

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
29 June 2023 (29.06.2023)



(10) International Publication Number
WO 2023/122764 A1

(51) International Patent Classification:

A61K 48/00 (2006.01) C12N 15/88 (2006.01)
C12N 15/10 (2006.01) C12N 15/90 (2006.01)
C12N 15/85 (2006.01) C12N 9/00 (2006.01)
C12N 15/86 (2006.01)

(21) International Application Number:

PCT/US2022/082297

(22) International Filing Date:

22 December 2022 (22.12.2022)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

63/292,698	22 December 2021 (22.12.2021)	US
63/318,343	09 March 2022 (09.03.2022)	US
63/355,235	24 June 2022 (24.06.2022)	US

(71) Applicant: **TOME BIOSCIENCES, Inc.** [US/US]; 100 Talcott Avenue, Watertown, MA 02472 (US).

(72) Inventors: **FINN, Jonathan Douglas**; Tome Biosciences, Inc., 100 Talcott Avenue, Watertown, MA 02472 (US). **KAKKAR, Rahul**; Tome Biosciences, Inc., 100 Talcott Avenue, Watertown, MA 02472 (US). **XIE, Xin Jenny**; Tome Biosciences, Inc., 100 Talcott Avenue, Watertown, MA 02472 (US). **ESTES, Brett Joseph Gordon**; Tome Biosciences, Inc., 100 Talcott Avenue, Watertown, MA 02472 (US).

(74) Agent: **BECKER, Daniel M.** et al.; Fenwick & West LLP, Silicon Valley Center, 801 California Street, Mountain View, CA 94041 (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,

(54) Title: CO-DELIVERY OF A GENE EDITOR CONSTRUCT AND A DONOR TEMPLATE

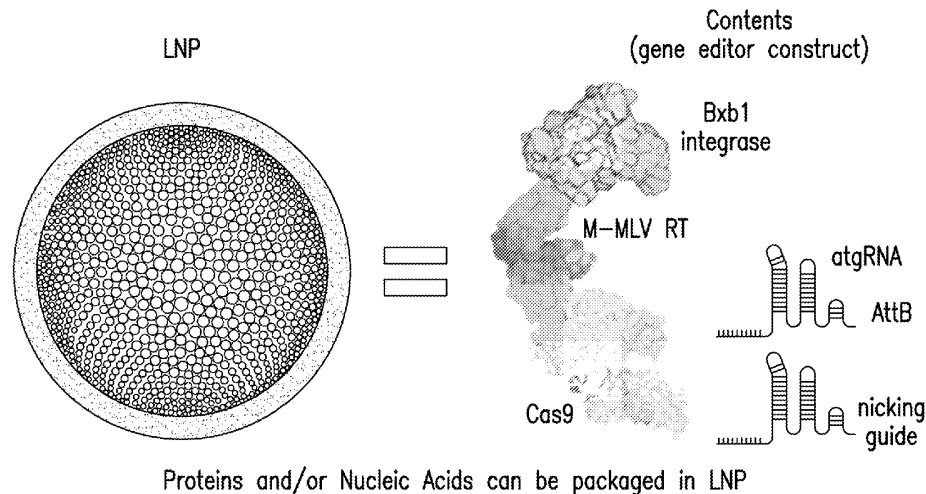


FIG. 1

(57) Abstract: The present disclosure provides compositions, methods, and an overall platform for co-delivery of gene editor polynucleotides and template polynucleotides. The gene editor polynucleotide packaged in a LNP is co-delivered with a template polynucleotide (i.e., "cargo" or "payload") packaged into a separate vector that is capable of localizing the donor template to a cell nucleus. In certain embodiments, the donor template vector is an AAV, a helper dependent adenovirus, or an integration deficient lentivirus. In typical embodiments, the template polynucleotide is integrated into the genomic integration recognition site by an integrase, optionally by an integrase fused/linked to a gene editor protein.

[Continued on next page]

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, 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, 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).

Declarations under Rule 4.17:

— *of inventorship (Rule 4.17(iv))*

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))*
— *with sequence listing part of description (Rule 5.2(a))*