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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
16 December 2021 (16.12.2021)

WIPO | PCT

(10) International Publication Number
WO 2021/250263 A1

(51) International Patent Classification:
A61K 9/00 (2006.01) *A61K 47/24* (2006.01)
A61K 9/127 (2006.01) *A61K 38/00* (2006.01)
A61K 9/51 (2006.01) *A61K 39/00* (2006.01)
A61K 47/14 (2017.01)

(21) International Application Number:
PCT/EP2021/065856

(22) International Filing Date:
11 June 2021 (11.06.2021)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
20179435.1 11 June 2020 (11.06.2020) EP
21160384.0 03 March 2021 (03.03.2021) EP

(71) Applicant: **ETHERNA IMMUNOTHERAPIES NV** [BE/BE]; Galileilaan 19, 2845 Niel (BE).

(72) Inventors: **BEVERS, Sanne**; Galileilaan 19, 2845 Niel (BE). **DE KOKER, Stefaan**; Galileilaan 19, 2845 Niel (BE). **SCHIFFELERS, Raymond Michel**; UMC Utrecht Holding B.V., Yalelaan 40, 3584CM Utrecht (NL). **KOOIJMANS, Sander Alexander Antonius**; UMC Utrecht Holding B.V., Yalelaan 40, 3584CM Utrecht (NL).

(74) Agent: **ARNOLD & SIEDSMA BV**; Bezuidenhoutseweg 57, 2594 AC The Hague (NL).

(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.

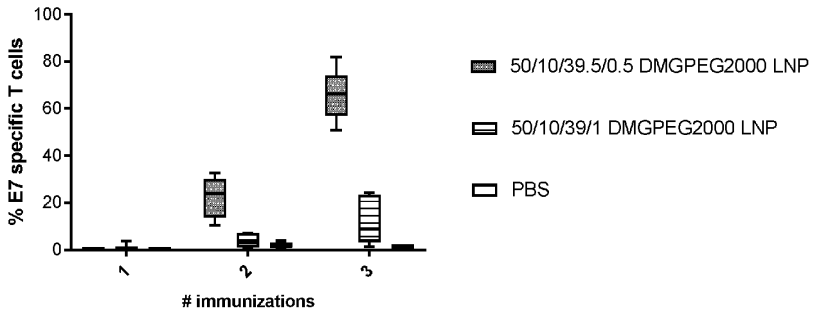
(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, 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).

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))*
— *of inventorship (Rule 4.17(iv))*

Published:
— *with international search report (Art. 21(3))*

(54) Title: LIPID NANOPARTICLES

Fig. 1



(57) Abstract: The present invention relates to the field of lipid nanoparticles (LNP); more specifically comprising an ionizable lipid, a phospholipid, a sterol, a PEG lipid and one or more nucleic acids. The LNP's of the present invention are characterized in comprising less than about 1 mol% of a C14-PEG2000 lipid; as well as particular percentages of the other lipids. The present invention provides use of the LNP's for immunogenic delivery of nucleic acid molecules, specifically mRNA; thereby making them highly suitable for use in vaccines, such as for the treatment of cancer or infectious diseases. Finally, methods are provided for preparing such LNP's.

WO 2021/250263 A1