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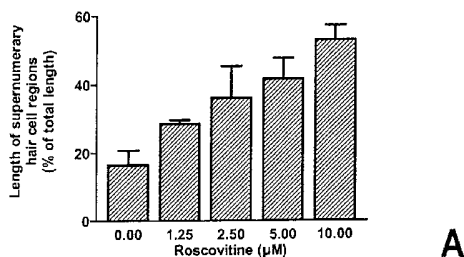
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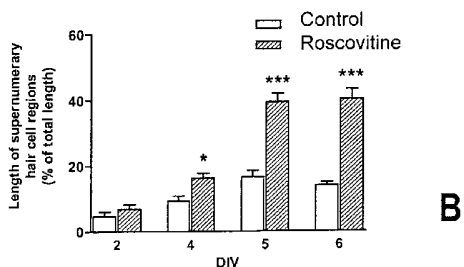
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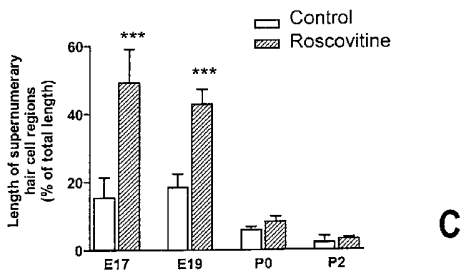
(54) Title: USE OF PURINE DERIVATIVES FOR INDUCING DIFFERENTIATION OF SUPERNUMERARY HAIR CELLS AND DEITERS' CELLS IN THE DEVELOPING ORGAN OF CORTI FOR TREATING DEAFNESS



A



B



C

(57) Abstract: Use of at least one kinase inhibitor for making drugs for inducing differentiation of supernumerary hair cells and Deiters' cells in the developing organ of Corti.

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European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 03/15047

A. CLASSIFICATION OF SUBJECT MATTER  
 IPC 7 A61K31/52 A61P27/16

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)  
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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, BIOSIS, WPI Data, PAJ, EMBASE, CHEM ABS 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 99/42088 A (LOEWENHEIM HUBERT ; OTOGENE AKTIENGESELLSCHAFT (DE)) 26 August 1999 (1999-08-26)	1,4,7
Y	abstract; claims 1-6	1-9
Y	LÖWENHEIM H ET AL: "Gene disruption of p27(Kip1) allows cell proliferation in the postnatal and adult organ of corti." PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA. 30 MAR 1999, vol. 96, no. 7, 30 March 1999 (1999-03-30), pages 4084-4088, XP002294147 ISSN: 0027-8424 abstract	1-9

Further documents are listed in the continuation of box C.  Patent family members are listed in annex.

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- \*E\* earlier document but published on or after the international filing date
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- \*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  27 August 2004	Date of mailing of the international search report  17/09/2004
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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  Ansaldo, M
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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.
Y	CHEN PING ET AL: "p27Kip1 links cell proliferation to morphogenesis in the developing organ of Corti" DEVELOPMENT (CAMBRIDGE), vol. 126, no. 8, April 1999 (1999-04), pages 1581-1590, XP002294148 ISSN: 0950-1991 abstract	1-9
Y	----- KNOCKAERT M ET AL: "Pharmacological inhibitors of cyclin-dependent kinases" TRENDS IN PHARMACOLOGICAL SCIENCES, ELSEVIER, AMSTERDAM, NL, vol. 23, no. 9, 1 September 2002 (2002-09-01), pages 417-425, XP004381043 ISSN: 0165-6147 abstract; figure 1	1-9
Y	----- LEGRAVEREND M ET AL: "Cyclin-dependent kinase inhibition by new C-2 alkynylated purine derivatives and molecular structure of a CDK2-inhibitor complex" JOURNAL OF MEDICINAL CHEMISTRY, AMERICAN CHEMICAL SOCIETY, WASHINGTON, US, vol. 43, no. 7, 2000, pages 1282-1292, XP002248272 ISSN: 0022-2623 abstract; figure 1	1-9
Y	----- LEGRAVEREND M ET AL: "Synthesis of C2 alkynylated purines, a new family of potent inhibitors of cyclin-dependent kinases" BIOORGANIC & MEDICINAL CHEMISTRY LETTERS, OXFORD, GB, vol. 8, no. 7, 7 April 1998 (1998-04-07), pages 793-798, XP004136967 ISSN: 0960-894X the whole document	1-9
A	----- WO 97/20842 A (CENTRE NAT RECH SCIENT ; MEIJER LAURENT (FR); BISAGNI EMILE (FR); LEGR) 12 June 1997 (1997-06-12) the whole document	1-9
	-----	

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 03/15047

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9942088	A	26-08-1999	DE 19807426 A1	14-10-1999
			AT 250936 T	15-10-2003
			AU 763868 B2	31-07-2003
			AU 2928199 A	06-09-1999
			CA 2320717 A1	26-08-1999
			DE 59907195 D1	06-11-2003
			DK 1056467 T3	09-02-2004
			WO 9942088 A2	26-08-1999
			EP 1056467 A2	06-12-2000
			ES 2211055 T3	01-07-2004
			JP 2002503687 T	05-02-2002
			PT 1056467 T	27-02-2004
			US 2003203482 A1	30-10-2003
WO 9720842	A	12-06-1997	FR 2741881 A1	06-06-1997
			AT 234838 T	15-04-2003
			CA 2238843 A1	12-06-1997
			DE 69626855 D1	24-04-2003
			DE 69626855 T2	24-12-2003
			DK 874847 T3	14-07-2003
			EP 1308447 A1	07-05-2003
			EP 0874847 A1	04-11-1998
			ES 2195027 T3	01-12-2003
			WO 9720842 A1	12-06-1997
			JP 2000501408 T	08-02-2000
			PT 874847 T	29-08-2003
			US 6316456 B1	13-11-2001
US 2003186999 A1	02-10-2003			
US 2002049218 A1	25-04-2002			