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- (81) **Designated States (unless otherwise indicated, for every kind of national protection available):** AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
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- (88) **Date of publication of the international search report:**  
24 April 2008

(54) **Title:** MASS TAGS FOR QUANTITATIVE ANALYSES

(57) **Abstract:** This invention pertains to methods, mixtures, kits and/or compositions for the determination of analytes by mass analysis using unique labeling reagents or sets of unique labeling reagents. The labeling reagents can be isomeric or isobaric and can be used to produce mixtures suitable for multiplex analysis of the labeled analytes.



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**INTERNATIONAL SEARCH REPORT**

International application No  
PCT/US2007/003990

**A. CLASSIFICATION OF SUBJECT MATTER**  
INV. G01N33/68 C07D239/54 C07D295/18 C07K1/13

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)  
G01N C07D C07K

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, CHEM ABS Data, BIOSIS, WPI Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P, X	THOMPSON, ANDREW ET AL: "Electrospray ionization-cleavable tandem nucleic acid mass tag-peptide nucleic acid conjugates: synthesis and applications to quantitative genomic analysis using electrospray ionisation-MS/MS" NUCLEIC ACIDS RESEARCH , 35(4), E28/1-E28/13 CODEN: NARHAD; ISSN: 0305-1048, 26 January 2007 (2007-01-26), XP002451950 figure 3	1-46, 51-60
P, X	WO 2006/017208 A (APPLERA CORP [US]) 16 February 2006 (2006-02-16) claims page 43 - page 58 figures 26-29	1-60

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
- \*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

13 February 2008

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25/02/2008

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## INTERNATIONAL SEARCH REPORT

International application No  
PCT/US2007/003990

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2004/070352 A (APPLERA CORP [US]) 19 August 2004 (2004-08-19) claims page 28 page 33 claim 110	1-46, 51-60
X	WO 2005/068446 A (APPLERA CORP [US]; DEY SUBHAKAR [US]; PAPPIN DARRYL J C [US]; PURKAYAS) 28 July 2005 (2005-07-28) page 35 page 40 - page 41 page 65 - page 72 claims	1-46, 51-60
X	WO 03/040288 A (BAYER AG [DE]; LERCHEN HANS-GEORG [DE]; SIEGMUND HANS-ULRICH [DE]; IMM) 15 May 2003 (2003-05-15) claims page 72; example 31	1-46, 51-60
A	WO 2005/054871 A (APPLERA CORP [US]) 16 June 2005 (2005-06-16) the whole document	1-46, 51-60
X	SONG ET AL: "Automated 96-well solid phase extraction and hydrophilic interaction liquid chromatography-tandem mass spectrometric method for the analysis of cetirizine (ZYRTEC<(>R)) in human plasma-with emphasis on method ruggedness" JOURNAL OF CHROMATOGRAPHY B: BIOMEDICAL SCIENCES & APPLICATIONS, ELSEVIER, AMSTERDAM, NL, vol. 814, no. 1, 5 January 2005 (2005-01-05), pages 105-114, XP005004073 ISSN: 1570-0232 figure 1	25
X	YAO, MING ET AL: "Simultaneous quantitation of d7-nefazodone, nefazodone, d7-hydroxynefazodone, hydroxynefazodone, m-chlorophenylpiperazine and triazole-dione in human plasma by liquid chromatographic-mass spectrometry" BIOMEDICAL CHROMATOGRAPHY , 14(2), 106-112 CODEN: BICHE2; ISSN: 0269-3879, 2000, XP002451951 figure 1	25-28
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## INTERNATIONAL SEARCH REPORT

International application No  
PCT/US2007/003990

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>VELTKAMP, A. C. ET AL: "On-line radiometric determination of [14C]-urapidil and its main metabolites in rat plasma, using post-column ion-pair extraction and solvent segmentation techniques"</p> <p>JOURNAL OF PHARMACEUTICAL AND BIOMEDICAL ANALYSIS, VOLUME DATE 1987, 6(6-8), 609-22 CODEN: JPBADA; ISSN: 0731-7085, 1988, XP002468824 figure 1</p> <p style="text-align: center;">-----</p>	47-50

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2007/003990

## 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.:

### 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: 1-46,51-60

kits, mixtures, isotopically enriched compounds and methods  
in which the linking moiety LK is LK5 having structure E  
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2. claims: 47-50

kits containing compounds in which the linker LK is LK6  
containing a nucleobase  
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## INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2007/003990

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 2006017208	A	16-02-2006	CA 2572754 A1	16-02-2006
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			CA 2542941 A1	16-06-2005
			EP 1687638 A2	09-08-2006
			JP 2007512536 T	17-05-2007