

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
4 March 2004 (04.03.2004)

PCT

(10) International Publication Number
WO 2004/019035 A3

(51) International Patent Classification⁷: **G01N 33/483**,
33/68, B01D 59/44

(21) International Application Number:
PCT/US2003/026471

(22) International Filing Date: 22 August 2003 (22.08.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/405,578 22 August 2002 (22.08.2002) US

(63) Related by continuation (CON) or continuation-in-part
(CIP) to earlier application:
US 60/405,578 (CIP)
Filed on 22 August 2002 (22.08.2002)

(71) Applicant (for all designated States except US): **AP-PLERA CORPORATION** [US/US]; 301 Merritt 7,
Norwalk, CT 06851 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **GRABER, Armin**

[AT/US]; 750 Farm Road, Apartment 209, Marlborough,
MA 01752 (US). **PATTERSON, Dale, H.** [US/US]; 50
Hosmer Street, Hudson, MA 01749 (US). **JUHASZ, Peter**
[HU/US]; 13 Pinewood Avenue, Natick, MA 01760 (US).
MARTIN, Stephen, A. [US/US]; 61 Carleton Road, Bel-
mont, MA 02478 (US).

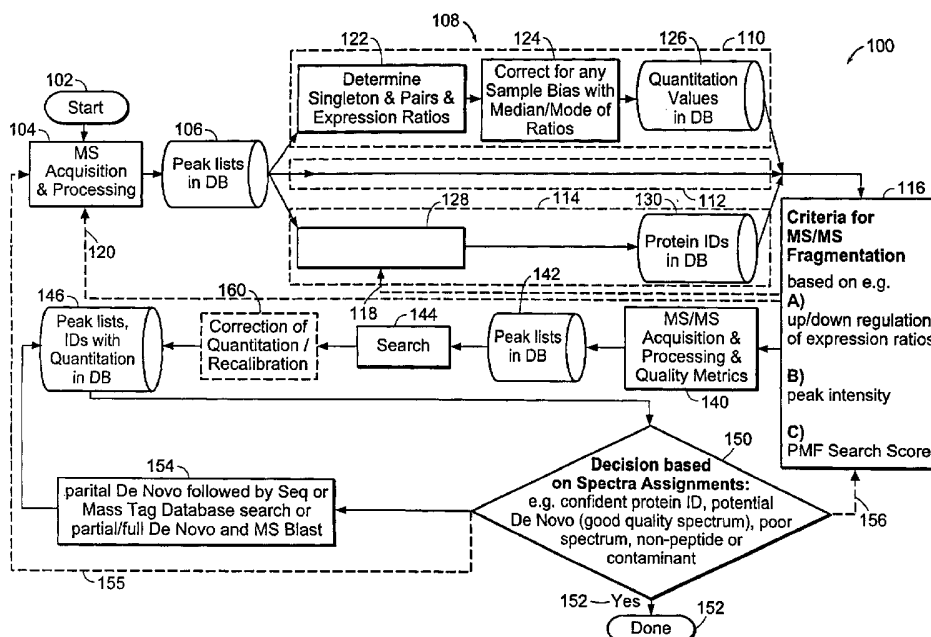
(74) Agents: **BASTIAN, Michael, J.** et al.; Bowditch &
Dewey, LLP, 161 Worcester Road, P.O. Box 9320, Fram-
ingham, MA 01701-9320 (US).

(81) Designated States (*national*): AE, AG, AL, AM, AT (util-
ity model), AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA,
CH, CN, CO, CR, CU, CZ (utility model), CZ, DE (util-
ity model), DE, DK (utility model), DK, DM, DZ, EC, EE
(utility model), EE, ES, FI (utility model), FI, GB, GD, GE,
GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ,
LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN,
MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO,
RU, SC, SD, SE, SG, SK (utility model), SK, SL, SY, TJ,
TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA,
ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),

[Continued on next page]

(54) Title: METHOD FOR CHARACTERIZING BIOMOLECULES UTILIZING A RESULT DRIVEN STRATEGY



(57) Abstract: In various embodiments, the methods for analyzing a sample are provided utilizing a result dependent acquisition strategy. In various embodiments, methods for analyzing a sample are provided wherein the sample is first analyzed by MALDI and MS to produce a first result that is then used to determine a second analysis that is used to analyze the sample again by MALDI and MS/MS or MSⁿ to produce a second result.



Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(88) **Date of publication of the international search report:**
17 February 2005

(15) **Information about Correction:**

Previous Correction:

see PCT Gazette No. 52/2004 of 23 December 2004, Sec-
tion II

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*

*For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.*

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 03/26471

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G01N33/483 G01N33/68 B01D59/44

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)

IPC 7 G01N B01D

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, BIOSIS, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 02/21139 A (OXFORD GLYSCSCIENCES UK LTD ; ROBINSON ANDREW WILLIAM (GB); TOWNSEND R) 14 March 2002 (2002-03-14) the whole document -----	1-30
A	US 2002/001814 A1 (CHU IVAN K ET AL) 3 January 2002 (2002-01-03) the whole document -----	1-30
A	WO 02/061047 A (CIPHERGEN BIOSYSTEMS INC) 8 August 2002 (2002-08-08) page 11, lines 19-26 page 14, line 23 - page 16, line 15 page 18, line 1 - page 20, line 18 claims 1-26; figures 1,2 ----- -/-	1-30

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in 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

22 September 2004

Date of mailing of the international search report

20.12.04

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Goetz, M

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 03/26471

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 1 006 559 A (MDS INC) 7 June 2000 (2000-06-07) column 4, paragraph 0015 - column 5, paragraph 0019 column 6, paragraph 0020 - column 7, paragraph 0030 claim 1; figure 1	1-30
A	PAPAYANNOPOULOS I A: "THE INTERPRETATION OF COLLISION-INDUCED DISSOCIATION TANDEM MASS SPECTRA OF PEPTIDES" MASS SPECTROMETRY REVIEWS, JOHN WILEY AND SONS, NEW YORK, NY, US, vol. 14, 1995, pages 49-73, XP001051562 ISSN: 0022-7037 the whole document	1-30
A	GRAS R ET AL: "Improving protein identification from peptide mass fingerprinting through a parameterized multi-level scoring algorithm and an optimized peak detection" ELECTROPHORESIS, WEINHEIM, DE, vol. 20, 1999, pages 3535-3550, XP002902845 ISSN: 0173-0835 the whole document	1-30
A	JENSEN O N ET AL: "Delayed extraction improves specificity in database searches by matrix-assisted laser desorption / ionization peptide maps" RAPID COMMUNICATIONS IN MASS SPECTROMETRY, HEYDEN, LONDON, GB, vol. 10, 23 July 1996 (1996-07-23), pages 1371-1378, XP002902844 ISSN: 0951-4198 page 1372, left-hand column, last paragraph - right-hand column, last paragraph page 1374, right-hand column, last paragraph - page 1375, left-hand column, paragraph 2	1-30

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 03/26471

Box I Observations where certain claims were found unsearchable (Continuation of item 1 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 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:

see additional 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.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ 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: Claims 1-27

Generic mass spectrometric method involving a first MS step to obtain a parent ion spectrum, a data analysis step, a second MS step to obtain a fragmentation spectrum of daughter ions, and a database comparison step.

2. claims: 28-30

Specific mass spectrometric method involving parallel MALDI spectrum generation of two sample portions with generation of four data sets.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 03/26471

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0221139	A	14-03-2002	AU 8605901 A	22-03-2002
			EP 1317765 A2	11-06-2003
			WO 0221139 A2	14-03-2002
			US 2002102610 A1	01-08-2002
US 2002001814	A1	03-01-2002	NONE	
WO 02061047	A	08-08-2002	CA 2436503 A1	08-08-2002
			EP 1356121 A2	29-10-2003
			WO 02061047 A2	08-08-2002
			US 2002182649 A1	05-12-2002
EP 1006559	A	07-06-2000	CA 2255122 A1	04-06-2000
			EP 1006559 A2	07-06-2000
			US 6285027 B1	04-09-2001