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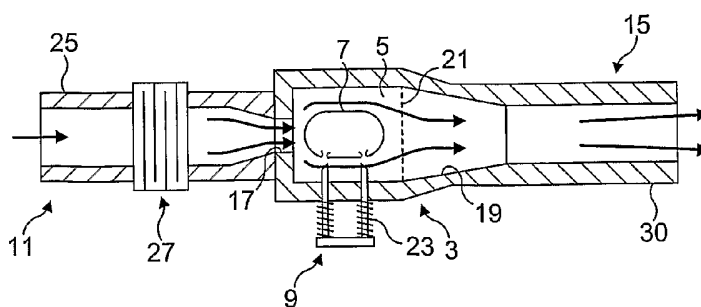
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21 December 2006

*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.*

(54) Title: NASAL DELIVERY DEVICE



(57) Abstract: A nasal delivery device for delivering substance to a nasal cavity of a subject, the delivery device comprising: a substance supply unit (3) for supplying a dose of substance to be delivered to the nasal cavity of the subject, the substance supply unit including an inlet (17) and an outlet (19); a nosepiece unit (15) including a nosepiece (30) for fitting to a nasal cavity of the subject and being in fluid communication with the outlet of the substance supply unit, - and a mouthpiece unit (11) including a mouthpiece (25) in fluid communication with the inlet of the substance supply unit and through which the subject in use exhales such as to entrain substance from the container chamber (5) and deliver the same through the nosepiece, and at least one temperature modifier (27) for reducing a temperature of the exhaled air flow such as to reduce the absolute humidity thereof.

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# INTERNATIONAL SEARCH REPORT

International application No  
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## A. CLASSIFICATION OF SUBJECT MATTER

INV. A61M15/08 A61M15/00 A61K9/48 A61J3/07

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)

A61M A61K A61J

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.
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☒ 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 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.
- \* & \* document member of the same patent family

Date of the actual completion of the international search

8 September 2006

Date of mailing of the international search report

04/10/2006

Name and mailing address of the ISA/

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# INTERNATIONAL SEARCH REPORT

International application No  
PCT/GB2006/000631

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>WO 00/51672 A (DJUPESLAND, PER, GISLE) 8 September 2000 (2000-09-08) cited in the application</p> <p>page 8, lines 16-21 page 10, lines 11-13 - page 15, lines 1-13 page 15, paragraph 15-22 page 22, line 17 - page 23, line 27; figure 6 page 23, line 29 - page 26, line 2; figure 7 page 26, line 4 - page 28, line 15; figure 8 page 28, line 24 - page 31, line 7; figure 9</p>	<p>1-11, 16-19, 26-28, 41, 70-75, 80-83, 90-98, 135</p>
X	<p>WO 03/090812 A (OPTINOSE AS; DJUPESLAND, PER, GISLE) 6 November 2003 (2003-11-06)</p> <p>page 20, line 22 - page 23, line 18 figures 6(a)-6(b)</p>	<p>70-75, 80-83, 90-98</p>
A	<p>WO 2004/103447 A (OPTINOSE AS; DJUPESLAND, PER, GISLE) 2 December 2004 (2004-12-02) page 50, line 8 - page 51, line 8 figures 15(a)-15(b)</p>	<p>1,42,70, 135</p>
A	<p>GB 2 404 867 A (OPTINOSE AS) 16 February 2005 (2005-02-16) page 9, line 14 - page 17, line 19 figures 1,2,3(a)-3(g)</p>	<p>1,42,70, 135</p>
A	<p>WO 2004/060433 A (OPTINOSE AS; DJUPESLAND, PER, GISLE) 22 July 2004 (2004-07-22) page 21, line 13 - page 32, line 7 figures 6(a)-6(j)</p>	<p>1,42,70, 135</p>
A	<p>US 5 373 841 A (KYLLOEN ET AL) 20 December 1994 (1994-12-20) the whole document</p>	<p>1,42,70, 135</p>
E	<p>WO 2006/030210 A (OPTINOSE AS; DJUPESLAND, PER, GISLE; HAFNER, RODERICK, PETER; SHELDRAK) 23 March 2006 (2006-03-23)</p> <p>the whole document</p>	<p>1-3,7,8, 10,11, 18,26, 27,135</p>
P,X	<p>WO 2005/021059 A (OPTINOSE AS; DJUPESLAND, PER, GISLE) 10 March 2005 (2005-03-10) the whole document</p>	<p>1,135</p>
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# INTERNATIONAL SEARCH REPORT

International application No

PCT/GB2006/000631

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>US 2004/043064 A1 (IORIO THEODORE L ET AL) 4 March 2004 (2004-03-04)</p> <p>page 1, paragraph 7 - page 2, paragraph 18 page 3, paragraphs 40,41 page 4, paragraphs 52,54 page 5, paragraph 61-63 page 9, paragraph 98-104 figures 1,2</p>	<p>99-104, 106-112, 114, 117-122, 124-130, 132</p>
X	<p>WO 2004/082750 A (GALEPHAR M/F; VANDERBIST, FRANCIS; BAUDIER, PHILIPPE; DEBOECK, ARTHUR) 30 September 2004 (2004-09-30)</p> <p>abstract page 16, line 31 - page 17, line 9 figures</p>	<p>99-104, 112, 114-122, 130, 132-134</p>
X	<p>WO 2004/091705 A (NEKTAR THERAPEUTICS; DUNKLEY, MIKE; TUCKWELL, JON; VERNON-HARCOURT, ED) 28 October 2004 (2004-10-28) page 9, lines 1-25 figures</p>	<p>99-104, 112,114, 117-122, 130,132</p>
X	<p>DE 198 35 346 A1 (BOEHRINGER INGELHEIM PHARMA KG) 10 February 2000 (2000-02-10)</p> <p>column 2, line 22 - column 3, line 39 column 4, lines 40-47 column 5, lines 9-29 figures</p>	<p>99-102, 105, 112-120, 123, 130-134</p>
X	<p>DE 103 00 982 A1 (BOEHRINGER INGELHEIM PHARMA GMBH &amp; CO. KG) 22 July 2004 (2004-07-22)</p> <p>page 9, paragraph 103-106 page 5, paragraphs 46,47 figures</p>	<p>99-102, 105-110, 112,114, 117-120, 123-128, 130,132</p>

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/GB2006/000631

### 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.: 136-138  
because they relate to subject matter not required to be searched by this Authority, namely:  
Rule 39.1(iv) PCT - Method for treatment of the human or animal body by therapy
2. ☒ Claims Nos.: 12-15, 20-25, 29-40, 48-51, 56-61, 76-79, 84-89  
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:

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.:

#### Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.1

Claims Nos.: 136-138

Rule 39.1(iv) PCT - Method for treatment of the human or animal body by therapy

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Continuation of Box II.2

Claims Nos.: 12-15, 20-25, 29-40, 48-51, 56-61, 76-79, 84-89

Claims 12-15, 20-25, 29-40, 48-51, 56-61, 76-79 and 84-89 attempt to define the subject-matter in terms of the result to be achieved, which merely amounts to a statement of the underlying problem, without providing the technical features necessary for achieving this result. To many undetermined parameters (materials used, materials properties, surfaces properties, fluids properties, pressure, temperature ...) put an undue burden to the skilled person to determine the scope of protection sought for (Article 6 PCT), and render a complete search impossible (Article 17(2)(a)(ii) PCT).

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.

**FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210**

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

1. claims: 1-98, 135 (with exceptions : see Continuation of Box 4.)

A nasal delivery device for delivering substance to a nasal cavity of a subject.  
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2. claims: 99-134

A capsule for containing a powdered substance and its use.  
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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2006/000631

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0051672	A	08-09-2000	AT 285810 T	15-01-2005
			AU 766410 B2	16-10-2003
			AU 2822700 A	21-09-2000
			BR 0008650 A	26-12-2001
			CA 2364009 A1	08-09-2000
			CN 1342093 A	27-03-2002
			DE 60017099 D1	03-02-2005
			DE 60017099 T2	12-01-2006
			EP 1161274 A1	12-12-2001
			ES 2235836 T3	16-07-2005
			GB 2349092 A	25-10-2000
			HK 1039459 A1	13-05-2005
			ID 30286 A	15-11-2001
			JP 2002537908 A	12-11-2002
			MX PA01008849 A	21-07-2003
			NO 20014182 A	01-11-2001
			NZ 514442 A	29-08-2003
			PL 350220 A1	18-11-2002
			PT 1161274 T	31-05-2005
			TR 200102563 T2	22-04-2002
			US 6715485 B1	06-04-2004
WO 03090812	A	06-11-2003	AU 2003244892 A1	10-11-2003
			GB 2390307 A	07-01-2004
			US 2006096589 A1	11-05-2006
WO 2004103447	A	02-12-2004	EP 1626762 A2	22-02-2006
			GB 2401795 A	24-11-2004
GB 2404867	A	16-02-2005	GB 2421914 A	12-07-2006
			WO 2005016423 A2	24-02-2005
WO 2004060433	A	22-07-2004	GB 2397025 A	14-07-2004
US 5373841	A	20-12-1994	NONE	
WO 2006030210	A	23-03-2006	GB 2418147 A	22-03-2006
WO 2005021059	A	10-03-2005	GB 2405350 A	02-03-2005
US 2004043064	A1	04-03-2004	AU 2003260067 A1	19-03-2004
			WO 2004019853 A2	11-03-2004
WO 2004082750	A	30-09-2004	CA 2519228 A1	30-09-2004
			EP 1603615 A1	14-12-2005
WO 2004091705	A	28-10-2004	AU 2004229446 A1	28-10-2004
			CA 2520032 A1	28-10-2004
			EP 1610850 A1	04-01-2006
			MX PA05010842 A	30-03-2006
DE 19835346	A1	10-02-2000	AT 220542 T	15-08-2002
			AU 763266 B2	17-07-2003
			AU 5730499 A	28-02-2000
			BG 64115 B1	30-01-2004
			BG 105189 A	31-07-2001
			BR 9912748 A	15-05-2001
			CA 2338323 A1	17-02-2000



# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No  
PCT/GB2006/000631

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 19835346	A1	CN 1311668 A	05-09-2001
		DK 1100474 T3	14-10-2002
		EA 2186 B1	28-02-2002
		EE 200100073 A	17-06-2002
		WO 0007572 A2	17-02-2000
		EP 1100474 A2	23-05-2001
		ES 2180325 T3	01-02-2003
		HK 1037975 A1	10-12-2004
		HU 0103490 A2	29-05-2002
		ID 28290 A	10-05-2001
		JP 2002522378 T	23-07-2002
		NO 20010535 A	31-01-2001
		NZ 509977 A	28-11-2003
		PL 346168 A1	28-01-2002
		PT 1100474 T	31-12-2002
		SK 1692001 A3	11-09-2001
		TR 200100355 T2	21-06-2001
		TW 221420 B	01-10-2004
		UA 71920 C2	17-09-2001
		ZA 200100796 A	29-05-2002
DE 10300982	A1	22-07-2004	AU 2003294927 A1
			CA 2513130 A1
			WO 2004062716 A1
			EP 1590026 A1
			JP 2006512958 T