

PRODUCT DATA SHEET

1,2-Distearoyl-sn-glycero-3-phosphorylglycerol (Na⁺ salt)

Catalog number: 1433

Common names: DSPG;

1,2-Distearoyl-sn-glycero-3-phosphatidylglycerol

Source: synthetic

Solubility: chloroform/methanol, 5:1

CAS number: 4537-78-4

Molecular Formula: C₄₂H₈₂O₁₀P·Na

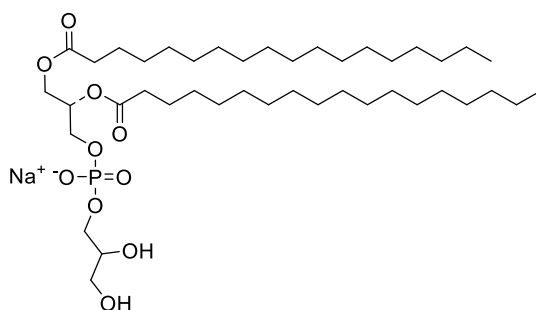
Molecular Weight: 801

Storage: -20°C

Purity: TLC >98%

TLC System: chloroform/methanol/DI water
(65:25:4 by vol.)

Appearance: solid



Application Notes:

This product is a high purity, well-defined phosphorylglycerol acylated with the common stearic acid, making it useful as a standard and for biological studies. Phosphorylglycerols are found in pulmonary surfactants, the lipoprotein complex that is formed by typeII alveolar cells in the lung. They are important in spreading secreted surfactants over the typeI alveolar cells. A decreased level of phosphorylglycerol in cystic fibrosis respiratory mucus is partly responsible for its marked adhesiveness and stickiness, which impairs mucus transport, and distearoyl phosphorylglycerol (DSPG) has been shown to be the most efficient form of phosphorylglycerol in the enhancement of respiratory mucus clearance.¹ The enzyme cardiolipin synthase attaches two phosphorylglycerols together to form cardiolipin which is a major component of the mitochondrial inner membrane.² Phosphorylglycerol is the main component of some bacterial membranes where it contains diacyl, alkylacyl, or alkenylacyl groups. Phosphorylglycerols generally have saturated and monoenoic fatty acids on position *sn*-2 and polyunsaturated fatty acids in position *sn*-1. This is the opposite of the other animal phospholipids and is due to its being synthesized by a different mechanism. Phosphorylglycerol has been found to be essential for the development of thylakoid membranes in some plants.³ Besides being critical in membranes it is essential for the oligomerization of photosystems I and II in cyanobacteria, for the sensitivity to chilling in plants, and for cellular fission and division in bacteria. DSPG has a high transition temperature and has therefore found much use in liposomal drug delivery systems.⁴ Amphotericin B, an antifungal drug, exhibits significant toxicity towards host cells. Studies using phosphorylglycerol have shown that interactions between amphotericin B and this phospholipid reduces its toxicity towards host cells.⁵

Selected References:

1. S. Girod de Bentzmann "Distearoyl phosphatidylglycerol liposomes improve surface and transport properties of CF mucus" *European Respiratory Journal*, vol. 6 pp. 1156-1161, 1993
2. S. Vaena de Avalos et al. "The phosphatidylglycerol/cardiolipin biosynthetic pathway is required for the activation of inositol phosphosphingolipid phospholipase C, Isc1p, during growth of *Saccharomyces cerevisiae*" *Journal of Biological Chemistry*, Vol. 280(8) pp. 7170-7177, 2004
3. M. Hagio et al. "Phosphatidylglycerol is Essential for the Development of Thylakoid Membranes in *Arabidopsis thaliana*" *Plant & Cell Physiology*, Vol. 43(12), pp. 1456-1464, 2002
4. A. Samad et al. "Liposomal Drug Delivery Systems: An Update Review" *Current Drug Delivery*, vol. 4 pp. 297-305, 2007
5. J. Miñones Jr. et al. "Amphotericin B-Dipalmitoyl Phosphatidyl Glycerol Interactions Responsible for the Reduced Toxicity of Liposomal Formulations: A Monolayer Study" *Langmuir*, vol. 18 pp. 8601-8608, 2002

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