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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, 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, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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Published:

— *with international search report (Art. 21(3))*

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(88) Date of publication of the international search report:
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(54) Title: COMPOSITIONS AND METHODS FOR TREATING MALIGNANT ASTROCYTOMAS

(57) Abstract: The disclosure provides methods of treating glioblastoma, methods of screening for compounds that treat glioblastoma, and pharmaceutical compositions useful in the treatment of glioblastoma.

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2013/020871

A. CLASSIFICATION OF SUBJECT MATTER
INV. C07D471/04 C07D209/88 A61K31/435
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)
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 practicable, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 03/033496 A1 (TRANSTECH PHARMA INC [US]; MJALLI ADNAN M M [US]; ANDREWS ROBERT C [US) 24 April 2003 (2003-04-24) the whole document	1-12,18, 20,22,23
X	WO 2008/036021 A1 (ASTRAZENECA AB [SE]; BROWN WILLIAM [CA]; LIU ZIPING [CA]; TREMBLAY MAX) 27 March 2008 (2008-03-27) the whole document	1-12,18, 20,22,23
X	WO 2008/119017 A1 (TRANSTECH PHARMA INC [US]; EBDRUP SOREN [DK]; TONDER JANNE EJRNAES [DK) 2 October 2008 (2008-10-02) the whole document	1-12,18, 20,22,23

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[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

"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	Date of mailing of the international search report
7 May 2013	22/07/2014

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

2

Form PCT/ISA/210 (second sheet) (April 2005)

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 2 236 511 A2 (ALLA CHEM LLC [US]; IVASHCHENKO ANDREY ALEXANDROVI [RU] ALLA CHEM LLC) 6 October 2010 (2010-10-06) the whole document	1-12,18, 20,22,23
X,P	US 2012/039804 A1 (DIAZ PHILIPPE [US] ET AL) 16 February 2012 (2012-02-16) the whole document	7-12,18, 20,22,23
X	KANDEMIRLI F: "STRUCTURE-ACTIVITY RELATIONSHIPS INVESTIGATION IN A MIXED SERIES OF CANNABINOIDS AN ELECTRONIC-TOPOLOGICAL APPROACH//UNTERSUCHUNG DER STRUKTUR-WIRKUNGS-BEZIEHUNGEN EINER REIHE VON CANNABINOIDEN/ELEKTRONENTOPOLOGISCHE METHODE", ARZNEIMITTEL FORSCHUNG. DRUG RESEARCH, ECV EDITIO CANTOR VERLAG, AULENDORF, DE, vol. 52, no. 10, 1 January 2002 (2002-01-01), pages 731-739, XP001182307, ISSN: 0004-4172 the whole document	1-6, 13-17, 19,21-23

2

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/020871

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.:

7-12, 18, 20(completely); 1-6, 22, 23(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: 7-12, 18, 20(completely); 1-6, 22, 23(partially)

   Tricyclic indole derivatives (carbolines) of generic formulae (III) and (I) and specific compounds as indicated in claims 1 and 8.

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2. claims: 13-17, 19, 21(completely); 1-6, 22, 23(partially)

   Indole derivatives of generic formula (II) and specific compounds as indicated in claims 1 and 8

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3. claims: 24, 25

   Method of screening for therapeutic agents using a GPR124 polypeptide

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/US2013/020871

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 03033496 A1	24-04-2003	AT 348828 T	15-01-2007
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US 2012039804 A1	16-02-2012	NONE	