



LIST BIOLOGICAL
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Adenylate cyclase from *B. pertussis*, product comparison

Adenylate cyclase toxin-hemolysin (CyaA, ACT or AC-Hly) is an important virulence factor for *Bordetella pertussis* which targets sentinel cells of the host's innate immune defense. It penetrates a variety of immune cells and, when activated by calmodulin, catalyzes conversion of cellular ATP to cyclic AMP, interfering with cell signaling and with the anti-bacterial activity of phagocytes. This toxin acts on phagocytes by limiting their ability to produce oxidative burst and kill bacteria through complement or antibodies. Non-enzymatic ACT toxoid (CyaA-AC⁻) is a potent protective antigen and adjuvant that boosts immunogenicity of co-administered *B. pertussis* antigens and improves the efficacy of acellular pertussis vaccines in mice.

List Labs offers three different variations of *B. pertussis* adenylate cyclase toxin: (1) lyophilized recombinant toxin in a new formulation, Adenylate Cyclase Toxin, Recombinant, Product #188, (2) this same toxin in a liquid formulation, providing the most active protein, Adenylate Cyclase Toxin, Recombinant, Liquid, Product #188L, and (3) a preparation of adenylate cyclase toxin extracted from the native *B. pertussis*, with low enzyme activity, Adenylate Cyclase Antigen, Product #189. Samples of two additional adenylate cyclase products are available upon request. To follow is a list of the products described above, as well as the two additional products, which may be sampled:

- (1) Adenylate Cyclase Toxin, Recombinant, Product #188
- (2) Adenylate Cyclase Toxin, Recombinant, Liquid, Product #188L
- (3) Adenylate Cyclase Antigen, Product #189

Single samples are available of:

- (1) Adenylate Cyclase Toxoid, CyaA-AC⁻, frozen in liquid, Product #198L
- (2) Adenylate Cyclase Toxin with < 100 EU/mg, frozen in liquid, Product #197L.

Contact List Labs if you are interested in any of these products.

Adenylate Cyclase Lyophilized or Frozen in Liquid (Products #188 or #188L). Adenylate Cyclase Toxin, Recombinant, Product #188 is offered as a frozen liquid (Product #188L), an alternative to the lyophilized form. Lyophilization reduces cell toxicity by ~40% and enzyme activity by ~10% compared to the liquid formulation. The liquid formulation must be kept frozen, and as such, offers more challenges for shipping. If maintaining optimal enzyme activity is important to your work, Product #188L is the best product to order. For ease of shipping and for most experimentation, the lyophilized form, Product #188, should be ordered.

Adenylate Cyclase Toxoid, a genetically modified, non-enzymatic protein may be of great use for delivery of vaccines. It has been demonstrated in mice to act as a protective antigen and to improve pertussis vaccines. The toxoid could be used for conjugation of antigens for the purpose of delivery to antigen presenting cells for the purpose of induction of cytotoxic T cells. Toxoid may also be used for bead assays, ELISA, and Western Blots. Advantages to using this protein are that it is an adjuvant, it can act as a targeted carrier, it is not fully toxic and it is a well defined protein. Contact List Labs to request a sample of product #198L.

Reference: Sebo P, Osicka R, Masin J (2014) *Expert Review of Vaccines* **13(10)**:1215-1227. Adenylate cyclase toxin-hemolysin relevance for pertussis vaccines. PMID: 25090574.

Endotoxin-free Adenylate Cyclase is available as a sample. For most research, the standard ACT, which already has quite low endotoxin, will be sufficient. The specification for endotoxin-free ACT is <100 EU/mg, Product #197L. It is good practice to use this product for immunology, despite the lower specific toxin activity, a consequence of the purification processes which decrease endotoxin.

Single free 50 µg samples of endotoxin-free ACT and ACT toxoid will be provided upon request. Purchaser will be responsible only for the shipping costs of these frozen liquid samples. Additional material, a minimum of 5 mg, may be purchased by special order.