

Shiga Toxin Type 1 Subunit A, Recombinant from *Escherichia coli*

Catalog No. NR-859

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Contributor:

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Product Description:

The Shiga toxin (Stx) family refers to two types of related toxins: Shiga toxin type 1 (Stx1, Shiga-like toxin 1, or verotoxin 1) and Shiga toxin type 2 (Stx2, Shiga-like toxin 2, or verotoxin 2).¹ Stx1 is almost identical to Shiga toxin produced by *Shigella dysenteriae* at the nucleotide sequence level, while Stx2 shares approximately 55% overall nucleotide sequence homology with Stx1 and Shiga toxin. Shiga toxins are multimeric molecules that are comprised of two polypeptide subunits, A and B. The B subunit is a pentamer that binds the toxin to glycolipids on host cell membranes and the entire toxin molecule can then enter the cell via endocytosis.² Once inside the cell, the A subunit undergoes proteolytic cleavage and the reduction of an internal disulfide bond to generate Stx A₁ and Stx A₂. Stx A₁ is an N-glycosidase that catalytically inactivates the 28S ribosomal RNA subunit to inhibit protein synthesis.³

The sequences of the structural genes for Shiga toxin from *Shigella dysenteriae* and Shiga toxin type 2 from *E. coli* have been determined.^{4,5} The crystal structure of Shiga toxin from *Shigella dysenteriae* and Shiga toxin type 2 from *E. coli* have been solved (PDB: 1DM0 and 1R4P, respectively).^{6,7}

NR-859 is a recombinant protein of Shiga toxin type 1 subunit A (rStx1A).^{8,9} The protein sequence¹⁰ of the native Shiga toxin A subunit was modified to include an internal penta-histidine-tag used for the purpose of purification. The tagged protein was produced using a Qiagen QE30 series his-tag vector series, expressed in *E. coli*, and purified by nickel affinity chromatography. The resulting protein, NR-859, has a molecular weight of approximately 34,900 daltons. The predicted protein sequence of NR-859 is shown in Table 1 below.

Material Provided:

Each vial contains 0.1 mg of NR-859 suspended in phosphate buffered saline. The concentration, expressed as mg/mL is shown on the Certificate of Analysis.

Packaging/Storage:

NR-859 was packaged aseptically in plastic cryovials. The product is provided frozen on dry ice and should be stored at -20°C or colder immediately upon arrival. Repeated freeze-thaw cycles should be avoided.

Functional Activity:

NR-859 reacts with rabbit polyclonal antiserum specific for Stx type 1 subunit A. Carbonic anhydrase negative control is not recognized.

Citation:

Acknowledgment for publications should read "The following reagent was obtained through BEI Resources, NIAID, NIH: Shiga Toxin Type 1 Subunit A, Recombinant from *Escherichia coli*, NR-859."

Biosafety Level: 1

Appropriate safety procedures should always be used with this material. Laboratory safety is discussed in the following publication: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, and National Institutes of Health. [Biosafety in Microbiological and Biomedical Laboratories](#). 5th ed. Washington, DC: U.S. Government Printing Office, 2009; see www.cdc.gov/biosafety/publications/bmb15/index.htm.

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References:

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Table 1 – Predicted Protein Sequence

1	MKIIIFRVLT	FFFVIFSVNV	VAKEFTLDFS	TAKTYVDSL N	VIRSAIGTPL
51	QTISSGGTSL	LMIDSGSGDN	LFAVDVRGID	PEEGRFNNLR	LIVERNNLYV
101	TGFVNRTNNV	FYRFADFSHV	TFPGTTAVTL	SGDSSYTTLQ	RVAGISRTGM
151	QINRHSLTTS	YLDLMSHSGT	SLTQSVARAM	LRFVTVTAEA	LRFRQIQRGF
201	RTTLDDLGR	SYVMTAEDVD	LTLNWGRLSS	VLPDYHGQDS	VRVGRISFGS
251	INAILGSVAL	ILNCHHHHR	VARMASDEFP	SMCPADGRVR	GITHNKILWD
301	SSTLGAILMR	RTISS			