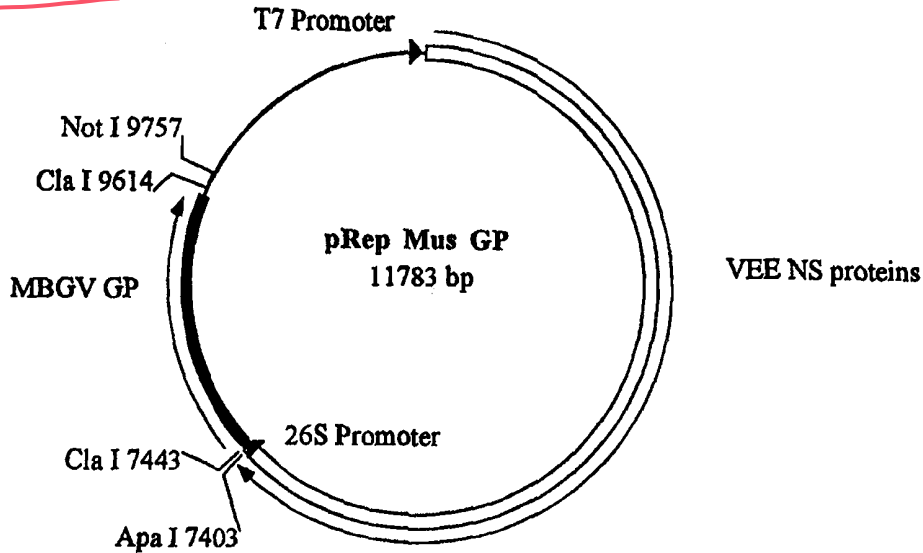




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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| <p>(51) International Patent Classification ⁷ : C12N 15/40, 15/86, 7/01, C07K 14/08, A61K 39/12</p> | <p>A3</p> | <p>(11) International Publication Number: WO 00/00616 (43) International Publication Date: 6 January 2000 (06.01.00)</p> |
| <p>(21) International Application Number: PCT/US99/14174 (22) International Filing Date: 21 June 1999 (21.06.99) (30) Priority Data: 60/091,403 29 June 1998 (29.06.98) US (71) Applicant (for all designated States except US): U.S. MEDICAL RESEARCH INSTITUTE OF INFECTIOUS DISEASES [US/US]; Dept. of the Army, 504 Scott Street, Frederick, MD 21702 (US). (72) Inventors; and (75) Inventors/Applicants (for US only): HEVEY, Michael, C. [US/US]; 5764 Katsura Court, Frederick, MD 21703 (US). NEGLEY, Diane, L. [US/US]; 8105 Stone Ridge Drive, Frederick, MD 21702 (US). PUSHKO, Peter [US/US]; 917 Seminole Road, Frederick, MD 21701 (US). SMITH, Jonathan, F. [US/US]; 6936 Eylers Valley Flint Road, Sabillasville, MD (US). SCHMALJOHN, Alan, L. [US/US]; 7613 Irongate Drive, Frederick, MD (US). (74) Agent: HARRIS, Charles, H.; United States Army Medical Research and Material Command, 504 Scott Street, Fort Detrick, MD 21702 (US).</p> | <p>(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> (88) Date of publication of the international search report: 6 July 2000 (06.07.00)</p> | |

(54) Title: MARBURG VIRUS VACCINES



Map of MBGV GP replicon plasmid.

(57) Abstract

Using the MBGV GP, NP and virion proteins, a method and composition for use in inducing an immune response which is protective against infection with MBGV in nonhuman primates is described.

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INTERNATIONAL SEARCH REPORT

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| Intern. al Application No PCT/US 99/14174 |
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A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 C12N15/40 C12N15/86 C12N7/01 C07K14/08 A61K39/12

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)
 IPC 7 C12N C07K A61K

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 practical, 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. |
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| Y | page 8, line 29 -page 9, line 2; claims 1-37 | 7,14-16 |
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| Y | the whole document | 5,7, 14-16 |
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Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

° Special categories of cited documents :

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| Date of the actual completion of the international search <p style="text-align: center;">20 January 2000</p> | Date of mailing of the international search report <p style="text-align: center;">02.05.2000</p> |
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| Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016 | Authorized officer <p style="text-align: center;">HORNIG H.</p> |
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INTERNATIONAL SEARCH REPORT

Intern: al Application No
PCT/US 99/14174

| C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT | | |
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| Category ° | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
| X | A.A. BUKREYEV ET AL.: "The GP-protein of Marburg virus contains the region similar to the 'immunosuppressive domain' of oncogenic retrovirus P15E protein" FEBS LETTERS, vol. 323, no. 1,2, May 1993 (1993-05), pages 183-187, XP002128206 ELSEVIER, AMSTERDAM, NL | 1-4,6, 17-20 |
| Y | the whole document | 5,7, 14-16 |
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| Y | P. PUSHKO ET AL.: "Replicon-helper systems from attenuated Venezuelan equine encephalitis virus: Expression of heterologous genes in vitro and imunization against heterologous pathogens in vivo" VIROLOGY, vol. 239, 1997, pages 389-401, XP002128209 ACADEMIC PRESS, INC.,NEW YORK, US the whole document | 5,7, 14-16 |
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INTERNATIONAL SEARCH REPORT

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| International Application No PCT/US 99/14174 |
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
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| P,X | HEVEY M ET AL: "Marburg virus vaccines based upon alphavirus replicons protect guinea pigs and nonhuman primates." VIROLOGY, (1998 NOV 10) 251 (1) 28-37. JOURNAL CODE: XEA., XP002128210 the whole document ----- | 1-7, 14-20 |

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 99/14174

Box I Observations where certain claims were found unsearchable (Continuation of item 1 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 II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

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 an additional fee, this Authority did not invite payment of any additional fee.
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.:
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.:

1-6,14-20 (partially); 7 (complete)

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

1. Claims: (1-6,14-20)-partially; 7-complete

A recombinant DNA construct comprising (i) a vector, and (ii) at least one MBGV virus DNA fragment encoding GP; the recombinant DNA construct wherein said MBGV virus protein is from strain Musoke; said DNA construct wherein said vector is VEE; host cell transformed with said recombinant DNA construct; said recombinant DNA construct is pRep Mus GP; Self replicating RNA produced from said construct; Infectious alphavirus particles produced from packaging said self replicating RNA; a pharmaceutical composition comprising infectious alphavirus particles; a method for producing MBGV virus proteins;

2. Claims: (1-6,14-20)-partially; 8-complete

Idem as invention 1 but limited to NP respectively pRep Mus NP;

3. Claims: (1-6,14-20)-partially; 9-complete

Idem as invention 1 but limited to NVP40 respectively pRep Mus VP40;

4. Claims: (1-6,14-20)-partially; 10-complete

Idem as invention 1 but limited to VP35 respectively pRep Mus VP35;

5. Claims: (1-6,14-20)-partially; 11-complete

Idem as invention 1 but limited to VP30 respectively pRep Mus VP30;

6. Claims: (1-6,14-20)-partially; 12-complete

Idem as invention 1 but limited to VP24 respectively pRep Mus VP24;

7. Claims: (1-6,14-20)-partially; 13-complete

Idem as invention 1 but limited to GPdeltaTM respectively pRep Mus GPdeltaTM;

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 99/14174

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
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| | | CA 2220964 A | 28-11-1996 |
| | | JP 11505719 T | 25-05-1999 |
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