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Published:

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

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

11 July 2013

(54) Title: FLUORESCENT MOLECULAR PROBES FOR USE IN ASSAYS THAT MEASURE TEST COMPOUND COMPETITIVE BINDING WITH SAM-UTILIZING PROTEINS

(57) Abstract: Assay methods may generally comprise forming homogeneous assay mixtures comprising target SAM-utilizing protein, fluorescent detection analyte, and test compound, incubating, and measuring FP or TR-FRET signal emitted in order to determine a measure of test compound-SAM-utilizing protein binding. Assay mixtures comprise a SAM-utilizing protein, and a fluorescent detection analyte that binds with the SAM-utilizing protein in the absence of test compound. Assay mixtures may further comprise a test compound. Assay mixture embodiments may generate FP or TR-FRET signal properties that are a function of the inherent binding interactions of both the test compound and the detection analyte with the SAM-utilizing protein. Fluorescent detection analytes comprise a fluorophore moiety, a covalent linker moiety, and a SAM-utilizing protein ligand moiety and could be utilized in FP or TR-FRET assays to measure test compound binding.



INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/038678**A. CLASSIFICATION OF SUBJECT MATTER****GOIN 33/68(2006.01)i, GOIN 33/58(2006.01)1, GOIN 33/52(2006.01)1, C07D 473/32(2006.01)i, C07D 407/04(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)

GOIN 33/68; GOIN 33/542; C07H 19/10; C12N 5/00; C07H 19/19; GOIN 33/58; C12Q 1/68; A61K 31/7076

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) & Keywords: fluorescent molecule, SAM-utilizing proteins

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 2305835 A1 (KOREA INSTITUTE OF SCIENCE AND TECHNOLOGY) 06 April 2011 See the whole document.	1-58
A	US 2005-0074760 A1 (JASENKA MATULIC-ADAMIC et al.) 07 April 2005 See the whole document.	1-58
A	US 2007-0281902 A1 (PIER BARALDI et al.) 06 December 2007 See the whole document.	1-58
A	EP 2312317 A2 (LIFE TECHNOLOGIES CORPORATION) 20 April 2011 See the whole document.	1-58

☐ 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

"&" document member of the same patent family

Date of the actual completion of the international search

29 March 2013 (29.03.2013)

Date of mailing of the international search report

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Name and mailing address of the ISA/KR

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2012/038678

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 extra sheets.

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 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

International application No.
PCT/US2012/038678

Box No. III

Group 1: Claims 1-6, drawn to a method for identifying compounds that bind to SAM-utilizing proteins .

Group 2: Claims 7-9, drawn to a method for identifying compounds that bind to SET domain-containing lysine methyltransferase enzymes.

Group 3: Claims 10,11, drawn to a method for identifying compounds that bind to lysine methyltransferase enzyme SET7/9.

Group 4: Claims 12,13 drawn to a method for identifying compounds that bind to lysine methyltransferase enzyme G9a.

Group 5: Claims 14,15, drawn to a method for identifying compounds that bind to lysine methyltransferase enzyme GLP.

Group 6: Claims 16,17, drawn to a method for identifying compounds that bind to lysine methyltransferase enzyme MLL.

Group 7: Claim 18, drawn to a method for identifying compounds that bind to SET domain-containing lysine methyltransferase enzyme.

Group 8: Claims 19,20, drawn to a method for identifying compounds that bind to the SET domain-containing lysine methyltransferase enzyme PRDM9.

Group 9: Claims 21-23, drawn to a method for identifying compounds that bind to the arginine methyltransferase enzymes.

Group 10: Claims 24-28, drawn to an assay mixture for identifying compounds that bind to a SAM-utilizing protein.

Group 11: Claim 29, drawn to an assay mixture for identifying compounds that bind to a SAM-utilizing methyltransferase enzyme.

Group 12: Claim 30, drawn to an assay mixture for identifying compounds that bind to a SAM-utilizing methyltransferase enzyme.

Group 13: Claims 31-33, drawn to an assay mixture for identifying compounds that bind to a SET domain-containing methyltransferase enzyme.

Group 14: Claim 34, drawn to an assay mixture for identifying compounds that bind to a SET domain-containing methyltransferase enzyme.

Group 15: Claim 35, drawn to an assay mixture for identifying compounds that bind to lysine methyltransferase enzyme SET7/9.

Group 16: Claim 36, drawn to an assay mixture for identifying compounds that bind to lysine methyltransferase enzyme G9a.

Group 17: Claim 37, drawn to an assay mixture for identifying compounds that bind to lysine methyltransferase enzyme GLP.

Group 18: Claim 38, drawn to an assay mixture for identifying compounds that bind to lysine methyltransferase enzyme MLL.

Group 19: Claim 39, drawn to an assay mixture for identifying compounds that bind to SET domain-containing lysine methyltransferase enzymes.

Group 20: Claims 40,41, drawn to an assay mixture for identifying compounds that bind to SET domain-containing lysine methyltransferase enzyme PRDM9.

Group 21: Claims 42-44, drawn to an assay mixture for identifying compounds that bind to arginine methyltransferase enzymes.

Group 22: Claims 45,46, drawn to a fluorescent detection analyte having the structure of Formula(I) .Group 23: Claims 47,48, drawn to a fluorescent detection analyte having the structure of Formula(II).

Group 24: Claims 49,50, drawn to a fluorescent detection analyte having the structure of Formula(III).

Group 25: Claims 51,52, drawn to a fluorescent detection analyte having the structure of Formula(IV) .

Group 26: Claims 53,54, drawn to a fluorescent detection analyte having the structure of Formula(V) .

Group 27: Claim 55, drawn to a fluorescent detection analyte selected from the group consisting of listed as.

- Continue on the next extra sheet -

INTERNATIONAL SEARCH REPORT

International application No.

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Group 28: Claim 56, drawn to a fluorescent detection analyte selected from the group consisting of listed as.

Group 29: Claim 57, drawn to a fluorescent detection analyte selected from the group consisting of listed as.

Group 30: Claim 58, drawn to a fluorescent detection analyte selected from the group consisting of listed as.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/038678

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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