

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
30 November 2006 (30.11.2006)

PCT

(10) International Publication Number
WO 2006/128143 A3

(51) International Patent Classification:
C07D 471/10 (2006.01) **A61K 31/435** (2006.01)

(74) Agent: **ROBIDOUX, Andrea, L., C.**; Choate, Hall & Steward LLP, Two International Place, Boston, MA 02110 (US).

(21) International Application Number:
PCT/US2006/020848

(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(22) International Filing Date: 26 May 2006 (26.05.2006)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/685,594 27 May 2005 (27.05.2005) US

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(71) Applicant (*for all designated States except US*): **EI-SAI CO., LTD.** [JP/JP]; 6-10 Koishikawa 4-chome, Bunkyo-ku, Tokyo, 112-8088 (JP).

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): **CARLSON, Eric** [US/US]; 14 Blair Road, Merrimack, NH 03054 (US). **CHEN, Qian** [CN/US]; 122 Druid Hill Road, Methuen, MA 01844 (US). **DAVIS, Heather** [US/US]; 202 Morgan Drive, Haverhill, MA 01832 (US). **GALLAGHER, Brian, M., Jr.** [US/US]; 28 Orchard Street, Merrimack, MA 01860 (US). **SCHILLER, Shawn** [US/US]; 614 Hilldale Avenue, Haverhill, MA 01832 (US). **SHAFFER, Christina** [US/US]; 131 Talent Road, Litchfield, NH 03841 (US). **SPYVEE, Mark** [GB/US]; 75 Laura Lane, Hampstead, 03841 (US). **WONG, Nancy** [US/US]; 121 Amberville Road, No. Andover, MA 01845 (US).

Published:

— with international search report

(88) Date of publication of the international search report:
29 March 2007

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: HYDANTOIN COMPOUNDS

(57) Abstract: The invention relates to the use of hydantoin compounds useful for treating or preventing autoimmune disorders. The present invention also provides compositions and uses thereof.



WO 2006/128143 A3

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2006/020848A. CLASSIFICATION OF SUBJECT MATTER
INV. C07D471/10 A61K31/435

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)
C07D

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, PAJ, BEILSTEIN Data, CHEM ABS 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	WO 2005/023810 A (VIROCHEM PHARMA INC [CA]; CHAN CHUN KONG LAVAL [CA]; ZHANG MING-QIANG) 17 March 2005 (2005-03-17) Formula I; claims 1,49,53,56; tables 1,6	1-24
Y	page 23, lines 15-21; claim 45	25-29
Y	BALASHOV K E ET AL: "CCR5+ AND CXCR3+ T CELLS ARE INCREASED IN MULTIPLE SCLEROSIS AND THEIR LIGANDS MIP-1ALPHA AND IP-10 EXPRESSED IN DEMYELINATING BRAIN LESIONS" PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF USA, NATIONAL ACADEMY OF SCIENCE, WASHINGTON, DC, US, vol. 96, June 1999 (1999-06), pages 6873-6878, XP002936303 ISSN: 0027-8424 Page 6878 last paragraph; abstract	25-29

☒ 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.

Z document member of the same patent family

Date of the actual completion of the international search

13 November 2006

Date of mailing of the international search report

24/11/2006

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Rudolf, Manfred

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2006/020848

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	FINN SELLEBJERG, HANS O. MADSEN, CLAUS V. JENSEN, JAKOB JENSEN, PETER GARRED: "CCR5 Delta32, matrix metalloproteinase-9 and disease activity in multiple sclerosis" JOURNAL OF NEUROIMMUNOLOGY, vol. 102, 2000, pages 98-106, XP002407070 Page 104 last paragraph	25-29
A	KONRAD H. BLEICHER, YVES WÜTHRICH, MAXIME DE BONI, SABINE KOLCZEWSKI, TORSTEN HOFFMANN, ANDREW J. SLEIGHT: "Parallel Solution- and Solid-Phase Synthesis of Spirohydantoin Derivatives as Neurokinin-1 Receptor Ligands" BIOORGANIC & MEDICINAL CHEMISTRY LETTERS, vol. 12, 2002, pages 2519-2522, XP002406030 tables 1-3	1-29
P,X	EP 1 619 193 A (ONO PHARMACEUTICAL CO [JP]) 25 January 2006 (2006-01-25) Formula I; page 5 lines 45-55; paragraphs [0129], [0163]; claims 1,4,5; examples 4,20	1-29
P,X	WO 2006/000096 A (VIROCHEM PHARMA INC [CA]; CHAN CHUN KONG LAVAL [CA]; MOINET CHRISTOPHE) 5 January 2006 (2006-01-05) compound 14; claims 1,40,41,45	1,2, 4-10,12, 13,24

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2006/020848

Box 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.: 25, 27, 29
because they relate to subject matter not required to be searched by this Authority, namely:
Although claims 25, 27, 29 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 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.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2006/020848

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 2005023810	A	17-03-2005	NONE	
EP 1619193	A	25-01-2006	WO 2004092169 A1 US 2006229301 A1	28-10-2004 12-10-2006
WO 2006000096	A	05-01-2006	NONE	