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Product Specification Sheet

Monophosphoryl lipid A (MPLA) (Synthetic, TLR4/Th1) vaccine adjuvant

Cat. # AV-7030-1 Monophosphoryl lipid A (MPLA) (Synthetic, TLR4/Th1) vaccine adjuvant **SIZE:** 1 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.

MPL adjuvant is a chemically modified derivative of lipopolysaccharide that displays greatly reduced toxicity while maintaining most of the immunostimulatory activity of lipopolysaccharide. It has been used extensively in clinical trials as a component in prophylactic and therapeutic vaccines targeting infectious disease, cancer and allergies. MPL is a potent stimulator of T cell and antibody responses.

MPL has been shown to be capable of binding and activating Toll-like receptor-4 (TLR-4), present on key antigen-presenting cells, which play an important role in the induction of the innate and subsequent adaptive immune responses. Recent observations suggest that MPL, directly affects adaptive immune responses via specific interactions with B cells.

MPL is the first and only TLR ligand in licensed human vaccines, in the form of AS04. MPL is licensed in Europe for allergy treatment *Pollinex* Quattro. With over 33,000 doses administered to date, MPL adjuvant has emerged as a safe and effective vaccine adjuvant.

Synthetic lipid A from E. coli (MPLAs) is a pure monophosphoryl lipid A compound produced by chemical synthesis. MPLAs activates TLR4 but does not activate TLR2 reflecting its high purity. MPLAs contains 6 fatty acyl groups, while MPLA purified from bacteria contains a mixture of 5, 6,and 7 acyl lipid A.

CAS No. 1246298-63-4
Appearance: Colorless, odorless white powder
Formula: C96H184N3O22P

Mol. Wt : 1763.469

Form: provided as a lyophilized powder; sterile.
Solubility: DMSO (1 mg/ml)
Working concentration: 10 ng - 1 µg/ml
Preparation : Synthetic lipid A from E-coli.

Suggested usage:
Add 1 ml of DMSO to 1 mg MPLA and vortex until complete solubilization. Solutions can be further diluted to the desired working concentration with sterile endotoxin free water.

Storage and Stability: Shipped at room temperature and it should be stored at -20oC. Avoid repeated freeze thaw cycles.

References: Okemoto K. et al., 2006. J Immunol. 176(2):1203-8. Mata-Haro V. et al., 2007.Science. 316(5831):1628-32.

Related items

Catalog#	Prod Description
AV-7010-50	Recombinant flagellin FlicC vaccine adjuvant (TLR5 agonist); vaccine adjuvant
AV-7015-1	Lipopolysaccharides (LPS) (Escherichia coli 0111:B4) vaccine adjuvant
AV-7016-1	Lipopolysaccharides (LPS) (Escherichia coli 0111:B4) vaccine adjuvant, ultrapure, TLR4 tested
AV-7020-1	Lipopolysaccharides (LPS) (Salmonella enterica typhimurium) vaccine adjuvant
AV-7025-1	Monophosphoryl lipid A (MPLA)-SM (S. enterica Minnesota, R595),vaccine adjuvant
AV-7035-1	MDP, muramyldipetide (Ac-muramyl-Ala-D-Glu-amide) Synthetic; vaccine adjuvant
AV-7040-5	Diphosphoryl Lipid A (E. coli K12 D31m4)
AV-7045-25	Peptidoglycan (S. aureus); vaccine adjuvant

Complete list is available at:
http://4adi.com/objects/catalog/product/extras/Vaccine_Adjuvants_flr.pdf

AV-7030-1 190515AC

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