DOMOIC ACID

What is Domoic Acid?

Domoic Acid (DA) is a naturally occurring marine toxin. It is the result of an extreme proliferation of marine algae, usually (but not always) of the genus *Pseudonitzschia.* These toxic species have been found on the East and the West Coasts of the U.S., as well as the Gulf Mexico.

Domoic Acid is a chemical that is produced by algae or plankton when it blooms. Higher ocean temperatures trigger the seasonal algae bloom. This proliferation of marine algae blooms is an annual event occurring between March and June. The algae containing DA is eaten by sea life and passed along up through the food chain. Both shellfish and filter feeding fish (clams, mussels, anchovies, sardines, krill, etc.) can accumulate this toxin without apparent ill effects. However, in marine mammals and humans, DA is a tricarboxylic acid that acts as a neurotoxin.

It is generally accepted that the incidence of problems associated with toxic algae is increasing. Possible reasons to explain this increase include natural mechanisms of species dispersal (currents and tides) to a host of human-related phenomena such as nutrient enrichment (agricultural run-off), climate shifts or transport of algae species via ship ballast water.

The Impact of Domoic Acid on Marine Mammals

Domoic Acid was first pinpointed as a problem in marine mammals in 1998, when many California sea lion (*Zalophus californianus*) died along the Central California coast. There were an exceptionally high number of DA cases in 2003.

DA binds to a glutamate receptor that help nerves cells control the flow of ions across their cell membranes. The receptor no longer works correctly and the uncontrolled flux of ions damages and eventually kills the nerve cell.

The toxin affects the parts of the brain known as the hippocampus and amygdale and causes rapid neurological deterioration. Affected sea lions exhibit head weaving and bobbing, bulging eyes, mucus from the mouth, disorientation and atax (“drunken”) movements. Seizures are also prevalent.

The neurological impacts make it difficult for the animals to stay afloat and breath in the water. In many cases, marine mammals that are affected by Domoic Acid will beach (haul out of the water) in effort to rest and survive. Seabirds are also affected by DA.

In severe cases, permanent brain damage and eventually death are likely to occur.

The Impact of Domoic Acid on Humans

Domoic Acid Poisoning does affect humans. Mild cases arise within 24 hours of consumption of contaminated fish. Symptoms include nausea, vomiting, diarrhea and abdominal cramps. Neurological symptoms occur in the more severe cases these symptoms include headaches, hallucinations, confusion, short-term memory loss, respiratory difficulty, seizures, coma and, in extreme cases, death.

The first reported outbreak of Domoic Acid Poisoning occurred in 1987 when shellfish from Prince Edward Island, Canada was consumed. In this outbreak, three people died and over 100 people developed various toxic symptoms.

According to the California Department of Health Services (CDHS), there have not been any reported cases of human poisoning from Domoic Acid in California.