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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, IR, IS, JP, KE, KG, KN, KP, KR,
KZ, LA, LC, LK, LR, LS, 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, SA, SC,
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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,
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SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
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- before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
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(54) Title: AUTOPHAGY-INHIBITING COMPOUNDS AND USES THEREOF

(57) Abstract: The present disclosure describes a compound for use in the treatment of cancer, infectious disease, and autoimmune disorders. The compounds herein can inhibit autophagy in an affected cell to promote cell death. Further, the compound can be used to overcome the drug-resistance of certain cells.



A. CLASSIFICATION OF SUBJECT MATTER

C07D 401/14(2006.01)i, C07D 403/14(2006.01)i, C07D 215/38(2006.01)i, C07D 215/40(2006.01)i, A61K 31/47(2006.01)i, A61K 31/4725(2006.01)i

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 401/14; A61K 31/495; C07D 401/12; C07D 215/12; C07D 403/14; C07D 215/38; C07D 215/40; A61K 31/47; A61K 31/4725

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal), STN(Registry, Caplus), Google & keywords: autophagy-inhibiting, autophagosomal aggregation, tumor, cancer, quinoline

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	MCAFEE, Q. et al., "Autophagy inhibitor Lys05 has single-agent antitumor activity and reproduces the phenotype of a genetic autophagy deficiency", PNAS, 22 May 2012, Vol. 109, No. 21, pages 8253-8258 (Epub. 7 May 2012) See abstract; page 8253, right column; page 8254, Fig. 1.	1-3
X	WO 2012-149186 A2 (THE TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA) 01 November 2012 See abstract; claims 1-63; Figs. 1-2.	1-3
X	ZHANG, H. et al., "Synthesis and in vitro cytotoxicity evaluation of 4-amino quinoline derivatives", Biomedicine & Pharmacotherapy, 2008, Vol. 62, No. 2, pages 65-69 (Epub. 24 May 2007) See abstract; Scheme 1.	1-3
X	WO 2006-051489 A1 (INSTITUT NATIONAL DE LA SANTE ET DE LA RECHERCHE MEDICALE (INSERM) et al.) 18 May 2006 See abstract; page 48, example 1.	1-3



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

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Name and mailing address of the ISA/KR

International Application Division

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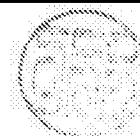
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2016/034887

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	HEERDEN, L. V. et al., "Synthesis and in vitro antimalarial activity of a series of bisquinoline and bispyrrolo[1,2a]quinoxaline compounds", European Journal of Medicinal Chemistry, 2012, Vol. 55, pages 335-345 (Epub. 27 July 2012) See abstract; Fig. 1.	1-3

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.: 30-32
because they relate to subject matter not required to be searched by this Authority, namely:
Claims 30-32 pertain to methods for treatment of the human body by surgery or therapy and thus relate to a subject matter which this International Searching Authority is not required to search under PCT Article 17(2)(a)(i) and Rule 39.1(iv).
2. ☒ Claims Nos.: 5, 6, 11-22, 29
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:
Claims 5, 6, 11-22 and 29 are unclear because they refer to multiple dependent claims which do not comply with PCT Rule 6.4(a).
3. ☒ Claims Nos.: 4, 7-10, 23-28, 30, 31
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:

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 any 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.:

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.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2016/034887

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2012-149186 A2	01/11/2012	AU 2012-249646 A1 CA 2841452 A1 CN 103687853 A EP 2702054 A2 EP 2702054 A4 JP 2014-513101 A US 2014-0050696 A1 US 2016-0168099 A1 WO 2012-149186 A3 WO 2012-149186 A9	27/02/2014 01/11/2012 26/03/2014 05/03/2014 05/11/2014 29/05/2014 20/02/2014 16/06/2016 03/01/2013 21/02/2013
WO 2006-051489 A1	18/05/2006	AT 524181 T CA 2585983 A1 CA 2585983 C DK 1809288 T3 EP 1809288 A1 EP 1809288 B1 ES 2373561 T3 JP 2008-519825 A JP 5179190 B2 US 2009-0149464 A1 US 9044478 B2	15/09/2011 18/05/2006 25/03/2014 06/02/2012 25/07/2007 14/09/2011 06/02/2012 12/06/2008 10/04/2013 11/06/2009 02/06/2015