

Product Specification Sheet

**Diphosphoryl Lipid A (E. coli K12 D31m4)**

- Cat. # AV-7040-1**
- Cat. # AV-7040-5**

Diphosphoryl Lipid A (E. coli K12 D31m4);  
Diphosphoryl Lipid A (E. coli K12 D31m4);

**SIZE: 1 mg**  
**SIZE: 5 mg**

**General Information:** The word 'adjuvant' is derived from the Latin word 'adjuvare' which means 'to help'. Therefore, Immunologic Adjuvants are added to vaccines to stimulate the immune system's response to the target antigen, but do not in themselves confer immunity. Adjuvants act in various ways in presenting an antigen to the immune system. Adjuvants can act as a depot for the antigen, presenting the antigen over a long period of time, thus maximizing the immune response before the body clears the antigen. Examples of depot type adjuvants are oil emulsions. Adjuvants can also act as an irritant which causes the body to recruit and amplify its immune response. A tetanus, diphtheria, and pertussis vaccine, for example, contains minute quantities of toxins/toxoids produced by each of the target bacteria. The body's immune system develops an antitoxin to the bacteria's toxins, not to the aluminum, but would not respond enough without the help of the aluminum adjuvant. Adjuvants have also evolved as substances that can aid in stabilizing formulations of antigens, especially for vaccines administered for animal health.

**Adjuvants** augment the effects of a vaccine by stimulating the immune system to respond to the vaccine more vigorously, and thus providing increased immunity to a particular disease. Adjuvants accomplish this task by mimicking specific sets of evolutionarily conserved molecules, so called PAMPs, which include liposomes, lipopolysaccharide (LPS), molecular cages for antigen, components of bacterial cell walls (e.g., **flagellins**), and endocytosed nucleic acids such as double-stranded RNA (**dsRNA**), single-stranded DNA (**ssDNA**), and unmethylated CpG dinucleotide-containing DNA (**ODNs**). Natural proteins such as **ovalbumin** or OVA-peptides and key hole limpet hemocyanins (**KLH**) are also being explored not only serve as carrier protein but also as adjuvants. Because immune systems have evolved to recognize these specific antigenic moieties, the presence of an adjuvant in conjunction with the vaccine can greatly increase the innate immune response to the antigen by augmenting the activities of dendritic cells (DCs), lymphocytes, and macrophages by mimicking a natural infection. Furthermore, because adjuvants are attenuated beyond any function of virulence, they pose little or no independent threat to a host organism.

For human vaccines, aluminum hydroxide (Alum) based adjuvants (Aluminum hydroxide or Alhydrogel; Aluminium phosphate or Adjuphos) are the only **FDA-approved adjuvants**. Vaccine components that are formulated in Alum are called "Adsorbed Vaccines". The effectiveness of each salt as an adjuvant depends on the characteristics of the specific vaccine and how the manufacturer prepares the vaccine. To work as an adjuvant, the antigen must be adsorbed to the Alum to keep the antigen at the site of injection.

**Not all vaccines contain Alum** because an adjuvant may not have been needed, was not expected to increase the desired immune response, or was going to cause an imbalance in the immune response. For example, **inactivated Polio Virus (IPV/IPOL)** vaccine, measles, mumps and rubella vaccine (**MMR/MMRII/MMRV**), **Varicella or chickenpox vaccine (Varivax/Proquad/MMRV)**, **Meningococcal conjugate (MCV4/Menomune/Menactra)** vaccine, and **influenza vaccines (Fluzone/Flulaval/Flumist/Fluvirin etc)** do not contain aluminum salts.

**Product Information**

Bacterial lipopolysaccharide (LPS) was demonstrated to have the capacity in mice to enhance the response to soluble bovine serum albumin (BSA) and to interfere with the induction of tolerance to human 7-globulin (HGG). Lipid A molecules compose the lipid membrane anchoring core components of endotoxins produced by Gram-negative bacteria. Lipid A molecules possess a broad spectrum of immunologic activities. immune responses. LPS is a mitogen for B lymphocytes, it is a powerful adjuvant of antibody formation, and as an antigen it is highly immunogenic in that extremely small amounts will elicit a specific antibody response in vivo. LPS may act as an adjuvant because of its ability to induce mitogenesis in B cells

Structurally, lipid A molecules are composed of two glucosamine unites with varied, species dependent, fatty acyl chain number and identity and degree of phosphorylation.

Diphosphoryl Lipid A (MPLA) is prepared from E. coli K12 D31m4. Lipid A, a disaccharide with fatty acid side chains, recognized by TLR4 receptors, is the component responsible for the endotoxic activity of LPS.

**Related vaccines:** Brucella ovis Microparticle Subunit Vaccine (Brucella spp.)

**Form:** supplied as, sterile powder

**Storage and Stability:** Shipped at room temperature and it should be stored at room temp. DO NOT FREEZE. Stable for 6 months.

**References:** Jamalana et al.,(2011) Biologicals : journal of the International Association of Biological Standardization. 39(1); 23-28. Skidmore et al., (1975) Journal of immunology (Baltimore, Md. : 1950). 114(2 pt 2); 770-775

**Related Items**

- AV-7025-1 Monophosphoryl lipid A (MPLA)-SM (S. enterica Minnesota, R595) vaccine adjuvant
- AV-7025-5 Monophosphoryl lipid A (MPLA)-SM (S. enterica Minnesota, R595) vaccine adjuvant
- AV-7030-1 Monophosphoryl lipid A (MPLA) (Synthetic, TLR4/Th1) vaccine adjuvant
- AV-7030-5 Monophosphoryl lipid A (MPLA) (Synthetic, TLR4/Th1) vaccine adjuvant
- AV-7035-1 MDP, muramyldipetide (Ac-muramyl-Ala-D-Glu-amide) Synthetic; vaccine adjuvant
- AV-7035-5 MDP, muramyldipetide (Ac-muramyl-Ala-D-Glu-amide) Synthetic; vaccine adjuvant

Complete list is available at:  
[http://4adi.com/objects/catalog/product/extras/Vaccine\\_Adjuvants\\_fir.pdf](http://4adi.com/objects/catalog/product/extras/Vaccine_Adjuvants_fir.pdf)

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