

## Ricin: The Seeds of Destruction



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Ricin is one of the most deadly poisons known to man, a few grains being enough to kill an adult human, it infiltrates a cell's protein synthesis operation and destroys the mechanisms of production.

Ricin is known as a ribosome-inactivating protein, which means that its function is to deactivate the ribosomes of a cell, and since ribosomes are the protein synthesis factories of a cell, their deactivation would cause the cell to die. The molecule of Ricin is composed of two parts, an A chain (RTA) which contains the active site, and a B chain (RTB) which functions as a binding mechanism to promote Ricin's entry into the cell. Ricin achieves entry into the cell by means of binding to carbohydrate residues containing galactose and being transported into the cell. Once in the inside of a cell, RTA is cleaved from RTB by the enzyme and chaperone HPDI, the RTA continues on to cause destruction of ribosomes by means of cleaving an important part of their structure, which prevents further protein synthesis.

On the left the RTA is shown as a primarily light green while the RTB is shown as grey. Alpha helices are a purple and beta pleated sheets are a light blue. The disulphide bond linking RTA and RTB is shown as bright yellow. The carbohydrate binding sites are shown in light red. The components of the active site are as follows: Tyrosine 80 and 123 are red, Arginine 180 is orange, and Glutamic acid 177 is blue. The second picture shows the pocket into which the key loop of a ribosome fits in relation to the the active site.

