

**Ricin Toxin B Subunit with N-Terminal Histidine Tag, Recombinant from *Escherichia coli***

**Catalog No. NR-854**

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**Contributor and Manufacturer:**

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**Product Description:**

Ricin toxin is a glycoprotein that can be isolated from the seeds of the castor bean plant *Ricinus communis*.<sup>1</sup> Structurally, ricin toxin consists of two polypeptide subunits, A and B, that are linked by a disulfide bond. The A subunit of ricin toxin catalytically inactivates the eukaryotic 28S ribosomal RNA subunit resulting in the inhibition of protein synthesis and death of the cell.<sup>2</sup> The ricin toxin B subunit is a galactose-specific lectin that mediates the binding and delivery of the toxin to target cells.<sup>3,4</sup> The sequence of the *R. communis* gene for the ricin toxin precursor protein has been reported (GenBank: X03179).<sup>5</sup>

NR-854 is a recombinant form of the B subunit of ricin toxin. The amino acid sequence includes an N-terminal histidine tag (MRGSHHHHHHTDPH) and amino acid residues 315 to 576 of the ricin toxin precursor. A QIAGEN pQE-31 vector was used to express the recombinant protein in *Escherichia coli*. The protein was purified by nickel affinity chromatography. NR-854 has a theoretical molecular weight of approximately 30,672 daltons. The predicted amino acid sequence of NR-854 is shown below in Table 1.

**Material Provided:**

Each vial of NR-854 contains approximately 1 mg of recombinant ricin toxin B subunit suspended in 7 M urea, 25 mM imidazole, and 100 mM sodium phosphate buffer (pH 7.6). The concentration, expressed as mg per mL, is shown on the Certificate of Analysis.

**Packaging/Storage:**

NR-854 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. Storage for brief periods at 2°C to 8°C may be acceptable for some applications. Repeated freeze-thaw cycles should be avoided.

**Functional Activity:**

NR-854 reacts specifically with polyclonal antibody to ricin holotoxin and monoclonal antibody to ricin B subunit as determined by Western blot analysis.

**Citation:**

Acknowledgment for publications should read "The following reagent was obtained through BEI Resources, NIAID, NIH: Ricin Toxin B Subunit with N-Terminal Histidine Tag, Recombinant from *Escherichia coli*, NR-854."

**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/bmbl5/index.htm](http://www.cdc.gov/biosafety/publications/bmbl5/index.htm).

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**References:**

1. Doan, L. G. "Ricin: Mechanism of Toxicity, Clinical Manifestations, and Vaccine Development. A Review."

- J. Toxicol. Clin. Toxicol. 42 (2004): 201-208. PubMed: 15214627.
2. Endo Y. and K. Tsurugi. "RNA N-Glycosidase Activity of Ricin A-chain. Mechanism of Action of the Toxic Lectin Ricin on Eukaryotic Ribosomes." J. Biol. Chem. 262 (1987): 8128-8130. PubMed: 3036799.
  3. Chang, M.-S., et al. "Cloning and Expression of Recombinant, Functional Ricin B Chain." Proc. Natl. Acad. Sci. U.S.A. 84 (1987): 5640-5644. PubMed: 3112772.
  4. Olsnes, S., E. Saltvedt and A. Pihl. "Isolation and Comparison of Galactose-binding Lectins from *Abrus precatorius* and *Ricinus communis*." J. Biol. Chem. 249 (1974): 803-810. PubMed: 4811904.
  5. Halling, K. C., et al. "Genomic Cloning and Characterization of a Ricin Gene from *Ricinus communis*." Nucleic Acids Res. 13 (1985): 8019-8033. PubMed: 2999712. GenBank: X03179.
  6. Fulton, R. J., et al. "Purification of Ricin A<sub>1</sub>, A<sub>2</sub>, and B Chains and Characterization of Their Toxicity." J. Biol. Chem. 261 (1986): 5314-5319. PubMed: 3957927.
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**Table 1 – Predicted Protein Sequence**

1	<u>MRGSHHHHHH</u>	<u>TDPHADVCMD</u>	<u>PEPIVRIVGR</u>	<u>NGLCVDVRDG</u>	<u>RFHNGNAIQL</u>
51	<u>WPCKSNTDAN</u>	<u>QLWTLKRDNT</u>	<u>IRSNKGCLTT</u>	<u>YGYS PGVYVM</u>	<u>IYDCNTAATD</u>
101	<u>ATRWQIWDNG</u>	<u>TIINPRSSLV</u>	<u>LAATSGNSGT</u>	<u>TLTVQTNIYA</u>	<u>VSQGWLP TNN</u>
151	<u>TQPFVTTIVG</u>	<u>LYGLCLQANS</u>	<u>GQVWIEDCSS</u>	<u>EKAEQQWALY</u>	<u>ADGSIRPQQN</u>
201	<u>RDNCLTSDSN</u>	<u>IRETVVKILS</u>	<u>CGPASSGQRW</u>	<u>MFKNDGTILN</u>	<u>LYSGLVLDVR</u>
251	<u>ASDPSLKQII</u>	<u>LYPLHGDPNQ</u>	<u>IWLPLF</u>		

Non-ricin residues are underlined.