Abrin Toxin (A Subunit) from *Abrus precatorius* Seeds

Catalog No. NR-43945

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For research use only. Not for human use.

Contributor and Manufacturer:

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Product Description:

NR-43945 is a preparation of the A subunit of abrin toxin from *Abrus precatorius* (*A. precatorius*) seeds. The A subunit was separated from the B subunit by galactose affinity chromatography and has a molecular weight of approximately 28,000 daltons. The predicted amino acid sequence has been determined and is presented in Table 1. This preparation contains a mixture of abrin isotypes.[1]

A. precatorius is commonly known by a variety of names including: rosary pea, jequirity, Crab's eye, precatory pea or bean, John Crow Bead, Indian licorice, Akar Saga, gidee gidee or Jumbie bead. It is a vine, native to the Old World tropics, but now known to grow throughout the tropical and subtropical areas of the world. The plant is best known for its seeds, which are toxic due to the presence of abrin toxin.[2] Abrin toxin is a member of the ribosome inactivating protein (RIP) family of toxins, which specifically and irreversibly inhibit protein synthesis in eukaryotic cells by enzymatically altering the 28S rRNA of the large 60S ribosomal subunit. Most RIPs are produced by plants and are thought to represent a defense mechanism against viral or parasitic attacks.[3]

Abrin is a type II RIP comprised of a catalytically active A subunit and a lectin-like B subunit. The A subunit harbors the RNA N-glycosidase activity and the B subunit is responsible for the binding and trafficking of the toxin in cells.[4] The crystal structure of abrin has been determined (PDB: 1ABR). The overall protein fold is similar to ricin, but the secondary structure of the A subunit shows some differences. The B subunit displays the positions of several sugar residues linked to predicted glycosylation sites.[5]

Material Provided:

Each vial contains approximately 0.05 mg of the A subunit of abrin toxin in PBS. The concentration is shown on the Certificate of Analysis.

Packaging/Storage:

NR-43945 was packaged aseptically in screw-capped plastic cryovials. The product is shipped frozen on dry ice and should be stored at -20°C or colder immediately upon arrival.

Functional Activity:

NR-43945 is reactive with anti-Ricin polyclonal antiserum, BEI Resources NR-862, on western blots. Abrin shares some similarities to Ricin and cross-reactivity is expected.[6] NR-43945 shows approximately 3 logs less toxicity than the active toxin in an *in vitro* cytotoxicity assay using Vero cells.

Citation:

Acknowledgment for publications should read "The following reagent was obtained through BEI Resources, NIAID, NIH: Abrin Toxin (A Subunit) from *Abrus precatorius* Seeds, NR-43945."

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/od/ohs/biosfty/bmbl5/bmbl5toc.htm.

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References:

1. O'Brien, A. D. and J. F. Sinclair, Personal Communication.
2. Gul, M. Z. et al., "Antioxidant and Antiproliferative Activities of *Abrus precatorius* Leaf Extracts - An *in vitro* Study." BMC Complement. Altern. Med. 13 (2013): 53. PubMed: 23452983.
3. Walsh, M. J., J. E. Dodd and G. M. Hautbergue. "Ribosome-Inactivating Proteins: Potent Poisons and Molecular Tools." Virulence 4 (2013): 774-784. PubMed: 24071927.
4. Bagaria, S., et al. "Mechanistic Insights into the Neutralization of Cytotoxic Abrin by the Monoclonal Antibody D6F10." PLoS One 29 (2013): e70273. PubMed: 23922965.
5. Tahirov, T. H., et al. "Crystal Structure of Abrin-a at 2.14 Å." J. Mol. Biol. 250 (1995): 354-67. PubMed: 7608980. Erratum in J. Mol. Biol. 252 (1995): 154.
6. Kimura, M., T. Sumizawa and G. Funatsu. "The Complete Amino Acid Sequences of the B-Chains of Abrin-a and Abrin-b, Toxic Proteins from the Seeds of *Abrus precatorius*." Biosci. Biotechnol. Biochem. 57 (1993): 166-169. PubMed: 7763422.

Support Provided by NIAID

Table 1 – Predicted Protein Sequence for Abrin Toxin (A Subunit)

1	EDRPIKFSTE	GATSQSYKQF	IEALRERLRG	GLIHDIPVLP	DPTTLQERNR
51	YITVELSNSD	TESIEVGIDV	TNAYVVAYRA	GTQSYFLRDA	PSSASDYLFT
101	GTDQHSLPFY	GTYGDLERWA	HQSRQQIPLG	LQALTHGISF	FRSGGNDNEE
151	KARTLIVIIQ	MVAEAARFRY	ISNRVRVSIQ	TGTAFQPDAA	MISLENNWDN
201	LSRGVQESVQ	DTFPNQVTLT	NIRNEPVIVD	SLSHPTVAVL	ALMLFVCNPP
251	N				

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