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(88) Date of publication of the international search report:
10 August 2006

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: AVIAN ADENOASSOCIATED VIRUS (AAAV) AND USES THEREOF

(57) Abstract: The present invention provides an Avian adeno-associated virus (AAAV) virus and vectors and particles derived therefrom. In addition, the present invention provides methods of delivering a nucleic acid to a cell using the AAAV vectors and particles. Methods of isolating the AAAV are provided.



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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/15534

A. CLASSIFICATION OF SUBJECT MATTER

IPC: C12N 15/00(2006.01);A61K 31/713(2006.01)

USPC: 435/320.1;514/44

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)

U.S. : 435/320.1; 514/44

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 practicable, search terms used)
Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2002/0076754 A1 (SUN et al) 20 June 2002 (20.06.2002), abstract, pages 12-13.	1, 4-12
X	WO 00/28061 A2 (THE TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA) 18 May 2000 (18.05.2000), abstract, page 3, lines 14-16, page 8, lines 1-4, page 14, lines 6-15.	40
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Y		2
A		3, 40



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:		"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
"A"	document defining the general state of the art which is not considered to be of particular relevance	"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
"E"	earlier application or patent published on or after the international filing date	"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
"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)	"&"	document member of the same patent family
"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		

Date of the actual completion of the international search

27 April 2006 (27.04.2006)

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INTERNATIONAL SEARCH REPORT

International application No.

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Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 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 No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation 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 additional fees, this Authority did not invite payment of any additional fees.
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 and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

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BOX III. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claims 1-12, and 40, drawn to a nucleic acid vector comprising a pair of avian adeno-associated virus (AAAV) inverted terminal repeats and a promoter between said repeats; and said nucleic acid vector encapsidated in a viral particle

Group II, claims 13-20, drawn to an isolated nucleic acid comprising the nucleic acid sequence set forth in SEQ ID NO: 1, a nucleic acid encoding encodes the amino acid sequence set forth in SEQ ID NOS: 3, 5, 7 and 9 and isolated nucleic acid encoding an AAAV Rep protein.

Group III, claims 21-23, drawn to an isolated Rep protein.

Group IV, claim 24, drawn to an isolated antibody that specifically binds the protein of SEQ ID NO: 5.

Group V, claims 25-30, 32, 34 and 39, drawn to an isolated AAAV capsid protein and an AAAV particle comprising the capsid protein set forth in SEQ ID NO: 11.

Group VI, claims 31, 33 and 35, drawn to an isolated antibody that binds an isolated AAAV capsid protein.

Group VII, claims 36-38, drawn to an isolated nucleic acid encoding the protein of claim 25 as set forth in SEQ ID NOS: 10, 12 and 14.

Group VIII, claim 41, drawn to a method of screening a cell for infectivity by AAAV.

Group IX, claim 42, drawn to a method of determining the suitability of an AAAV vector for administration to a subject.

Group X, claim 43, drawn to a method of determining the presence in a subject of an AAAV-specific antibody.

Group XI, claims 44-48, drawn to a method of delivering a nucleic acid to a cell and to a subject, comprising administering to the cell an AAAV particle.

Group XII, claim 49, drawn to an isolated nucleic acid comprising the nucleotide sequence set forth in SEQ ID NO: 20.

Group XIII, claim 50, drawn to an isolated nucleic acid comprising the nucleotide sequence set forth in SEQ ID NO: 18.

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Group XIV, claims 51-82, 84, 85 and 87, drawn to a vector system for producing infectious virus particles and a cell comprising said vector system

Group XV, claims 83 and 86, drawn to a method of producing AAV particles

Group XVI, claim 88, drawn to a method of inducing an immune response to AAV in a subject.

Group XVII, claim 89, drawn to a method of blocking an immune response against AAV in a subject.

Group XVIII, claim 90-91, drawn to a method of producing a recombinant protein and a protein produced by said method.

According to PCT Rule 13.2, unity of invention exists only when the shared same or corresponding technical feature is a contribution over the prior art. The inventions listed in Groups I-III do not relate to a single general inventive concept because they lack the same or corresponding special technical feature. The technical feature of Group I a recombinant avian AAV viral particle which is shown by Sun et al (US 2002/0076754) to lack novelty or inventive step by teaching a recombinant avian AAV viral particle comprising a vector with two AAV inverted terminal repeat sequences flanking a promoter and exogenous nucleic acid (abstract and pages 12-13) and does not make a contribution over the prior art.

This application contains claims directed to more than one species of the generic invention. These species are deemed to lack unity of invention because they are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In order for more than one species to be examined, the appropriate additional examination fees must be paid. The species are as follows:

For Group II, the species are the amino acid sequences of the Rep protein set forth as SEQ ID NO: 3, 5, 7 and 9.

For Group V, the species are the amino acid sequences of the capsid protein set forth as SEQ ID NOS: 11, 13 and 15.

For Group VI, the species are antibodies that bind specifically to the protein of claim 33 (SEQ ID NO: 13) and claim 35 (SEQ ID NO: 15).

The following claim(s) are generic: claim 16 is generic to the species of Group II, claim 25 is generic to the species of Group IV and claim 31 is generic to the species of Group VI.

The species listed above do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, the species lack the same or corresponding special technical features for the following reasons: For Group II, the amino acid sequences represented by SEQ ID NO: 3, 5, 7 and 9 are different sequences with different structures and therefore lack a special technical feature. For Group V, the amino acid sequences represented by SEQ ID NO: 11, 13 and 15 are different sequences with different structures and therefore lack a special technical feature. For Group VI, the antibodies that bind to amino acid sequences represented by SEQ ID NO: 13 and 15 are different sequences with different structures and therefore lack a special technical feature.

Continuation of B. FIELDS SEARCHED Item 3:

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/15534

EAST, MEDLINE, EMBASE, CAPLUS, BIOSIS

Search terms: avian adeno-associated virus, AAV, p5 promoter, parvovirus, inverted terminal repeats, ITR