



(51) International Patent Classification:

A61K 39/00 (2006.01) G01N 33/569 (2006.01)

C12Q 1/68 (2018.01) C12Q 1/6869 (2018.01)

(21) International Application Number:

PCT/US2019/066104

(22) International Filing Date:

12 December 2019 (12.12.2019)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

62/780,832 17 December 2018 (17.12.2018) US

62/820,042 18 March 2019 (18.03.2019) US

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(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, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, 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, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, 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, 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 FOR IDENTIFYING NEOANTIGENS

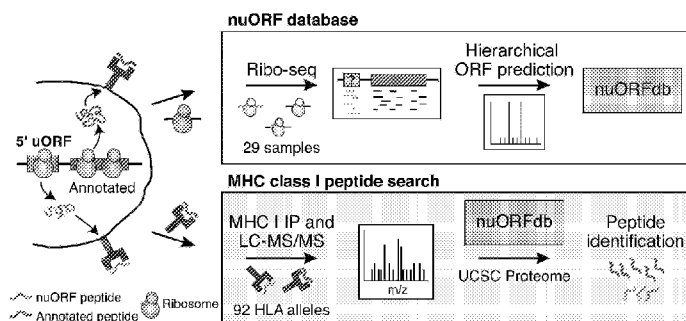


FIG. 32A

(57) Abstract: Disclosed herein are polypeptides and compositions comprising one or more neoantigens, methods of identifying neoantigens, and methods for preparing a neoantigen for an immunogenic pharmaceutical composition. The neoantigen can be specific to a subject that has a cancer, disease, or other disorder.



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))*

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

23 July 2020 (23.07.2020)

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2019/066104

A. CLASSIFICATION OF SUBJECT MATTER

INV. A61K39/00 C12Q1/68 G01N33/569 C12Q1/6869
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)

A61K C12Q G01N

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, EMBL, WPI Data, BIOSIS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>SHEN YING ET AL: "Focusing on long non-coding RNA dysregulation in newly diagnosed multiple myeloma", LIFE SCIENCES, PERGAMON PRESS, OXFORD, GB, vol. 196, 3 February 2018 (2018-02-03), pages 133-142, XP085351309, ISSN: 0024-3205, DOI: 10.1016/J.LFS.2018.01.025 abstract page 134, left-hand column, paragraph 1 - right-hand column, paragraph 6 table 2 page 137, right-hand column, paragraph 1 page 138, right-hand column, paragraph 2 - page 139, left-hand column, last paragraph ----- -/-</p>	<p>1-17, 24-28, 37-39, 43,44</p>



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

19 March 2020

Date of mailing of the international search report

25/06/2020

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2019/066104

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:
- ☐ in the form of an Annex C/ST.25 text file.
- ☐ on paper or in the form of an image file.
- b. ☐ furnished together with the international application under PCT Rule 13~~ter~~.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
- c. ☒ furnished subsequent to the international filing date for the purposes of international search only:
- ☒ in the form of an Annex C/ST.25 text file (Rule 13~~ter~~.1(a)).
- ☐ on paper or in the form of an image file (Rule 13~~ter~~.1(b) and Administrative Instructions, Section 713).
2. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
3. Additional comments:

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2019/066104

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:

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.:

1-17, 24-28, 37-39, 43, 44(all 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: 1-17, 24-28, 37-39, 43, 44(all partially)

Polypeptide comprising neoantigen designated ST3GAL6-AS1 of table 3A, polynucleotide, vector and vector system comprising the same, composition comprising the polypeptide or polynucleotide and medical uses, T cell specific for the neoantigen

2-79. claims: 1-17, 24-28, 37-39, 43, 44(all partially)

Polypeptide comprising neoantigen of tables 3A-3D, polynucleotide, vector and vector system comprising the same, composition comprising the polypeptide or polynucleotide and medical uses, T cell specific for the neoantigen

80. claims: 18-23, 40-42

Method for identifying neoantigens comprising ribosomal profiling

81. claims: 29-36

Method of identifying subject-specific T cell receptor pairs suitable for subject-specific cancer therapy

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2019/066104

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>WO 2015/095811 A2 (BROAD INST INC [US]; DANA FARBER CANCER INST INC [US] ET AL.) 25 June 2015 (2015-06-25)</p> <p>page 19, paragraph 0081 page 21, paragraph 0085 - page 35, paragraph 00125; examples -----</p>	<p>1-17, 24-28, 37-39, 43,44</p>
A	<p>WO 2016/201049 A2 (BROAD INST INC [US]) 15 December 2016 (2016-12-15)</p> <p>page 4, paragraph 0011 page 3, paragraph 0015 page 6, paragraph 0025 - paragraph 0026 page 14, paragraph 0074 page 27, paragraph 00131 page 31, paragraph 00138 - page 34, paragraph 00144 page 94, paragraph 00363; examples -----</p>	<p>1-17, 24-28, 37-39, 43,44</p>

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2019/066104

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2015095811 A2	25-06-2015	AU 2014368898 A1 BR 112016014410 A2 CA 2934073 A1 CN 106456724 A EP 3082853 A2 JP 2017502029 A KR 20160101073 A US 2016339090 A1 WO 2015095811 A2	28-07-2016 20-02-2018 25-06-2015 22-02-2017 26-10-2016 19-01-2017 24-08-2016 24-11-2016 25-06-2015
WO 2016201049 A2	15-12-2016	AU 2016276704 A1 CA 2988135 A1 CL 2017003151 A1 CL 2019003264 A1 CN 107921107 A CR 20180015 A EC SP18001613 A EP 3307303 A2 HK 1252325 A1 HK 1253271 A1 JP 2018521028 A KR 20180016531 A PE 6012018 A1 PH 12017502233 A1 RU 2017145963 A TW 201718000 A US 2019060428 A1 WO 2016201049 A2	14-12-2017 15-12-2016 06-04-2018 14-02-2020 17-04-2018 20-03-2018 31-05-2018 18-04-2018 24-05-2019 14-06-2019 02-08-2018 14-02-2018 09-04-2018 25-06-2018 16-07-2019 01-06-2017 28-02-2019 15-12-2016