Product Information

- Name: Phorbol 12-myristate 13-acetate (also known as PMA, TPA, Phorbol myristate acetate)
- CAS No. : 16561-29-8
- Molecular Weight: 616.83 g/mol
- Formula: $C_{36}H_{56}O_8$
- Appearance: White to off-white solid powder

Biological Activity

- Target and Mechanism: A phorbol ester that acts as a potent activator of protein kinase C (PKC) (EC_{50} = 11.7 nM) and SphK. It is also an activator of NF-κB. It is commonly used to induce differentiation in THP-1 cells.
- In Vitro Applications: THP-1 cell differentiation: Used at 50-200 ng/mL for 24-48 hours to differentiate THP-1 cells into macrophage-like cells (M0 macrophages).
- Protocol for M1/M2 polarization: After PMA treatment (e.g., 100 ng/mL for 24 h), cells can be further polarized:
- M1 macrophages: Stimulate with 100 ng/mL LPS and 20 ng/mL IFN-γ for 24 hours.
- M2 macrophages: Stimulate with 20 ng/mL IL-4 and 20 ng/mL IL-13 for 24 hours.

- Other concentrations: Used in a wide range (e.g., 20 ng/mL for endothelial cell migration studies; 150 nM for ADAM22 expression studies).
- In Vivo Applications: Used to induce ear edema models in mice and rats (e.g., topical application of 100 μg/mL or 2.5 μg per ear).

Handling and Storage

- Storage: Powder: Store at -20°C, protected from light.
- In Solvent: Store at -80°C for up to 6 months, or at -20°C for up to 1 month (protected from light). Avoid repeated freeze-thaw cycles.
- Solubility: Soluble in Ethanol at 100 mg/mL (162.12 mM) and in DMSO at 25 mg/mL (40.53 mM) with ultrasonic assistance. Note: Hygroscopic DMSO can significantly affect solubility; use freshly opened DMSO.

Important Handling Notes for THP-1 Differentiation

- THP-1 cells prefer high density. Maintain good cell condition (morphologically, uniform size, good refraction, single-cell suspension) before starting the experiment.
- Passaging frequency, cell state, and density can affect the outcome. Adjust conditions if necessary.
- Protect PMA from light. Prepare stock solution in DMSO, aliquot, and store frozen. Avoid repeated freeze-thaw cycles.

- Success indicator: The most direct sign of successful differentiation is the cells changing from suspension growth to adherent growth.

Precautions

- This product is for research use only and must not be used for clinical diagnosis or treatment.
- PMA is a potent tumor promoter and bioactive compound. Always wear appropriate personal protective equipment (gloves, lab coat) and handle it in a fume hood. Follow standard laboratory safety regulations for chemical handling and waste disposal.
- For in vivo formulations, please refer to the product page for detailed preparation methods (e.g., using DMSO, PEG300, Tween-80, and saline).