

(19) World Intellectual Property  
Organization  
International Bureau



(10) International Publication Number

**WO 2021/226436 A8**

(43) International Publication Date  
11 November 2021 (11.11.2021)

**WIPO | PCT****(51) International Patent Classification:**

*A61K 39/215* (2006.01) *C07K 16/10* (2006.01)  
*A61P 31/14* (2006.01) *C07K 14/08* (2006.01)

**(21) International Application Number:**

PCT/US2021/031256

**(22) International Filing Date:**

07 May 2021 (07.05.2021)

**(25) Filing Language:**

English

**(26) Publication Language:**

English

**(30) Priority Data:**

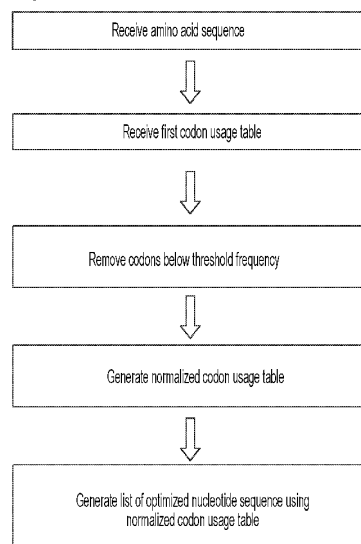
|            |                                |    |
|------------|--------------------------------|----|
| 63/021,319 | 07 May 2020 (07.05.2020)       | US |
| 63/032,825 | 01 June 2020 (01.06.2020)      | US |
| 63/076,729 | 10 September 2020 (10.09.2020) | US |
| 63/076,718 | 10 September 2020 (10.09.2020) | US |
| 63/088,739 | 07 October 2020 (07.10.2020)   | US |
| 63/143,604 | 29 January 2021 (29.01.2021)   | US |
| 63/143,612 | 29 January 2021 (29.01.2021)   | US |
| 63/146,807 | 08 February 2021 (08.02.2021)  | US |

(71) Applicant: **TRANSLATE BIO, INC.** [US/US]; 29  
Hartwell Avenue, Lexington, MA 02421 (US).

(72) Inventors: **DIAS, Anusha**; c/o Translate Bio, Inc., 29  
Hartwell Avenue, Lexington, MA 02421 (US). **TRAN,**  
**Khang, Anh**; c/o Translate Bio, Inc., 29 Hartwell Ave-  
enue, Lexington, MA 02421 (US). **ZACHARIA, Minnie**;  
c/o Translate Bio, Inc., 29 Hartwell Avenue, Lexington,  
MA 02421 (US). **GU, Xiaobo**; c/o Translate Bio, Inc., 29  
Hartwell Avenue, Lexington, MA 02421 (US). **BOEGLIN,**  
**Lianne**; c/o Translate Bio, Inc., 29 Hartwell Avenue, Lex-  
ington, MA 02421 (US). **SKALESKI, Joseph, A.**; c/o  
Translate Bio, Inc., 29 Hartwell Avenue, Lexington, MA  
02421 (US). **KARVE, Shrirang**; c/o Translate Bio, Inc., 29  
Hartwell Avenue, Lexington, MA 02421 (US). **DEROSA,**  
**Frank**; c/o Translate Bio, Inc., 29 Hartwell Avenue, Lex-  
ington, MA 02421 (US). **FU, Tong-Ming**; c/o Sanofi Pas-  
teur Inc., 1 Discovery Drive, Swiftwater, PA 18370 (US).  
**KALNIN, Kirill**; c/o Sanofi Pasteur Inc., 1 Discovery  
Drive, Swiftwater, PA 18370 (US). **CHIVUKULA, Sud-**  
**ha**; c/o Sanofi Pasteur Inc., 1 Discovery Drive, Swiftwa-  
ter, PA 18370 (US). **PLITNIK, Timothy**; c/o Sanofi Pas-  
teur Inc., 1 Discovery Drive, Swiftwater, PA 18370 (US).  
**CASIMIRO, Danilo**; c/o Sanofi Pasteur Inc., 1 Discovery  
Drive, Swiftwater, PA 18370 (US). **DUBINS, Jeffrey, S.**; c/

**(54) Title: OPTIMIZED NUCLEOTIDE SEQUENCES ENCODING SARS-COV-2 ANTIGENS**

Figure 1A



**(57) Abstract:** The present invention relates to optimized nucleotide sequence encoding SARS-CoV-2 antigens. These sequences are particularly suitable for use in vaccine compositions for the treatment or prevention of infections caused by a  $\beta$ -coronaviruses, including COVID-19 infections, in a human or animal subject in need of such treatment.

o Translate Bio, Inc., 29 Hartwell Avenue, Lexington, MA 02421 (US).

(74) **Agent: MENDEZ, Julio, J.** et al.; Proskauer Rose LLP, One International Place, Boston, MA 02110 (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, 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, 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, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

**Published:**

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

(48) **Date of publication of this corrected version:**  
10 November 2022 (10.11.2022)

(15) **Information about Correction:**  
see Notice of 10 November 2022 (10.11.2022)