

Toxicity of Harmful Algal Bloom

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Description

Skin toxicity, ranging from mild irritation to hives to blistering, has been reported through direct interaction with almost all the HAB toxins in contaminated water. Though, this phenomenon has not been well studied and might actually be due to the lipopolysaccharides of some HAB organisms.

Many HAB-related illnesses, such as ciguatera fish poisoning and the shellfish-associated diseases (such as PSP, NSP, ASP, and DSP) are diagnosed simply as “Food Poisoning” because victims present by significant GI symptoms within minutes to hours of consuming implicated seafood and usually have no fever. However, as these illnesses have a neurologic component, they might be distinguished from microbial food poisoning or seafood allergy by the concomitant or subsequent onset of neurologic symptoms such as paresthesias and confusion. Other presenting signs and symptoms (also neurologic in origin) can be cardiovascular (including labile hypotension and arrhythmias) and respiratory (including respiratory depression), and may require intensive care unit and respiratory support for several days.

Most HAB toxin-related illnesses present as acute, self-limiting cases of disease. However, there is a sign that ciguatera fish poisoning and possibly ASP produce lingering neurologic symptoms in human beings (i.e., paresthesias and possibly short-term memory loss) that could last from weeks to months and even years. Although controversial, it is possible that exposure through contaminated food to BMAA may lead to an increased risk for ALS, Parkinson's disease, and even Alzheimer's dementia. However, although the genes needed to produce BMAA have been found in every species of Cyanobacteria confirmed so far, it is not clear that all Cyanobacteria produce the toxin. As a result it is not known whether the general population could be exposed *via* the food web, whether this exposure is limited to

specific groups, or whether health effects occur only in sensitive subpopulations.

A number of illness occurrences associated with exposure to cyanobacterial toxins in drinking water have been reported in wild animals, domestic animals, and people. Severe GI illness associated with acute and chronic liver disease and consequent kidney disease has been reported in people exposed to cyanobacterial toxins in drinking water. In more than one episode in Brazil, dialysis patients received microcystin-contaminated dialysis water. The affected patients experienced severe acute hepatitis and most died. It is important to remember that these dialysis patients received an intraperitoneal dose that was equivalent to the mouse oral median lethal dose (LD50).

More recently, upper and lower respiratory tract symptoms (such as cough, shortness of breath, or chest tightness) have been associated with exposure to aerosolized Florida red tide brevetoxins, particularly among those with underlying respiratory disease such as asthma. Some evidence indicates that prolonged exposure to these aerosolized toxins, particularly among coastal residents, is associated with increased emergency department admissions for respiratory illness (including pneumonia, bronchitis, and asthma). There have also been anecdotal reports of respiratory illness in persons exposed to aerosols from irrigation systems using pond water with active algae blooms

Several HAB toxins are at least *in vitro* carcinogens okadaic acid and microcystin. There is some research to suggest that chronic exposure to microcystin in contaminated drinking water may be associated with an increased risk for hepatocellular carcinoma, whereas okadaic acid might be associated with increased prevalence of tumors in shellfish, which one author speculated might be relevant to an increased risk of tumors in human beings who consume toxin-contaminated seafood's.