

DC49952 | 246C10

Instructions for Use

246C10 is a synthesized ionizable lipid. 246C10 can be formulated into lipid nanoparticles (LNPs) with dioleoylphosphatidylethanolamine (DOPE), cholesterol, and C16-PEG2000 ceramide (PEG-lipid) as well as mRNA. The lipid nanoparticle formulations can be used for mRNA delivery. To obtain iLNPs that could specifically target liver sinusoidal endothelial cells (LSECs), six different ionizable lipids (241C10 to 246C10) were synthesized by an epoxide ring-opening reaction with piperazine- or piperidine-containing amines. Biodistribution and gene regulation of various iLNPs were assessed in vivo, and the results showed that the 246C10 iLNPs (containing piperazine amine) had the highest luciferase expression in the liver. When further analyzing the 246C10 iLNPs transfection efficiency in different types of liver cells, it was found that tdTomato fluorescence was mainly concentrated in hepatocytes, not in LSECs. Figure 6f shows that 80% of hepatocytes are fluorescent, 40% of LSECs are fluorescent, and 20% of Kupffer cells are fluorescent. Due to the mannose receptor on LSECs, mannose-PEG lipid was introduced into 246C10 iLNPs to alter the distribution of iLNPs in different liver cells. As shown in Figure 6g, tdTomato fluorescence distribution was 15% of hepatocytes, 70% of LSECs, and 15% of Kupffer cells, significantly improved the ability of iLNPs to actively target LSECs. In contrast, this work indirectly shows that the iLNPs with piperazine head lipid are more able to deliver mRNA to the liver and translate the target protein than the iLNPs with piperidine head lipid. It is worth mentioning that the preparation buffer of 246C10 iLNPs could influence the encapsulation efficiency of mRNA. With the addition of sodium chloride in the citrate buffer, the encapsulation efficiency of CRISPR-Cas9 mRNA and sgRNA was increased. These iLNPs were able to treat hemophilia safely, without causing hepatotoxicity, the immune response induced by Cas9 and off-target editing.

Product information

CAS No.	Not available
Chemical Name	246C10
Formula	C58H120N4O4
M.Wt	937.60
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: 937.6 g/mol. Volumes are final solution volumes.

Mass	1 mM	5 mM	10 mM
10 mg	10.666 mL	2.133 mL	1.067 mL
25 mg	26.664 mL	5.333 mL	2.666 mL
50 mg	53.328 mL	10.666 mL	5.333 mL
100 mg	106.655 mL	21.331 mL	10.666 mL
250 mg	266.638 mL	53.328 mL	26.664 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

[1]. Kim M, et al. Engineered ionizable lipid nanoparticles for targeted delivery of RNA therapeutics into different types of cells in the liver. Sci Adv. 2021;7(9):eabf4398. Published 2021 Feb 26.