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(54) Title: METHODS AND COMPOSITIONS FOR ASSAY READOUTS ON MULTIPLE ANALYTICAL PLATFORMS

(57) Abstract: The invention provides methods and compositions for reading out the results of multiplex assays on various analytical platforms, such as microarrays, bead arrays, electrophoresis devices, and the like. An important feature of the invention includes methods for converting different sets of oligonucleotide tags used for labeling into oligonucleotide tags specific for a particular analytical platform. The invention further includes compositions comprising oligonucleotide tags having convenient properties for labeling and conversion, particularly ligation tags that employ ligation reaction specificity as well as sequence specificity in order to discriminate between tags.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US06/09898

A. CLASSIFICATION OF SUBJECT MATTER

IPC: C12Q 1/68(2006.01)

USPC: 435/6

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)

U.S. : 435/6

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)

EAST, STN, search terms: tag, tagged, taggant, barcod\$3, bar code, oligonucleotide, ligat\$, concatenat\$5, length, size

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2003/0049616 A1 (BRENNER et al) 13 March 2003, (13.03.2003), see entire document.	1-11
A	WO 99/28505 (CURAGEN CORPORATION) 10 June 1999 (10.06.1999), see entire document.	1-11

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 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

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Name and mailing address of the ISA/US

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US06/09898

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:
Please See Continuation Sheet

- 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 any 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.: 1-11

- 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.

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claim(s) 1-11, drawn to methods for identifying segmented tags.

Group II, claim(s) 12 and 18-21, drawn to sets of ligation tags.

Group III, claim(s) 13-15, drawn to methods for identifying polynucleotides.

Group IV, claim(s) 16 and 17, drawn to methods for generating single stranded overhangs in cleaved dsDNAs.

The inventions listed as Groups I-IV do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: The methods of Groups I, III, and IV do not share a common special technical feature because they may each be practiced independently of one another. The methods of Groups I and III do not share a special technical feature with the sets of ligation tags of Group II because the sets of ligation tags of Group II may be used for purposes other than those of Groups I or III (*e.g.*, in affinity chromatography). The methods of Group IV are not needed to make the sets of ligation tags of Group II, which tags may be produced by chemical synthesis, adding one nucleotide at a time.

Group II mentions or requires the use of a large number of combinations of polynucleotides. The simplest combination requires only the first two mentioned tags in claim 18. Since there are 344,064 possible tags, an approximation of the number of combinations of a plurality of such tags is $344064!/(172032! \times 172032!)$ or no fewer than 1.40×10^{71837} . Should applicant pay additional fee(s) to include a search and examination of Group II, applicant is further required to identify one combination of specific ligation tags to be searched and examined, submitting one additional fee for each combination applicant wishes to be searched and examined.