



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification <sup>6</sup> : C07D 311/58, 311/70, 335/06, 311/72, 307/79, 317/60, 319/18, 311/14, 333/54, A61K 31/35</p>	A3	<p>(11) International Publication Number: <b>WO 98/07716</b></p> <p>(43) International Publication Date: 26 February 1998 (26.02.98)</p>
<p>(21) International Application Number: PCT/US97/14720</p> <p>(22) International Filing Date: 21 August 1997 (21.08.97)</p> <p>(30) Priority Data: 60/024,521 23 August 1996 (23.08.96) US</p> <p>(71) Applicant: THE BOARD OF REGENTS FOR OKLAHOMA STATE UNIVERSITY [US/US]; 305 Whitehurst, Oklahoma State University, Stillwater, OK 74078 (US).</p> <p>(72) Inventors: BERLIN, Kenneth, Darrel; 1228 North Lincoln Street, Stillwater, OK 74075 (US). SUBRAMANIAN, Shanker; Suite 190, 16115 Park Row, Houston, TX 77084 (US). NELSON, Eldon, Carl; 401 North Donaldson Drive, Stillwater, OK 74075 (US). MADLER, Matora, May; 3 Frost Street, Cambridge, MA 02140 (US). PATTERSON, Manford, Kenneth, Jr.; 2215 Hickory Drive, Ardmore, OK 73401 (US). BIRCKBICHLER, Paul, Joseph; 9021 Rockwell Drive, Oklahoma City, OK 73132 (US). BENBROOK, Doris, Mangiaracina; 12916 Endicott Drive, Oklahoma City, OK 73165 (US).</p> <p>(74) Agent: WEEKS, R., Alan; Fellers, Snider, Blankenship, Bailey &amp; Tippens, Suite 800, 6 East 5th Street, Tulsa, OK 74103-4444 (US).</p>	<p>(81) Designated States: AU, CA, CN, JP, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</p> <p><b>Published</b> <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p> <p>(88) Date of publication of the international search report: 26 March 1998 (26.03.98)</p>	
<p>(54) Title: HETEROAROTINOIDS-ANTICANCER AGENTS WITH RECEPTOR SPECIFICITY AND TGASE ACTIVITY</p>		
<p>(57) Abstract</p> <p>Anticancer compositions having receptor specificity as well as activity in stimulating formation of the enzyme transglutaminase as a marker for anticancer activity. The compositions comprise certain heteroarotinoid structures partially related to <i>trans</i>-retinoic acid through the basic, fused-ring framework.</p>		

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INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US 97/14720

A. CLASSIFICATION OF SUBJECT MATTER  
 IPC 6 C07D311/58 C07D311/70 C07D335/06 C07D311/72 C07D307/79  
 C07D317/60 C07D319/18 C07D311/14 C07D333/54 A61K31/35

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 C07D C07C

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.
X	EP,A,0 130 795 (PFIZER) 9 January 1985 see claims; examples 1-11 ---	1
X	US,A,5 006 550 (ROSHANTA CHANDRARATNA) 9 April 1991 see column 20 - column 29 ---	1,38
X	GB,A,2 119 801 (HOFFMAN-LA ROCHE) 23 November 1983 see page 1 - page 8 ---	1
X	EP,A,0 350 846 (HOFFMAN LA ROCHE.) 17 January 1990 see the whole document ---	1,33-35
X	EP,A,0 405 028 (ALLERGAN) 2 January 1991 see page 11 - page 23 ---	1
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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 :

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- \*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.
- \*G\* document member of the same patent family

Date of the actual completion of the international search  24 November 1997	Date of mailing of the international search report  06.02.98
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Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer  FRANCOIS, J
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INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US 97/14720

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,A,85 00806 (SRI INT.) 28 February 1985 see claims 7,8 ---	1
X	US,A,4 833 254 (KENNETH BERLIN) 23 May 1989 cited in the application see column 16 - column 28 ---	1
X	US,A,4 826 984 (KENNETH BERLIN) 2 May 1989 see the whole document ---	1,34
X	FR,A,2 390 428 (HOFFMAN LA ROCHE.) 8 December 1978 see claims ---	1
X	JOURNAL OF MEDICINAL CHEMISTRY., vol.31, November 1988, WASHINGTON US pages 2182 - 2192, XP000608417 HIROYUKI KAGECHIKA ET AL. 'RETINO BENZOIC ACIDS.1.' see page 2182 - page 2191 -----	1

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 97/14720

**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.:  
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. Claims : 1-35, 37, 38 (Bicyclic (hetero)aromatic compounds
  2. Claim : 36                      Compounds with a different skeleton from those of claims 1-35, 37, 38. The compounds described in claim 36 do not have a common specific structure feature with those of the other claims.
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.
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  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.:  
  
1-35, 37, 38

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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