

Product Specification Sheet

Recombinant Protective Antigen 83 (PA83) Protein (*B. Anthracis*)

Cat. # PA83-R PA83 Purified, recombinant Protein **SIZE:** 100 ug
FORM: Soln Lyophilized

After inhalation by mammals, *Bacillus anthracis* spores germinate in alveolar macrophages then migrate to lymph nodes where they multiply. The vegetative bacteria excrete the tripartite exotoxin which consists of three polypeptides: protective antigen (PA, 83 kDa), lethal factor (LF, 90 kDa) and oedema factor (OF, 89 kDa). The two components (OF and LF) of the toxin enzymatically modify substrates within the cytosol of the mammalian cells: The OF is an adenylate cyclase that impairs the host defenses through a variety of mechanisms inhibiting phagocytosis. The LF is a zinc dependent protease that cleaves several mitogen activated protein kinase kinases (MAPKK) and causes lysis of macrophages. To intoxicate mammalian cells, the third component of the toxin PA, binds to a ubiquitously expressed cellular receptor, Tumor Endothelium Marker-8 (TEM8). Upon binding to TEM8, PA is cleaved into 20 and 63kDa fragments (PA20 and PA63) by furin or furin-like proteases. PA20 dissociates into medium and allows the PA63 fragment to heptamerize and bind LF and OF of the toxin. The resulting complex of PA63 fragment with EF and/or OF binds to PA-receptor TEM8/ATR and internalized into endosomes followed by translocation of LF and OF into cytosol of the cells.

B. anthracis PA83 is the proteolytically activated in vivo by a furin-like protease to produce a 63kD protein PA63. It is one of the three protein components of anthrax toxin, protective antigen (PA) is the central moiety that mediates the entry of lethal factor and edema factor into the target cell. PA binds to the cell surface via a type I membrane protein with a von Willebrand factor A domain called anthrax toxin receptor.

Source of Protein

Purity: Single major band by SDS-PAGE, Mol wt 83Kda (purity >90-95%). A smaller band, a proteolytic form of PA83, may also appear. It is provided as 100ug/100ul in 5mM Hepes, 50 mM NaCl, pH 7.5 at 1 mg/ml or lyophilized in this buffer in 100 ug lyophilized solid (or other sizes). The product is not necessarily sterile. The lyophilized products should be reconstituted with 1.0 ml of distilled water and filter through 0.2 u if sterility is desired. It may help to add 1% BSA or HSA (albumin) to maintain PA protein activity. It can then be used or aliquoted for storage in small aliquots at -70oC or below.

Protein activity and Endotoxin concn

Endotoxin concn. in the final purified preparation is low (0.5-0.7 EU/100 ug protein). Biological activity of PA is assayed by its cytotoxicity in the presence of 1 µg/ml LF using J774A.1 cells, no significant toxicity is observed at 1 ug/ml. PA83 (83 kda) may require trypsinization to generate the active C-terminal 63,000 dalton fragment. ADI also supplies both PA63 and PA20 fragments.

Recommended Usage

May be used for ELISA or Western as positive control. Not intended for in vivo use.

For cell culture applications, medium containing glutamine must be fresh. Ammonium ion released when glutamine breaks down may prevent acidification of the endosome thereby inhibiting translocation of LF or EF into the cytosol. A stable form of glutamine may be used.

General References

Bradley KA et al (2001) Nature 414, 225-229; liu S and Leppla SH (2002) JBC (in press); Leppla, SH (1982) PNAS 79, 3182; O'Brien J et al (1985) Infect Immun 47, 306; Duesbery, NS et al (1998) Science 280, 734

Storage

Short-term: unopened, undiluted vials for less than a week at 4oC.

Long-term: at -20C or below in suitable aliquots after reconstitution. Do not freeze and thaw and store working, diluted solutions.

Stability: 6-12 months at -20oC or below.

Shipping: 4oC for solutions and room temp for powder.

MSDS: Anthrax proteins (LF, PA, and EF) are produced by plasmids from a non-sporulating avirulent strain of *Bacillus anthracis* which lacks both of the wild type plasmids, pX01 and pX02. This host makes none of the anthrax toxin components and no polyglutamate capsule. Thus, the anthrax toxin components produced are single, pure proteins lacking all other virulence factors. Individually, each protein is non-toxic and presents no hazard during normal laboratory use. However, normal GLP procedures should be observed when handling this product and all areas cleaned after usage.

**This product is for In vitro research use only.*

Related materials available from ADI

Antibodies: ATR11-A, ATR12-A, ATR31-A

PA83-R 71017A