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Published:

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— *with sequence listing part of description (Rule 5.2(a))*

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31 January 2013

(54) Title: COMPOSITIONS AND METHODS TARGETING FORCE GENERATION IN KINESIN

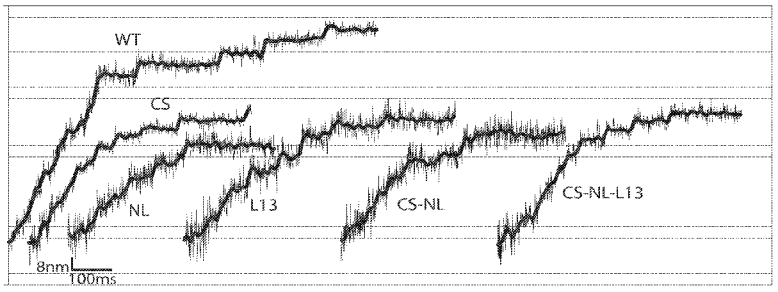


Fig. 3

(57) Abstract: In some aspects, the invention provides chimeric kinesin proteins. In other aspects the invention provides nucleic acids encoding chimeric kinesin proteins. Compositions and kits are provided that comprise chimeric kinesin proteins and nucleic acids encoding the same. Antibodies and antigen binding fragments that selectively bind kinesin proteins are also provided.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/027773

A. CLASSIFICATION OF SUBJECT MATTER

C07K 19/00(2006.01)i, C07K 14/195(2006.01)i, C07K 14/37(2006.01)i, C07K 14/47(2006.01)i, C07K 16/18(2006.01)i, C12N 15/62(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)

C07K 19/00; C12Q 1/42; C12P 21/02; C12N 9/12

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: kinesin, coverstrand, necklinker, L13

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	WILLIAM R. HESSE et al., `Chimeric Kinesin I/Eg5 Constructs Reveal Important Elements to Motor Activity`, Biophysical Journal, Vol. 100(3) Sup. 1, Page 123a (2 Febuary 2011). See Whole-document.	1-3,22-24,34-37 25-33
A	US 2006-0094074 A1 (ROMAN SAKOWICZ) 04 May 2006 See Abstract, Paragraphs 7-9, 38, 40, Claims 9-11, 15, 18-21.	1-3,22-37
A	US 2003-0044900 A1 (CHRISTOPHE BERAUD et al.) 06 March 2003 See Abstract, Paragraphs 14-18, 25, 62-65, Claims 1-4, 12.	1-3,22-37
A	AHMAD S. KHALIL et al., 'Kinesin' s cover-neck bundle folds forward to generate force', PNAS, Vol. 105(49), pp. 19247-19252 (9 December 2008). See Abstract, Page 19247 column 2 paragraph 2, Figure 1.	1-3,22-37
A	Paper for Master degree, Titled; 'Tools to study the kinesin mechanome using optical tweezers' by Eric Gunther, Department of Science in Biological Engineering, Massachusetts Institute of Technology (September 2009). See Abstract, Page 47 column 3 - Page 50 paragraph 2, Figure 23.	1-3,22-37

☐ 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	Date of mailing of the international search report
25 SEPTEMBER 2012 (25.09.2012)	**26 SEPTEMBER 2012 (26.09.2012)**

Name and mailing address of the ISA/KR	Authorized officer
Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon Metropolitan City, 302-701, Republic of Korea Facsimile No. 82-42-472-7140	PARK, Yeong-Gwan Telephone No. 82-42-481-8407

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/027773

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.: 13, 17, 18, 20
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:

Since claims 13, 17, 18 and 20 directly or indirectly refer to 12 or 16 which are not drafted in accordance with the second and/or third sentence of Rule 6.4(a), this international search report of the claims has not been established.

3. ☒ Claims Nos.: 4-12, 14-16, 19, 21
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 addtional 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

Information on patent family members

International application No.

PCT/US2012/027773

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2006-0094074 A1	04.05.2006	US 2003-0203419 A1	30.10.2003
		US 2008-0182271 A1	31.07.2008
		US 6440686 B1	27.08.2002
		US 6613540 B1	02.09.2003
		US 7005272 B2	28.02.2006
		US 7341845 B2	11.03.2008
US 2003-0044900 A1	06.03.2003	AU 2000-43677 A1	02.11.2000
		AU 2003-250947 A1	02.02.2004
		AU 2003-250947 A8	02.02.2004
		CA 2492687 A1	22.01.2004
		CN 1668947 A	14.09.2005
		CN 1668947 C0	16.01.2008
		EP 1537444 A2	08.06.2005
		JP 2005-533291 A	04.11.2005
		KR 10-0822783 B1	18.04.2008
		US 2004-0142397 A1	22.07.2004
		US 2006-0103932 A1	18.05.2006
		US 2006-0257962 A1	16.11.2006
		US 2007-0254310 A1	01.11.2007
		US 2008-0266524 A1	30.10.2008
		US 2008-0266525 A1	30.10.2008
		US 2009-0029344 A1	29.01.2009
		US 2009-0068693 A1	12.03.2009
		US 2009-0117534 A1	07.05.2009
		US 2012-0140182 A1	07.06.2012
		US 6331424 B1	18.12.2001
		US 6361993 B1	26.03.2002
		US 6387644 B1	14.05.2002
		US 6410254 B1	25.06.2002
		US 6448025 B1	10.09.2002
		US 6544766 B1	08.04.2003
		US 6548267 B1	15.04.2003
		US 6743599 B1	01.06.2004
		US 6762043 B1	13.07.2004
		US 6797484 B1	28.09.2004
		US 7202051 B1	10.04.2007
		US 7378254 B2	27.05.2008
		US 7416856 B2	26.08.2008
		US 7419265 B2	02.09.2008
		US 7824880 B2	02.11.2010
		US 8142020 B2	27.03.2012
		WO 00-63353 A1	26.10.2000
		WO 2004-008779 A2	22.01.2004