

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
27 January 2011 (27.01.2011)

PCT

(10) International Publication Number
WO 2011/009714 A3

(51) International Patent Classification:

C07D 455/03 (2006.01) A61P 35/00 (2006.01)
A61K 31/473 (2006.01)

(21) International Application Number:

PCT/EP2010/059654

(22) International Filing Date:

6 July 2010 (06.07.2010)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

12/458,657 20 July 2009 (20.07.2009) US

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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, 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, PE, PG, PH, PL, PT, RO, RS, RU, 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.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

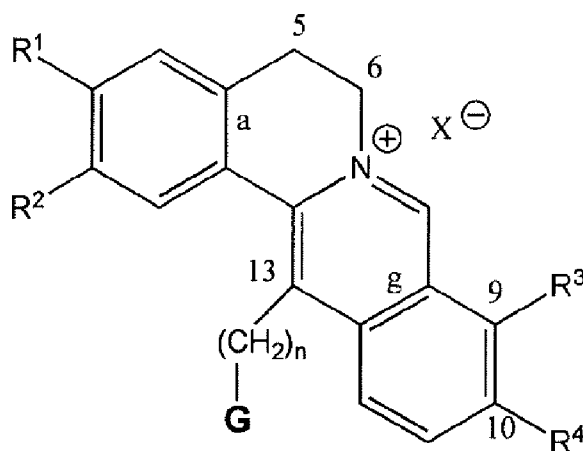
Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

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

15 September 2011

(54) Title: BENZOQUINOLIZINIUM SALT DERIVATIVES AS ANTICANCER AGENTS



(I)

(57) Abstract: 13 -substituted 5,6-dihydrodibenzo[a,g]quinolizinium salt compounds of the general formula (I); processes for the preparation of said compounds, pharmaceutical compositions containing said compounds and the use of said compounds for the manufacture of medicaments suitable for the treatment of cancerous diseases.

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INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER INV. C07D455/03 A61K31/473 A61P35/00 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 A61K A61P		
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, BEILSTEIN Data, BIOSIS, CHEM ABS Data, COMPENDEX, EMBASE, FSTA, INSPEC, 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	WO 01/95908 A1 (HANWHA CHEMICAL CORP [KR]; SONG KI WON [KR]; JWA MI RI [KR]; JANG MYOU) 20 December 2001 (2001-12-20)	1-4, 12-20
Y	claim 1; compound all	1-4, 12-20
X	----- JANG MYOUNG JIN ET AL: "SELECTIVE INHIBITION OF MAPKK WIS1 IN THE STRESS-ACTIVATED MAPK CASCADE OF SCHIZOSACCHAROMYCES POMBE BY NOVEL BERBERINE DERIVATIVES", JOURNAL OF BIOLOGICAL CHEMISTRY, vol. 277, no. 14, 1 January 2002 (2002-01-01), pages 12388-12395, XP009084621, ISSN: 0021-9258 paragraph [0001]; figure 1; compounds 3-4 ----- -/--	1-4, 12-20
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> 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. "&" document member of the same patent family
Date of the actual completion of the international search 22 October 2010		Date of mailing of the international search report 12/07/2011
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 Bareyt, Sébastien

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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2010/059654

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GORNALL KARINA C ET AL: "Selectivity of an indolyl berberine derivative for tetrameric G-quadruplex DNA", RAPID COMMUNICATIONS IN MASS SPECTROMETRY, vol. 21, no. 11, 2007, pages 1759-1766, XP002606550, ISSN: 0951-4198	1-4, 12-20
Y	page 1760, column 1, paragraph 4 - page 1760, column 2, paragraph 1; compound c -----	1-4, 12-20
X	US 6 008 356 A (KIM JUNG HO [KR] ET AL) 28 December 1999 (1999-12-28) claim 1; compound all -----	1-4, 12-14
X	EP 2 070 926 A1 (SHANGHAI INST MATERIA MEDICA [CN]) 17 June 2009 (2009-06-17) compound 7 -----	1-4, 12-14
X	WO 2009/002873 A1 (CVI PHARMACEUTICALS LTD; LIU HAIYAN [US]; WANG JUNBO [CN]; ZHANG RUI []) 31 December 2008 (2008-12-31) claim 1; compounds 31-32 -----	1-4, 12-14
X	SAMOSORN S ET AL: "Antibacterial activity of berberine-NorA pump inhibitor hybrids with a methylene ether linking group", BIOORGANIC & MEDICINAL CHEMISTRY, PERGAMON, GB LNKD-DOI:10.1016/J.BMC.2009.04.028, vol. 17, no. 11, 1 June 2009 (2009-06-01), pages 3866-3872, XP026118933, ISSN: 0968-0896 [retrieved on 2009-04-19] compounds 2-7 -----	1-4, 12-14
X	PARK K D ET AL: "Synthesis of 13-(substituted benzyl) berberine and berberrubine derivatives as antifungal agents", BIOORGANIC & MEDICINAL CHEMISTRY LETTERS, PERGAMON, ELSEVIER SCIENCE, GB LNKD-DOI:10.1016/J.BMCL.2006.05.033, vol. 16, no. 15, 1 August 2006 (2006-08-01), pages 3913-3916, XP025107098, ISSN: 0960-894X [retrieved on 2006-08-01] compounds 4-7 ----- -/--	1-4, 12-14

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2010/059654

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JOHN B BRENNER ET AL: "8-Allyldihydroberberine as an Alternative Precursor for the Synthesis of 13-Substituted Berberine Derivatives", AUSTRALIAN JOURNAL OF CHEMISTRY, CSIRO, AU, vol. 56, no. 9, 1 January 2003 (2003-01-01), pages 871-873, XP009140289, ISSN: 0004-9425 compounds 3a-e -----	1-4, 12-14

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/EP2010/059654

Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
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			EP 1307198 A1	07-05-2003
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			US 2010113494 A1	06-05-2010
WO 2009002873	A1	31-12-2008	US 2009048246 A1	19-02-2009

INTERNATIONAL SEARCH REPORT

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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:

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.:

4(completely); 1-3, 12-20(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: 4(completely); 1-3, 12-20(partially)

related to compounds of formula (I) wherein G stands for
-Z-Ar and Z is a bond

2. claims: 5, 6(completely); 1-3, 12-20(partially)

related to compounds of formula (I) wherein G stands for
-Z-Ar and Z is not a bond

3. claims: 7-11(completely); 1, 2, 12-20(partially)

related to compounds of formula (I) wherein G stands for
-Y=(AR)₂
