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Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(88) Date of publication of the international search report:
28 October 2010

(54) Title: METHODS, COMPOSITIONS, AND KITS FOR DETECTING ALLELIC VARIANTS

(57) Abstract: In some embodiments, the present inventions relates generally to compositions, methods and kits for use in discriminating sequence variation between different alleles. More specifically, in some embodiments, the present invention provides for compositions, methods and kits for quantitating rare (e.g., mutant) allelic variants, such as SNPs, or nucleotide (NT) insertions or deletions, in samples comprising abundant (e.g., wild type) allelic variants with high specificity and selectivity. In particular, in some embodiments, the invention relates to a highly selective method for mutation detection referred to as competitive allele-specific TaqMan PCR ("cast-PCR").



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A. CLASSIFICATION OF SUBJECT MATTER*C12Q 1/68(2006.01)i, C12N 15/11(2006.01)i*

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 1/68; C07H 21/04

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

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) & Keywords: allelic variant, allele specific primer, allele specific blocker, locus specific primer, detector probe

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	PAGE B. MCKINZIE et al. Detection of rare K-ras codon 12 mutations using allele-specific competitive blocker PCR, Mutation Research 517, 27 May 2002, pp.209-220; See abstract and pages 209-219.	1-31,33-60,62-90 ,92-116,119
A	BARBARA L. PARSONS et al. Detection of a mouse H-ras codon 61 mutation using a modified allele-specific competitive blocker PCR genotype selection method Mutagenesis, November 1998, Vol.13, No.6, pp.581-588 See abstract and pages 581-587.	1-31,33-60,62-90 ,92-116,119
A	TOSHIO SEYAMA et al. A novel blocker-PCR method for detection of rare mutant alleles in the presence of an excess amount of normal DNA, Nucleic Acids Research, 25 May 1992, Vol.20, No.10, pp.2493-2496 See abstract and pages 2493-2496.	1-31,33-60,62-90 ,92-116,119
A	ANDREAS OROU et al. Allele-specific competitive blocker PCR: a one-step method with applicability to pool screening, Human Mutation, 1995, Vol.6, pp.163-169; See abstract and pages 163-168.	1-31,33-60,62-90 ,92-116,119
A	US 2003/0082549 A1 (XIANGJUN LIU) 1 May 2003 See abstract; paragraphs [0017]-[0082]; figures 1-4.	1-31,33-60,62-90 ,92-116,119



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 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 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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Date of mailing of the international search report

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2009/006652

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 1905842 A1 (DIASORIN S.P.A.) 2 April 2008 See abstract; paragraphs [0001]–[0063]; claims 1, 9, 20–25; figures 1, 5–6.	1–31, 33–60, 62–90 , 92–116, 119

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2009/006652

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.: 32, 61, 91, 117, 118
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:

 Claims 32, 61, 91, 118 contain references to the drawings. According to PCT Rule 6.2(a), claims should not contain such references except where absolutely necessary, which is not the case here.
 Claims 117-118 are not clear because claims 117-118 refer to itself respectively.

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:

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.:

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.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2009/006652Patent document
cited in search reportPublication
datePatent family
member(s)Publication
date

US 2003-0082549 A1

01.05.2003

US 2006-0008826 A1

12.01.2006

EP 1905842 A1

02.04.2008

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10.06.2009

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