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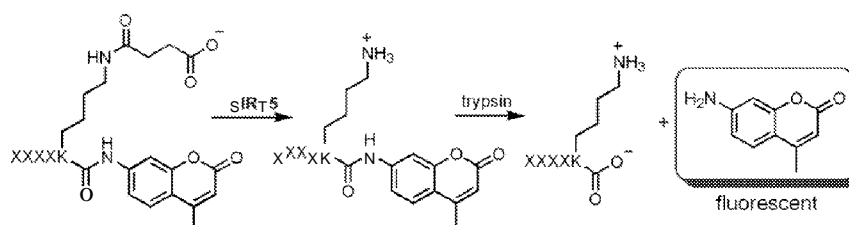
CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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**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))
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7 June 2012

(54) **Title:** MODULATORS FOR SIRT5 AND ASSAYS FOR SCREENING SAME



**Fig. 1**

(57) **Abstract:** Sirt5, a mitochondrial Sirtuin, has been identified herein as an efficient demalonylase and desuccinylase. Disclosed herein are assays to identify Sirt5 modulators based on this robust enzymatic activity. Sirt5-specific modulators can be used to study the biological function of Sirt5 and to target Sirt5 activities in treating human diseases.

## INTERNATIONAL SEARCH REPORT

International application No.  
**PCT/US2011/043130****A. CLASSIFICATION OF SUBJECT MATTER***C12Q 1/25(2006.01)i, GOIN 33/52(2006.01)i, GOIN 33/15(2006.01)1*

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)

C12Q 1/25; A61K 31/05; C07D 239/42; A61K 31/505; A61K 31/7048; G01N 33/543; G01N 33/53; G01N 33/58

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) &amp; Keywords: Sirt5 demalonylase, Sirt5 desuccinylase, fluorophore, fluorescence assay, modulator, lysine, trypsin

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	MARCOTTE, P. A. et al. Fluorescence assay of SIRT protein deacetylases using an acetylated peptide substrate and a secondary trypsin reaction. Analytical Biochemistry. 2004. Vol. 332, pp. 90-99 See the whole document.	1-25,27,28
A	US 2004-0091951 A1 (SCHULTZ, B. E.) 13 May 2004 See the whole document.	1-25,27,28
A	WO 2009-058348 A1 (SIRTRIS PHARMACEUTICALS, INC.) 7 May 2009 See the whole document.	1-25,27,28
A	US 2006-0014705 A1 (HOWITZ, K. T. et al.) 19 January 2006 See the whole document.	1-25,27,28
A	WO 2006-094239 A2 (SIRTRIS PHARMACEUTICALS, INC.) 8 September 2006 See the whole document.	1-25,27,28

 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 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

"&amp;" document member of the same patent family

Date of the actual completion of the international search

14 MARCH 2012 (14.03.2012)

Date of mailing of the international search report

**23 MARCH 2012 (23.03.2012)**

Name and mailing address of the ISA/KR

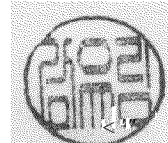
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**Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)**

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.: 26  
because they relate to subject matter not required to be searched by this Authority, namely:  
Claim 26 pertains to methods for treatment of the human body by surgery or therapy, as well as diagnostic methods, and thus relates to a subject matter which this International Searching Authority is not required, under Article 17(2)(a)(i) of the PCT and Rule 39.1(iv) of the Regulations under the PCT, to search.
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:

1. IAs all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. IAs all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. IAs 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. INo 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/US2011/043130**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2004-009195 1 A1	13.05.2004	None	
wo 2009-058348 A1	07.05.2009	AU 2008-319267 A1 CA 2704336 A1 CN 10 19 1837 1 A EA 20 107055 1 A1 EP 22 15066 A1 JP 2011-502984 A JP 2011-502984 T KR 10-20 10-0092000 A MX 20 10004965 A US 2011-0039847 A1	07.05.2009 07.05.2009 15.12.2010 30.12.2010 11.08.2010 27.01.2011 27.01.2011 19.08.2010 20.05.2010 17.02.2011
US 2006-00 14705 A1	19.01.2006	None	
wo 2006-094239 A2	08.09.2006	AU 2006-218404 A1 AU 2006-218405 A1 AU 2006-218407 A1 AU 2006-278396 A1 AU 2006-278397 A1 AU 2006-278503 A1 AU 2006-278504 A1 AU 2006-278505 A1 CA 2599989 A1 CA 2599992 A1 CA 2600 154 A1 CA 26 17532 A1 CA 26 17557 A1 CA 26 18360 A1 CA 26 18368 A1 CA 26 18370 A1 CN 10 1277963 AO CN 10 1277965 AO CN 10 128276 1 AO CN 10 1282974 AO CN 10 13 16853 A EP 18536 10 A1 EP 1853920 A2 EP 1856099 A2 EP 19099 10 A1 EP 19 10362 A1 EP 19 10380 A1 EP 19 10384 A1 EP 19 10385 A1 EP 1955077 A2 EP 2388263 A1 JP 2008-535790 A JP 2009-503 112 A JP 2009-503 113 A	08.09.2006 08.09.2006 08.09.2006 15.02.2007 15.02.2007 15.02.2007 15.02.2007 15.02.2007 15.02.2007 08.09.2006 08.09.2006 08.09.2006 15.02.2007 15.02.2007 15.02.2007 15.02.2007 01.10.2008 01.10.2008 08.10.2008 08.10.2008 03.12.2008 14.11.2007 14.11.2007 21.11.2007 16.04.2008 16.04.2008 16.04.2008 16.04.2008 16.04.2008 13.08.2008 23.11.2011 04.09.2008 29.01.2009 29.01.2009

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		JP 2009-503 114 A	29.01.2009
		JP 2009-503 117 A	29.01.2009
		JP 2009-5088 11 A	05.03.2009
		US 2007-0037809 A1	15.02.2007
		US 2008-029308 1 A1	27.11.2008
		US 2009-0163476 A1	25.06.2009
		US 2009-022 1020 A1	03.09.2009
		US 2011-01 30387 A1	02.06.2011
		US 7855289 B2	21.12.2010
		wo 2006-094236 A1	08.09.2006
		wo 2006-094237 A2	08.09.2006
		wo 2006-094237 A3	08.09.2006
		wo 2006-094239 A3	08.09.2006
		wo 2006-094239 A3	29.03.2007
		wo 2007-019344 A1	15.02.2007
		wo 2007-019344 A8	15.02.2007
		wo 2007-019345 A1	15.02.2007
		wo 2007-019346 A1	15.02.2007
		wo 2007-019416 A1	15.02.2007
		wo 2007-019417 A1	15.02.2007
		wo 2007-064902 A2	07.06.2007
		wo 2007-064902 A3	07.06.2007