



(51) International Patent Classification:

C07K 19/00 (2006.01) A61K 39/12 (2006.01)
C07K 14/045 (2006.01) A61K 38/20 (2006.01)
C07K 14/54 (2006.01) A61P 31/20 (2006.01)
C12N 15/13 (2006.01)

(21) International Application Number:

PCT/US2012/030666

(22) International Filing Date:

27 March 2012 (27.03.2012)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/468,945 29 March 2011 (29.03.2011) US

(71) Applicants (for all designated States except US): **UAB RESEARCH FOUNDATION** [US/US]; 701 S. 20th Street, Suite 1120G, Birmingham, Alabama 35294-0111 (US). **THE REGENTS OF THE UNIVERSITY OF CALIFORNIA** [US/US]; 1111 Franklin Street, Twelfth Floor, Oakland, California 94607-5200 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **WALTER, Mark R.** [US/US]; 3531 East Street, Birmingham, Alabama 35243 (US). **BARRY, Peter A.** [US/US]; 840 Los Molinos Way, Sacramento, California 95864 (US).

(74) Agent: **MYERS BIGEL SIBLEY & SAJOVEC, P.A.**;
P.O. Box 37428, Raleigh, North Carolina 27627 (US).

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

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

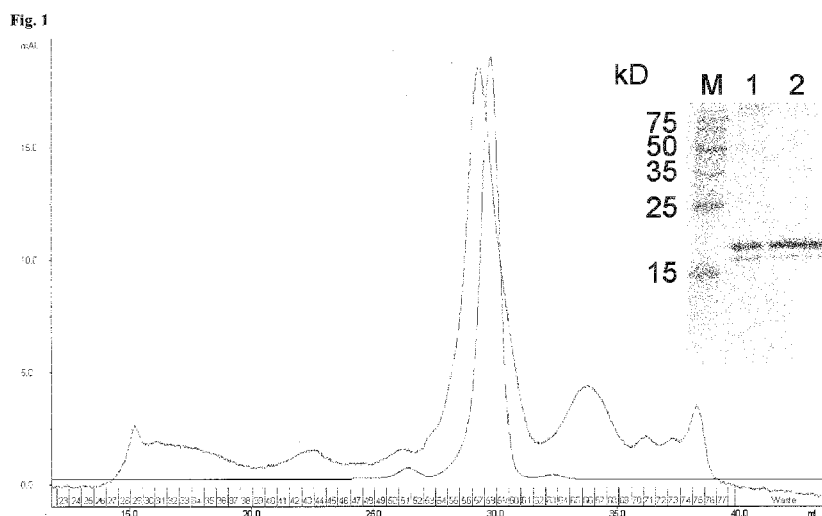
Published:

— with international search report (Art. 21(3))

(88) Date of publication of the international search report:

14 March 2013

(54) Title: METHODS AND COMPOSITIONS FOR CYTOMEGALOVIRUS IL-10 PROTEIN



(57) Abstract: The present invention provides methods and compositions for treating and/or preventing a cytomegalovirus infection in a subject, comprising administering to the subject an effective amount of a cytomegalovirus IL-10 protein modified to have reduced functional activity while retaining immunogenicity. The present invention further provides nucleic acid molecules encoding a cytomegalovirus IL-10 protein or fragment thereof of this invention as well as vectors comprising such nucleic acids. Also provided herein are neutralizing antibodies that specifically bind cmvIL-10.

A. CLASSIFICATION OF SUBJECT MATTER

C07K 19/00(2006.01)i, C07K 14/045(2006.01)i, C07K 14/54(2006.01)i, C12N 15/13(2006.01)i, A61K 39/12(2006.01)i, A61K 38/20(2006.01)i, A61P 31/20(2006.01)i

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)

C07K 19/00

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

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal), Pubmed

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE LEMOS RIEPER, C. et al. 'Characterization of specific antibodies against cytomegalovirus(CMV)-encoded interleukin 10 produced by 28 percent of CMV-seropositive blood donors' Journal of General Virology. Vol.92(Pt.7), pp.1508-1518 (14 March 2011) See the abstract.	5-12
A	BRODEUR, N. D. and SPENCER, J. V. 'Antibodies to human IL-10 neutralize ebvIL-10-mediated cytokine suppression but have no effect on cmvIL-10 activity' Virus Research. Vol.153(2), pp.265-268 (20 August 2010) See the abstract.	5-12
A	YUE, Y. et al. 'Immunogenicity and protective efficacy of DNA vaccines expressing rhesus cytomegalovirus glycoprotein B, phosphoprotein 65-2, and viral interleukin-10 in rhesus macaques' Journal of Virology. Vol.81(3), pp.1095-1099 (15 November 2006) See the abstract.	5-12



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

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"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

"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

"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

"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

"&" document member of the same patent family

Date of the actual completion of the international search

08 NOVEMBER 2012 (08.11.2012)

Date of mailing of the international search report

09 NOVEMBER 2012 (09.11.2012)

Name and mailing address of the ISA/KR



Korean Intellectual Property Office
189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan
City, 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

JANG, Jung Suk

Telephone No. 82-42-481-5575



INTERNATIONAL SEARCH REPORTInternational application No.
PCT/US2012/030666**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.: 13-23
because they relate to subject matter not required to be searched by this Authority, namely:
Said claims pertain to methods for treatment of the human body, thus relate to a subject-matter which International Searching Authority is not required to search under PCT Art. 17(2)(a)(i) and Rule 39.1(iv).
2. ☒ Claims Nos.: 1-4
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:
Claims 1-4 relate to a cytomegalovirus IL-10 protein having a mutation in one or more amino acids which results in a phenotype of reduced binding to an receptor. However, the location of the mutation is not defined or broadly defined in the claims. Thus, the claims lack clarity within the meaning of PCT Article 6.
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:

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.:

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/US2012/030666

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	LOGSDON, N. J. et al. 'Design and analysis of rhesus cytomegalovirus IL-10 mutants as a model for novel vaccines against human cytomegalovirus' PLoS One. Vol.6(11), e28127 (21 November 2011) See the abstract.	5-12
T	EBERHARDT, M. K. et al. 'Host Immune responses to a viral immune modulating protein: immunogenicity of viral interleukin-10 in rhesus cytomegalovirus-infected rhesus macaques' PLoS One. Vol.7(5), e37931 (24 May 2012) See the abstract.	5-12

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/030666Patent document
cited in search reportPublication
datePatent family
member(s)Publication
date

None