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GB, GD, GE, GH, 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, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,
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GW, ML, MR, NE, SN, TD, TG).

Published:

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19 May 2005

For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: SDR PROTEINS FROM STAPHYLOCOCCUS CAPITIS AND THEIR USE IN PREVENTING AND TREATING
INFECTIONS

(57) Abstract: An isolated and/or purified Sdr surface protein from *S. capitis* and nucleic acids encoding them are provided which
includes the SdrX protein which possesses collagen binding activities and the SdrZL protein which possesses SdrZ-like properties.
The Sdr surface proteins from *S. capitis* can be used in pharmaceutical compositions to treat and prevent *S. capitis* infection and
can also be used in vaccines and to raise antibodies which can treat or prevent such infections. Because the SdrX protein has been
shown to have collagen binding abilities, antibodies to SdrX will have the ability to inhibit or prevent the ability of *S. capitis* to bind
to collagen.



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INTERNATIONAL SEARCH REPORT

International application No.

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A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : C07K 1/00, 2/00; A61K 39/085, 39/02, 39/38; G01N 33/53; C07H 21/04.
US CL : 530/350, 825, 300; 424/243.1, 190.1, 184.1; 536/23.7; 435/975

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. : 530/350, 825, 300; 424/243.1, 190.1, 184.1; 536/23.7; 435/975

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

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6,423,690 B1 (HUNTER et al) 23 July 2002 (23.07.2002), especially last paragraph in column 67.	1-3, 5-7, 13, 14, 17 and 18
A	McCREA K.W. et al. The serine-aspartate repeat (Sdr) protein family in Staphylococcus epidermidis. Microbiology, 2000, Vol. 146, pages 1535-1546.	1-3, 5-7, 13, 14, 17 and 18

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

☐ See patent family 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 application or patent 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

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INTERNATIONAL SEARCH REPORT

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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:
Please See Continuation 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.: 1-7,13,14,17-21 and 23
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.

INTERNATIONAL SEARCH REPORT

International application No.
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BOX III. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claims 1, 2-7, 13, 14, 17, 18 and 23, drawn to an isolated SdrX protein from *Staphylococcus capitis* and a pharmaceutical composition comprising the same.

Group II, claims 1, 2, 3, 5-7 and 13, drawn to an isolated SdrZL protein from *Staphylococcus capitis* and a pharmaceutical composition comprising the same.

Group III, claims 8-12, 15, 16 and 22, drawn to an isolated antibody that recognizes the SdrX protein of *Staphylococcus capitis* and a therapeutic composition comprising the same.

Group IV, claims 19-21, drawn to an isolated nucleic acid encoding the protein of SEQ ID NO. 2.

Group V, claims 24 and 30, drawn to a method of treating *S. capitis* infection by administering an isolated Sdr protein from *S. capitis*.

Group VI, claims 25, drawn to a method of treating an *S. capitis* infection by administering an antibody to the *S. capitis* Sdr protein.

Group VII, claims 26 and 27, drawn to a method of preventing *S. capitis* binding to collagen by administering an antibody to the *S. capitis* Sdr protein to inhibit binding of *S. capitis* to collagen.

Group VIII, claims 28 and 29, drawn to a method of eliminating an *S. capitis* from an indwelling medical device or implant by coating the same with an SdrX protein.

Group IX, claims 31-33, drawn to a purified human donor plasma immunoglobulin having a higher antibody titer to an SdrX protein from *S. capitis* than found in pooled intravenous Ig from unselected human donors.

The inventions listed as Groups I-IX 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 special technical feature of invention I is an isolated SdrX protein from *Staphylococcus capitis* and a pharmaceutical composition comprising the same. However, such a protein was already known in the art at the time of the invention. For example, Hunter *et al.* (US 6,423,690 B1) disclosed a culture broth of the same strain 35661 of *Staphylococcus capitis* (see last paragraph in column 67) as used in the instant specification, which culture broth is expected comprise the isolated SdrX protein from *Staphylococcus capitis*. The SdrZL protein from *Staphylococcus capitis* of invention II, the antibody of invention III, the nucleic acid of invention IV, and the purified human donor plasma immunoglobulin of invention IX are subsequently claimed products which do not share significant structural elements with each other and with the protein of invention I. The special technical features of inventions V-VIII are methods as delineated above which do not share significant steps, objectives and/or compositions or reagents. Although the first claimed product and the method of using the product is a permitted combination under PCT Rule 13.2, in the instant case, since the product is already disclosed in the art, the special technical feature does not define over the prior art. Technically, the absence of special technical feature permits the separation of the methods of using or making the product from the product itself.

INTERNATIONAL SEARCH REPORT

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Continuation of B. FIELDS SEARCHED Item 3:
WEST, DIALOG, MEDLINE, BIOSIS, EMBASE, Sequence databases
capitis, sdr?, serine aspartate repeat, SEQ ID NO: 1 and 2; inventors' name