

Abrin Toxoid (Formalin Fixed Abrin) from *Abrus precatorius* Seeds

Catalog No. NR-32831

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Contributor and Manufacturer:

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Product Description:

NR-32831 is a preparation of Abrin which has been chemically inactivated by treatment with formalin. Mature Abrin toxin has a molecular weight of approximately 60,000 daltons, however, formalin fixation can induce cross linking which may interfere with how the toxoid behaves in SDS-PAGE and the band may appear larger than expected.¹ The predicted amino acid sequence has been determined and is presented in Table 1.

Abrus 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 of NR-32831 contains approximately 0.1 mg of Abrin toxoid in PBS. The concentration is shown on the Certificate of Analysis.

Packaging/Storage:

NR-32831 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-32831 is reactive with anti-Ricin polyclonal antiserum, NR-862 on western blots. Abrin does share similarity with Ricin and some cross reactivity is expected.⁶ NR-32831 is approximately 100,000 times less active than the active toxin in an *in vitro* cytotoxicity assay using Vero cells.

Decontamination:

Contaminated glassware or disposable containers should be soaked in 3% sodium hypochlorite or comparable solutions of other strong oxidizing agents for at least 24 hours.

Citation:

Acknowledgment for publications should read "The following reagent was obtained through BEI Resources, NIAID, NIH: Abrin Toxoid (Formalin Fixed Abrin) from *Abrus precatorius* Seeds, NR-32831."

Biosafety Level: 2

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.
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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.

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Table 1 – Predicted Protein Sequence for Abrin Toxin

1	EDRPIKFSTE	GATSQSYKQF	IEALRERLRG	GLIHDIPVLP	DPTTLQERNR
51	YITVELSNSD	TESIEVGIDV	TNAYVVAYRA	GTQSYFLRDA	PSSASDYLFT
101	GTDQHSLPFY	GTYGDLERWA	HQSRQQIPLG	LQALTHGISF	FRSGGNDNEE
151	KARTLIVIIQ	MVAEAARFRY	ISNRVRSIQ	TGTAFAQPDA	MISLENNWDN
201	LSRGVQESVQ	DTFPNQVTLT	NIRNEPVIVD	SLSHPTVAVL	ALMLFVCNPP
251	NANQSPLLIR	SIVEKSKICS	SRYEPTVRIG	GRDGMCDVY	DNGYHNGNRI
301	IMWKCKDRLE	ENQLWTLKSD	KTIRSNKCL	TTYGYAPGSY	VMIYDCTSAV
351	AEATYWEIWD	NGTIINPKSA	LVLSAESSM	GGTLTVQTNE	YLMRQGWRTG
401	NNTSPFVTSI	SGYSDLQMA	QGSNVWADC	DSNKKEQQA	LYTDGSIRSV
451	QNTNCLTSK	DHKQGSTILL	MGCSNGWASQ	RWVFKNDGSI	YSLYDDMVMD
501	VKGSDPSLKQ	IILWPYTGKP	NQIWLTFL		