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[Continued on next page]

(54) Title: METHODS FOR AMPLIFYING AND DETECTING NUCLEIC ACID SEQUENCES

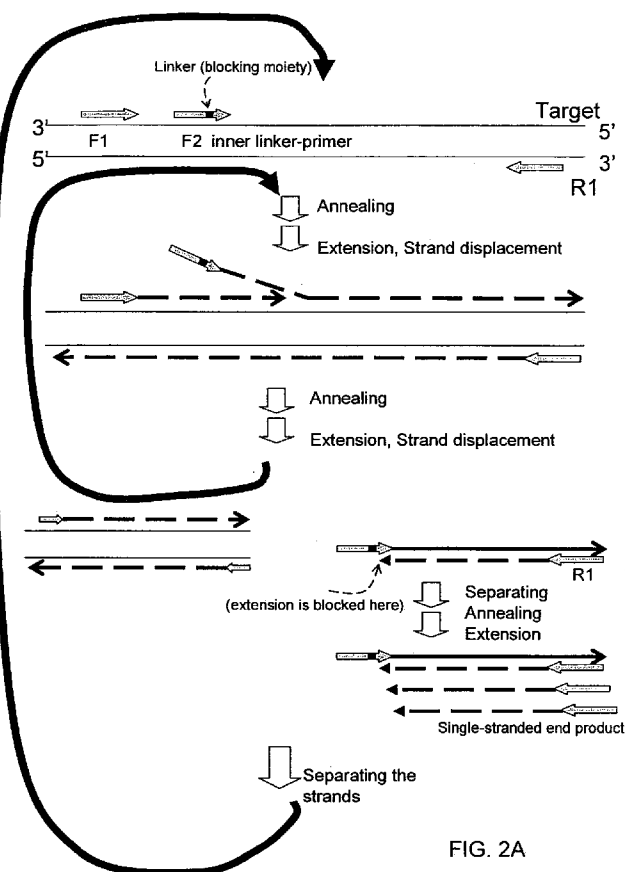


FIG. 2A

(57) Abstract: The present invention, in different aspects and embodiments, provides nucleic acid amplification and detection methods that are both sensitive and fast. In various aspects there are disclosed amplification methods employing different combinations of primers to which can achieve exponential amplification and strand displacement, such as to generate a more than two fold increase of the amount of a target nucleic acid sequence during repeated cycles, while additionally permitting the production of single stranded products. Also provided are detection systems and kits.

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PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM,  
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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— *of inventorship (Rule 4.17(iv))*

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**INTERNATIONAL SEARCH REPORT**

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**A. CLASSIFICATION OF SUBJECT MATTER**  
INV. C12Q1/68

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)  
C12Q

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 practical, search terms used)

EPO-Internal, WPI Data, BIOSIS, EMBASE

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 03/074724 A (INTEGRATED DNA TECH INC [US]; BEHLKE MARK AARON [US]; WALDER JOSEPH AL) 12 September 2003 (2003-09-12)  the whole document	1-8,21, 24-34, 37-45, 49,50, 54,63,64
X	WO 2005/012499 A (INTEGRATED DNA TECH INC [US]; BEHLKE MARK AARON [US]; WALDER JOSEPH AL) 10 February 2005 (2005-02-10) the whole document	1
X	page 5, line 7 - line 12 page 6, line 1 - line 3	63,64
X	US 2003/228596 A1 (LIU QIANG [US] ET AL) 11 December 2003 (2003-12-11) the whole document	1
X	claim 58	63,64
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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 document but published on or after the international filing date
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- \*P\* document published prior to the international filing date but later than the priority date claimed

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- \*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
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- \* & \* document member of the same patent family

Date of the actual completion of the international search

30 January 2008

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21/07/2008

Name and mailing address of the ISA/

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## INTERNATIONAL SEARCH REPORT

International application No

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 420 069 A (TAKARA BIO INC [JP]) 19 May 2004 (2004-05-19) the whole document paragraphs [0012], [0045], [0100], [0128]	54
X	claim 5	63, 64
X	SOLINAS A ET AL: "Duplex Scorpion primers in SNP analysis and FRET applications" NUCLEIC ACIDS RESEARCH, OXFORD UNIVERSITY PRESS, SURREY, GB, vol. 29, no. 20, 15 October 2001 (2001-10-15), page E96, XP002318909 ISSN: 0305-1048 the whole document figure 1	63, 64
A	TERRANCE WALKER G: "ISOTHERMAL IN VITRO AMPLIFICATION OF DNA BY A RESTRICTION ENZYME/ DNA POLYMERASE SYSTEM" PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF USA, NATIONAL ACADEMY OF SCIENCE, WASHINGTON, DC, US, vol. 89, no. 1, January 1992 (1992-01), pages 392-396, XP000368694 ISSN: 0027-8424 the whole document figure 1	
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A	WO 99/18241 A (UNIV YALE [US]) 15 April 1999 (1999-04-15) the whole document	
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A	EP 1 568 786 A (AFFYMETRIX INC A US ENTITY [US]) 31 August 2005 (2005-08-31) the whole document paragraph [0068]	

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/GB2007/003793

## 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:

see additional sheet

1.  As all required additional search fees were timely paid by the applicant, this international search report covers allsearchable claims.
  
2.  As all searchable claims could be searched without effort justifying an 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.:

see annex

### 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.

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-3 , 4-8, 32, 33, 34 (completely), 21, 24-31, 37-45, 49, 50, 54, 57-60, 63, 64 (partially)

methods and means for amplifying and optionally detecting a target nucleic acid sequence, wherein at least one of the amplification primers is a linker-primer comprising a blocking moiety.

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2. claims: 1-3, 9-11, 22, 23, 32-36, 46-48 (completely), 21, 24-31, 37-45, 49, 50, 54, 57-60, 63, 64 (partially)

methods and means for amplifying and optionally detecting a target nucleic acid sequence, wherein said primer is a cleavable linker-primer.

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3. claims: 1-3, 12-20, 32, 33, 34, 55, 56, 61, 62 (completely), 21, 24-31, 37-45, 49, 50, 57-60 (partially)

methods and means for amplifying and optionally detecting a target nucleic acid sequence, wherein said linker-primer is capable of forming a hairpin by self-hybridizing to the extension product.

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4. claim: 51 (completely)

methods for amplifying and optionally detecting a target nucleic acid sequence, comprising using multiple primers and extension conditions permitting primer extension and strand displacement.

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5. claims: 52, 53 (completely)

method for amplifying a nucleic acid target comprising using random or partially random primers and extension conditions permitting primer extension and strand displacement.

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/GB2007/003793
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