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DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, MG, MK, MN, MU, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

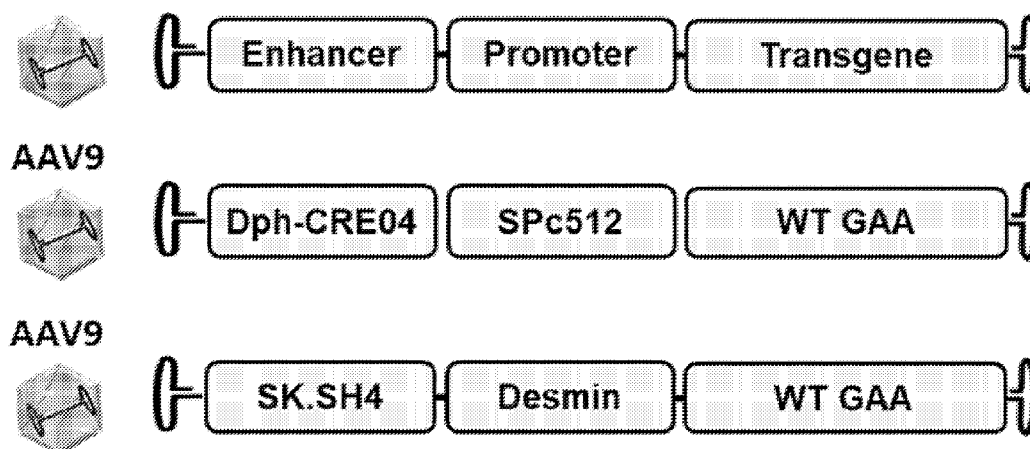
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Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))
- with sequence listing part of description (Rule 5.2(a))
- in black and white; the international application as filed contained color or greyscale and is available for download from PATENTSCOPE

(54) Title: TREATMENT OF POMPE DISEASE

AAV
capsid



(57) Abstract: Variant acid alpha-glucosidase (GAA) polypeptides, codon-optimized polynucleotides encoding GAA, and GAA gene therapy methods and constructs are provided.

(88) Date of publication of the international search report:
13 February 2025 (13.02.2025)

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2024/056362

A. CLASSIFICATION OF SUBJECT MATTER

INV. C12N9/42 A61P21/00 A61K48/00 A61P43/00 C12N15/63
C12N15/861

ADD.

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)

C12N A61P A61K C07K

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)

EPO-Internal, WPI Data, CHEM ABS Data, Sequence Search, BIOSIS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EGGERS MICHELLE ET AL: "Muscle-directed gene therapy corrects Pompe disease and uncovers species-specific GAA immunogenicity", EMBO MOLECULAR MEDICINE, vol. 14, no. 1, 1 December 2021 (2021-12-01), XP093203337, US ISSN: 1757-4676, DOI: 10.15252/emmm.202113968 Retrieved from the Internet: URL:https://onlinelibrary.wiley.com/doi/full-xml/10.15252/emmm.202113968> the whole document ----- - / - -	4-63, 158-161

☒ Further documents are listed in the continuation of Box C.

☒ See patent family 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 application or patent 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

1 November 2024

Date of mailing of the international search report

14/01/2025

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2024/056362

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 2023/028567 A2 (CANBRIDGE PHARMACEUTICALS INC [US]; LOGICBIO THERAPEUTICS INC [US]) 2 March 2023 (2023-03-02) pages 2,141-14; claims 1-127; sequence 2 -----	4 - 63, 158 - 161
A	US 2003/223966 A1 (FRAITES THOMAS J [US] ET AL) 4 December 2003 (2003-12-04) pages 2-4,11; claims 1-20; example 2 -----	4 - 63, 158 - 161

INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB2024/056362

Box No. I Nucleotide and/or amino acid sequence(s) (Continuation of item 1.c of the first sheet)

1. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of a sequence listing:
 - a. ☒ forming part of the international application as filed.
 - b. ☐ furnished subsequent to the international filing date for the purposes of international search (Rule 13~~ter~~.1(a)).
☐ accompanied by a statement to the effect that the sequence listing does not go beyond the disclosure in the international application as filed.
2. ☐ With regard to any nucleotide and/or amino acid sequence disclosed in the international application, this report has been established to the extent that a meaningful search could be carried out without a WIPO Standard ST.26 compliant sequence listing.
3. Additional comments:

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2024/056362

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.: 1-3 (completely); 10-63, 158-161 (partially)
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:
see FURTHER INFORMATION sheet PCT/ISA/210
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:

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 fees, this Authority did not invite payment of 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.:
4-9 (completely); 10-63, 158-161 (partially)

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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 4-9 (completely); 10-63, 158-161 (partially)

A nucleic acid encoding an acid alpha-glucosidase (GAA) protein, the nucleic acid comprising a first polynucleotide sequence that is at least 95%, at least 96%, at least 97% or at least 98% identical to CO3-MP-WT-NA (SEQ ID NO:34), its expression cassette, mammalian expression vector, host cell, pharmaceutical composition and medical use

2. claims: 1-3 (completely); 10-63, 158-161 (partially)

A nucleic acid encoding an acid alpha-glucosidase (GAA) protein, the nucleic acid comprising a first polynucleotide sequence that is at least 95%, at least 96%, at least 97% or at least 98% identical to CO3-MP-46-NA (SEQ ID NO:36), its expression cassette, mammalian expression vector, host cell, pharmaceutical composition and medical use

3. claims: 64-76 (completely); 131-161 (partially)

recombinant GAA variant protein according to claim 64, its nucleic acid, expression cassette, mammalian expression vector, host cell, pharmaceutical composition and medical use

4. claims: 77-119 (completely); 131-161 (partially)

recombinant GAA variant protein according to claim 77, its nucleic acid, expression cassette, mammalian expression vector, host cell, pharmaceutical composition and medical use

5. claims: 120-130 (completely); 131-161 (partially)

recombinant GAA variant protein according to claim 120, its nucleic acid, expression cassette, mammalian expression vector, host cell, pharmaceutical composition and medical use

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.2

Claims Nos.: 1-3 (completely); 10-63, 158-161 (partially)

The reasons as to why a meaningful search was not possible are specified in the annexed provisional opinion accompanying the partial search results (Form PCT/ISA/237).

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guidelines C-IV, 7.3), should the problems which led to the Article 17(2) PCT declaration be overcome.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IB2024/056362

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2023028567	A2	02-03-2023	AR 126877 A1 22-11-2023
			AU 2022335593 A1 14-03-2024
			CA 3230004 A1 02-03-2023
			CN 118159663 A 07-06-2024
			EP 4392570 A2 03-07-2024
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			KR 20240078666 A 04-06-2024
			TW 202338095 A 01-10-2023
			WO 2023028567 A2 02-03-2023

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			US 2003223966 A1 04-12-2003
			WO 03092598 A2 13-11-2003
