

## Ciguatoxin in the Marine Biota as a Model for the Movement of Metals

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### Abstract

Ciguatoxin is a lipid soluble, non-protein toxin which causes both gastrointestinal and neurological disorders in man after the ingestion of certain reef and pelagic fish. Ciguatoxin is produced by a dinoflagellate Gambierdiscus toxicus and has been shown to pass along the food web from one animal to another and can ultimately produce severe poisoning in humans. Gambierdiscus toxicus is known to be both benthic and epiphytic in nature and is usually associated with a variety of macro algae.

Ciguatoxin is extracted and purified on silicic acid where it is eluted in a 9:1 chloroform: methanol fraction. At our laboratories a toxic 9:1 fraction has been isolated not only from fish but a number of herbivorous molluscs such as the Ass's Ear abalone, Haliotis asinina and the Sea Hare, Aplysia dactylomela. The 9:1 toxic fraction has also been found in the carnivorous Red Eye crab, Eriphia sebana and the herbivorous Shawl Backed crab, Atergatus floridus as well as in a number of bivalve molluscs Black Lip Pearl oyster, Pinctada margaritifera; Cocks-comb oyster Lopha cristagalli; and Crenulated oyster, Ostrea nomades.

Certain heavy metals (Cu, Zn and Cd) are known to bind to metallothioneins (low molecular weight proteins) in the storage organs of numerous invertebrates and vertebrates. We contend that the uptake and storage of metals will be similar to that of ciguatoxin. We believe that the passage of ciguatoxin through the marine biota is an excellent model for the movement of metals and we propose to use similar suitable organisms in assessing the passage of metals in the biota.

