

DC67567 | ARV-T1

Instructions for Use

ARV-T1 is a novel ionizable lipid featuring a cholesterol moiety incorporated in its tail, designed to enhance mRNA delivery efficiency. With a pKa of 6.73, it exhibits optimal pH-dependent ionization for endosomal escape and mRNA release. Structurally, ARV-T1 contains a tertiary amine head group and ester-linked lipid tails, enabling rapid in vivo metabolism and improved biocompatibility. Compared to SM-102 (used in Moderna's vaccine), LNPs formulated with ARV-T1 demonstrate superior physicochemical properties: smaller particle size (~80 nm vs. 90 nm), lower polydispersity index (0.09 vs. 0.10), and higher absolute zeta potential (-10 mV vs. -5 mV). These characteristics correlate with >90% mRNA encapsulation efficiency and enhanced stability, maintaining performance for 12 weeks at -20°C. In vitro, ARV-T1 LNPs showed 7-fold higher protein expression than SM-102 LNPs. In vivo, they prolonged luciferase expression (>72 hours vs. <48 hours for SM-102) and induced 10-fold higher neutralizing antibodies against SARS-CoV-2 spike protein at low doses. The cholesterol tail promotes endosomal membrane fusion, while ester linkages facilitate metabolic clearance, yielding an excellent safety profile in toxicity studies. This combination of efficacy and safety positions ARV-T1 as a promising platform for mRNA vaccines and therapeutics.

Product information

CAS No.	Not available
Chemical Name	ARV-T1
Formula	CsgH107NO5
M.Wt	910.51
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: 910.51 g/mol. Volumes are final solution volumes.

Mass	1 mM	5 mM	10 mM
10 mg	10.983 mL	2.197 mL	1.098 mL
25 mg	27.457 mL	5.491 mL	2.746 mL
50 mg	54.914 mL	10.983 mL	5.491 mL
100 mg	109.829 mL	21.966 mL	10.983 mL
250 mg	274.571 mL	54.914 mL	27.457 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

Lipid Nanoparticles Formulated with a Novel Cholesterol-Tailed Ionizable Lipid Markedly Increase mRNA Delivery Both in vitro and in vivo-Int J Nanomedicine. 2025 Jul 28:20:9389-9405. doi: 10.2147/IJN.S527822. eCollection 2025.