

DC67298 | Lipid 5D8

Instructions for Use

Lipid 5D8 is a novel biodegradable ionizable lipid (IL) developed through a combinatorial chemistry strategy to overcome the limitations of conventional lipid nanoparticles (LNPs) in mRNA delivery. Synthesized via a one-step, solvent-free Michael addition reaction between amine and thiol monomers, 5D8 features asymmetric lipid tails and a biodegradable ester backbone, ensuring both structural versatility and reduced toxicity. In preclinical studies, 5D8-based LNPs demonstrated exceptional liver-targeting efficiency and mRNA delivery performance. A single intravenous dose (1 mg/kg) achieved 61% CRISPR-Cas9-mediated editing of the TTR gene in mice, reducing serum TTR protein by 90%, outperforming benchmark lipids like C12-200 (51% editing). Moreover, 5D8 enabled efficient delivery of base editors (ABE8.8 and CBE4max), achieving 42% PCSK9 editing (74% serum protein reduction) and correcting hereditary tyrosinemia in mice, significantly extending survival. Beyond gene editing, 5D8 LNPs effectively delivered siRNA (complete serum TTR clearance at 0.05 mg/kg) and enhanced hepatocyte targeting by enriching apolipoprotein E on particle surfaces. Crucially, 5D8 exhibited superior biocompatibility with no hepatotoxicity (normal ALT/AST levels), contrasting traditional LNPs. Its rapid biodegradability and "plug-and-play" design make 5D8 a versatile platform for mRNA therapeutics, holding broad potential for treating genetic disorders, cardiovascular diseases, and beyond. This innovation represents a critical advancement toward safer, high-efficiency clinical translation of gene-editing therapies.

Product information

CAS No.	Not available
Chemical Name	Lipid 5D8
Formula	C48H93O8N3
M.Wt	840.28
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: 840.28 g/mol. Volumes are final solution volumes.

Mass	1 mM	5 mM	10 mM
10 mg	11.901 mL	2.380 mL	1.190 mL
25 mg	29.752 mL	5.950 mL	2.975 mL
50 mg	59.504 mL	11.901 mL	5.950 mL
100 mg	119.008 mL	23.802 mL	11.901 mL
250 mg	297.520 mL	59.504 mL	29.752 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/10.1101/2025.02.25.640222v1>