DC60918 | C14-306

Instructions for Use

C14-306 is a rationally designed ionizable lipid for brain targeting delivery, characterized by a linear 3,3'-diamino-N-methyldipropylamine (306) core conjugated with tetradecyl (C14) tails. This specific architectural configuration, synthesized via epoxide ring-opening amination, yields a molecular structure that optimally balances hydrophobic character and protonation capacity. The C14 alkyl chains enhance membrane integration and LNP stability, while the multiamine core facilitates efficient mRNA complexation and pH-dependent endosomal disruption. When formulated into LNPs with standard helper lipids (DOPE, cholesterol, DMG-PEG2000), C14-306-based nanoparticles exhibit favorable physicochemical properties, including a monodisperse size distribution near 110 nm and high mRNA encapsulation efficiency (>84%). High-throughput in vivo barcoding screening identified C14-306 LNPs as lead candidates for brain delivery, demonstrating a significant tropism for neuronal cells over liver tissue. In validation studies, LNPs incorporating C14-306 achieved a 6.9-fold increase in luciferase mRNA transfection in the mouse brain compared to the SM-102 benchmark, coupled with a substantial reduction in hepatic off-target expression. Flow cytometry confirmed preferential transfection of NeuN+ neurons, and safety assessments indicated no significant blood-brain barrier compromise or induction of systemic inflammation. The efficacy of C14-306 is attributed to its tailored pKa, promoting extended circulation and enhanced endosomal escape within brain cells. C14-306 represents a promising platform for systemic mRNA therapeutics targeting neurological disorders.

Product information

CAS No.	Not available
Chemical Name	C14-306
Formula	C63H131O4N3
M.Wt	994.76
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: 994.76 g/mol. Volumes are final solution volumes.

Mass	1 mM	5 mM	10 mM
10 mg	10.053 mL	2.011 mL	1.005 mL
25 mg	25.132 mL	5.026 mL	2.513 mL
50 mg	50.263 mL	10.053 mL	5.026 mL
100 mg	100.527 mL	20.105 mL	10.053 mL
250 mg	251.317 mL	50.263 mL	25.132 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

Han EL, Kim D, Murray AM, Mrksich K, Hamilton AG, Tang S, Yoo S, Zhu AT, Tong ER, Palanki R, Hall ML, Bedingfield SK, Mitchell MJ. High-Throughput In Vivo Screening Identifies Structural Factors Driving mRNA Lipid Nanoparticle Delivery to the Brain. ACS Nano. 2026 Jan 19