



(51) International Patent Classification:

A61K 9/51 (2006.01) A61K 39/12 (2006.01)
A61P 31/12 (2006.01) A61K 9/127 (2025.01)
B82Y 5/00 (2011.01) A61K 31/7088 (2006.01)
C12N 15/86 (2006.01)

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))

(21) International Application Number:

PCT/US2024/033024

(88) Date of publication of the international search report:

09 January 2025 (09.01.2025)

(22) International Filing Date:

07 June 2024 (07.06.2024)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

63/471,614 07 June 2023 (07.06.2023) US

(71) Applicant: NUTECH VENTURES [US/US]; 2021 Transformation Drive, Suite 2220, Lincoln, Nebraska 68508 (US).

(72) Inventors: VU, Hiep; 2535 Alana Ln, Lincoln, Nebraska 68512 (US). NGUYEN, The Nhu; 3835 Holdrege Street, Lincoln, Nebraska 68583-0745 (US). SILLMAN, Sarah; 17595 S 96th St, Hickman, Nebraska 68372 (US).

(74) Agent: PARSONS, M. Angela; P.O. Box 1022, Minneapolis, MN 55440-1022 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CV, CZ, DE, DJ, DK, DM, 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.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, CV, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, ME, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

(54) Title: METHODS AND COMPOSITIONS FOR VACCINE DEVELOPMENT AND DELIVERY

(57) Abstract: This document describes methods and compositions that can be used to rapidly develop and deliver new vaccines.



WO 2024/254461 A3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2024/033024

A. CLASSIFICATION OF SUBJECT MATTERIPC: **A61K 9/51** (2023.01); **A61P 31/12** (2023.01); **B82Y 5/00** (2023.01); **C12N 15/86** (2023.01); **A61K 39/12** (2023.01); **A61K 9/127** (2023.01); **A61K 31/7088** (2023.01)CPC: **A61K 9/5123**; **A61K 39/12**; **A61P 31/12**; **B82Y 5/00**; **C12N 15/86**; **A61K 2039/53**; **A61K 2039/55555**; **A61K 31/7088**; **A61K 9/127**

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)

See Search History Document

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

See Search History Document

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

See Search History Document

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2021/0252133 A1 (GLAXOSMITHKLINE BIOLOGICALS SA) 19 August 2021 (19.08.2021) entire document	1-3
A	US 2022/0106257 A1 (ACUITAS THERAPEUTICS INC.) 07 April 2022 (07.04.2022) entire document	1-3
A	US 2021/0196806 A1 (GRITSTONE ONCOLOGY INC.) 01 July 2021 (01.07.2021) entire document	1-3
A	WO 2022/173730 A1 (VIRGINIA COMMONWEALTH UNIVERSITY) 18 August 2022 (18.08.2022) entire document	1-3

☐ 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

“D” document cited by the applicant in the international application

“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

26 November 2024 (26.11.2024)

Date of mailing of the international search report

04 December 2024 (04.12.2024)

Name and mailing address of the ISA/US

COMMISSIONER FOR PATENTS
MAIL STOP PCT, ATTN: ISA/US
P.O. Box 1450
Alexandria, VA 22313-1450
UNITED STATES OF AMERICA

Authorized officer

TAINA MATOS

Facsimile No. 571-273-8300

Telephone No. 571-272-4300

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2024/033024

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 13ter.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/US2024/033024

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.: **4-19**
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).