

UNITED STATES  
SECURITIES AND EXCHANGE COMMISSION  
WASHINGTON, D.C. 20549

SCHEDULE 13G/A

UNDER THE SECURITIES EXCHANGE ACT OF 1934

LEXICON GENETICS INCORPORATED

-----  
(Name of Issuer)

Common Stock, Par Value \$0.001

-----  
(Title of Class of Securities)

528872 10 4

-----  
(CUSIP Number)

December 31, 2004

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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).

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1. Name of Reporting Persons  
Arthur T. Sands, M.D., Ph.D.

I.R.S. Identification Nos. of above person (entities only)  
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2. Check the Appropriate Box if a Member of a Group (See Instructions)  
(a)   
(b)

3. SEC Use Only  
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4. Citizenship or Place of Organization

United States  
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5. Sole Voting Power  
Number of  
Shares 3,798,399  
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6. Shared Voting Power  
None  
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7. Sole Dispositive Power  
Owned by Each  
Reporting Person 3,798,399  
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8. Shared Dispositive Power  
With: None  
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9. Aggregate Amount Beneficially Owned by Each Reporting Person

3,798,399  
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10. Check if the Aggregate Amount in Row (9) Excludes Certain Shares  
(See Instructions)

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11. Percent of Class Represented by Amount in Row (9)

5.7%  
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12. Type of Reporting Person (See Instructions)

IN  
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SCHEDULE 13G

ITEM 1. NAME AND ADDRESS OF ISSUER.

- (a) Name of Issuer:  
Lexicon Genetics Incorporated
- (b) Address of Issuer's Principal Executive Offices:  
8800 Technology Forest Place  
The Woodlands, Texas 77381

ITEM 2. FILER AND SECURITY INFORMATION.

- (a) Name of Person Filing:  
Arthur T. Sands, M.D., Ph.D.
- (b) Address of Principal Business Office or, if none, Residence:  
c/o Lexicon Genetics Incorporated  
8800 Technology Forest Place  
The Woodlands, Texas 77381
- (c) Citizenship:  
United States
- (d) Title of Class of Securities:  
Common stock, par value \$0.001
- (e) CUSIP Number:  
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 1940 (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:	3,798,399*
(b) Percent of class:	5.7%
(c) Number of shares as to which each person has:	
(i) Sole power to vote or to direct the vote:	3,798,399*
(ii) Shared power to vote or to direct the vote:	Not Applicable
(iii) Sole power to dispose or to direct the disposition of:	3,798,399*
(iv) Shared power to dispose or to direct the disposition of:	Not Applicable

\* Includes 60,000 shares held by spouse as custodian for minor children. Also includes 2,770,037 shares subject to options exercisable within 60 days of December 31, 2004.

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. CERTIFICATIONS.

Not Applicable

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 11, 2005

By: /s/ ARTHUR T. SANDS

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Name: Arthur T. Sands, M.D., Ph.D.

