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Ricin

National Cancer Institute

Source

National Cancer Institute. *Ricin*. NCI Thesaurus. Code C809.

A phytotoxin and lectin comprised of a homodimer of ricin toxin A and B chains derived from the seeds of *Ricinus communis*, the castor oil plant, with protein synthesis inhibitory activity and extremely high cytotoxicity. Following ingestion, inhalation or injection of ricin, the B chain binds to complex carbohydrates containing either terminal N-acetylgalactosamine or beta-1,4-linked galactose residues on the surface of cells. Subsequently, the ricin A/B heterodimer is internalized and undergoes retrograde transport to the endoplasmic reticulum (ER). In the ER, the A chain, which has enzymatic activity that is sterically hindered by the B chain, is proteolytically released from the heterodimer by protein disulfide isomerase. In the ER, the free A chain has N-glycosidase activity that cleaves 28S rRNA. This enzymatic cleavage disrupts the ribosome, halts protein synthesis, and can lead to cell death. The extreme cytotoxicity of ricin makes it an attractive candidate for artificial fusion with binding proteins to create cell-type-specific toxins.