



1,2-Dipalmitoylphosphatidylinositol-4,5-diphosphate

Product Number **P 7115**

Storage Temperature -20°C

Synonyms: PtdIns(4,5) P_2 (dipalmitoyl), PI(4,5) P_2 (dipalmitoyl), 1-(1,2-dihexadecanoylphosphatidyl)-inositol-4,5-diphosphate, Dipalmitoyl-L- α -phosphatidyl-D-*myo*-inositol 4,5-bisphosphate

Product Description

Molecular Formula: $\text{C}_{41}\text{H}_{81}\text{P}_3\text{O}_{19}$

Molecular Weight: 971.1

Purity: $\geq 98\%$ by nuclear magnetic resonance

Phosphorylated phosphatidylinositols and their metabolic products play critical roles in the generation and transmission of cellular signals, in cell adhesion, and in cytoskeletal organization.^{1,2,3} Phosphatidyl 4,5-diphosphate is synthesized from phosphatidylinositol in the plasma membrane, secretory vesicles, Golgi apparatus and nuclei of most cells by the action of phosphoinositide-4-kinase (PI4K) and phosphatidylinositol phosphate kinase-I (PIPkin-I). Phosphatidylinositol 4,5-diphosphate is cleaved by phosphatidylinositol-specific phospholipase C to form the intracellular second messengers diacylglycerol (DAG) and D-*myo*-inositol 1,4,5-trisphosphate (IP_3). DAG activates protein kinase C, and, is involved in the activation and regulation of many cellular enzymes. IP_3 acts at receptors on the endoplasmic reticulum to release Ca^{2+} from its intracellular stores, and, thus, plays a role in regulating Ca^{2+} -dependent enzymes and processes.

Phosphatidylinositol 4,5-diphosphate interacts with inwardly rectifying potassium channels (e.g., IRK1) and renders them constitutively active.⁴ The 4,5-diphosphate group is critical for binding to the pleckstrin homology (PH) domains and the epsin NH2-terminal homology (ENTH) domain of proteins involved in protein-protein and cell-cell interactions. These interactions with membrane and vesicle proteins appear to regulate the exocytosis of transmitters and hormones from neurons and chromaffin cells^{5,6} and the endocytosis of molecules via clathrin-coated pits.^{6,7}

Phosphatidylinositol 4,5-diphosphate is converted to phosphatidylinositol 3,4,5-trisphosphate (PI(3,4,5) P_3) by the action of phosphoinositide 3-kinase-I (PI3K-I). PI(3,4,5) P_3 synthesis is initiated in platelets challenged

Product Information

by thrombin and its increase at the cell membrane precedes platelet aggregation. PI(3,4,5) P_3 is also an activator of Akt (protein kinase B).^{1,2}

Reagent

1,2-Dipalmitoylphosphatidyl 4,5-diphosphate is supplied as a crystalline solid.

Precautions and Disclaimer

For Laboratory use only. Not for drug, household or other uses.

Preparation Instructions

1,2-Dipalmitoylphosphatidylinositol-4,5-diphosphate is soluble in DMSO at greater than 10 mg/mL. It forms a clear solution at 8 mg/mL in 50mM HEPES buffer, pH 7.0, containing 5 mM EDTA and 16 mg/mL sodium deoxycholate. It forms an opaque solution at 1 mg/mL in phosphate-buffered saline (PBS), pH 7.2. Aqueous solutions will not be stable for more than 24 hr.

Storage/Stability

1,2-Dipalmitoylphosphatidylinositol-4,5-diphosphate is stable for at least one year at -20°C .

References

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2. Payastre, B., et al., Phosphoinositides: key players in cell signalling, in time and space. *Cell. Signal.*, **13**, 377-387 (2001).
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4. Zhang, H., et al., Activation of inwardly rectifying K^+ channels by distinct PtdIns(4,5) P_2 interactions. *Nat. Cell. Biol.* **1**, 183-188 (1999).
5. Holz, R.W., et al., A pleckstrin homology domain specific for phosphatidylinositol 4,5-bisphosphate (PtdIns-4,5- P_2) and fused to green fluorescent protein identifies plasma membrane PtdIns-4,5- P_2 as being important in exocytosis. *J. Biol. Chem.* **275**, 17878-17885 (2000).

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7. Itoh, T., et al., Role of ENTH domain in phosphatidylinositol-4,5-bisphosphate binding and endocytosis. *Science*, **291**, 1047-1051 (2001).

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