ALPHA DIAGNOSTIC INTERNATIONAL

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Product Specification Sheet

Monophosphoryl lipid A (MPLA)-SM (S. enterica Minnesota, R595) vaccine adjuvant

□ **Cat. #** AV-7025-1	Monophosphoryl lipid A (MPLA)-SM (S. enterica Minnesota, R595) vaccine adjuvant	**SIZE:** 1 mg
□ **Cat. #** AV-7025-5	Monophosphoryl lipid A (MPLA)-SM (S. enterica Minnesota, R595) vaccine adjuvant	**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

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

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.

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 : Obtained by treatment of LPS of Salmonella minnesota R595. with mild acid and base hydrolytic conditions, and chromatographic purification.

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 2-8 C. Long term storage at -20 C for up to 6 months
Avoid repeated freeze thaw cycles.

References: Dubensky and Reed (2010): Seminars in immunology. 22(3); 155-161. Evans et al. (2003) Expert review of vaccines 2(2); 219-229. Giannini et al.,(2006) Vaccine; 24(33-34); 5937-5949. Mothes et al Immunology. 33(9); Vogel and Powell,(1995:) Pharmaceutical biotechnology 6; 141-228

Related items:

Catalog#	ProdDescription
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

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

AV-7025-1 140204P

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