

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
10 October 2002 (10.10.2002)

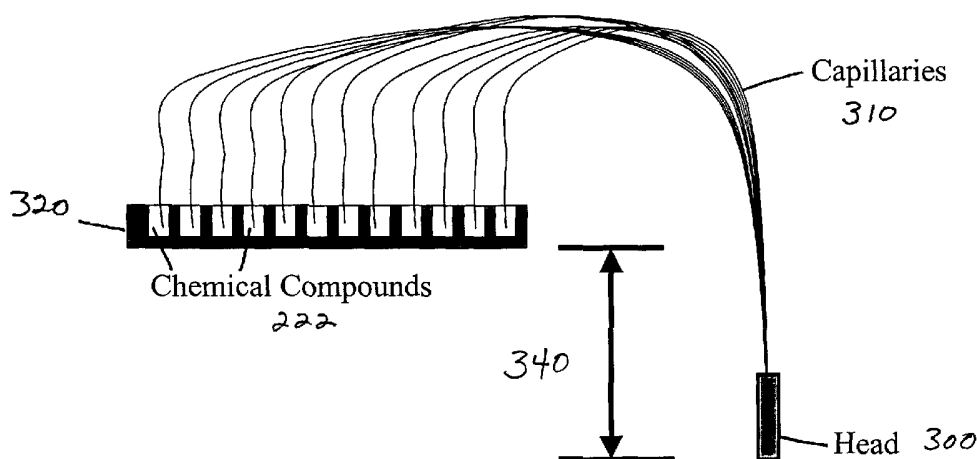
PCT

(10) International Publication Number  
WO 02/078834 A3

- (51) International Patent Classification<sup>7</sup>: **B01J 16/00**, (71) Applicant (for all designated States except US): **GENOSPECTRA, INC.** [US/US]; 6519 Dumbarton Circle, Fremont, CA 94555 (US).  
B01L 1/00, G01N 33/543, B01J 19/00
- (21) International Application Number: PCT/US02/05316 (72) Inventors; and  
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- (22) International Filing Date: 19 February 2002 (19.02.2002)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
- |            |                               |    |
|------------|-------------------------------|----|
| 60/269,642 | 16 February 2001 (16.02.2001) | US |
| 60/271,002 | 22 February 2001 (22.02.2001) | US |
| 09/791,410 | 22 February 2001 (22.02.2001) | US |
| 09/791,411 | 22 February 2001 (22.02.2001) | US |
| 60/302,735 | 3 July 2001 (03.07.2001)      | US |
| 60/314,747 | 24 August 2001 (24.08.2001)   | US |
| 60/315,285 | 27 August 2001 (27.08.2001)   | US |
| 60/327,686 | 4 October 2001 (04.10.2001)   | US |
| 60/357,275 | 15 February 2002 (15.02.2002) | US |
- (74) Agents: **HOLLAND, Charles, D.** et al.; Morrison & Foerster LLP, 755 Page Mill Road, Palo Alto, CA 94304-1018 (US).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,

[Continued on next page]

(54) Title: BUNDLED CAPILLARIES APPARATUS FOR HIGH THROUGHPUT SCREENING



(57) Abstract: Disclosed are systems and methods involved in extreme high throughput screening of compounds which have an affinity for a biological target. The system is based on a capillary bundle with two distinguishable ends wherein capillaries on one end are connected to compounds stored in discrete reservoirs and capillaries on the other end are bound and processed to form a two dimensional microarray. A capillary bundle having reaction wells for hybridization and compound reaction in one end of the capillaries is disclosed. The capillaries may be light-conducting. Also disclosed are various methods of identifying a target compound in a liquid using this capillary bundle as well as methods of fabricating the bundle. A novel surface tension guided reaction chamber is also provided. Methods and chemistry for fabrication and use of a surface tension guided reaction chamber in binding and hybridization assays are also disclosed. Methods and systems for precise metering of fluids within the capillaries and at the reaction chambers, including the surface tension guided "virtual" reaction well is provided. Methods for performing high throughput screens using optical fiber lined capillaries of the invention are also provided. The capillary arrays are used with both liquid probes as well as probes immobilized on the walls of the capillary.



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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, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.

**(84) Designated States (regional):** ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**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*

**(88) Date of publication of the international search report:**  
5 June 2003

*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.*

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 02/05316

A. CLASSIFICATION OF SUBJECT MATTER  
 IPC 7 B01J16/00 B01L1/00 G01N33/543 B01J19/00

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 B01J

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)

WPI Data, PAJ, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category ° | Citation of document, with indication, where appropriate, of the relevant passages  | Relevant to claim No.                       |
|------------|---|---|
| X          | US 6 027 873 A (VOLKER SCHELLENBERG & AMY DEMING LUI) 22 February 2000 (2000-02-22) cited in the application the whole document                             | 1   |
| X          | WO 01 07161 A (MERCK & CO., INC.) 1 February 2001 (2001-02-01)<br><br>page 3, line 13 -page 4, line 21<br>page 5, line 29 -page 6, line 21<br>figures 1A-2B | 1-7,<br>10-15,<br>17,19,<br>21-25,<br>28-35 |

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

15 January 2003

Date of mailing of the international search report 16.04.2003

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## INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 02/05316

## 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 00 01859 A (OCHID BIOCOMPUTER, INC.)<br>13 January 2000 (2000-01-13)<br><br>abstract<br>page 9, line 27 -page 10, line 17<br>page 17, line 14 -page 18, line 2<br>examples 1,6<br>figures 1A-1E,5<br>--- | 1,8,10,<br>13-15,<br>17,<br>21-26,<br>28-31,<br>33,35-37 |
| X          | US 6 083 763 A (WILLIAM J. BALCH)<br>4 July 2000 (2000-07-04)<br>abstract; figure 4<br>---  | 1  |
| P,A        | WO 01 62377 A (GENOSPECTRA, INC.)<br>30 August 2001 (2001-08-30)<br>cited in the application<br>---   |  |
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INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US 02/05316

**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.:

1-38

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: 1-38

Apparatus comprising channels with first and second ends, each of the first ends being connected to a separate reaction chamber.

Systems comprising such apparatus.

## 2. Claims: 39-48

Method of fabricating an apparatus, comprising the steps of forming a substrate with channels, and forming a plurality of reaction chambers.

## 3. Claim : 49

Method for forming an array, comprising applying a mask to define hydrophilic and hydrophobic zones.

## 4. Claims: 50-54

Method of metering a volume of a liquid by placing a liquid in a hydrophilic region surrounded by a hydrophobic region, and removing the liquid from the hydrophobic region.

## 5. Claims: 55-62

Method of determining the affinity of a compound for a receptor, wherein the receptor is immobilised on a channel wall in an array, binding a ligand to the receptor, contacting the array with the compound and measuring the rate of displacement of bound ligand by the compound.

Method of determining the affinity of a compound for a receptor, wherein the receptor is immobilised on a channel wall in an array, binding a mixture of a ligand and a compound to the receptor, and measuring the ratio of bound ligand to bound receptor.

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 02/05316

| Patent document cited in search report |   | Publication date | Patent family member(s) | Publication date |
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