What are protective effects of anti-ricin A-chain aptamer?

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Ricin, a lectin from the castor bean plant Ricinus communis is considered one of the most potent plant toxins. Ricin poisoning can cause severe tissue damage and inflammation and can result in death. Most accidental exposures occur by ingestion of the seeds of castor beans whereby the toxin is released after the seed coat is damaged. The ingested toxin causes severe gastrointestinal damage with symptoms and death due to multiorgan failure or cardiovascular collapse.

A research article to be published on November 7, 2008 in the *World Journal of Gastroenterology* addresses this question. The research team was led by Dr. Kam-Meng Tchou-Wong from New York University School of Medicine in United States.

Authors investigated the therapeutic potential of an RNA ligand (aptamer) specific for the catalytic ricin A-chain (RTA), the protective effects of a 31-nucleotide RNA aptamer (31RA), which formed a high affinity complex with RTA, against ricin-induced toxicity in cell-based luciferase translation and cell cytotoxicity assays were evaluated.

They have shown that 31RA RNA aptamer can protect against ricin ribotoxicity in cell-based luciferase and cell cytotoxicity assays. Hence, RNA aptamer that inhibits RTA enzymatic activity represents a novel class of nucleic acid inhibitor that has the potential to be developed as a therapeutic agent for the treatment of ricin intoxication.

In this report, authors utilized a stable cell-based luciferase assay and

showed that 31RA aptamer also neutralized the inhibitory effects of ricin on translation inhibition in cell-free and cell-based luciferase assays and ricin-induced cytotoxicity assay. The use of a stably transfected cell-based luciferase assay will facilitate the development of high throughput screening for inhibitors of ricin as potential antidotes for the treatment of ricin intoxication.

Reference: Fan S, Wu F, Martiniuk F, Hale ML, Ellington AD, Tchou-Wong KM. Protective effects of anti-ricin A-chain RNA aptamer against ricin toxicity. World J Gastroenterol 2008; 14(41): 6360-6365
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