASHINGTON, D.C. 20549

## SCHEDULE 13G

UNDER THE SECURITIES EXCHANGE ACT OF 1934

LEXICON GENETICS INCORPORATED

-----  
(Name of Issuer)

Common Stock, \$0.001 Par Value Per Share

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(Title of Class of Securities)

528872 10 4

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(CUSIP Number)

December 31, 2000

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(Date of Event Which Requires Filing of this Statement)

Check the appropriate box to designate the rule pursuant to which this Schedule is filed:

Rule 13d-1(b)

Rule 13d-1(c)

Rule 13d-1(d)

\* The remainder of this cover page shall be filled out for a reporting person's initial filing on this form with respect to the subject class of securities, and for any subsequent amendment containing information which would alter the disclosures provided in a prior cover page.

The information required in the remainder of this cover page shall not be deemed to be "filed" for the purpose of Section 18 of the Securities Exchange Act of 1934 ("Act") or otherwise subject to the liabilities of that section of the Act but shall be subject to all other provisions of the Act (however, see the Notes).

1 NAMES OF REPORTING PERSONS  
Gordon A. Cain

I.R.S. IDENTIFICATION NOS. OF ABOVE PERSONS (ENTITIES ONLY).

2 CHECK THE APPROPRIATE BOX IF A MEMBER OF A GROUP  
(a) [ ]

(b) [ ]

3 SEC USE ONLY

4 CITIZENSHIP OR PLACE OF ORGANIZATION

United States of America

5 SOLE VOTING POWER

NUMBER OF

11,501,000

SHARES

6 SHARED VOTING POWER

BENEFICIALLY

OWNED BY

2,000,000

EACH

7 SOLE DISPOSITIVE POWER

REPORTING

11,501,000

PERSON

8 SHARED DISPOSITIVE POWER

WITH

2,000,000

9 AGGREGATE AMOUNT BENEFICIALLY OWNED BY EACH REPORTING PERSON

13,501,000

10 CHECK BOX IF THE AGGREGATE AMOUNT IN ROW (9) EXCLUDES CERTAIN SHARES

[ ]

11 PERCENT OF CLASS REPRESENTED BY AMOUNT IN ROW (9)

27.0%

12 TYPE OF REPORTING PERSON\*

IN

## SCHEDULE 13G

Introductory Note: All information with respect to Lexicon Genetics Incorporated is to the best knowledge and belief of the Reporting Person, as defined herein.

## ITEM 1.

- (a) Name of Issuer. The name of the issuer is Lexicon Genetics Incorporated (the "Issuer").
- (b) Address of Issuer's Principal Executive Offices. The address of the Issuer's Principal Executive Offices is 4000 Research Forest Drive, The Woodlands, Texas 77381.

## ITEM 2.

- (a) Name of Person Filing. The name of the person filing this Schedule 13G is Gordon A. Cain (the "Reporting Person").
- (b) Address of Principal Business Office or, if none, Residence. The address of the Reporting Person is 8 Greenway Plaza, Suite 702, Houston, Texas 77046.
- (c) Citizenship. The reporting person is a citizen of the United States.
- (d) Title of Class of Securities. The class of securities of the Issuer owned beneficially by the Reporting Person is common stock, \$0.01 par value (the "Common Stock").
- (e) CUSIP Number. The CUSIP Number for the Common Stock is 528872 10 4.

ITEM 3. IF THIS STATEMENT IS FILED PURSUANT TO SECTIONS 240.13d-1(b) OR 240.13d-2(b) OR (c), CHECK WHETHER THE PERSON FILING IS A:

- (a)  Broker or dealer registered under section 15 of the Act (15 U.S.C. 78o);
- (b)  Bank as defined in section 3(a)(6) of the Act (15 U.S.C. 78c);
- (c)  Insurance company as defined in section 3(a)(19) of the Act (15 U.S.C. 78c);
- (d)  Investment company registered under section 8 of the Investment Company Act of 1950 (15 U.S.C. 80a-8);
- (e)  An investment adviser in accordance with Section 240.13d-1(b)(1)(ii)(E);
- (f)  An employee benefit plan or endowment fund in accordance with Section 240.13d-1(b)(1)(ii)(F);
- (g)  A parent holding company or control person in accordance with Section 240.13d-1(b)(1)(ii)(G);
- (h)  A savings association as defined in Section 3(b) of the Federal Deposit Insurance Act (12 U.S.C. 1813);
- (i)  A church plan that is excluded from the definition of an investment company under section 3(c)(14) of the Investment Company Act of 1940 (15 U.S.C. 80a-3);
- (j)  Group, in accordance with Section 240.13d-1(b)(1)(ii)(J).

## ITEM 4. OWNERSHIP.

- (a) AMOUNT BENEFICIALLY OWNED: The amount of securities beneficially owned by the Reporting Person is 13,501,000 shares of Common Stock.
- (b) PERCENT OF CLASS: The percent of the class of Common Stock beneficially owned by the Reporting Person is 27.0%.
- (c) NUMBER OF SHARES AS TO WHICH EACH PERSON HAS:
  - (i) SOLE POWER TO VOTE OR TO DIRECT THE VOTE: 11,501,000
  - (ii) SHARED POWER TO VOTE OR TO DIRECT THE VOTE: 2,000,000\*
  - (iii) SOLE POWER TO DISPOSE OR TO DIRECT THE DISPOSITION OF:  
11,501,000
  - (iv) SHARED POWER TO DISPOSE OR TO DIRECT THE DISPOSITION OF:  
2,000,000\*

\* These shares are owned by the Gordon and Mary Cain Foundation, of which Gordon A. Cain is the chairman and a trustee.

## ITEM 5. OWNERSHIP OF FIVE PERCENT OR LESS OF A CLASS.

If this statement is being filed to report the fact that as of the date hereof the reporting person has ceased to be the beneficial owner of more than five percent of the class of securities, check the following: [ ]

## ITEM 6. OWNERSHIP OF MORE THAN FIVE PERCENT ON BEHALF OF ANOTHER PERSON.

Not Applicable.

## ITEM 7. IDENTIFICATION AND CLASSIFICATION OF THE SUBSIDIARY WHICH ACQUIRED THE SECURITY BEING REPORTED ON BY THE PARENT HOLDING COMPANY.

Not Applicable.

## ITEM 8. IDENTIFICATION AND CLASSIFICATION OF MEMBERS OF THE GROUP.

Not Applicable.

## ITEM 9. NOTICE OF DISSOLUTION OF GROUP.

Not Applicable.

## ITEM 10. CERTIFICATION

By signing below I certify that, to the best of my knowledge and belief, the securities referred to above were not acquired and are not held for the purpose of or with the effect of changing or influencing the control of the issuer of the securities and were not acquired and are not held in connection with or as a participant in any transaction having that purpose or effect.

SIGNATURE

After reasonable inquiry and to the best of my knowledge and belief, I certify that the information set forth in this statement is true, complete and correct.

Date: February 14, 2001

/s/ GORDON A. CAIN

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Gordon A. Cain