

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(10) International Publication Number
WO 2022/223617 A1

(43) International Publication Date
27 October 2022 (27.10.2022)

(51) International Patent Classification:

A61K 39/12 (2006.01) C12N 15/09 (2006.01)
A61P 31/14 (2006.01)

TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
KM, ML, MR, NE, SN, TD, TG).

(21) International Application Number:

PCT/EP2022/060417

Published:

- with international search report (Art. 21(3))
- with sequence listing part of description (Rule 5.2(a))

(22) International Filing Date:

20 April 2022 (20.04.2022)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

PCT/EP2021/060273

20 April 2021 (20.04.2021) EP

(71) Applicant: **BIONTECH SE** [DE/DE]; An der Goldgrube
12, 55131 Mainz (DE).

(72) Inventors: **SAHIN, Ugur**; c/o BioNTech SE, An der Gold-
grube 12, 55131 Mainz (DE). **MUIK, Alexander**; c/o
BioNTech SE, An der Goldgrube 12, 55131 Mainz (DE).

(74) Agent: **SCHNAPPAUF, Georg**; Zwicker Schnappauf &
Partner Patentanwälte PartG mbB, Hansastr. 32, 80686 Mu-
nich (DE).

(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, IT, JM, 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, 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, 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,

(54) Title: VIRUS VACCINE

(57) Abstract: This disclosure relates to the field of preventing or treating virus infection, in particular, the disclosure relates to agents for vaccination against virus infection and inducing effective virus antigen-specific immune responses such as antibody and/or T cell responses and methods for generating and using such agents. Administration of agents such as RNA disclosed herein to a subject can protect the subject against virus infection. Specifically, the present disclosure relates to amino acid sequences comprising at least a portion of a virus protein having amino acid modifications found in other variants of the virus protein. Administration of RNA encoding one or more of the amino acid sequences may provide protection against diverse virus variants. Methods and agents described herein are, in particular, useful for the prevention or treatment of coronavirus infection such as SARS-CoV-2 infection.



WO 2022/223617 A1