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Product Information

Cholera Toxin A subunit
from *Vibrio cholerae*

Catalog Number **C8180**
Storage Temperature 2–8 °C

Product Description

Cholera toxin is the virulent factor from *Vibrio cholerae* that leads to severe diarrhea followed by dehydration in humans.[1,2] Several bacterial toxins are ADP-ribosyl-transferases with protein substrates. Many of the substrates ADP-ribosylated by bacterial protein toxins are G-proteins, which are involved in signal transduction and ADP-ribosylation is one of the more significant post translational modifications of proteins. The ADP-ribosylation activity of cholera toxin activates adenylate cyclase, resulting in the production of cyclic AMP by adenylate cyclase, which causes many metabolic alterations.[1,2]

Cholera toxin belongs to the AB_5-subunit family of toxins.[1] The native hexameric protein has a molecular mass of ~85 kDa and contains two subunits. It consists of a single A subunit (~27.2 kDa), responsible for the ADP-ribosylation activity, and five B subunits (~11.6 kDa each), which are arranged as a pentameric ring with an apparent 5-fold symmetry and are associated with the cell surface receptor binding and subsequent internalization (transmembrane transport) of the enzymatic component.[3,4]

A single isoelectric variant of the cholera toxin has been isolated, which crystallizes readily and reproducibly.[5] Cholera toxin has an isoelectric point (pI) of 6.6. Chromatographic properties, however, suggest a cationic surface is exposed at pH 7.0, which apparently resides in the B subunit.[6]

The entire hexameric complex is required for toxic behaviour. Choleragenoid, the intact pentamer of B subunits, interacts with a ganglioside G_{M1} membrane receptor, but cannot activate adenylyl cyclase; whereas, the A subunit alone does not enter the cell.[7]

Due to the effect on adenylate cyclase, cholera toxin and its purified A subunit are frequently used for the study of signal transduction mechanisms. In addition, cholera toxin acts as an adjuvant through the stimulation of B lymphocytes.

The A subunit, synthesized as a single polypeptide, is proteolytically cleaved during secretion from the bacterium to give rise to two disulfide-linked polypeptides, A1 (~21.8 kDa) and A2 (~5.4 kDa). It is the A1 fragment of A subunit, released by disulfide reduction, that acts enzymatically within the target cells as an ADP-ribosyltransferase.

This product is the cholera toxin A subunit. The product was prepared and packaged using aseptic technique, and sealed under vacuum. The lyophilized powder contains ~5% protein. The cholera toxin B subunit is present at ≤0.5% (SDS-PAGE). When reconstituted with water to a final concentration of 1 mg cholera toxin A subunit per ml, the solution will contain 0.05 M Tris buffer, pH 7.5, 0.2 M NaCl, 3 mM NaN_3, and 1 mM sodium EDTA.

Precautions and Disclaimer

This product is for R&D use only, not for drug, household, or other uses. Please consult the Material Safety Data Sheet for information regarding hazards and safe handling practices.

Preparation Instructions

Cholera toxin is soluble in water at a concentration of 10 mg/ml. Swirl bottles gently during reconstitution. Avoid vigorous pipetting of solutions that may lead to foaming. Solutions can be filtered through a 0.2 μm filter.

Storage/Stability
Store the lyophilized product at 2–8 °C. The product, as supplied, is stable 2 years when stored properly.

Store reconstituted solutions at 2–8 °C. The free A subunit precipitates in aqueous solutions at protein concentrations above 10 mg/ml and neutral pH.[8] DO NOT FREEZE.

References

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