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*[Continued on next page]*

(54) Title: FC VARIANTS

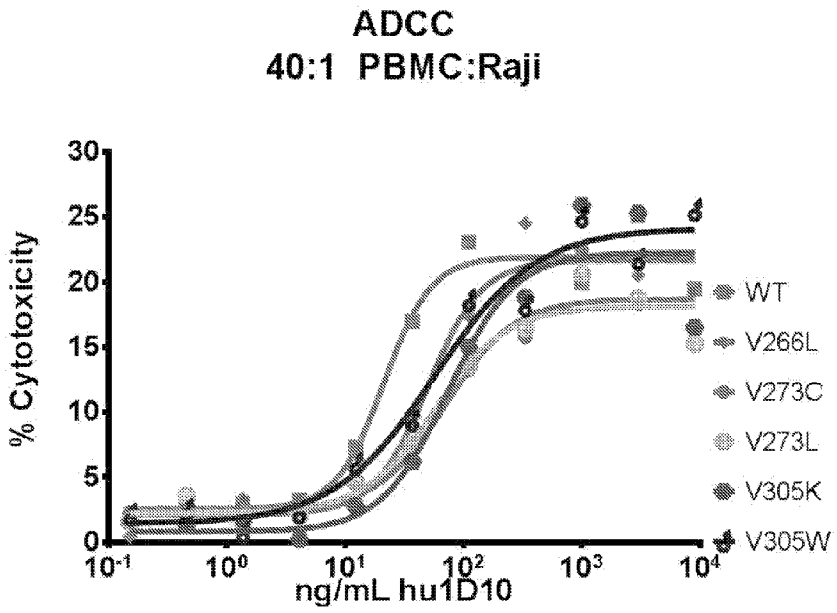



FIGURE 13B

(57) Abstract: The present disclosure relates to polypeptide variants having modified Fc domains with altered affinity to Fc receptors.

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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, KM, ML, MR, NE, SN, TD, TG).

**Published**:

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**(88) Date of publication of the international search report**:
15 January 2015

# INTERNATIONAL SEARCH REPORT

International application No
PCT/US2014/029585

A. CLASSIFICATION OF SUBJECT MATTER
INV. C07K16/00 A61K39/00 C07K16/28
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 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 practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| X<br><br><br>Y | WO 2004/099249 A2 (XENCOR INC [US]; LAZAR GREGORY ALAN [US]; CHIRINO ARTHUR J [US]; DANG) 18 November 2004 (2004-11-18)<br>abstract<br>paragraph [0021]<br>paragraph [0030]<br>paragraph [0099] - paragraph [0127];<br>example 3; tables 25,61,62<br>----- | 1,2,6,7,<br>11-13,<br>25-77<br>3-5,<br>8-10,14,<br>16-22 |
| X | WO 2011/120134 A1 (ZYMEWORKS INC [CA]; D ANGELO IGOR [CA]; BLEILE DUSTIN [CA]; TOM-YEW ST) 6 October 2011 (2011-10-06)<br>abstract<br>paragraph [0044]<br>-----<br>-/-- | 1,4,6,7,<br>9,11-13,<br>15,25-77 |

[X] Further documents are listed in the continuation of Box C.

[X] 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

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| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| 17 November 2014 | 01/12/2014 |

| Name and mailing address of the ISA/ | Authorized officer |
|---|---|
| European Patent Office, P.B. 5818 Patentlaan 2<br>NL - 2280 HV Rijswijk<br>Tel. (+31-70) 340-2040,<br>Fax: (+31-70) 340-3016 | Mossier, Birgit |

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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 | WO 2007/024249 A2 (MACROGENICS INC [US]; STAVENHAGEN JEFFREY [US]; KOENIG SCOTT [US]) 1 March 2007 (2007-03-01)<br>abstract<br>paragraph [0176]; table 8 | 3-5, 8-10,14, 16-22 |
| X | WO 2006/034488 A2 (GENENTECH INC [US]; EIGENBROT CHARLES W [US]; JUNUTULA JAGATH REDDY [U) 30 March 2006 (2006-03-30)<br>abstract<br>page 58, line 18 - line 32; figure 16 | 1-4,6-9, 11-13, 16,25-77 |
| Y | SHIELDS R L ET AL: "High resolution mapping of the binding site on human IgG1 for FcgammaRI, FcgammaRII, FcgammaRIII, and FcRn and design of IgG1 variants with improved binding to the FcgammaR", JOURNAL OF BIOLOGICAL CHEMISTRY, AMERICAN SOCIETY FOR BIOCHEMISTRY AND MOLECULAR BIOLOGY, US,<br>vol. 276, no. 9, 2 March 2001 (2001-03-02) , pages 6591-6604, XP002271092,<br>ISSN: 0021-9258, DOI: 10.1074/JBC.M009483200<br>abstract<br>page 6596, column 2, paragraph 4; table 1 | 3-5, 8-10,14, 16-22 |
| X,P | EP 2 679 681 A1 (CHUGAI PHARMACEUTICAL CO LTD [JP]) 1 January 2014 (2014-01-01)<br>abstract<br>paragraph [0070]<br>paragraph [0082] - paragraph [0126]<br>examples 5,6; table 8 | 1,4,6,7, 9,11-13, 15,25-77 |
| X | & WO 2012/115241 A1 (CHUGAI SEIYAKU KK) 30 August 2012 (2012-08-30)<br>abstract<br>see EP2679681 | 1,4,6,7, 9,11-13, 15,25-77 |
| A | US 2008/112961 A1 (STAVENHAGEN JEFFREY B [US] ET AL) 15 May 2008 (2008-05-15)<br>abstract<br>paragraph [0053]<br>paragraph [0083]; table 10 | 1-77 |
| A | WO 2004/100898 A2 (PROTEIN DESIGN LABS INC [US]; WILLIAMS MARNA [US]; TSO YUN J [US]; LAN) 25 November 2004 (2004-11-25)<br>abstract<br>page 50, line 3 - page 51, line 30 | 1-77 |

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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. |
|---|---|---|
| A | US 2007/231329 A1 (LAZAR GREGORY A [US] ET AL LAZAR GREGORY ALAN [US] ET AL)<br>4 October 2007 (2007-10-04)<br>abstract<br>figure 41; tables 1,10 | 1-77 |
| A | PRESTA L G ET AL: "Engineering therapeutic antibodies for improved function",<br>BIOCHEMICAL SOCIETY TRANSACTIONS, PORTLAND PRESS LTD, GB,<br>vol. 30, no. 4, 1 August 2002 (2002-08-01), pages 487-490, XP002432766,<br>ISSN: 0300-5127, DOI: 10.1042/BST0300487<br>the whole document | 1-77 |
| X,P | WO 2013/109279 A2 (THERAPEUTIC PROTEINS INC [US]; WILTON ROSEMARIE [US])<br>25 July 2013 (2013-07-25)<br><br>abstract; examples 1-4 | 1-14, 25-33, 37,41, 43-59, 63,64 |

# INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2014/029585

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

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

   a. (means)

   ☐ on paper

   ☒ in electronic form

   b. (time)

   ☒ in the international application as filed

   ☐ together with the international application in electronic form

   ☐ subsequently to this Authority for the purpose of search

2. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto 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/US2014/029585

**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.:

**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: 14(completely); 1-13, 25-77(partially)

   A polypeptide comprising a variant CH2 domain which has relative to the CH2 domain of SEQ ID NO:2 at least a V263 substitution and the subject-matter relating thereto.

   ---

2. claims: 15(completely); 1, 4, 6, 7, 9, 11-13, 25-77(partially)

   A polypeptide comprising a variant CH2 domain which has relative to the CH2 domain of SEQ ID NO:2 at least a V266 substitution and the subject-matter relating thereto.

   ---

3. claims: 16-22(completely); 1-13, 25-77(partially)

   A polypeptide comprising a variant CH2 domain which has relative to the CH2 domain of SEQ ID NO:2 at least a V273 substitution and the subject-matter relating thereto.

   ---

4. claims: 23, 24(completely); 4, 9, 11-13, 25-77(partially)

   A polypeptide comprising a variant CH2 domain which has relative to the CH2 domain of SEQ ID NO:2 at least a V305K or V305W substitution and the subject-matter relating thereto.

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Information on patent family members

International application No
PCT/US2014/029585

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