

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
15 December 2022 (15.12.2022)



(10) International Publication Number
WO 2022/261101 A1

(51) International Patent Classification:

A61K 9/51 (2006.01) A61K 48/00 (2006.01)
A61K 38/17 (2006.01) C12N 15/66 (2006.01)

(21) International Application Number:

PCT/US2022/032510

(22) International Filing Date:

07 June 2022 (07.06.2022)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

63/197,881 07 June 2021 (07.06.2021) US

(71) Applicant: **GENERATION BIO CO.** [US/US]; 301 Binney Street, 4th Floor, Cambridge, MA 02142 (US).

(72) Inventors: **LEBLANC, Michelle**; c/o Generation Bio Co., 301 Binney Street, 4th Floor, Cambridge, MA 02142 (US). **FEINSTEIN, Gregory**; c/o Generation Bio Co., 301 Binney Street, 4th Floor, Cambridge, MA 02142 (US). **TOY, Randall, Newton**; c/o Generation Bio Co., 301 Binney Street, 4th Floor, Cambridge, MA 02142 (US). **NOLTING, Birte**; c/o Generation Bio Co., 301 Binney Street, 4th Floor, Cambridge, MA 02142 (US). **SILVER, Nathaniel**; c/o Generation Bio Co., 301 Binney Street, 4th Floor, Cambridge, MA 02142 (US). **SAMAYOA, Phillip**; c/o Genera-

tion Bio Co., 301 Binney Street, 4th Floor, Cambridge, MA 02142 (US). **CHATTERTON, Jon, Edward**; c/o Generation Bio Co., 301 Binney Street, 4th Floor, Cambridge, MA 02142 (US). **MANGANIELLO, Matthew**; c/o Generation Bio Co., 301 Binney Street, 4th Floor, Cambridge, MA 02142 (US). **ROSE, Douglas, A.**; c/o Generation Bio Co., 301 Binney Street, 4th Floor, Cambridge, MA 02142 (US). **DELANEY, Ryan, M.**; c/o Generation Bio Co., 301 Binney Street, 4th Floor, Cambridge, MA 02142 (US).

(74) Agent: **CLARKE, Marcie, B.** et al.; McCarter & English, LLP, 265 Franklin Street, 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, IQ, 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,

(54) Title: APOE AND APOB MODIFIED LIPID NANOPARTICLE COMPOSITIONS AND USES THEREOF

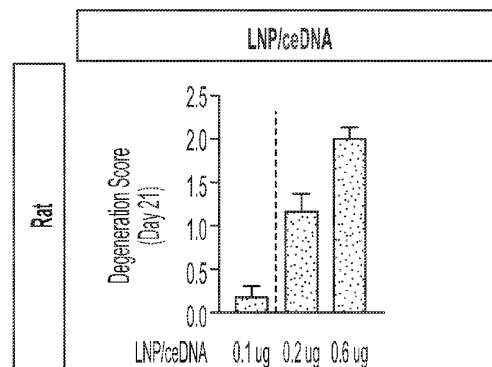


FIG. 1A

(57) Abstract: Provided herein are pharmaceutical compositions comprising a lipid nanoparticle (LNP) and a therapeutic nucleic acid (TNA), wherein the LNP comprises an ApoE polypeptide, or a fragment thereof and/or an ApoB polypeptide, or a fragment thereof, linked to the LNP, and at least one pharmaceutically acceptable excipient. The ApoE polypeptide, or the fragment thereof, and/or the ApoB polypeptide, or the fragment thereof, are capable of binding a low-density lipoprotein (LDL) receptor, or LDL receptor family member, advantageously providing LNP compositions that can be directed to any cell or tissue expressing the LDL receptor.

[Continued on next page]

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).

Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

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))*