

## Product Specification Sheet

### Purified CRM197 (Diphtheria Toxin mutant) protein (antigen grade)

□ **Cat.** AV-9125-100 Purified CRM197 (Diphtheria Toxin mutant) protein (antigen grade) **SIZE:** 100 ug

**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 Adjuvophos) 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

Large inactivated toxins such as tetanus toxoid, diphtheria toxoid and diphtheria CRM197 are used as carriers in vaccines to develop strong immune responses. Conjugate vaccines rely on these immunogenic molecules to stimulate long-lasting immunity to attached polysaccharides or peptides.

CRM197, is a natural genetically inactive diphtheria toxin (mutant) produced in the native host, *Corynebacterium diphtheriae*. Mutant forms of diphtheria toxin (DT), cross-reactive material 197 (CRM197) is a non-toxic DT mutant containing a lesion in the A chain blocking ADP-ribosylation. CRM results from a single base change in the structural gene resulting in the substitution of glutamic acid for glycine. While CRM shows no enzymatic activity, it is immunologically indistinguishable from diphtheria toxin. In its applications, CRM 197 is similar to diphtheria toxoid. CRM has the advantage of being a well defined protein in contrast to formaldehyde treated toxin (toxoid) which is non-specifically cross linked and subject to rearrangement. CRM functions as a carrier for polysaccharides and haptens making them immunogenic.

**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.

**General References:** Honjo J (1968) JBC 243, 3553; Gill Dm (1969) J. Exp. Med. 129, 1-21; Bowman JB (1970) J. Exp. Med. 132, 1138; Uchida T (1972) Science 175, 901-903; Holmes RK (2000) J. Infect. Dis. 181, S156; Robbins JB (1990) J. Infect. dis. 161, 821-832;

This product is for in vitro research use only.

#### Related material available from ADI

Catalog#	ProdDescription
AV-9105-25	Tetanus Toxoid from <i>C. tetani</i> purified, vaccine grade
AV-9110-10	Recombinant purified tetani toxin Light-chain (Non toxic)
AV-9115-10	Recombinant ( <i>P. fluorescens</i> ) purified tetani toxin C-terminal fragment (~52 Kda, >95% pure, low endotoxin)
AV-9120-500	Purified Diphtheria Toxoid protein (vaccine grade)
AV-9125-100	Purified CRM197 (Diphtheria Toxin mutant) protein (vaccine grade)
AV-9130-50	Pertussis Toxin B.Pertussis, vaccine grade
AV-9135-1000	Purified Cholera Toxin protein (vaccine grade)
AV-9135-500	Purified Cholera Toxin protein (vaccine grade)
AV-9140-100	Purified Recombinant Anthrax Protective Antigen (83 kD) (Non toxic), vaccine grade
AV-9140-1000	Purified Recombinant Anthrax Protective Antigen (83 kD) (Non toxic), vaccine grade
AV-9145-10	Purified Pasteurella multocida Toxin (146 kda), vaccine grade
AV-9150-10	Purified Exotoxin A from <i>P. aeruginosa</i> , vaccine grade

Complete list is available at:

[http://4adi.com/objects/catalog/product/extras/Vaccine\\_Adjuvants\\_flr.pdf](http://4adi.com/objects/catalog/product/extras/Vaccine_Adjuvants_flr.pdf)

AV-9125-100 140516P

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