

DC60793 | LUMI6

Instructions for Use

The LUMI-6 lipid, autonomously designed via the LUMI-lab platform, is a brominated ionizable lipid optimized for mRNA delivery. Formulated at a molar ratio of 35:28:34.5:2 (LUMI-6:DOTAP:cholesterol:C14-PEG2000), LNPs exhibit uniform physicochemical properties, including a hydrodynamic diameter of ~80 nm, polydispersity index (PDI) <0.2, and robust mRNA encapsulation efficiency. In vitro, LUMI-6 LNPs demonstrated 1.8-fold higher transfection potency in human bronchial epithelial cells compared to its debrominated counterpart (LUMI-6D), with minimal cytotoxicity confirmed by CCK-8 assays. In vivo, pulmonary delivery of CRISPR-Cas9 mRNA via LUMI-6 LNPs achieved 20.3% gene editing efficiency in murine lung epithelial cells, surpassing SM-102 (Moderna's clinical benchmark) and demonstrating preferential tropism for lung epithelium over endothelial cells—critical for inhaled therapies targeting cystic fibrosis and surfactant disorders. The brominated tail enhances endosomal escape through optimized protonation dynamics, though explicit pKa values remain unmeasured. Synthesized via high-throughput combinatorial chemistry and refined through AI-driven active learning, LUMI-6 combines scalable production with organ-selective delivery, positioning it as a transformative platform for pulmonary nucleic acid therapeutics.

Product information

CAS No.	Not available
Chemical Name	LUMI6
Formula	C45H81O4BrN4
M.Wt	822.07
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.

A complete product-specific formulation has not been verified. No standard ratio is substituted.

N/P ratio	Not reported in the verified record
Cargo	Not available in the verified record
Administration route	Not available in the verified record
Animal model	Not available in the verified record
Formulation process	Not available in the verified record

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: 822.07 g/mol. Volumes are final solution volumes.

Mass	1 mM	5 mM	10 mM
10 mg	12.164 mL	2.433 mL	1.216 mL
25 mg	30.411 mL	6.082 mL	3.041 mL
50 mg	60.822 mL	12.164 mL	6.082 mL
100 mg	121.644 mL	24.329 mL	12.164 mL
250 mg	304.110 mL	60.822 mL	30.411 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

<https://www.biorxiv.org/content/10.1101/2025.02.14.638383v1.full.pdf>