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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: OCCLUSION RESISTANT HYDROCEPHALIC SHUNT

(57) Abstract: An occlusion resistant medical shunt, particularly a hydrocephalic shunt, is provided for implantation into a mammal. The shunt has an elongate wall structure configured as a tube having a lumen therethrough and a proximal end for receipt of bodily fluids. The bodily fluids, such as cerebrospinal fluid, flows through the shunt to a distal end for discharge of the bodily fluids. The wall structure of the shunt generally includes a biocompatible medical device material. The shunts of the present invention further include one or more occlusion resistant materials to resist occlusion of the luminal passage in the shunt.



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# INTERNATIONAL SEARCH REPORT

International Application No

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**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 A61L31/16

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 A61M A61K A61L

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, WPI Data, PAJ

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 348 042 B1 (WARREN JR W LEE) 19 February 2002 (2002-02-19) cited in the application column 2, line 19 - line 61 column 3, line 13 - line 49 claims 1-20	1,6,18, 23,32, 37,50,55
X	WO 97/04819 A (CAPHCO INC) 13 February 1997 (1997-02-13)  page 4, line 13 - line 37 page 5, line 32 - page 6, line 10 page 7, line 3 - line 35 page 8, line 1 - line 22 page 9, line 18 - line 22 claims 1-10  ----- -/--	1,6,18, 23,32, 37,50,55

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

\* Special categories of cited documents :

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- \*E\* earlier document but published on or after the international filing date
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- \*&\* document member of the same patent family

Date of the actual completion of the international search

29 November 2004

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## INTERNATIONAL SEARCH REPORT

International Application No

T/US2004/004925

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 94/25081 A (MENAKER GERALD J) 10 November 1994 (1994-11-10)	1-3,6, 11, 18-20, 23, 32-34, 37,42, 50-52, 55,60 1-67
Y	page 1, paragraph 1 page 8, last paragraph - page 9, paragraph 2 page 9, last paragraph - page 10, paragraph 2	
Y	EP 0 691 130 A (AMERICAN HOME PROD) 10 January 1996 (1996-01-10) the whole document	1-67
P,X	WO 2004/000383 A (ADVANCED CARDIOVASCULAR SYSTEM) 31 December 2003 (2003-12-31)  page 3, line 5 - line 22 page 4, line 5 - page 5, line 19 page 9, line 22 - page 10, line 18 page 11, line 16 - line 21 page 12, line 10 - page 13, line 19 claims 1-27  ----- -/--	1,3,6-8, 11,14, 15,18, 20, 23-25, 29,32, 34, 37-39, 42,46, 47,50, 52, 55-57, 60,64,65

## INTERNATIONAL SEARCH REPORT

International Application No

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P, X	<p>WO 03/057218 A (NOVARTIS PHARMA GMBH ; NOVARTIS AG (CH); SCHULER WALTER (DE); PRESCOTT) 17 July 2003 (2003-07-17)</p> <p>page 3, last paragraph - page 4, paragraph 2 page 9, paragraph 2 - paragraph 3 page 11, paragraph 2 page 14, paragraph 2 - paragraph 3 claims 1-13</p> <p>-----</p>	<p>1, 3, 6-8, 11, 14, 15, 18, 20, 23-25, 29, 32, 34, 37-39, 42, 46, 47, 50, 52, 55-57, 60, 64, 65</p>

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2004/004925

### 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 50-67 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:

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.

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 6348042	B1	19-02-2002	NONE	
WO 9704819	A	13-02-1997	US 5788687 A WO 9704819 A1 US 6306422 B1	04-08-1998 13-02-1997 23-10-2001
WO 9425081	A	10-11-1994	US 5207706 A WO 9425081 A1 AU 4227893 A US 5464438 A	04-05-1993 10-11-1994 21-11-1994 07-11-1995
EP 0691130	A	10-01-1996	US 5516781 A AT 210979 T AU 706486 B2 AU 1791895 A CA 2148871 A1 CY 2332 A DE 69524679 D1 DE 69524679 T2 DK 691130 T3 EP 0691130 A1 ES 2166802 T3 HK 1010333 A1 JP 8040901 A NZ 272092 A PT 691130 T SI 691130 T1 US 5665728 A US 5646160 A US 5563146 A	14-05-1996 15-01-2002 17-06-1999 23-11-1995 13-11-1995 06-02-2004 31-01-2002 13-06-2002 11-03-2002 10-01-1996 01-05-2002 04-04-2002 13-02-1996 27-07-1997 28-06-2002 30-04-2002 09-09-1997 08-07-1997 08-10-1996
WO 2004000383	A	31-12-2003	WO 2004000383 A2	31-12-2003
WO 03057218	A	17-07-2003	BR 0306858 A CA 2472198 A1 WO 03057218 A1 EP 1465624 A1 US 2003170287 A1	03-11-2004 17-07-2003 17-07-2003 13-10-2004 11-09-2003