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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: COMPETITIVE BINDING ASSAY FOR IDENTIFYING INHIBITORS OF HCV POLYMERASE

(57) Abstract: A method for identifying compounds binding to HCV polymerase comprising the steps of: contacting said HCV polymerase or an analog thereof with a probe formula I: wherein A is O, S, N, NR1, or CR1, wherein R1 is defined herein; --- represents either a single or a double bond; R2 is selected from: H, halogen, R21, OR21, SR21, COOR21, SO2N(R22)2, N(R22)2, CON(R22)2, NR22C(O)R22 or NR22C(O)NR22 wherein R21 and each R22 is defined herein; B is NR3 or CR3, wherein R3 is defined herein; with the proviso that, when A is not N, then one of A or B is either CR1 or CR3, K is N or CR4, wherein R4 is defined herein; L is N or CR5, wherein R5 has the same definition as R4 defined above; M is N or CR7, wherein R7 has the same definition as R4 defined above; R5 is C(Y1)Z wherein Y1 is O or S; and Z is N(R6a)R6 or OR6, wherein R6a is H or alkyl or NR61R62 wherein R61 and R62 are defined herein; and R6 is H, alkyl, cycloalkyl, alkenyl, Het, alkyl-aryl, alkyl-Het; or R6 is wherein R7 and R8 and Q are as defined herein; Y2 is O or S; R9 is H, (C1-6 alkyl), (C3-7)cycloalkyl or (C1-6)alkyl-(C3-7)cycloalkyl, aryl, Het, (C1-6)alkyl-aryl or (C1-6)alkyl-Het, all of which optionally substituted with R90; or R9 is covalently bonded to either of R7 or R8 to form a 5- or 6-membered heterocycle; or a salt thereof; where the probe comprises a detectable label attached to any suitable position, whereby said probe binds to an HCV polymerase or an analog thereof and is capable of being displaced by an inhibitor thereof.



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INTERNATIONAL SEARCH REPORT

International Application No.

PCT/CA 02/01214

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G01N33/569 C12Q1/00

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 G01N C12Q

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 01 47883 A (JAPAN TOBACCO INC ;MIZUTANI KENJI (JP); HASHIMOTO HIROMASA (JP); Y) 5 July 2001 (2001-07-05)	20
X	claims; examples 32-34, 37, 53, 281, 503	1-3, 14-19, 21
P, X	WO 02 04425 A (BEAULIEU PIERRE LOUIS ;BOEHRINGER INGELHEIM CA LTD (CA); GILLARD J) 17 January 2002 (2002-01-17)	20
P, X	US 2002/065418 A1 (BEAULIEU PIERRE LOUIS ET AL) 30 May 2002 (2002-05-30)	20
	claims	

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

☒ Patent family members are listed in 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

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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.
E	WO 02 070739 A (BOEHRINGER INGELHEIM CA LTD ;MCKERCHER GINETTE (CA); KUKOLJ GEORGE) 12 September 2002 (2002-09-12) claims ---	20
E	WO 03 007945 A (BEAULIEU PIERRE LOUIS ;BOEHRINGER INGELHEIM CA LTD (CA); GOULET SY) 30 January 2003 (2003-01-30) claims ---	20
E	WO 03 010140 A (BEAULIEU PIERRE LOUIS ;BOEHRINGER INGELHEIM CA LTD (CA); GILLARD J) 6 February 2003 (2003-02-06) claims ---	20
E	WO 03 010141 A (BEAULIEU PIERRE LOUIS ;BOEHRINGER INGELHEIM CA LTD (CA); GILLARD J) 6 February 2003 (2003-02-06) claims -----	20

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA 02/01214

Box I Observations where certain claims were found unsearchable (Continuation of item 1 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.: 1-3, 6-12, 14-21 (partly)
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 II Observations where unity of invention is lacking (Continuation of item 2 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.

Continuation of Box I.2

Claims Nos.: 1-3, 6-12, 14-21 (partly)

The initial phase of the search revealed a very large number of documents relevant to the issue of novelty. So many documents were retrieved that it is impossible to determine which parts of the claim(s) may be said to define subject-matter for which protection might legitimately be sought (Article 6 PCT). For these reasons, a meaningful search over the whole breadth of the claim(s) is impossible.

The examiner restricted the search to the probes as defined by formula's IIa-f (claim 4).

Presently only one document is cited against claim 20, for further documents the applicant is referred to the incomplete search report of WO03010140 & -141.

The applicant's attention is drawn to the fact that claims, or parts of 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.

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
WO 0147883	A	05-07-2001	AU 763356 B2	17-07-2003
			AU 2401701 A	09-07-2001
			CA 2363274 A1	05-07-2001
			CN 1342145 T	27-03-2002
			CZ 20013424 A3	13-02-2002
			EP 1162196 A1	12-12-2001
			HU 0202263 A2	28-12-2002
			WO 0147883 A1	05-07-2001
			JP 2001247550 A	11-09-2001
			NO 20014134 A	22-10-2001
			NZ 514403 A	25-10-2002
			SK 13752001 A3	02-07-2002
			TR 200103147 T1	21-06-2002
			US 2003050320 A1	13-03-2003
			ZA 200107870 A	25-09-2002
WO 0204425	A	17-01-2002	AU 7225801 A	21-01-2002
			WO 0204425 A2	17-01-2002
			CA 2412718 A1	17-01-2002
			EP 1301487 A2	16-04-2003
			US 2002065418 A1	30-05-2002
			US 6479508 B1	12-11-2002
			WO 02070739 A2	12-09-2002
US 2002065418	A1	30-05-2002	US 6479508 B1	12-11-2002
			AU 7225801 A	21-01-2002
			WO 0204425 A2	17-01-2002
			CA 2412718 A1	17-01-2002
			EP 1301487 A2	16-04-2003
			WO 02070739 A2	12-09-2002
WO 02070739	A	12-09-2002	AU 7225801 A	21-01-2002
			WO 0204425 A2	17-01-2002
			WO 02070739 A2	12-09-2002
			CA 2412718 A1	17-01-2002
			EP 1301487 A2	16-04-2003
			US 2002065418 A1	30-05-2002
			US 6479508 B1	12-11-2002
WO 03007945	A	30-01-2003	WO 03007945 A1	30-01-2003
WO 03010140	A	06-02-2003	WO 03010140 A2	06-02-2003
			WO 03010141 A2	06-02-2003
			US 2003176433 A1	18-09-2003
WO 03010141	A	06-02-2003	WO 03010140 A2	06-02-2003
			WO 03010141 A2	06-02-2003
			US 2003176433 A1	18-09-2003