

DOTMA

Catalog Number: 14476

DESCRIPTION

DOTMA is a tetra-methylated analogue of DOTAP and is one of the first cationic lipids used for gene delivery. Its positive head facilitates DNA-lipid complex formation and cell membrane interaction. It's been shown to have high transfection efficiency in a variety of cells including mammalian, primary, and insect cells. DOTMA is typically used with helper lipids like DOPE to form lipid nanoparticles (LNP), nanostructured lipid carriers (NLC), lipoplexes, and other nano lipid drug delivery systems used in vivo.

SPECIFICATIONS

CAS Number	104162-48-3
Purity	≥ 98%
Molecular Weight	670.57
Appearance	white powder
Storage	-20°C
Synonyms(s)	N,N,N-trimethyl-2,3-bis[(9Z)-9-octadecen-1-yloxy]-1-propanaminium, chloride
Formula	C ₄₂ H ₈₄ ClNO ₂

PREPARATION

DOTMA stock solutions can be prepared by dissolving in an organic solvent of choice. DOTMA is soluble in chloroform (>25 mg/ml), ethanol (33 mg/ml), DMSO (0.5 mg/ml), and DMF (5 mg/ml). Once dissolved, the mixture can be stored at -20°C for up to 1 month.

LIPOSOME SYNTHESIS

Materials

- DOTMA Dry Nitrogen or Argon
- Purified H₂O or Phosphate-buffered saline (PBS) at pH 7.4
- Chloroform (or other organic solvent)

Equipment

- 5 mL Glass beaker
- Glass round bottom flask
- Rotary evaporator
- Water bath sonicator
- Vortex Mixer
- Sterile polystyrene storage tube



- Pipette with appropriate tips
- Calibrated scale
- Laminar flow hood with vacuum
- Extruder with appropriately sized polycarbonate membrane
- Block heater

Prepare Stock Solution

1. Remove DOTMA from freezer (-20 °C) and thaw to room temperature.
2. Weigh 10 mg of DOTMA into glass vial.
3. Add 1 mL of chloroform to the glass vial; agitate until dissolved.
4. (Optional: Incubate at 37 °C for 10 minutes to facilitate homogenization).
5. (Optional: Store stock solution at -20 °C under nitrogen or argon).

Preparation of Lipid Film

1. To create lipid film, place stock solution in round bottom flask and use a rotary evaporator to remove the organic solvent.
2. Evaporate chloroform with dry nitrogen flow in fume hood.
3. To remove any residual organic solvent and ensure the lipid film is fully dry, place the vial in a vacuum pump at a temperature of 45-60 C overnight.

Rehydration

1. Add 1 mL filtered H₂O or PBS to lipid film.
 - a. Warm to 37 °C for 10-30 minutes for homogenization; gently vortex as needed.
 - b. If dry lipid film remains on flask, sonicate for 15 s in a water bath sonicator.

Extrusion

1. Prepare extruder:
 - c. Assemble the extruder with 400 nm polycarbonate membrane and lubricate with 1 mL filtered H₂O or PBS, then discard solvent.
2. Extrude 1 mL of solution by passing through the extruder 5 times.
 - a. Repeat with smaller polycarbonate membranes (200 nm, 100, nm, and 50 nm) if smaller sized liposomes are desired.
3. Store suspension in a glass vial under nitrogen or argon at 4 °C until use, up to one month.

