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- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

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

5 November 2009

(54) Title: HLA-DR BINDING PEPTIDES AND THEIR USES

(57) Abstract: The present invention provides HLA-DR (MHC class II) binding peptides derived from the ovarian/breast cancer associated antigens, Human Epidermal Growth Factor Receptor 2 (HER-2/neu), Carcinoembryonic Antigen (CEA), Insulin Growth Factor Binding Protein 2 (IGFBP-2), and Cyclin D1. The immunogenic peptides can be used in cancer vaccines.



WO 2009/059011 A3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2008/081799**A. CLASSIFICATION OF SUBJECT MATTER****C07K 14/435(2006.01)i, C07K 14/725(2006.01)i, C07K 14/00(2006.01)i, C07K 7/00(2006.01)i, A61K 38/00(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)

IPC 8 C07K 14/435

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
N.A.Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKOMPASS (KIPO internal), USPTO, PAJ, NCBI, INSPECT "her-2/neu peptide, HLA-DR, breast cancer, tumor, dendritic cells, DCs, carcinoembryonic antigen, CEA, , MHC, multiple, vaccin, composition, cancer, tumor, cyclin D1, IGFBP-2, epitope, etc."**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X ----- Y	Cancer Immunol Immunother. vol.50(11):615-624 (Perez, S.A., et al., GR) Jan 2002 "HER-2/neu-derived peptide 884-899 is expressed by human breast, colorectal and pancreatic adenocarcinomas and is recognized by in-vitro-induced specific CD4(+) T cell clones." - see abstract; pages 615-616; & page 617, the 5th paragraph of the left column	1-18 & 21-29 (all partial) ----- 30-37(all partial)
Y	Clin Cancer Res. vol.9(15):5559-5565. (Salazar, L.G., et al., US) 15 Nov 2003 "Immunization of cancer patients with HER-2/neu-derived peptides demonstrating high-affinity binding to multiple class II alleles." - see abstract; & page 5560, the 2nd paragraph of the left column	1-18, 21-37 (all partial)
Y	WO 2004-094454 A2 (EPIMMUNE, INC., US) 04 Nov 2004 - see abstract; [0015] ~ [0019]; & claims	1-18, 21-37 (all partial)
Y	US 2007-098776 A1 (Fikes, J.D., et al., US) 03 May 2007 - see abstract; Table 6; & claims	1-18, 21-37 (all partial)
Y	US 2007-098776 A1 (Fikes, J.D., et al., US) 03 May 2007 - see abstract; & claims	1-18, 21-37 (all partial)

☒ 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

31 AUGUST 2009 (31.08.2009)

Date of mailing of the international search report

01 SEPTEMBER 2009 (01.09.2009)

Name and mailing address of the ISA/KR

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2008/081799

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
T	Cancer Res. vol.68(12):4893-4901. (Kalli, K.R., et al., US) 15 Jun 2008 "An HLA-DR-degenerate epitope pool detects insulin-like growth factor binding protein 2-specific immunity in patients with cancer." - see the whole document	1-18 & 21-37 (all partial)
A	EP 1806359 A1 (Immatics Biotechnologies GmbH, DE) 11 Jul 2007 - see abstract; <11> ~ <15>; SEQ ID NOs 1~49; claims	1-18 & 21-37 (all partial)
A	WO 2005-012502 A2 (EPIMMUNE, INC., US) 10 Feb 2005 - see abstract; [0054] ~ [0056]; & claims	1-18 & 21-37 (all partial)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2008/081799**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.: 19, 20
because they relate to subject matter not required to be searched by this Authority, namely:
Claims 19 & 20 relate to a method for treating human body by therapy. [Article 17(2)(a)(i), Rule 39.1(iv) PCT]
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 the Extra 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 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.:
1-18 & 21-37 (all partial) regarding HER2/NEU.885 peptide only, which is contained in Table 1 - Table 3.

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.

BOX No. III

Lack of Unity of Invention

This ISA found that the present application consists of multiple inventions for the following reason:

The present application relates to 193 groups of inventions, each of which features an isolated HLA-DR binding peptide selected from the group consisting of the peptides listed from Table 1. Table 1 exhibits 193 isolated HLA-DR binding peptides. 56 peptides in Table 2 and 8 different epitopes shown in Table 3 are those contained in Table 1.

Each peptide selected from Groups 1-193 contains different amino acid sequences constituting a different structure. Therefore, the single general concept linking 193 Groups is merely "an isolated HLA-DR binding peptide".

Cancer Immunol Immunother. vol.50(11):615-624, Perez, S.A., et al., (Jan 2002), however, describes HER-2/neu-derived peptide 884-899 capable of binding to HLA-DR. Said peptide 884-899 corresponds to the common concept. Accordingly, the aforementioned concept does not represent any contribution over the prior art.

The inventions listed as Groups 1-193 do not relate to a single general inventive concept under PCT Rule 13.1 because the above mentioned common concept fails to make a contribution over the prior art within the meaning of PCT Rule 13.2.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2008/081799

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2004-094454 A2	04.11.2004	AU 2004-232971 A1 CA 2522812 A1 EP 1620456 A2 JP 2006-526628 T US 2008-0274129 A1 WO 2004-094454 A3	04.11.2004 04.11.2004 01.02.2006 24.11.2006 06.11.2008 09.11.2006
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