ALPHA DIAGNOSTIC INTERNATIONAL

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Product Specification Sheet

Keyhole Limpet Hemocyanin (Megathura Crenulata)

Cat. AV-9305-10	Keyhole Limpet Hemocyanin (Megathura Crenulata)	**SIZE**: 10 mg
Cat. AV-9305-100	Keyhole Limpet Hemocyanin (Megathura Crenulata)	**SIZE**: 100 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

Keyhole limpet hemocyanin (KLH) is a large, multi subunit, oxygen-carrying, metalloprotein that is found in the hemolymph of the giant keyhole limpet, *Megathura crenulata*, a species of keyhole limpet.
KLH is purified by a series of steps that typically includes ammonium sulfate precipitation and dialysis, and may involve chromatographic purification to obtain the highest purity. KLH purification may also include endotoxin removal, but this step is often unnecessary because the endotoxin serves as an adjuvant when injected for antibody production.
Haptens can be coupled to KLH .KLH can be activated with the crosslinker Sulfo-SMCC, which converts lysine residues to sulfhydryl-reactive maleimide groups. A sulfhydryl-containing hapten can then be reacted with the KLH to complete the immunogen without causing polymerization.
KLH is being tested in a variety of cancer vaccines, including non-Hodgkins lymphoma, cutaneous melanoma, breast and bladder cancer. These vaccines contain specific tumor-associated antigens conjugated to KLH to stimulate anti-tumor immune responses which can destroy tumor cells.
The rapidly growing interest in therapeutic vaccines (i.e. active immunotherapies) for cancer and the documented efficacy of KLH as a superior carrier protein for cancer vaccines are creating a significant biopharmaceutical market for KLH formulations. Assays to monitor humoral immune responses against KLH in human serum have been developed to facilitate optimal use of biomedical KLH applications.

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: Gatsogiannis, C (2009). *Journal of Molecular Biology* **385**(3): 963–983. Lateef SS (2007) *J Biomol Tech.***18**(3): 173–6. Aarntzen EH et al (2012). *Cancer Immunol Immunother.***61**(11): 2003–11

**All product are for In vitro research use only.*

Related items :

Catalog#	ProdDescription
AV-9305-10	Keyhole Limpet Hemocyanin (Megathura Crenulata)
AV-9305-100	Keyhole Limpet Hemocyanin (Megathura Crenulata)
AV-9310-1000	Chicken egg ovalbumin protein (ELISA, antigen, allergy grade)
AV-9315-1	Ovalbumin peptide OVA (257-264) class I MHC molecule
AV-9320-10	Ovalbumin peptide OVA (323-339) MHC class II peptide
AV-9325-10	Dinitrophenyl (DNP)-KLH protein Conjugate
AV-9330-BSA	Dinitrophenyl (DNP)-BSA protein Conjugate
AV-9330-HAS	Dinitrophenyl (DNP)-HSA protein Conjugate
AV-9335-10	Dinitrophenyl (DNP)-Ovalbumin (OVA) protein Conjugate
AV-9340-1	Dinitrophenyl (DNP)-Lipopolysaccharide (LPS) Conjugate

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

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