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ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.*

(54) Title: HUMANISED BACULOVIRUS

(57) Abstract: The invention relates to a genetically engineered baculovirus wherein said virus is engineered to target therapeutic agents to cells, typically cancer cells, for example prostate cancer cells.



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INTERNATIONAL SEARCH REPORT

Inter: al Application No

PCT/GB 02/03791

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C12N15/86 C07K14/005 A61K48/00

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 C12N

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, PAJ, WPI Data, MEDLINE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 197 35 593 A (HEPAVEC AG FUER GENTHERAPIE) 18 February 1999 (1999-02-18) the whole document ---	1-40
X	WO 00 77233 A (GEN HOSPITAL CORP ; BIOGEN INC (US)) 21 December 2000 (2000-12-21) the whole document ---	1-40
A	WO 00 58470 A (MOUL JUDD W ; SRIVASTAVA SHIV (US); ZOU ZHIQIANG (US); SRIKANTAN VA) 5 October 2000 (2000-10-05) ---	
A	WO 94 08022 A (COWLEY JEFF ALEXANDER ; PREHAUD CHRISTOPHE JEAN (AU); WALKER PETER) 14 April 1994 (1994-04-14) -----	

☐ 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

5 November 2002

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26. 03. 03

Name and mailing address of the ISA

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Pilat, D

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB 02/03791**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:

Although claims 39-40 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:

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.:

1, 2, 6-40 partially, 3-5 completely

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

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

1. Claims: 1,2,6-40 partially, 3-5 completely

A baculovirus wherein the baculovirus genome has been modified to include a nucleic acid molecule which encodes a therapeutic agent and a nucleic acid molecule which encodes a polypeptide which functions to target said baculovirus to at least one cell type, said genome is further adapted for eukaryotic gene expression of said nucleic acid molecules, wherein the expression of said nucleic acid molecule encoding a therapeutic agent is controlled by a cancer specific promoter. Composition methods and uses thereof.

2. Claims: 1-6, 32-40 partially, 7-9 completely

A baculovirus wherein the baculovirus genome has been modified to include a nucleic acid molecule which encodes a therapeutic agent and a nucleic acid molecule which encodes a polypeptide which functions to target said baculovirus to at least one cell type, said genome is further adapted for eukaryotic gene expression of said nucleic acid molecules, wherein said therapeutic agent is a tumour suppressor polypeptide. Composition methods and uses thereof.

3. Claims: 1-6, 32-40 partially, 10,11 completely

A baculovirus wherein the baculovirus genome has been modified to include a nucleic acid molecule which encodes a therapeutic agent and a nucleic acid molecule which encodes a polypeptide which functions to target said baculovirus to at least one cell type, said genome is further adapted for eukaryotic gene expression of said nucleic acid molecules, wherein said therapeutic agent is a cytotoxic polypeptide. Composition methods and uses thereof.

4. Claims: 1-6, 32-40 partially, 12,13 completely

A baculovirus wherein the baculovirus genome has been modified to include a nucleic acid molecule which encodes a therapeutic agent and a nucleic acid molecule which encodes a polypeptide which functions to target said baculovirus to at least one cell type, said genome is further adapted for eukaryotic gene expression of said nucleic acid molecules, wherein said therapeutic agent is a polypeptide which induces cell-cycle arrest. Composition methods and uses thereof.

5. Claims: 1-6, 32-40 partially, 14-16 completely

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

A baculovirus wherein the baculovirus genome has been modified to include a nucleic acid molecule which encodes a therapeutic agent and a nucleic acid molecule which encodes a polypeptide which functions to target said baculovirus to at least one cell type, said genome is further adapted for eukaryotic gene expression of said nucleic acid molecules, wherein said therapeutic agent is a cytokine polypeptide. Composition methods and uses thereof.

6. Claims: 1-6, 32-40 partially, 17-18 completely

A baculovirus wherein the baculovirus genome has been modified to include a nucleic acid molecule which encodes a therapeutic agent and a nucleic acid molecule which encodes a polypeptide which functions to target said baculovirus to at least one cell type, said genome is further adapted for eukaryotic gene expression of said nucleic acid molecules, wherein said therapeutic agent is an antibody or active fragment thereof. Composition methods and uses thereof.

7. Claims: 1-6, 32-40 partially, 19, 20 completely

A baculovirus wherein the baculovirus genome has been modified to include a nucleic acid molecule which encodes a therapeutic agent and a nucleic acid molecule which encodes a polypeptide which functions to target said baculovirus to at least one cell type, said genome is further adapted for eukaryotic gene expression of said nucleic acid molecules, wherein said therapeutic agent is a polypeptide which induces apoptosis. Composition methods and uses thereof.

8. Claims: 1-6, 32-40 partially, 21-24 completely

A baculovirus wherein the baculovirus genome has been modified to include a nucleic acid molecule which encodes a therapeutic agent and a nucleic acid molecule which encodes a polypeptide which functions to target said baculovirus to at least one cell type, said genome is further adapted for eukaryotic gene expression of said nucleic acid molecules, wherein said therapeutic agent is a prodrug activating polypeptide. Composition methods and uses thereof.

9. Claims: 1-5, 32-40 partially, 25-29 completely

A baculovirus wherein the baculovirus genome has been modified to include a nucleic acid molecule which encodes a therapeutic agent and a nucleic acid molecule which encodes a polypeptide which functions to target said baculovirus to at least one cell type, said genome is further adapted for eukaryotic gene expression of said nucleic acid molecules, wherein said therapeutic agent is an antisense. Composition

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

methods and uses thereof.

10. Claims: 1-5, 32-40 partially, 30, 31 completely

A baculovirus wherein the baculovirus genome has been modified to include a nucleic acid molecule which encodes a therapeutic agent and a nucleic acid molecule which encodes a polypeptide which functions to target said baculovirus to at least one cell type, said genome is further adapted for eukaryotic gene expression of said nucleic acid molecules, wherein said therapeutic agent is a RNA molecule.
Composition methods and uses thereof.

INTERNATIONAL SEARCH REPORT

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 19735593	A	18-02-1999	DE 19735593 A1	18-02-1999
			CA 2300362 A1	25-02-1999
			WO 9909193 A1	25-02-1999
			EP 1003896 A1	31-05-2000
			ES 2150894 T1	16-12-2000

WO 0077233	A	21-12-2000	US 6183993 B1	06-02-2001
			AU 5470100 A	02-01-2001
			EP 1192266 A2	03-04-2002
			JP 2003502051 T	21-01-2003
			WO 0077233 A2	21-12-2000

WO 0058470	A	05-10-2000	AU 3919600 A	16-10-2000
			EP 1185639 A1	13-03-2002
			WO 0058470 A1	05-10-2000

WO 9408022	A	14-04-1994	AU 5103893 A	26-04-1994
			WO 9408022 A1	14-04-1994
			EP 0672153 A1	20-09-1995
			JP 8501453 T	20-02-1996
			ZA 9307164 A	23-05-1994
