

DC60554 | Lipid 20b

Instructions for Use

Lipid 20b is a thiophene-based ionizable lipid synthesized via the Gewald reaction. It features dual unsaturated linoleic tails (C18:2) attached to the same side of the thiophene core and a tertiary amine headgroup. Formulated into LNPs (~100 nm, PDI ~0.2) with DSPC/cholesterol/DMG-PEG, it exhibits high mRNA encapsulation (>90%). Unlike traditional lipids, 20b lacks a pH-dependent ionization profile, likely due to electron delocalization in the thiophene ring. Intravenously, 20b LNPs transfect the liver and spleen in mice. Notably, subretinal delivery in mice and non-human primates (NHPs) achieved robust mRNA expression in photoreceptors (35% rods, 45% cones at high dose) and retinal pigment epithelium (RPE) with minimal acute toxicity. Immunosuppression enhanced rod transfection efficiency. High-dose administration in NHPs caused subretinal debris, but low doses (2.5 µg mRNA) maintained retinal health. This lipid demonstrates potential for liver and retinal gene therapy.

Product information

CAS No.	Not available
Chemical Name	Lipid 20b
Formula	C44H72N2O3S
M.Wt	709.12
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: 709.12 g/mol. Volumes are final solution volumes.

Mass	1 mM	5 mM	10 mM
10 mg	14.102 mL	2.820 mL	1.410 mL
25 mg	35.255 mL	7.051 mL	3.525 mL
50 mg	70.510 mL	14.102 mL	7.051 mL
100 mg	141.020 mL	28.204 mL	14.102 mL
250 mg	352.550 mL	70.510 mL	35.255 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

Thiophene-based lipids for mRNA delivery to pulmonary and retinal tissues-PNAS-March 4, 2024
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