OPERATOR INDEPENDENT PROGRAMMABLE SAMPLE PREPARATION AND ANALYSIS SYSTEM

(54) Title: OPERATOR INDEPENDENT PROGRAMMABLE SAMPLE PREPARATION AND ANALYSIS SYSTEM

(57) Abstract: The present invention provides a protocol and apparatus for enriching circulating tumor cells and other rare cells from blood, including debris and other components, from samples with high precision and at high throughput rates. This invention discloses an improved processing system from previously described semi-automated sample processing. The system further reduces operator intervention and hands-on time from prior systems. While this system has general utility in processing diverse materials, the system is configured for sample processing of biological specimens to provide an enriched fraction suitable for detection, enumeration and identification of target cells by appropriate analytical methodologies. The presence and quantities of such target cells in a sample specimen can be utilized for screening and detection in disease such as cancer, assessing early stage pre-metastatic cancer, monitoring for disease remission in response to therapy and selection of more effective dose regimens or alternative therapies in case of relapse.
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

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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

A. CLASSIFICATION OF SUBJECT MATTER
IPC(7) : G01N 21/00,31/00, 33/00, 33/53, 1/00; H01L 21/265
US CL. : 422/64,63,50,68,1,82,06,190,67; 435/4,7,1; 436/518,47-50,54,174
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)
U.S. : 422/64,63,50,68,1,82,06,190,67; 435/4,7,1; 436/518,47-50,54,174

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 practicable, search terms used)
Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>US 6,190,617 (CLARK et al) 20 February 2001 (20.02.2001), see entire document.</td>
<td>1-5, 12-14, 17-18 and</td>
</tr>
<tr>
<td></td>
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<td>22-23</td>
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<tr>
<td>Y</td>
<td>US 6,350,613 (WARDLAW et al) 26 February 2002 (26.02.2002), see entire document.</td>
<td>6-11 and 19-21</td>
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□ Further documents are listed in the continuation of Box C.
□ See patent family annex.

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Date of the actual completion of the international search
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Form PCT/ISA/210 (second sheet) (April 2005)
Continuation of B. FIELDS SEARCHED Item 3:
Chemical Abstracts, Medline
search terms: magnetic, separation, detection, optical, pipette, reagent, sample, pixel, red blood cell, plasma