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61/482,419 4 May 2011 (04.05.2011) US
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- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

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Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

Published:

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

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

21 March 2013

(54) Title: MULTIPLEXED GENETIC REPORTER ASSAYS AND COMPOSITIONS

(57) Abstract: The invention provides methods for determining the activity of a plurality of nucleic acid regulatory elements. These methods may facilitate, e.g., the systematic reverse engineering, and optimization of mammalian cis-regulatory elements at high resolution and at a large scale. The method may include integration of multiplexed DNA synthesis and sequencing technologies to generate and quantify the transcriptional regulatory activity of, e.g., thousands of arbitrary DNA sequences in parallel in cell-based assays (e.g., mammalian cell based assays).



A. CLASSIFICATION OF SUBJECT MATTER*C12N 15/63(2006.01)i, C12N 15/11(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)

C12N 15/63; A61K 39/395; C12N 15/867; C12N 15/82; C12N 15/09; C12Q 1/70; C12Q 1/68; C12N 15/00; A01H 1/00; A61K 38/16

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: plasmid, expression vector, determining nucleic acid regulatory element, plurality vectors

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	SANG-MIN CHUNG et al., 'A versatile vector system for multiple gene expression in plants', TRENDS in Plant Science, Vol. 10(8), pp. 357-361 (August 2005). See Abstract, Figures 1, 2.	1,3-24,37,38
A	US 2009-0111099 A1 (YONGSHENG MA et al.) 30 April 2009. See Abstract, Claim 1.	1,3-24,37,38
A	US 2005-0221491 A1 (KYRI MITROPHANOUS et al.) 06 October 2005. See Abstract, Claim 2.	1,3-24,37,38
A	US 2005-0106559 A1 (PHILIPPA RADCLIFFE et al.) 19 May 2005. See Abstract, Claim 49.	1,3-24,37,38
A	US 2011-0027282 A1 (SERGEI V. KOTENKO et al.) 03 February 2011. See Abstract, Claims 5, 7, 8.	1,3-24,37,38
A	WO 94-25609 A1 (HYBRITECH INCORPORATED) 10 November 1994. See Abstract, Claim 1.	1,3-24,37,38



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

13 DECEMBER 2012 (13.12.2012)

Date of mailing of the international search report

14 DECEMBER 2012 (14.12.2012)

Name and mailing address of the ISA/KR

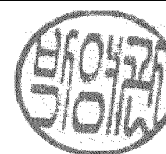
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/036558

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:

Claims 1, 3-24, 37 and 38 (Group 1), Claims 2, 25 and 39 (Group 2), Claims 26, 27, 29-30(partially), 33-36(partially) (Group 3), Claims 28, 29-30(partially) and 33-36(partially) (Group 4), Claims 31 and 32 (Group 5).

The only common technical features between Groups 1-5 are a plurality of expression vectors. However, these features lack novelty and/or inventive step, considering a document of TRENDS in Plant Science, Vol. 10(8), pp. 357-361 (August 2005) cited in this ISR.

Thus, there is no technical relationship left over the prior art among the claimed inventions leaving the claims without a single general inventive concept. Hence there is lack of unity "a posteriori" (PCT Rules 13.1 and 13.2).

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.:
1, 3-24, 37 and 38

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/US2012/036558

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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WO 94-25609 A1	10.11.1994	AU 6776194 A	21.11.1994