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Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

Published:

- 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))
- with sequence listing part of description (Rule 5.2(a))

(88) Date of publication of the international search report:
7 October 2010

(54) Title: RAPID EXPRESSION CLONING OF HUMAN MONOCLONAL ANTIBODIES FROM MEMORY B CELLS

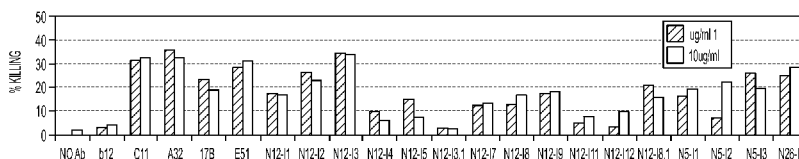


FIG. 11A

(57) Abstract: The present application provides methods for producing human monoclonal antibodies without using hybridoma technology, antibodies produced used the described methods, and methods for using the antibodies to treat or prevent disease conditions (e.g., infection by pathogens such as the Human Immunodeficiency Virus).



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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2009/064253**A. CLASSIFICATION OF SUBJECT MATTER***C07K 16/18(2006.01)i, G01N 33/569(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 16/18; C12N 5/06; C12P 21/04; C12Q 1/68; G01N 33/50

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), Delphion, Pubmed

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	TILLER, T. et al. 'Efficient generation of monoclonal antibodies from single human B cells by single cell RT-PCR and expression vector cloning.' Journal of Immunological Methods. Vol.329(1-2), pp.114-124(31 October 2007) See the abstract;Fig.1.	1-5,10,11
A	BEERLI, R. R. et al. 'Isolation of human monoclonal antibodies by mammalian cell display.' Proceedings of the National Academy of Sciences. USA. Vol. 105(38), pp. 1433 1414341 (23 September 2008) See the abstract.	1-5,10,11
A	US 2006-0040363 A1 (RAJU KUCHERLAPATI et al.) 23 February 2006 See the abstract.	1-5,10,11
A	WO 2005-116645 A2 (FRAUNHOFER GESELLSCHAFT ZUR F횜RDERUNG DER ANGEWANDTEN FO RSCHUNG E.V. et al.) 08 December 2005 See the abstract.	1-5,10,11
A	US 2008-0193978 A1 (RAUM TOBIAS et al.) 14 August 2008 See the abstract.	1-5,10,11

 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

26 JULY 2010 (26.07.2010)

Date of mailing of the international search report

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Name and mailing address of the ISA/KR

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2009/064253

Box No. I Nucleotide and/or amino acid sequence(s) (Continuation of item 1.b of the first sheet)

1. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of :

a. a sequence listing filed or furnished

- on paper
- in electronic form

b. time of filing or furnishing

- contained in the international application as filed
- filed together with the international application in electronic form
- furnished subsequently to this Authority for the purposes of search

2. In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

3. Additional comments:

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2009/064253**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.: 6-9
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:

See Extra sheet.

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/US2009/064253

(1) Claim 6 & 7 are directed to a monoclonal antibody isolated by the method of claim 1. However, the subject-matter of claim 6 & 7 is not considered to comply with the requirement of PCT Article 6, as said claims only describe the method to produce an antibody without mentioning any structural features thereof, which renders the scope of the claim unclear.

(2) Claims 8 & 9 are directed to an antibody wherein an amino acid sequence of CDR3 of VH and/or VL is specified. However, the target(antigen) which the antibody specifically binds to is not exactly defined, and the structural information except CDR3 is not unknown. Thus, the scope of such antibodies are considered to be unclear.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2009/064253

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2006-0040363 A1	23.02.2006	CA 2140638 C	04.05.2010
		CA 2140638-A1	03.02.1994
		EP 0463151 A1	02.01.1992
		EP 0463151 B1	12.06.1996
		EP 0652950 A1	28.07.1999
		EP 0652950 B1	19.12.2007
		EP 0710719 A1	08.05.1996
		EP 0710719 B1	14.03.2007
		EP 0822830 A1	02.02.2005
		EP 0822830 B1	02.04.2008
		EP 1690934 A2	16.08.2006
		EP 1690934 A3	30.07.2008
		EP 1690935 A2	16.08.2006
		EP 1690935 A3	30.07.2008
		EP 1709970 A1	11.10.2006
		EP 1978033 A2	08.10.2008
		EP 1978033 A3	24.12.2008
		JP 03-068180 B2	19.05.2000
		JP 03-068506 B2	19.05.2000
		JP 03-068507 B2	19.05.2000
		JP 04-312259 B2	22.05.2009
		JP 10-146194 A	02.06.1998
		JP 10-155492 A	16.06.1998
		JP 11-239490 A	07.09.1999
		JP 11-239491 A	07.09.1999
		JP 11-243973 A	14.09.1999
		JP 11-262386 A	28.09.1999
		JP 11-262388 A	28.09.1999
		JP 11-262396 A	28.09.1999
		JP 11-505523 A	21.05.1999
		JP 2005-336200 A	08.12.2005
		JP 2006-115839 A	11.05.2006
		JP 2006-204301 A	10.08.2006
		JP 2007-125020 A	24.05.2007
		JP 2007-167070 A	05.07.2007
		JP 2008-136494 A	19.06.2008
		JP 2008-253268 A	23.10.2008
		JP 2009-039127 A	26.02.2009
		JP 2009-136290 A	25.06.2009
		JP 2010-057507 A	18.03.2010
		KR 10-0203511 B1	15.06.1999
		KR 10-0654645 B1	04.04.2007
		KR 10-2005-0085971 A	29.08.2005
		US 2003-0229905 A1	11.12.2003
		US 2004-0010810 A1	15.01.2004
		US 2004-0093622 A1	13.05.2004
		US 2005-0054055 A1	10.03.2005
		US 2005-0076395 A1	07.04.2005
		US 2005-0241006 A1	27.10.2005

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2009/064253

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		US 2005-0287630 A1	29.12.2005
		US 2009-0149637 A1	11.06.2009
		US 2010-0010202 A1	14.01.2010
		US 5769269 A1	23.06.1998
		US 5939598 A1	17.08.1999
		US 6075181 A1	13.06.2000
		US 6114598 A1	05.09.2000
		US 6150584 A1	21.11.2000
		US 6162963 A1	19.12.2000
		US 6657103 B1	02.12.2003
		US 6673986 B1	06.01.2004
		US 6713610 B1	30.03.2004
		WO 91-10741 A1	25.07.1991
		WO 94-02602 A1	03.02.1994
		WO 95-30212 A1	09.11.1995
		WO 96-33735 A1	31.10.1996
WO 2005-116645 A2	08.12.2005	CA 2567623-A1	08.12.2005
		EP 1749210 A2	07.02.2007
		US 2010-0035241 A1	11.02.2010
		WO 2005-116645 A3	08.12.2005
		WO 2005-116645 A3	16.03.2006
US 2008-0193978 A1	14.08.2008	AT 435238 T	15.07.2009
		AU 2005-238203 A1	10.11.2005
		CA 2562604-A1	10.11.2005
		DE 602004021773 D1	13.08.2009
		DK1593690T3	09.11.2009
		EP 1593690 A1	09.11.2005
		EP 1593690 B1	01.07.2009
		EP 1742967 A2	17.01.2007
		WO 2005-105844 A2	10.11.2005
		WO 2005-105844 A2	10.11.2005
		WO 2005-105844 A3	10.11.2005
		WO 2005-105844 A3	26.01.2006