

DC60843 | CF3-2N6-UC18

Instructions for Use

CF3-2N6-UC18 is a rationally designed chloroquine-inspired ionizable lipid that enables robust mRNA delivery and genome editing. It integrates three modular components: a 7-trifluoromethyl-substituted quinoline scaffold (mimicking chloroquine's endosomolytic properties), a hexamethylenediamine linker with two ionizable nitrogen atoms (pH-responsive protonation), and two unsaturated oleyl (C18:1) hydrophobic tails (enhancing membrane fusion and nanoparticle stability). This lipid self-assembles into ecoLNPs (endosomolytic chloroquine-like lipid nanoparticles) with spherical morphology (~200 nm diameter, 98% mRNA encapsulation). Its pH-sensitive activity triggers endosomal escape through dual mechanisms: proton sponge effect (buffering endo-lysosomal pH) and saposin B-mediated membrane disruption (molecular docking confirms chloroquine-like binding to lysosomal saposin B). In vitro, ecoLNPs outperform commercial reagents (18.9-fold higher mRNA delivery than Lipofectamine 2000) and penetrate 3D cell models. They resist serum/RNase degradation and retain >90% activity after 7-day storage at 4°C. In vivo, ecoLNPs achieve tissue-specific mRNA expression via multiple routes (intravenous, intramuscular, etc.), with strong lymph node tropism (90.2% after intramuscular injection) comparable to SM-102 LNPs (Moderna's COVID-19 vaccine carrier). They mediate efficient Cre mRNA-driven recombination and CRISPR-Cas9 editing in transgenic mice. CF3-2N6-UC18's modular design, stability, and dual endosomal escape strategies position it as a versatile platform for mRNA vaccines, gene therapy, and genome editing applications.

Product information

CAS No.	Not available
Chemical Name	CF3-2N6-UC18
Formula	C53H92F3N3
M.Wt	828.34
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: 828.34 g/mol. Volumes are final solution volumes.

Mass	1 mM	5 mM	10 mM
10 mg	12.072 mL	2.414 mL	1.207 mL
25 mg	30.181 mL	6.036 mL	3.018 mL
50 mg	60.362 mL	12.072 mL	6.036 mL
100 mg	120.723 mL	24.145 mL	12.072 mL
250 mg	301.808 mL	60.362 mL	30.181 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

Structure-guided design of endosomolytic chloroquine-like lipid nanoparticles for mRNA delivery and genome editing-Nature Communications volume 16, Article number: 4241 (2025)