

Product Specification Sheet

MDP, muramyl dipeptide (Ac-muramyl-Ala-D-Glu-amide) Synthetic; vaccine adjuvant

<input type="checkbox"/> Cat. # AV-7035-1	MDP, muramyl dipeptide (Ac-muramyl-Ala-D-Glu-amide) Synthetic; vaccine adjuvant	SIZE: 1 mg
<input type="checkbox"/> Cat. # AV-7035-5	MDP, muramyl dipeptide (Ac-muramyl-Ala-D-Glu-amide) Synthetic; 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. 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

Muramyl dipeptide is a peptidoglycan constituent of both Gram positive and Gram negative bacteria. It is composed of N-acetylmuramic acid linked by its lactic acid moiety to the N-terminus of an L-alanine D-isoglutamine dipeptide.

N-acetyl-muramyl-L-alanyl-D-isoglutamine (MDP, for muramyl-dipeptide) is the smallest immuno-adjuvant active peptidoglycan derivative capable of replacing whole mycobacteria in Freund's complete adjuvant. It can be recognized by the immune system as a PAMP (pathogen associated molecular pattern) and activate the NALP3 inflammasome which in turn leads to cytokine activation, especially IL-1 α and IL-1 β . uramyl dipeptide (MDP) have adjuvant activity and can be substituted for mycobacteria incomplete Freund's adjuvant. MDP is of particular interest since it is a synthetic, small, nontoxic, homogeneous molecule with therapeutic potential

MDP and its derivatives have a variety of clinical uses and therapeutic potential. Biological evaluation of MDP analogs indicated that lipophilicity of the molecule caused various important effects on biological activity by increasing adjuvant activity and decreasing pyrogenicity, which is one of the major side effects of MDP

Currently, MDP is being used as an adjuvant in a subunit vaccine : gp120 recombinant with MDP adjuvant (Human Immunodeficiency Virus)

CAS Number.: 53678-77-6

Formula: C₁₉H₃₇N₄O₁₁

Appearance: White to off-white powder.

Mol. Wt : 492.5

purity: \geq 95% (HPLC)

Solubility: water (50 mg/ml).

Form: MDP is 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: Martinon F Curr Biol. 2004 Nov 9;14(21):1929-34. Chikako Ogawa (2011) 7(3): 180–197. Oppenheim et al., 1980 1980; 50(1); 71-81. Sugimoto et al., 1978 1978; 120(3); 980-982.

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, muramyl dipeptide (Ac-muramyl-Ala-D-Glu-amide) Synthetic; vaccine adjuvant
 AV-7035-5 MDP, muramyl dipeptide (Ac-muramyl-Ala-D-Glu-amide) Synthetic; vaccine adjuvant
 AV-7040-1 Diphosphoryl Lipid A (E. coli K12 D31m4)
 AV-7040-5 Diphosphoryl Lipid A (E. coli K12 D31m4)

Complete list is available at:

http://www.4adi.com/objects/catalog/product/extras/ODN_Vaccine_Flr.pdf

AV-7035-5

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India Contact:

Life Technologies (India) Pvt. Ltd.

306, Aggarwal City Mall, Opposite M2K Pitampura, Delhi – 110034 (INDIA). Ph: +91-11-42208000, 42208111, 42208222, Mobile: +91-9810521400, Fax: +91-11-42208444
 Email: customerservice@lifetechindia.com Website: www.lifetechindia.com