

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
8 December 2005 (08.12.2005)

PCT

(10) International Publication Number
WO 2005/115444 A3

(51) International Patent Classification:
C12N 9/22 (2006.01) C07H 21/04 (2006.01)
A61K 38/46 (2006.01)

(74) Agent: GUTERMAN, Sonia, K.; Lawson & Weitzen,
LLP, 88 Black Falcon Ave., Suite 345, Boston, MA 02210-
2414 (US).

(21) International Application Number:
PCT/US2005/012532

(81) Designated States (*unless otherwise indicated, for every
kind of national protection available*): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA,
MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM,
PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM,
SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US (patent), UZ,
VC, VN, YU, ZA, ZM, ZW.

(22) International Filing Date: 14 April 2005 (14.04.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/561,934 14 April 2004 (14.04.2004) US

(84) Designated States (*unless otherwise indicated, for every
kind of regional protection available*): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO,
SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN,
GQ, GW, ML, MR, NE, SN, TD, TG).

(63) Related by continuation (CON) or continuation-in-part
(CIP) to earlier application:
US 60/561,934 (CIP)
Filed on 14 April 2004 (14.04.2004)

(71) Applicant (*for all designated States except US*): AVIRID,
Inc. [US/US]; 2153 SE Hawthorne Road, Suite 101,
Gainesville, FL 32641 (US).

Published:
— with international search report

(72) Inventors; and
(75) Inventors/Applicants (*for US only*): SALGANIK,
Rudolf, I. [US/US]; 107-E Brogan Place, Cary, NC 27511
(US). APPELBAUM, Jacob, G. [US/US]; 1810 NW 23rd
Blvd., Apt. 249, Gainesville, FL 32605-3035 (US).

(88) Date of publication of the international search report:
14 December 2006

*For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.*

(54) Title: COMPOSITIONS WITH MODIFIED NUCLEASES TARGETED TO VIRAL NUCLEIC ACIDS AND METHODS
OF USE FOR PREVENTION AND TREATMENT OF VIRAL DISEASES

(57) Abstract: Antiviral compositions comprising a modified nuclease, or a plurality of such modified nucleases having at least one non-natural amino acid residue substituted for a naturally occurring amino acid in a parent nuclease are provided, as are methods of use and kits providing unit dosages of such compositions.



WO 2005/115444 A3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US05/12532

A. CLASSIFICATION OF SUBJECT MATTER

IPC: C12N 9/22(2006.01);A61K 38/46(2006.01)
C07H 21/04(2006.01)

USPC: 435/199;424/94.6;536/23.4

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 435/199;424/94.6;536/23.4

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EAST, STN dbs: medline, scisearch, caplus, japio, embase

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,989,886 A (BOEKE et al.) 23 November 1999, (23.11.1999) see entire document.	90, 92,98-101
---		-----
Y		91,93-97102-105
Y	NOREN et al.,A General Method for Site-specific Incorporation of Unnatural Amino Acids into Proteins, Science, 1989, Vol 244, pages 182-188.	1-44

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search
10 August 2006 (10.08.2006)

Date of mailing of the international search report

18 SEP 2006

Name and mailing address of the ISA/US
Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
Facsimile No. (571) 273-3201

Authorized officer

Richard G. Hutson

Telephone No. 571-272-1600

Janice Ford
for

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US05/12532

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation Sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of any additional fees.
3. ☒ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.: Group I, claims 1-44 and 89; Group IV, claims 48, 50-52, 54-55, 57, 61-70 and Group V, claims 90-105
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

- Remark on Protest**
- | | |
|--------------------------|---|
| ☐ | The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee. |
| ☐ | The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation. |
| ☐ | No protest accompanied the payment of additional search fees. |

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US05/12532

BOX III. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claim(s) 1-44, 89, drawn to an antiviral composition comprising a modified nuclease with a non-naturally occurring amino acid.

Group II, claim(s) 45, 49, 50, 51, 53, 54, 56, 57, 58, 59, 60, 61, 62, 63, 64-70, 73-88, 89, drawn to an antiviral composition represented by formula Nuc-(Tb)r.

Group III, claim(s) 46, 47, 58, 59, 60, 71, 72, drawn to an antiviral composition represented by formula Nuc-H.

Group IV, claim(s) 48, 50, 51, 52, 54, 55, 57, 61, 62, 63, 64-70, drawn to antiviral composition represented by formula (Nuca)q-Pn-H.

Group V, claim(s) 90-105, drawn to a method of preventing or treating a viral disease with a nuclease.

The inventions listed as Groups I thru V do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: Each of the groups I thru IV are drawn to structurally different antiviral compositions which do not share a special technical feature and group V is drawn to a method of treatment of a viral disease comprising a nuclease. Further Ambion Inc., Cat. No. 2239 teach Turbo DNase, a genetically modified recombinant DNase and methods of its use which anticipates the method claims of group V and destroying any unity.