Title: SARS-CORONAVIRUS VIRUS-LIKE PARTICLES AND METHODS OF USE

Abstract: The present disclosure describes a system for making SARS-CoV-virus-like particles (SARS-CoV-VLPs) comprising one or more recombinant vectors which express the SARS-CoV E-protein, the SARS-CoV M-protein, and the SARS-CoV S-protein. Additionally, the present disclosure describes methods of inducing an immune response in a subject comprising administering to the subject a nucleic acid encoding the SARS-CoV E-protein, the SARS-CoV M-protein, and the SARS-CoV S-protein. Methods of inducing an immune response in a subject comprising administering to the subject SARS-CoV-VLPs are also disclosed.
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 C07K14/165 C12N7/04 C12N5/10 A61K48/00 A61K39/215

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 C07K C12N

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, EMBASE, Sequence Search, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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X Further documents are listed in the continuation of box C.

X 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)
C* 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

** Other 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
X* 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
S* document member of the same patent family

Date of the actual completion of the international search
21 April 2005

Date of mailing of the international search report
06/05/2005

Name and mailing address of the ISA
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk
Tel. (+31-70) 940-3240, Tx. 31 651 epo nl, Fax: (+31-70) 940-3016

Authorized officer
Brenz Verca, S

Form: PCT/ISA/210 (second sheet) [January 2004]
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INTERNATIONAL SEARCH REPORT

Box No. 1  Nucleotide and/or amino acid sequence(s) (Continuation of item 1.b of the first sheet)

1. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, the international search was carried out on the basis of:

   a. type of material
      - X a sequence listing
      -   table(s) related to the sequence listing

   b. format of material
      - X in written format
      - X in computer readable form

   c. time of filing/furnishing
      - X contained in the international application as filed
      -   filed together with the international application in computer readable form
      - X furnished subsequently to this Authority for the purpose of search

2. X In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

3. Additional comments:
Continuation of Box II.1

Although claims 12-23 are directed to a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the compound/composition.

Continuation of Box II.2

Claims Nos.: 7-11

Present claims 7-11 relate to a cell defined by reference to a desirable characteristic or property, namely to be able to express the SARS-CoV E-protein, SARS-CoV M-protein and SARS-CoV S-protein.

The claims lack clarity (Article 6 PCT) because an attempt is made to define the cell by reference to a result to be achieved in absence of the technical features necessary to achieve said result. This lack of clarity is such as to render a meaningful search over the whole of the claimed scope impossible. Consequently, the search has been carried out for those parts of the claims which appear to be clear, supported and disclosed, namely those parts relating to the cells comprising the genetic constructs explicitly mentioned in examples 3-10.

The applicant’s attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guideline C-VI, 8.5), should the problems which led to the Article 17(2) declaration be overcome.
## Box 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. **X** Claims Nos.: 1-7 because they relate to subject matter not required to be searched by this Authority, namely:
   
   Although claims 12–23 are directed to a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the compound/composition.

2. **X** Claims Nos.: 7–11 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:
   
   see FURTHER INFORMATION sheet PCT/ISA/210

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 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:

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.

Form PCT/ISA/210 (continuation of first sheet (2)) (January 2004)
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