

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
2 September 2004 (02.09.2004)

PCT

(10) International Publication Number  
**WO 2004/073604 A3**

- (51) International Patent Classification<sup>7</sup>: **A61K 31/70**, 39/00, 39/38
- (21) International Application Number:  
PCT/US2003/027479
- (22) International Filing Date:  
2 September 2003 (02.09.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
60/447,460 14 February 2003 (14.02.2003) US
- (71) Applicant (for all designated States except US): **UNIVERSITY OF MARYLAND BIOTECHNOLOGY** [US/US];  
Institute Off. of Research Admin./Tech. Dev., 701 E. Pratt  
Street, Suite 200, Baltimore, MD 21202 (US).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): **HONE, David, M.**  
[US/US]; 7927 Ruitling Bark Court, Ellicott City, MD  
21043 (US).
- (74) Agent: **FUIERER, Marianne; HULQUIST, Steven, J.**;  
INTELLECTUAL PROPERTY/TECHNOLOGY LAW,  
P.O. Box 14329, RESEARCH TRIANGLE PARK, NC  
27709 (US).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU,  
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,  
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,  
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,  
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,  
MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC,  
SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA,  
UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM,  
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),  
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,  
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,  
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,  
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:**  
— with international search report
- (88) Date of publication of the international search report:  
26 May 2005
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: DNA VACCINES THAT EXPRESS AN ADP-RIBOSYLTRANSFERASE TOXIN DEVOID OF ADP-RIBOSYLTRANSFERASE ACTIVITY

(57) Abstract: The present invention describes DNA vaccines that encode for and direct the coincident expression of an antigen and an ADP-ribosyltransferase toxin that is devoid of ADPribosyltransferase activity and methods for vaccinating animals with the same. The DNA vaccines are useful for vaccinating against viral, bacterial and parasitic pathogens.

WO 2004/073604 A3

**INTERNATIONAL SEARCH REPORT**

International application No.

PCT/US03/27479

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(7) : A61K 31/70, 39/00, 39/38

US CL : 514/44; 424/184.1

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. : 514/44; 424/184.1

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)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6,019,982 (CLEMENTS et al) 1 Feb. 2000 (01.02.2000), see entire document	1-51
Y	STEVENS, L.A., Effects of Site-Directed Mutagenesis of Escherichia coli Heat-Labile Enterotoxin on ADP-Ribosyltransferase Activity and Interaction with ADP-Ribosylation Factors. Infection and Immunity. January 1999, Vol 67, No 1, pages 259-265, see entire document	1-4, 6-16, 18-26, 28-44, 46-51
Y	TURNES, C.G., DNA inoculation with a plasmid vector carrying the faeG adhesion gen of Escherichia coli K88ab induced immune responses in pigs. Vaccine Vol 17, No 15-16, pages 2089-2095, see entire document	1-9, 11-21, 23-30, 32, 34, 35 47-39, 41-49, 51
Y	PEET, N.M., The Effect of Low-Profile Serine Substitutions in the V3 Loop of HIV-1 gp120 III <sub>B</sub> /LAI on the immunogenicity of the Envelope Protein	10,22,31,36,50
Y	WO 9,313,202-A1 (DOMENIGHENI et al) 08 July 1993 (08.07.1993), see entire document	5,17,45
Y	WO 200127294-A1 (DEVICO et al) 19 April 2001 (19.04.2001), see entire document	27

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	
"P" document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family

Date of the actual completion of the international search

10 November 2004 (10.11.2004)

Date of mailing of the international search report

10 FEB 2005

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. (703) 305-3230

Authorized officer

Amy J Nelson

Telephone No. (571) 272-0547