Abstract:

Title: FILTER MEDIA USING PEPTIDE-BASED ANTIMicroBIALS

Embodiments of the present invention include an antimicrobial filter device and a method of filtering a fluid using the device. A filter device may include a substrate, where the substrate has a surface. A therapeutically effective amount of a linear and alpha-helical antimicrobial peptide may be immobilized on at least a portion of the surface. The linear and alpha-helical antimicrobial peptide has hydrophobic and cationic regions. Microbes and/or pathogens are removed, killed, and/or deactivated by flowing a stream of fluid containing the microbes and/or pathogens through the antimicrobial filter device.
### 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).

### 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 additional fees, this Authority did not invite payment of any 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. **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.: 1-3, 7-20, 36-38, 41-51 and 54-61 as pertaining to SEQ ID NO: 1**

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.
INTERNATIONAL SEARCH REPORT

A CLASSIFICATION OF SUBJECT MATTER

IPC A61K 38/00( 2006 01),C07K 16/00( 2006 01),AOIN 25/34( 2006 01)

USPC 530/300,324,5 14/2, 12,424/404,409

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 530/300, 324, 514/2, 12, 424/404, 409

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>A</td>
<td>US 5,714,577 A (MONTERALO et al) 03 February 1998 (03 02 1998), abstract, Tables 1 and 2 and cols</td>
<td>1-3, 7-20, 36-38, 41-51 and 54-61</td>
</tr>
<tr>
<td>A</td>
<td>US 6,887,847 B2 (MONTERALO et al) 03 May 2005 (03 05 2005), abstract and Figure 1 sequence of LPI</td>
<td>1-3, 7-20, 36-38, 41-51 and 54-61</td>
</tr>
</tbody>
</table>

Further documents are listed in the continuation of Box C

See patent family annex

Date of the actual completion of the international search
07 September 2008 (07 09 2008)

Name and mailing address of the ISA/US
Mail Stop PCT, Ann ISA/US
Commissioner for Patents
P.O Box 1450
Alexandria Virginia 22313-1450
Facsimile No (57 1) 273-3201

Form PCT/ISA/2 10 (second sheet) (April 2007)
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, claim(s) 1-20 and 36-61, drawn to a filter device comprising a filter device substrate, a linear and alpha-helical antimicrobial peptide, wherein the linear lytic peptide is selected from the group consisting SEQ ID NOS 1-185 and a method of preventing or inhibiting infection in a subject by using the filter device thereof

Group II, claim(s) 21-35, drawn to a filter medium comprising a sorptive material, a linear and alpha-helical antimicrobial peptide wherein the lytic peptide is selected from the group consisting SEQ ID NOS 1-185

1 This International Searching Authority considers that the international application does not comply with the requirements of unity of invention (Rules 13 1, 13 2 and 13 3) for the reasons indicated below

The inventions listed as Groups I and II 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 filter device of Group I as claimed can be practiced by another different device and/or apparatus or by hand that can be used to remove microbes such as bacteria, virus, protozoa and fungi in a flowing fluid stream such as a syringe or can be used as an implantable blood filter while the claimed filter medium of Group II can be employed in tissue culture to grow cells in vitro or could be bonded to sorptive material and interspersed with solid antimicrobial particles to form antimicrobial peptides Thus, there is no unity of invention between the filter device and a filter medium, although, both groups use the same peptide

With respect to the various sequences (i.e., SEQ ID NOS 1-185) recited in Groups I and II, the sequences encompass peptides having different structures which are distinct from each other, there is no sequences linking each other, it is only consensus, and as such, they are considered as patently distinct and/or independent, one from the other, and are capable of independent use Thus, Applicant is required to elect a single disclosed sequence, and/or provide a single subsequence within a disclosed sequence wherein the subsequence for the elected is searched Therefore, Groups I and II do not share the same specific technical features, the inventions do not relate to the same inventive concept

Continuation of B FIELDS SEARCHED Item 3

Form PCT/ISA/210 (extra sheet) (April 2007)
Registry, APS and CAPLUS
search term: SEQ ID NO: 1, filter device, substrate, antimicrobial peptide, fiber, cellulose, cotton, acrylic, metal, ceramic.