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(71) Applicant (for all designated States except US): **STRATAGENE** [US/US]; 11011 North Torrey Pines Road, La Jolla, CA 92037 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **SORGE, Joseph, A.** [US/US]; 5310 W Pine Meadows Road, Wilson, WY 83014 (US). **MULLINAX, Rebecca, Lynn** [US/US]; 3856 Creststone Place, San Diego, CA 92130 (US). **NOVORADOVSKY, Alexey** [RU/US]; 4114 Via Candidiz, #106, San Diego, CA 92130 (US).

(74) Agent: **WILLIAMS, Kathleen, Madden**; Palmer & Dodge LLP, 111 Huntington Avenue, Boston, MA 02199-7613 (US).

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Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: COMPOSITIONS AND METHODS COMPRISING CONTROL NUCLEIC ACID

(57) Abstract: The present invention relates, in part, to control nucleic acid molecules having no significant sequence homology to any known nucleic acid, and predefined G/C-content. The present invention further relates to method of using control nucleic acid molecules to validate microarray analyses, compositions comprising control nucleic acid molecules, and kits comprising control nucleic acid molecules.



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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US02/26157

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : C12Q 1/68; C12P 19/34; C07H 21/04

US CL : 435/6, 91.1, 91.2; 536/23.1

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)

U.S. : 435/6, 91.1, 91.2; 536/23.1

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)

Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,P	US 6,309,822 B1 (FODOR et al) 30 October 2001 (30.10.2001), column 17, lines 30-65; column 19, lines 1-25; column 20, lines 20-25; and columns 20-23.	9-15, 19, 20, 22, and 24-29
T	YUEN et al. Accuracy and Calibration of commercial oligonucleotide and custom cDNA microarrays. 2002, Vol 30. No. 10, pages 1-9.	26-29



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

"B" 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

22 April 2003 (22.04.2003)

Date of mailing of the international search report

04 JUN 2003

Name and mailing address of the ISA/US

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Box PCT

Washington, D.C. 20231

Facsimile No. (703)305-3230

Authorized officer

Young J. Kim

Telephone No. (703) 308-0196

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US02/26157

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claim 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. ☐ Claim Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 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 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.: 9-15, 19, 20, 22, and 24-29
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.

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) 1-8 and 16-18, drawn to a method of validating hybridization conditions via use of control oligonucleotides.

Group II, claim(s) 9-15 and 19-25, drawn to a method of making target nucleic acids and control oligonucleotides.

Group III, claim(s) 26-29, drawn to a method of using a control nucleic acid.

Group IV, claim(s) 30-54, drawn to an isolated nucleic acid, a vector comprising the nucleic acid, a collection of nucleic acids, and a kit comprising the nucleic acids selected from a group of SEQ ID Numbers.

Total Number of Invention was determined from the below formula:

Number of Groups (w/o SEQ ID Numbers) + (Number of Groups X SEQ ID Numbers) = Total Number of Inventions

Therefore, Total Number of Inventions: (3 Groups w/o SEQ ID Numbers) + (1 Group X 40 SEQ ID Numbers) = 43 Inventions.

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: PCT Rule 13.2 states that where a group of inventions is claimed in one and the same international application, the requirement of unity of invention referred to in Rule 13.2 shall be fulfilled only when there is a technical relationship among those inventions involving one or more of the same or corresponding special technical features, wherein said, "special technical feature" is defined as a feature that define a contribution which each of the claimed inventions, considered as a whole, makes over the prior art.

For the instant international application, such technical feature has been determined as the technique of using control oligonucleotides in a hybridization assay.

This special technical feature is disclosed by Gingeras et al. (US Patent No. 6,228,575, issued May 8, 2001, attached hereto) wherein the artisan discloses a hybridization assay wherein control oligonucleotides (probes) are hybridized onto a microarray (column 33, lines 29-33).

Furthermore, Groups I-III lack unity of invention with regards to each other because PCT Rule 13.1 and Annex B do not provide for unity of invention between two or more products or methods of use that share a special technical feature. As Groups I-III are drawn to different methods that utilize control oligonucleotides, the unity of invention is not provided for under PCT Rule 13.1 and Annex B.

Finally, Group IV is drawn to a method of using unrelated (structurally different) nucleic acid sequences, rendering the groups further lacking in unity of invention with respect to each SEQ ID Number disclosed (See MPEP 1850, Lack of Unity of Invention). Therefore, in pursuant to PCT Rule 13.1 and 13.2, the instant application is determined to lack unity of invention.

Applicants are advised that claims 21 and 23 have not been searched as it is drawn to inventions not paid for. Claims 21 and 23 depend on claim 32 which is drawn to Invention IV, a group which had not been paid for by the Applicants.

INTERNATIONAL SEARCH REPORT

PCT/US02/26157

Continuation of B. FIELDS SEARCHED Item 3:

EAST Patent Database (USPAT, USPGP, EPO, JPO, DERWENT, IBM-TDB)

search terms: control nucleic acid, control oligonucleotide, normalization, database, hybridization, transcriptase, polymerase, GAPDH, BIO B, BIO C, BIO D, house keeping gene, and all plural terms thereof.