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7 March 2013

(54) Title: TREATING MENTAL DISORDERS

(57) Abstract: A method for treating mental disorders such as schizophrenia, depression and bipolar disorder comprises applying peripheral blood from a patient or subject to an apheresis column loaded with a solid support comprising a binding reagent capable of specifically binding to a chemokine receptor, optionally the chemokine receptor CCR9, CCR1, CCR3 and/or CCR5 immobilized directly or indirectly on the support thus removing chemokine receptor, optionally CCR9, CCR1, CCR3 and/or CCR5 expressing cells from the peripheral blood of the patient or subject. Various companion diagnostic methods and useful binding reagents are also described.



WO 2012/172340 A3

INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER INV. C07K14/52 A61M1/36 B01J20/32 C07K17/02 G01N33/68 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 A61M B01J G01N 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.
A	DE 10 2005 036505 A1 (ADEXTER GMBH [DE]) 1 June 2006 (2006-06-01) paragraphs [0023], [0024] -----	3,11, 31-36
A	WO 2007/133147 A1 (IBD COLUMN THERAPIES INTERNAT [SE]; THOERN MAGNUS [SE]; WINQVIST OLA [SE]) 22 November 2007 (2007-11-22) claims -----	3,11, 31-36
X	WO 2010/029317 A2 (IBD COLUMN THERAPIES INTERNAT [SE]; WINQVIST OLA [SE]; COTTON GRAHAM [SE]) 18 March 2010 (2010-03-18) cited in the application	9-13,15, 16,37,38
Y	the whole document ----- -/--	1-5,7,8, 31-36
☒ 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 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 "&" document member of the same patent family		
Date of the actual completion of the international search 21 September 2012		Date of mailing of the international search report 11/01/2013
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer Van der Schaal, C

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2012/051350

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	TEIXEIRA ET AL: "Increased serum levels of CCL11/eotaxin in schizophrenia", PROGRESS IN NEURO-PSYCHOPHARMACOLOGY & BIOLOGICAL PSYCHIATRY, OXFORD, GB, vol. 32, no. 3, 23 November 2007 (2007-11-23), pages 710-714, XP022508051, ISSN: 0278-5846, DOI: 10.1016/J.PNPBP.2007.11.019 cited in the application the whole document	1
A	----- WO 2007/024705 A2 (ABBOTT BIOTECH LTD [GB]; HOFFMAN REBECCA S [US]; DECKER MICHAEL W [US]) 1 March 2007 (2007-03-01) page 1, line 32 - page 2, line 11	1
A	----- REALE MARCELLA ET AL: "Dysregulation of chemo-cytokine production in schizophrenic patients versus healthy controls", BMC NEUROSCIENCE, BIOMED CENTRAL, LONDON, GB, vol. 12, no. 1, 25 January 2011 (2011-01-25), page 13, XP021086680, ISSN: 1471-2202, DOI: 10.1186/1471-2202-12-13 the whole document	1
A	----- HSING-CHENG LIU ET AL: "Immunologic variables in acute mania of bipolar disorder", JOURNAL OF NEUROIMMUNOLOGY, vol. 150, no. 1-2, 1 May 2004 (2004-05-01), pages 116-122, XP055036823, ISSN: 0165-5728, DOI: 10.1016/j.jneuroim.2004.01.006 abstract	1
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INTERNATIONAL SEARCH REPORT

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.
A	US 2010/029753 A1 (ANDERSON ERIC C [US] ET AL) 4 February 2010 (2010-02-04) paragraph [0017] -----	1
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A,P	WOUTER BEUMER ET AL: "Increased level of serum cytokines, chemokines and adipokines in patients with schizophrenia is associated with disease and metabolic syndrome", PSYCHONEUROENDOCRINOLOGY, 1 April 2012 (2012-04-01), XP055036803, ISSN: 0306-4530, DOI: 10.1016/j.psyneuen.2012.04.001 the whole document -----	1

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB2012/051350

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.:

1-5, 7-13, 15, 16, 31-38(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: 1-5, 7-13, 15, 16, 31-38(all partially)

A binding reagent capable of specifically binding the CCR9 chemokine receptor, immobilized on a solid support within an apheresis column, and its use for treating mental disorders

2. claims: 1-5, 7-13, 15, 16, 31-38(all partially)

A binding reagent capable of specifically binding the CCR1 chemokine receptor, immobilized on a solid support within an apheresis column, and its use for treating mental disorders

3. claims: 6, 14(completely); 1-5, 7-13, 15, 16, 31-38(partially)

A binding reagent capable of specifically binding the CCR3 chemokine receptor, immobilized on a solid support within an apheresis column, and its use for treating mental disorders

4. claims: 1-5, 7-13, 15, 16, 31-38(all partially)

A binding reagent capable of specifically binding the CCR5 chemokine receptor, immobilized on a solid support within an apheresis column, and its use for treating mental disorders

5. claims: 17-25

Methods of diagnosing mental disorders or selecting a suitable treatment for the disease comprising determining the levels of CCR9, CCR1, CCR3 and/or CCR5

6. claims: 26-30, 44-48

Modified CCL11/eotaxin chemokine

7. claims: 39-43

Modified CCL8/MCP-2 chemokine

8. claims: 49-52

Modified CCL5/RANTES chemokine

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2012/051350

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