

DC67721 | Macrocyclic Lipid 5

Instructions for Use

Lipid 5 is an ionizable lipid based on a macrocyclic cyclam headgroup. Its structure incorporates a benzylmethyl carbonate (BMC) linker, which contains an aromatic benzene ring, and a saturated C18 hydrophobic tail. Lipid 5 was mixed with helper lipids at a fixed molar ratio and formulated into mRNA-loaded lipid nanoparticles (LNPs) using microfluidic technology. Characterization data show that these LNPs have a hydrodynamic diameter of approximately 50-80 nanometers and a polydispersity index (PDI) below 0.2, indicating a small particle size with a uniform distribution. Their zeta potential at physiological pH is near neutral (ranging from -3 to +3 mV). The mRNA encapsulation efficiency, as determined by the Ribogreen assay, exceeds 95%. Cryo-transmission electron microscopy images reveal that the LNPs exhibit a typical spherical bilayer structure. In in vitro experiments, Lipid 5 LNPs mediated a higher level of luciferase protein expression in HEK293FT cells compared to the benchmark lipid DLin-MC3-DMA. In Balb/c mice, intravenous injection of LNPs encapsulating luciferase mRNA resulted in in vivo imaging signals predominantly concentrated in the lungs. Quantitative analysis indicated that the signal intensity in the lungs was over 100 times greater than that in the liver, with more than 95% of the total signal distributed in the lungs. In Ai9 reporter gene mice, two intravenous injections of Lipid 5 LNPs encapsulating Cre mRNA led to quantitative analysis of lung tissue sections showing that approximately 30% of lung cells were positive for tdTomato signal.

Product information

CAS No.	Not available
Chemical Name	Macrocyclic Lipid 5
Formula	C60H104O4N4
M.Wt	945.52
Purity	>98%
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: 945.52 g/mol. Volumes are final solution volumes.

Mass	1 mM	5 mM	10 mM
10 mg	10.576 mL	2.115 mL	1.058 mL
25 mg	26.440 mL	5.288 mL	2.644 mL
50 mg	52.881 mL	10.576 mL	5.288 mL
100 mg	105.762 mL	21.152 mL	10.576 mL
250 mg	264.405 mL	52.881 mL	26.440 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

Not available