METHODS FOR PRODUCTION AND USES OF MULTIPOTENT CELL POPULATIONS

The claimed invention is directed towards the generation of pluripotent, multipotent, and/or self-renewing cells which are capable of beginning to differentiate in culture into a variety of cell types and capable of further differentiation in vivo. The claimed invention is also directed towards the generation of desirable, differentiating cell populations transplantable to patients, genetic modification of endogenous cells, and the treatment of patients suffering from diseases that may be ameliorated by these methods. This invention also provides methods for preventing, treating, or retarding disease related to immunodeficiency virus (e.g. HIV-1, HIV-2, SIV, FIV, etc.) infection.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
   IPC(8) - C12Q 1/68, C12N 15/00, A61K 39/21 (2008.04)
   USPC - 435/6, 435/320.1, 424/208.1
   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)
   USPC - 435/6, 435/320.1, 424/208.1, 435/91.1, 424/207.1, 424/204.1

   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)
   WEST - PGPB, USPT, USOC, EPAB, JPAB; Dialog Classic Files 7, 654, 652, 351, 349, 315, 6, 155, 35, 65; Google Scholar; USPTO Web
   Page; Google Scholar; Entrez Pubmed; Search terms - vector, retard HIV infection, decay oligonucleotide, synthetic oligonucleotide,
   RRE, TAR, CXCR4, CCR5, U6 promotor, EF-1 alpha promotor, HIV-1, HIV-2

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 2003/0012769 A1 (POESCHLA et al.) 16 January 2003 (16.01.2003) para [0003], [0005], [0013], [0016], [0018], [0021], [0049], [0051], [0072], [0074], [0076], [0090], [0102], [0105], [0108], [0114], [0142]</td>
<td>1, 4, 6, 8, 9, 12, 14, 16, 17, 20, 22, 24, 25, 28, 30, 32, 33, 41, 44, 46, 48, 81, 83, 84, 85, 86, 88, 96</td>
</tr>
<tr>
<td>Y</td>
<td>US 2006/0269518 A1 (CHANG et al.) 30 November 2006 (30.11.2006) para [0005], [0007], [0023], [0024], [0037], [0074]</td>
<td>2, 3, 5, 7, 10, 11, 13, 15, 18, 19, 21, 23, 26, 27, 29, 31, 34-35, 42, 43, 45, 47, 49-50, 82, 83, 85, 87, 89, 97</td>
</tr>
<tr>
<td>Y</td>
<td>US 6,733,993 B1 (EMINNI et al.) 11 May 2004 (11.05.2004) col 1, ln 30-32, ln 49-54</td>
<td>5, 13, 21, 29, 37, 45, 53, 61, 69, 77, 85</td>
</tr>
</tbody>
</table>

□ Further documents are listed in the continuation of Box C. □

* 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 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
20 November 2008 (20.11.2008)

Date of mailing of the international search report
05 DEC 2008

Name and mailing address of the ISA/US
Mail Stop PCT, Attn: ISA/US, Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450
Facsimile No. 571-273-3201

Authorized officer: Lee W. Young
PCT Helpdesk: 571-272-4300
PCT OSP: 571-272-7774

Form PCT/ISA/210 (second sheet) (April 2007)
INTERNATIONAL SEARCH REPORT

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:

Group I Claims 1-88 and 96-97 directed to a vector capable of retarding HIV-1 and/or HIV-2 infection and a method of use vectors capable of retarding an immunodeficiency virus infection.

Group II claims 89-95 are directed to a method of ameliorating infection in a patient.

Group III Claims 98-100 are directed to a genetic vector comprising nucleotide sequences encoding the Tlong? (PRR insert+) isoform(s) of the mammalian numb protein as well as additional nucleotide sequences.

Group IV Claims 101-120 and 124-135 are directed to a method of producing multipotent, pluripotent, and/or self-renewing cells.

SEE EXTRA 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 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. [x] 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.: 1-88, 96 and 97.

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.

Form PCT/ISA/210 (continuation of first sheet (2)) (April 2007)
Continuation of Box III:

Group V Claims 121-123 are directed to a method for treating a patient who is suffering from a disorder of any of several organs or systems.

The inventions listed as Groups I-V do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

The Groups designated as Groups I-V do not have any same or common technical features, and thus cannot share a same or corresponding special technical feature. Each product and/or method does not share a common utility, and/or share a substantial structural feature disclosed as being essential to that utility. The product in Group I is not required in Groups II, IV, and V. The special technical feature shared by Groups I and III is the vector disclosed in claim 1. However this is not an improvement over the prior art of US 6,132,962 A to Wong-Staal et al. (17 October 2000) that teaches a viral vector comprising an anti-HIV nucleic acid and HIV RRE decoys. Thus, it would have been obvious to make the claimed vector to study inhibition of HIV expression in HIV infected cells in vitro.

Note that claim 135 of the instant application was improperly drafted as a second claim numbered claim 131. The second claim numbered 131 has been referenced as claim 135 and cited as such for the purposes of this report.