

DC67515 | CICL-207

Instructions for Use

CICL 207 is structurally optimized based on Lipid CICL-1. CICL207 is a constrained ionizable cationic lipid designed for lipid nanoparticle (LNP) delivery systems developed by Capstan. Its structure features a rigid cyclic backbone (e.g., pyrrolidine-derived core) paired with a tertiary amine group that ionizes at acidic pH (pKa ~6.5–7.0), enhancing endosomal escape. The lipid includes asymmetric hydrophobic tails (likely C14–C18 alkyl/ester chains) to stabilize LNP membranes and improve nucleic acid encapsulation. Integrated into LNPs (e.g., 58% CICL-207, 10% DSPC, 30.5% cholesterol, PEG-lipids), it enables targeted delivery to T cells (anti-CD5/CD8 tLNPs) with high transfection efficiency (spleen T cells >70% mCherry+), reduced liver uptake, and low toxicity (no significant ALT/AST elevation in rats). Its constrained design balances stability, tissue specificity, and biocompatibility for gene therapy applications. CICL 207 (F50) significantly outperforms CICL-1 by delivering dramatically enhanced target cell transfection with reduced off-target effects. It achieves >50% transfection efficiency in splenic T-cells—nearly double that of CICL-1—while slashing off-target expression in liver cells to <5% (versus >15% for CICL-1). This precision translates to superior therapeutic outcomes: CICL-207 enables ~95% B-cell depletion in CAR-T applications, far exceeding CICL-1's ~60% efficacy. Critically, it maintains an exceptional safety profile, showing no significant liver toxicity or inflammatory cytokine elevation even at high doses. Furthermore, CICL-207 demonstrates 2-fold higher transfection efficiency in hematopoietic stem cells, enabling robust gene editing. Its optimized pKa (~6.5) and constrained amine structure enhance endosomal escape while minimizing Kupffer cell uptake, making it ideal for targeted therapeutics requiring both potency and safety.

Product information

CAS No.	Not available
Chemical Name	CICL-207
Formula	C ₅₆ H ₁₀₀ N ₂ O ₁₄
M.Wt	1,024.72
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: 1024.72 g/mol. Volumes are final solution volumes.

Mass	1 mM	5 mM	10 mM
10 mg	9.759 mL	1.952 mL	0.976 mL
25 mg	24.397 mL	4.879 mL	2.440 mL
50 mg	48.794 mL	9.759 mL	4.879 mL
100 mg	97.588 mL	19.518 mL	9.759 mL
250 mg	243.969 mL	48.794 mL	24.397 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

US2025012778A1