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(88) Date of publication of the international search report:
3 March 2016

(54) Title: SEQUENCING SMALL AMOUNTS OF COMPLEX NUCLEIC ACIDS

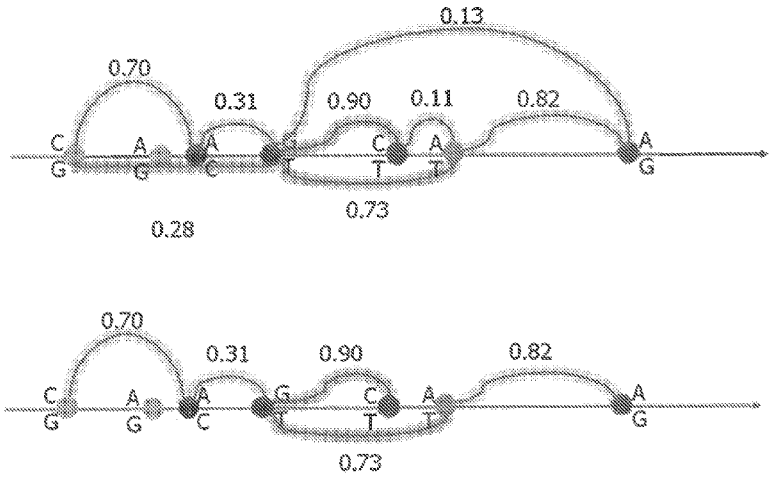


Fig. 7

(57) Abstract: The present invention provides methods and compositions for sequencing small amounts of complex nucleic acids (as defined herein) and for analyzing the resulting sequence information in order to reduce errors and perform haplotype phasing, among other things. As one example, even after amplifying complex nucleic acids more than 1 000-fold- starting, for example, with genomic DNA from 5- human cells- highly accurate whole genome sequences that are fully haplotyped have been produced.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/033832

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - C12Q 1/68 (2012.01)
USPC - 435/91.1
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)
IPC(8) - C12M 1/34; C12Q 1/68; G06F 11/10; H03M 13/05, 13/07 (2012.01)
USPC - 435/91.1, 91.2, 287.2; 714/752, 784

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 2011/0033854 A1 (DRMANAC et al) 10 February 2011 (10.02.2011) entire document	34, 35, 38, 40, 41 --- 31, 36, 37, 39, 42
X --- Y	DRMANAC et al. 'Human Genome Sequencing Using Unchained Base Reads on Self-Assembling DNA Nanoarrays.' (January 2010) Science 327(78): 78-81. entire document	19 --- 1-9, 12-14, 17, 18, 20-26, 28-33, 36, 39, 42-44
Y	US 2010/0199155 A1 (KERMANI et al) 05 August 2010 (05.08.2010) entire document	1-9, 12-14, 17, 18, 29-33, 43, 44
Y	US 2007/0054311 A1 (KAMBEROV et al) 08 March 2007 (08.03.2007) entire document	20-26, 28-33, 37
A	US 2007/0099208 A1 (DRMANAC et al) 03 May 2007 (03.05.2007) entire document	1-9, 12-14, 17-26, 28-44

☐ Further documents are listed in the continuation of Box C. ☐

* 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	Date of mailing of the international search report
25 September 2012	16 OCT 2012
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/033832

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.: 10, 11, 15, 16, 27
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 additional fees, this Authority did not invite payment of 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.