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ProductInformation

Lipid A, diphosphoryl
from *Escherichia coli* F583 (Rd mutant)

Product Number **L 5399**
Storage Temperature 2-8 °C

Product Description

This product is the diphosphoryl form of Lipid A prepared from a rough strain *E. coli* lipopolysaccharide using treatment with mild acid and heat followed by chromatography.[1]

Lipid A is a glucosamine disaccharide with a β (1→6) linkage to which are attached two phosphate groups at positions 1 and 4'. Lipid A contains up to 7 fatty acid side chains. The approximate (or average) molecular weight is 1.7-1.8 kDa, depending on the number and identity of fatty acid chains present. The fatty acid composition will vary depending upon the method of production. The KDO (2-keto-3-deoxyoctonate) attachment was through the 6' position.

Lipopolysaccharides are composed of a hydrophobic lipid (lipid A), a hydrophilic core polysaccharide chain, and a hydrophilic O-antigenic polysaccharide side chain. Removal by hydrolysis of the polysaccharide chains from LPS produces Lipid A, either as the naturally occurring, cytotoxic diphosphoryl form[1] or the less toxic monophosphoryl form.[2,3] The longer the polysaccharide chain is, the longer and more difficult the hydrolysis. Thus, LPS with a short polysaccharide chain (LPS from mutant bacteria) is used to produce Lipid A products. The most extreme mutants are the Re mutants which produce an LPS which is made up of Lipid A and 3-deoxy-D-manno-octulosonic acid (2-keto-3-deoxyoctonate, KDO) as the sole constituent of the core.[4] Lipid A and lipopolysaccharides from rough strains are tested for KDO content.[5] The measure of the remaining KDO in the lipid A is a measure of the efficiency of hydrolysis. The preparation is considered pure if there is less than 0.2% KDO in the product. The lipopolysaccharides and the Lipid A products are all diphosphorylated (1, 4') unless noted as monophosphoryl (4').

Lipid A is the endotoxic principle of lipopolysaccharides. Free lipid A has been shown to exhibit most of the endotoxic reactions of the parent lipopolysaccharide; however, free lipid A did not induce necrosis and regression of tumors in mice.[6] Lipid A is of great pathophysiological interest since it exerts many profound effects when injected into animals, including the induction of endotoxic shock,[7] pyrogenicity,[8] macrophage activation,[9] B lymphocyte mitogenicity,[10] induction of interferon production[11] complement activation,[12] and tumor regression.[13]

Monophosphoryl lipid A is nontoxic, whereas diphosphoryl lipid A is toxic.[3] Monophosphoryl Lipid A has been reported to be used in the preparation of liposomes for antigenic studies.[14] Monophosphoryl Lipid A is a component of the Ribi Adjuvant System.

Precautions and Disclaimer

For Laboratory Use Only. Not for drug, household or other uses.

Preparation Instructions

Diphosphoryl Lipid A is miscible in chloroform:methanol:water (74:23:3) (10 mg/ml), yielding a slightly hazy, yellow solution. Diphosphoryl Lipid A is also soluble in 0.2% triethylamine (1 mg/ml) and in DMSO (1 mg/ml). Both solutions were faintly hazy and colorless after sonication. This product is not soluble in DMSO (10 mg/ml).

References

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