DC67553 | Lipid PL40

Instructions for Use

PL40 is a cardiolipin-mimic phosphoramide (CAMP) lipid developed for antibody-free, T-cell-favored mRNA delivery. The cited study reported approximately 100-fold higher luciferase expression than ALC-0315 LNP and MessengerMax in primary human T cells under a specific in vitro assay, more than 80% GFP-positive human T cells at tested doses of at least 0.5 micrograms per 100,000 cells, and spleen-favored expression after intravenous administration. PL40 LNPs carrying circular uPAR CAR mRNA were also evaluated in preclinical liver-fibrosis and collagen-induced-arthritis models. All formulation and performance information shown below is literature-derived study evidence, not a product specification or a guarantee of reproducible LNP performance.

Product information

CAS No.	Not available
Chemical Name	Lipid PL40
Formula	C86H170N4O14P2
M.Wt	1,546.27
Purity	ELSD-HPLC>95%
Storage	Original product: up to 1 year under the storage conditions stated on the vial, kept tightly sealed. Stock solutions: aliquots at -20°C, generally up to one month.
Shipping condition	Ships from Shanghai. Pure lipid is stable during ice-pack transport.

Formulation & study context

Literature values apply to the cited study only. Administration routes describe research, not clinical instructions.

Component	mol%	Role
PL40	Not reported	Ionizable lipid
DOPE	Not reported	Helper phospholipid
Cholesterol	Not reported	Sterol
DMG-PEG2000	Not reported	PEG lipid
Reported total	Not reported	Source values retained

N/P ratio	Not reported in the cited article
Total lipid:cargo weight ratio	Not reported in the supplied main article or Supporting Information
Buffer & pH	10 mM citrate aqueous phase, pH 4; final dialysis into PBS at 4 degrees C overnight

Cargo	Linear or circular luciferase mRNA, depending on the experiment
Administration route	Intravenous tail-vein injection
Dose	0.25 mg mRNA/kg for the reported luciferase-expression study
Animal model	C57BL/6 mice
Formulation process	Aqueous mRNA and ethanolic lipids were combined at 3:1 v/v by hand mixing or microfluidic mixing. Final mRNA concentration was 0.1 mg/mL; the article does not assign one mixing mode or report device and flow settings for every experiment.

N/P is a nitrogen-to-phosphate molar ratio. Lipid:cargo mass ratio is a different quantity and must not be used as N/P.

Stock-solution preparation table

Calculated using product-page MW: 1546.27 g/mol. Volumes are final solution volumes.

Mass	1 mM	5 mM	10 mM
10 mg	6.467 mL	1.293 mL	0.647 mL
25 mg	16.168 mL	3.234 mL	1.617 mL
50 mg	32.336 mL	6.467 mL	3.234 mL
100 mg	64.672 mL	12.934 mL	6.467 mL
250 mg	161.679 mL	32.336 mL	16.168 mL

Volume (mL) = mass (mg) × 1000 / [MW (g/mol) × concentration (mM)]. Mathematical conversions only; not measured solubility. Confirm solvent compatibility and the exact material before preparation.

Handling & storage

Provided that storage conditions are as stated on the product vial and the vial is kept tightly sealed, the product can be stored for up to 1 year.

Wherever possible, prepare and use solutions on the same day. If stock solutions must be prepared in advance, store them as aliquots in tightly sealed vials at -20°C. Generally, these will be usable for up to one month.

Before use, and prior to opening the vial, allow the product to equilibrate to room temperature for at least 1 hour.

References

Cited literature for this formulation and performance dataset Zhang Z, Ma B, Li B, et al. Cardiolipin-mimic lipid nanoparticles without antibody modification delivered senolytic in vivo CAR-T therapy for inflamm-aging. Cell Reports Medicine. 2025;6:102209. DOI: 10.1016/j.xcrm.2025.102209 Structure: main Figures 1E and 2D; formulation and preparation: main Results and STAR Methods p. e4; particle properties: main Figure 2E; T-cell transfection, circRNA expression and preclinical efficacy: main Figures 1-7 and Supplementary Figures S1-S21.