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12 May 2005

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: METHODS AND COMPOSITIONS FOR THE DETECTION OF BACTERIAL SPECIES

(57) Abstract: The invention relates to compositions, methods and kits for the PCR-based detection of bacterial species. Methods are provided for increasing the specificity of a PCR-based bacterial assay. More specifically, primer sets and PCR-based assays are provided that amplify and detect conserved 16S rRNA gene sequences from multiple *Mycoplasma* species. The invention also provides kits for performing those assays, and compositions comprising oligonucleotide primers useful in those assays.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US04/10875

A. CLASSIFICATION OF SUBJECT MATTER
IPC(7) : C12Q 1/68
US CL : 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)
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.
Y	MONCIARDINI ET AL. New PCR primers for the selective amplification of 16S rDNA from different groups of actinomycetes. FEMS Microbiology Ecology, 2002, Vol. 42, pages 419-429, see entire document.	1-3
Y	OKHRAVI ET AL. PCR-RFLP-Mediated Detection and Speciation of Bacterial Species Causing Endophthalmitis. Investigative Ophthalmology & Visual Science. May 2000, Vol. 41, No. 6, pages 1438-1477, see page 1441, column 2 in particular.	1-3
Y	XU ET AL. PRIMEGENS:robust and efficient design of gene-specific probes for microarray analysis. Bioinformatics. 2002, Vol. 18, No. 11, pages 1432-1437, see especially page 1433, column 1, Materials and Methods.	1-3
A	GRIFFIN ET AL. PCR Technology Current Innovations. Boca Raton:CRC Press. 1994, pages 5-11, see entire document.	1-3

☐ 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	Date of mailing of the international search report
02 March 2005 (02.03.2005)	18 MAR 2005
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. (703) 305-3230	Authorized officer Patricia A. Duffy Telephone No. 703-308-0196

Form PCT/ISA/210 (second sheet) (January 2004)

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/US04/10876

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 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

Remark on Protest
☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International applic[redacted] No.
PCT/US04/10875

BOX III. 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 1, claim(s) 1-3, drawn to methods for increasing specificity of a PCR-based assay by selecting a primer from E. coli and homologs.

Group 2, claim(s) 4-27, drawn to oligonucleotide primers for *Mycoplasma* sp.

Group 3, claim(s) 28-105, drawn to methods of using oligonucleotide primers to detect the presence of *Mycoplasma* sp.

This application contains claims directed to more than one species of the generic invention. These species are deemed to lack unity of invention because they are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In order for more than one species to be examined, the appropriate additional examination fees must be paid. The species are as follows:

Groups 2 and 3 :

Species - SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4 and SEQ ID NO:5.

The inventions listed as Groups 1-3 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 invention of group 1 is a method for increasing the specificity of a PCR based assay using the method steps of aligning *E. coli* sequences and homologs, choosing 3' sequences of the primer and performing an assay. None of Groups 2-3 perform the method steps of the invention of Group 1. The products of Group 2 are not required or recited in the method of Group 1 and as such, the method of Group 1 lacks unity of invention with Group 2, since they fail to share a technical feature in common. With respect to the methods of Group 1 and the methods of Group 2, these groups of methods also fail to share the same technical feature in common because the methods of Group 2 are drawn to Mycoplasma detection and do not use the method of Group 1. As such, the groups fail to share a technical feature in common and by definition lack unity of invention each with the other.

The species listed above do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, the species lack the same or corresponding special technical features for the following reasons: the species of oligonucleotide primers lack unity of invention because they fail to have a common core chemical structure that would define a common technical feature among the different species of oligonucleotide primers. As such, the species as set forth supra lack unity of invention each with the other.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US04/10875

Continuation of B. FIELDS SEARCHED Item 3:
WEST, MEDLINE, EMBASE, CAB ABSTRACTS.
SEARCH TERMS: PCR, PRIMER SELECTION, SPECIFICTY, BACTERIAL PCR