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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, PG, PH, PL,
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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
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments
- with sequence listing part of description published separately in electronic form and available upon request from the International Bureau
- the filing date of the international application is within two months from the date of expiration of the priority period

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

15 May 2008

(54) Title: VARIABLE REGION SEQUENCES OF IL-31 MONOCLONAL ANTIBODIES AND METHODS OF USE

Alignment of VL and VH predicted amino acid sequences from mouse anti-human IL31 hybridomas from Bin 1B. Residues are numbered and CDRs are defined according to Kabat. The CDRs are underlined. N-linked carbohydrate motifs are highlighted in grey. An "x" indicates identity with sequence above.

[illegible]

(S7) Abstract: Novel compositions derived from antigen-binding sites of immunoglobulins having affinity for IL-31 are provided. The compositions exhibit immunological binding properties of antibody molecules capable of binding specifically to a human IL-31. CDR regions derived from same or different immunoglobulin moieties are provided. Also provided are single chain polypeptides wherein VH and VL domains are attached. The sFv molecules can include ancillary polypeptide moieties which can be bioactive, or which provide a site of attachment for other useful moieties. The compositions are useful in specific binding assays, affinity purification schemes, drug or toxin targeting, imaging, and genetic or immunological therapeutics for inflammatory diseases. The invention thus provides novel polypeptides, the DNAs encoding those polypeptides, expression cassettes comprising those DNAs, and methods of inducing the production of the polypeptides. The invention further provides the amino acid sequences of the variable regions of the monoclonal antibodies and use of these monoclonal antibody or antibody fragment in conjunction with an an human IgG4 Fc molecule.

INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER

INV. C07K16/24 A61K39/395 C12N5/18 A61P37/00 A61P17/00

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 practical, search terms used)

EPO-Internal, 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	"Monoclonal Anti-human IL-31 Antibody" 18 April 2006 (2006-04-18), R&D SYSTEMS, INC, XP002461764 ISBN: 1-800-343-7475 Retrieved from the Internet: URL: http://www.rndsystems.com/pdf/MAB2824.pdf the whole document	1,9,11, 13,15, 17-21
X	WO 03/060090 A (ZYMOGENETICS INC [US]) 24 July 2003 (2003-07-24) page 58, line 11 - page 61, line 24 page 64, line 3 - line 10 page 83, line 6 - page 84, line 30 page 104, line 5 - page 106, line 26 claims 17-19,30-49; example 46 ----- -/-	1-21

☒ 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 document 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 another 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.

G document member of the same patent family

Date of the actual completion of the international search

10 December 2007

Date of mailing of the international search report

12/03/2008

Name and mailing address of the ISA/

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Authorized officer

Bayer, Annette

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2007/077555

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 and necessary to the claimed invention, the international search was carried out on the basis of:
- a. type of material
- ☒ a sequence listing
- ☐ table(s) related to the sequence listing
- b. format of material
- ☒ on paper
- ☒ in electronic form
- c. time of filing/furnishing
- ☒ contained in the international application as filed
- ☒ filed together with the international application in electronic form
- ☐ furnished 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/US2007/077555

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2006/188500 A1 (LEUNG DONALD Y [US] ET AL) 24 August 2006 (2006-08-24) the whole document, especially example 10 and claims 1-17 -----	1-21
A	PRESTA ET AL: "Engineering of therapeutic antibodies to minimize immunogenicity and optimize function" ADVANCED DRUG DELIVERY REVIEWS, AMSTERDAM, NL, vol. 58, no. 5-6, 7 August 2006 (2006-08-07), pages 640-656, XP005611419 ISSN: 0169-409X -----	
P,X	WO 2006/122079 A (ZYMOGENETICS INC [US]; SIADAK ANTHONY W [US]; BILSBOROUGH JANINE [US];) 16 November 2006 (2006-11-16) paragraphs [0025], [0029], [0037], [0041] - [0047], [0065], [0066], [0078], [0082], [0224] - [0237] paragraphs [0277], [0278], [0287], [0288], [0230] claims 1-34; example 2 -----	1-21

INTERNATIONAL SEARCH REPORT

International application No.
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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:
Although claims 2-8, 10, 12, 14, 16-18 are directed to a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the compound/composition.
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 allsearchable 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.:

1-20 (all partially), 21 (complete)

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: 1-20 (all partially), claim 21 (complete)

A monoclonal antibody or antibody fragment specifically binding to a polypeptide comprising SEQ-ID NO: 2 wherein the heavy chain variable domain comprises CDRs consisting of SEQ-ID NO: 51, SEQ-ID NO: 52 or 57 and SEQ-ID NO: 53 and the light chain variable domain comprises CDRs consisting of SEQ-ID NO: 54, SEQ-ID NO: 55 and SEQ-ID NO: 56 and use thereof.

2. claims: claims 1-20 (all partially), claim 22 (complete)

A monoclonal antibody or antibody fragment specifically binding to a polypeptide comprising SEQ-ID NO: 2 wherein the heavy chain variable domain comprises CDRs consisting of SEQ-ID NO: 51, SEQ-ID NO: 58 and SEQ-ID NO: 59 and the light chain variable domain comprises CDRs consisting of SEQ-ID NO: 60, SEQ-ID NO: 61 and SEQ-ID NO: 62 and use thereof.

3. claims: claims 1-20 (all partially), claim 23 (complete)

A monoclonal antibody or antibody fragment specifically binding to a polypeptide comprising SEQ-ID NO: 2 wherein the heavy chain variable domain comprises CDRs consisting of SEQ-ID NO: 63, SEQ-ID NO: 64 and SEQ-ID NO: 65 and the light chain variable domain comprises CDRs consisting of SEQ-ID NO: 66, SEQ-ID NO: 67 and SEQ-ID NO: 68 and use thereof.

4. claims: claims 1-20 (all partially), claim 24 (complete)

A monoclonal antibody or antibody fragment specifically binding to a polypeptide comprising SEQ-ID NO: 2 wherein the heavy chain variable domain comprises CDRs consisting of SEQ-ID NO: 69, SEQ-ID NO: 70 or 79 and SEQ-ID NO: 71 and the light chain variable domain comprises CDRs consisting of SEQ-ID NO: 72, SEQ-ID NO: 73 and SEQ-ID NO: 74 and use thereof.

5. claims: claims 1-20 (all partially), claim 25 (complete)

A monoclonal antibody or antibody fragment specifically binding to a polypeptide comprising SEQ-ID NO: 2 wherein the heavy chain variable domain comprises CDRs consisting of SEQ-ID NO: 75, SEQ-ID NO: 76 and SEQ-ID NO: 65 and the light chain variable domain comprises CDRs consisting of SEQ-ID NO: 77, SEQ-ID NO: 78 and SEQ-ID NO: 68 and use thereof.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

6. claims: claims 1-20 (all partially), claim 26 (complete)

A monoclonal antibody or antibody fragment specifically binding to a polypeptide comprising SEQ-ID NO: 2 wherein the heavy chain variable domain comprises CDRs consisting of SEQ-ID NO: 80, SEQ-ID NO: 81 and SEQ-ID NO: 82 and the light chain variable domain comprises CDRs consisting of SEQ-ID NO: 83, SEQ-ID NO: 84 and SEQ-ID NO: 85 and use thereof.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2007/077555

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 03060090	A	24-07-2003	AU 2003225525 A1 BR 0306979 A CA 2473686 A1 CN 1643138 A EP 1476541 A2 JP 2005526494 T	30-07-2003 23-11-2004 24-07-2003 20-07-2005 17-11-2004 08-09-2005
US 2006188500	A1	24-08-2006	NONE	
WO 2006122079	A	16-11-2006	CA 2607588 A1 EP 1891111 A1	16-11-2006 27-02-2008