



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification ⁶ : A61K 31/385, C07D 339/04, 339/08</p>	A3	<p>(11) International Publication Number: WO 98/01440</p> <p>(43) International Publication Date: 15 January 1998 (15.01.98)</p>
<p>(21) International Application Number: PCT/US97/10870</p> <p>(22) International Filing Date: 3 July 1997 (03.07.97)</p> <p>(30) Priority Data: 60/021,665 5 July 1996 (05.07.96) US</p> <p>(71) Applicants (for all designated States except US): THE GOVERNMENT OF THE UNITED STATES OF AMERICA, represented by THE SECRETARY, DEPARTMENT OF HEALTH AND HUMAN SERVICES [US/US]; Suite 325, 6011 Executive Boulevard, Rockville, MD 20852 (US). THE UNIVERSITY OF TENNESSEE RESEARCH CORPORATION [US/US]; The University of Tennessee, 415 Communications Building, Knoxville, TN 37996-0344 (US).</p> <p>(72) Inventors; and (75) Inventors/Applicants (for US only): RICE, William, G. [US/US]; 625 Magnolia Avenue, Frederick, MD 21701 (US). SCHULTZ, Robert, R. [US/US]; 9540 Brink Road, Gaithersburg, MD 20882-4235 (US). BAKER, David, C. [US/US]; 5708 Glen Cove Drive, Knoxville, TN 37919 (US). HENDERSON, Louis, E. [US/US]; 10296 Quail Trail, New Market, MD 21774 (US).</p>	<p>(74) Agent: BRUESS, Steven, C.; Merchant, Gould, Smith, Edell, Welter & Schmidt, P.A., 3100 Norwest Center, 90 South Seventh Street, Minneapolis, MN 55402-4131 (US).</p> <p>(81) Designated States: AL, AM, AT, AT (Utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), EE, EE (Utility model), ES, FI, FI (Utility model), GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).</p> <p>Published <i>With international search report.</i></p> <p>(88) Date of publication of the international search report: 14 May 1998 (14.05.98)</p>	
<p>(54) Title: ANTI-VIRAL PHARMACEUTICAL COMPOSITIONS CONTAINING SATURATED 1,2-DITHIAHETEROCYCLIC COMPOUNDS AND USES THEREOF</p> <p>(57) Abstract</p> <p>The present invention is directed to pharmaceutical compositions including a saturated 1,2-dithiaheterocyclic compound having anti-viral activity. The present invention also provides a kit containing the pharmaceutical composition and methods of treating or preventing viral disease using the composition, as well as methods for inactivating retrovirus in a body fluid.</p>		

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INTERNATIONAL SEARCH REPORT

Intern: al Application No
PCT/US 97/10870

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A61K31/385 C07D339/04 C07D339/08

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 6 A61K C07D

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 427 246 A (ASTA PHARMA AG) 15 May 1991 see the whole document ---	1,20
X	EP 0 318 891 A (ASTA PHARMA AG) 7 June 1989 see the whole document ---	1,3,6
X	WO 96 09406 A (THE GOVERNMENT OF THE UNITED STATES OF AMERICA) 28 March 1996 see page 5, line 21 see page 2, line 25 - page 7, line 25 see page 5, line 21 ---	1,3,4,6, 10,13,20
A	WO 92 08717 A (IAF BIOCHEM INTERNATIONAL INC.) 29 May 1992 see page 5, line 5 - page 8, line 6 --- -/--	1,7,10



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

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- *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.
- *Z* document member of the same patent family

Date of the actual completion of the international search

29 January 1998

Date of mailing of the international search report

23.02.98

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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.
X	GB 2 148 296 A (SANDOZ LTD) 30 May 1985 see the whole document ---	1-3,6,7
A	WILLIAM G. RICE ET AL.: "Inhibitors of HIV Nucleocapsid Protein Zinc Fingers as Candidates for the Treatment of AIDS" SCIENCE, vol. 270, 17 November 1995, pages 1194-1197, XP002053791 cited in the application see the whole document ---	1
A	WILLIAM G. RICE ET AL.: "Inhibition of HIV-1 infectivity by zinc-ejecting aromatic C-nitroso compounds" NATURE, vol. 361, 4 February 1993, LONDON, pages 473-475, XP000572354 cited in the application see the whole document -----	1

INTERNATIONAL SEARCH REPORT

International application No.

PC1/US 97/10870

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.: 16-19
because they relate to subject matter not required to be searched by this Authority, namely:
Remark: Although claim(s) 16-19
is(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 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.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 97/10870

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 427246 A	15-05-91	AT 126053 T	15-08-95
		BE 1003834 A	23-06-92
		BE 1005018 A	23-03-93
		CA 2029599 A	10-05-91
		CH 684054 A	15-07-94
		DE 4035456 A	16-05-91
		DE 9017987 U	09-12-93
		DE 59009497 D	14-09-95
		DK 267790 A	10-05-91
		ES 2076279 T	01-11-95
		FR 2653997 A	10-05-91
		GB 2239797 A,B	17-07-91
		GR 1000918 B	16-03-93
		GR 1001503 B	28-02-94
		IE 67874 B	01-05-96
		IT 1246328 B	17-11-94
		JP 3188021 A	16-08-91
		LU 87834 A	07-05-91
		NL 9002438 A	03-06-91
		SE 9003564 A	07-06-91
US 5334612 A	02-08-94		

EP 318891 A	07-06-89	DE 3840076 A	15-06-89
		DE 3867445 A	13-02-92
		IE 60877 B	24-08-94

WO 9609406 A	28-03-96	AU 3592795 A	09-04-96
		EP 0782632 A	09-07-97

WO 9208717 A	29-05-92	AT 143016 T	15-10-96
		AU 8864191 A	11-06-92
		CA 2095613 A	14-05-92
		DE 69122264 D	24-10-96
		DE 69122264 T	06-02-97
		EP 0560794 A	22-09-93
		ES 2091948 T	16-11-96
		HK 12597 A	14-02-97
		JP 6504266 T	19-05-94
		US 5587480 A	24-12-96

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 97/10870

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 2148296 A	30-05-85	CH 656382 A	30-06-86
		AU 3454984 A	02-05-85
		BE 900854 A	19-04-85
		DE 3438585 A	02-05-85
		DK 505684 A	25-04-85
		FR 2553663 A	26-04-85
		JP 60115574 A	22-06-85
		LU 85607 A	19-06-85
		NL 8403083 A	17-05-85
		SE 8405275 A	25-04-85
