Title: THE SEVERE ACUTE RESPIRATORY SYNDROME CORONAVIRUS

Abstract: An outbreak of a virulent respiratory virus, now known as Severe Acute Respiratory Syndrome (SARS), was identified in Hong Kong, China and a growing number of countries around the world in 2003. The invention relates to nucleic acids and proteins from the SARS coronavirus. These nucleic acids and proteins can be used in the preparation and manufacture of vaccine formulations, diagnostic reagents, kits, etc. The invention also provides methods for treating SARS by administering small molecule antiviral compounds, as well as methods of identifying potent small molecules for the treatment of SARS.
before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments

— with sequence listing part of description published sepa-
rately in electronic form and available upon request from
the International Bureau

(88) Date of publication of the international search report:
4 August 2005

For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
inning of each regular issue of the PCT Gazette.
### A. CLASSIFICATION OF SUBJECT MATTER

<table>
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<th>IPC</th>
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<tr>
<td>C07K14/165</td>
<td>C12Q1/70</td>
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<td>C07K16/10</td>
<td>A61K35/76</td>
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**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

**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, Sequence Search, EMBASE, PAJ, WPI Data

### C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
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<tr>
<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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* 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 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.
* "Z" document member of the same patent family

**Date of the actual completion of the international search**

1 March 2005

**Name and mailing address of the ISA**

European Patent Office, P.B. 5816 Patentlaan 2 NL - 2280 HV Rijswijk  
Tel: (+31-70) 340-2040, Tx: 31 651 epo nl, Fax: (+31-70) 340-3016

**Date of mailing of the international search report**

08.06.2005

**Authorized officer**

Renggli-Zulliger, N
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<td>DATABASE GENBANK 'Online!' NATIONAL CENTER FOR BIO; 14 April 2003 (2003-04-14), BCCCA GENOME SCIENCES CENTER BRITISH COLUMBIA: &quot;SARS coronavirus Tor2&quot; XP002319430 retrieved from NCBI Database accession no. AY274119 page 1971, left-hand column; figure 1; table 1</td>
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Form: PCT/ISA/210 (patent family annex) (January 2004)
INTERNATIONAL SEARCH REPORT

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.☐ Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:
   Although claims 77-83, 117-120 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.☐ 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 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:

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.:
   1-12(partially), 13(partially), 14, 15, 16-21(partially), 22-28(partially), 73-77 (partially), 79(partially), 83(partially), 85-93(partially), 94-98 99-104(partially), 105, 106-107(partially), 108, 109, 114-120(partially)

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)
This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

Invention 1

claims: 1-12(partially), 13(partially), 14, 15, 16-21(partially), 22-28(partially), 73-77(partially), 79(partially), 83(partially), 85-93(partially), 94-98, 99-104(partially), 105, 106-107(partially), 108, 109, 114-120(partially)
The polypeptide is a spike (S) polypeptide encoded by SEQ. ID n 6042, nucleic acid encoding the spike protein, fragments thereof, antibodies specific for the spike protein, immunoassays using these antibodies, a vaccine comprising a spike protein, a viral vector comprising the protein, an immunogenic fragment thereof, double stranded RNA thereof, the recombinant expression thereof and the medical use thereof.

Invention 2

claims: 1-12(partially), 13(partially), 16-21(partially), 22-28(partially), 73-77(partially), 79(partially), 83(partially), 85-93(partially), 99-104(partially), 106-107(partially), 114-120(partially)
the polypeptide is an envelope (E) polypeptide encoded by SEQ. ID n 6045, nucleic acid encoding the E protein, fragments thereof, antibodies specific for the E protein, immunoassays using that antibody, a vaccine comprising an E protein, a viral vector comprising the protein, double stranded RNA thereof the recombinant expression thereof and the medical use thereof.

Invention 3

claims: 1-12(partially), 13(partially), 16-21(partially), 22-28(partially), 73-77(partially), 79(partially), 83(partially), 85-93(partially), 99-104(partially), 106-107(partially), 114-120(partially)
the polypeptide is a membrane (M) polypeptide encoded by SEQ. ID n 6046, nucleic acid encoding the M protein, fragment thereof, antibodies specific for the M protein, immunoassays using that antibody, a vaccine comprising a M protein, a viral vector comprising the protein, double stranded RNA thereof, the recombinant expression thereof and the medical use thereof.

Invention 4
Claims: 1-12(partially), 13(partially), 16-21(partially),
22-27(partially), 73-77(partially), 79(partially),
83(partially), 85-93(partially), 99-104(partially),
106-107(partially), 114-120(partially)
The polypeptide is a hemagglutinin esterase (HE)
polypeptide, nucleic acid encoding the HE protein, fragment
thereof, antibodies specific for the HE protein,
immunoassays using that antibody, a vaccine comprising a HE
protein, a viral vector comprising the protein, double
stranded RNA thereof, the recombinant expression thereof and
the medical use thereof.

Invention 5

claims: 1-12(partially), 13(partially), 16-21(partially),
22-28(partially), 73-77(partially), 79(partially),
83(partially), 85-93(partially), 99-104(partially),
106-107(partially), 114-120(partially)
The polypeptide is a nucleocapsid (N) polypeptide encoded by
SEQ. ID n 6052, nucleic acid encoding the N protein,
fragment thereof, antibodies specific for the N protein,
immunoassays using that antibody, a vaccine comprising a N
protein, a viral vector comprising the protein, double
stranded RNA thereof, the recombinant expression thereof and
the medical use thereof.

Invention 6

claims: 1-12(partially), 13(partially), 16-21(partially),
22-27(partially), 73-77(partially), 79(partially),
83(partially), 85-93(partially), 99-104(partially),
106-107(partially), 114-120(partially)
The ORF1a polypeptide encoded by SEQ. ID n 6039, the
preproteolytic fragments thereof such as NSP1-Nsp-7
corresponding to SEQ.ID n 9766-9774), nucleic acid encoding
these proteins, fragments thereof, antibodies specific for
these proteins, immunoassays using these antibodies, a
vaccine comprising the protein, fragments thereof, antibodies specific for
the protein, double stranded RNA thereof, the recombinant
expression thereof and the medical use thereof.

Invention 7
FURTHER INFORMATION CONTINUED FROM PCT/SA/ 210

claims: 1-12(partially), 13(partially), 16-21(partially),
22-27(partially), 73-77(partially), 79(partially),
83(partially), 85-93(partially), 99-104(partially),
106-107(partially), 114-120(partially)
The ORF lab polypeptide encoded by SEQ. ID n 6041, the
preoteolytic fragments thereof such as NSP9-Nsp-13
corresponding to SEQ.ID n 9775-9779), nucleic acid encoding
these proteins, fragments thereof, antibodies specific for
these proteins, immunoassays using these antibodies, a
vaccine comprising the protein, a viral vector comprising
the protein, double stranded RNA thereof, the recombinant
expression thereof and the medical use thereof.

Invention 8

claims: 22(partially), 29-58, 84,
110-113(partially), 114-118(partially):
A vaccine comprising an inactivated/attenuated SARS virus, a
method of inactivating the SARS virus, a method of making an
inactivated SARS vaccine

Invention 9:

claims: 77(partially), 78, 79(partially), 80-82, 83
(partially), 110-113(partially), 119-120 (partially)
A method of treatment of a patient suffering from SARS and a
method of identifying a therapeutically active agent
comprising measuring the attenuation of a SARS related
enzyme, a method of treatment using a therapeutical agent of
claims 77-82.

Invention 10-7760

claims: 59-72(partially)
A single-stranded oligonucleotide selected from the group
consisting of the SEQ. IDs 21-6020, 6076-6568, 6586-6587,
7292-7301, 7325-7328, 7332-7352, 7353-7385, 10235-10298,
10352-10504, 10580-11322, 11325-11551 (taken from the list
of claim number 59), PCR kit comprising these primers, a
method of detecting the presence of SARS virus in a sample
using PCR.