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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, PA, 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.

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- *with information concerning incorporation by reference of missing parts and/or elements (Rule 20.6)*

- (88) **Date of publication of the international search report:**
1 August 2013

(54) **Title:** CMV ANTIGENS AND USES THEREOF

(57) **Abstract:** The present invention relates to immunogenic compositions comprising CMV antigens and methods for preparing compositions that contain CMV antigens. The invention also relates to methods for inducing an immune response to CMV.



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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
INV. C07K14/005 A61K39/245
ADD.

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

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)

EPO-Internal, Sequence Search, WPI Data, BIOSIS, EMBASE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	S. SPADERNA ET AL: "Identification of Glycoprotein gpTRL10 as a Structural Component of Human Cytomegalovirus", JOURNAL OF VIROLOGY, vol. 76, no. 3, 1 February 2002 (2002-02-01), pages 1450-1460, XP055057292, ISSN: 0022-538X, DOI: 10.1128/JVI.76.3.1450-1460.2002	1,4,6,9, 10,14, 17-22
Y	the whole document ----- -/--	5,11-13, 15,16,23

☒ 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

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"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

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International application No
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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.
Y	ARVIN A M ET AL: "VACCINE DEVELOPMENT TO PREVENT CYTOMEGALOVIRUS DISEASE: REPORT FROM THE NATIONAL VACCINE ADVISORY COMMITTEE", CLINICAL INFECTIOUS DISEASES, THE UNIVERSITY OF CHICAGO PRESS, CHICAGO, IL, US, vol. 39, no. 2, 15 July 2004 (2004-07-15), pages 233-239, XP008040187, ISSN: 1058-4838, DOI: 10.1086/421999 table 1	5,16
Y	----- WO 2005/007689 A1 (ALPHAVAX INC [US]; CHULAY JEFFREY D [US]; DRYGA SERGEY [US]; REAP ELIZ) 27 January 2005 (2005-01-27) figure 2	11-13,15
A	----- figure 2	1
A	----- WO 2004/055166 A2 (ALPHAVAX INC [US]) 1 July 2004 (2004-07-01) tables 2,3	1
A	----- WO 2007/146024 A2 (UNIV PRINCETON [US]; WANG DAI [US]; SHENK THOMAS [US]) 21 December 2007 (2007-12-21) paragraph [0073]; claims 1,21	1
A	----- SHEN ET AL: "DNA vaccines expressing glycoprotein complex II antigens gM and gN elicited neutralizing antibodies against multiple human cytomegalovirus (HCMV) isolates", VACCINE, ELSEVIER LTD, GB, vol. 25, no. 17, 5 April 2007 (2007-04-05), pages 3319-3327, XP022022109, ISSN: 0264-410X, DOI: 10.1016/J.VACCINE.2007.01.011 figures 5,6	1
Y	----- DATABASE BIOSIS [Online] BIOSCIENCES INFORMATION SERVICE, PHILADELPHIA, PA, US; March 2004 (2004-03), SPADERNA S ET AL: "Glycoprotein gpTRL10 of human cytomegalovirus is dispensable for virus replication in human fibroblasts.", XP002694316, Database accession no. PREV200400255310 abstract	23
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2012/002491

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2012/002491

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:

see additional 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 an additional fees, this Authority did not invite payment of 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.:
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, 4-6, 9-23(all partially)

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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1, 4-6, 9-23(all partially)

hCMV RL10 polypeptide; nucleic acid encoding said polypeptide; composition comprising said polypeptide; said composition comprising an adjuvant; complex comprising said polypeptide; said nucleic acid being a self-replicating RNA, preferably an alphavirus replicon; alphavirus replication particle (VRP) comprising said replicon; composition comprising said nucleic acid or said VRP; method of inducing an immune response comprising administering said composition; method of forming a CMV protein complex comprising delivering said nucleic acid; method of inhibiting CMV entry into a cell using said composition or complex.

2-14. claims: 1-23(partially)

As for subject one, but wherein said hCMV polypeptide is respectively RL11, RL12, RL13, UL5, UL80.5, UL116, UL119, UL122, UL132, UL133, UL138, UL139 or UL148A.
