



Food Poisoning: Fish

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Scombroid fish poisonings are characterized by **paresthesias within 1 hour** of fish consumption. The symptoms resemble those of a histamine reaction. Burning of the mouth and throat, flushing, headache and dizziness are common; abdominal cramps, nausea, vomiting and diarrhea also occur in most cases. In severe cases, urticaria and bronchospasm may also occur. Symptoms are thought to result from histamine and inhibitors of histamine degradation produced in fish flesh by the enzymatic decarboxylation of histidine by certain marine bacteria. Symptoms usually resolve in a few hours.

Ciguatera fish poisoning is characterized by an onset of abdominal cramps, nausea, vomiting and diarrhea, preceded or followed by numbness and paresthesias of the lips, tongue and throat. Malaise, headache, pruritus, dry mouth, metallic taste, myalgias, arthralgias, blurred vision, photophobia and transient blindness have also been reported. Sharp shooting pains in the legs and a sensation of looseness and pain in the teeth are characteristic. In severe cases, reversal of hot and cold temperature sensations, sinus bradycardia, hypotension, cranial nerve palsies and respiratory paralysis may occur.

The illness is caused by ciguatoxin, a lipid-soluble, heat-stable compound that is acquired by fish through the food chain. The dinoflagellate *Gambierdiscus toxicus* and algae that grow on reefs have been identified as the source of the toxin in the food chain. Ciguatoxin inhibits red blood cell cholinesterase activity, increases membrane sodium permeability and changes the electrical potential of cells through its action on sodium channels. Duration of the acute illness ranges from a few days to a few months; pain in the extremities has been reported to occur intermittently for years after an episode of ciguatera. Other natural marine toxins have been associated with similar syndromes, including scaritoxin, maitotoxin and palytoxin.

Three types of **shellfish poisoning** should be considered:

- **paralytic (PSP)**
- **neurotoxic (NSP)**
- **amnesic (ASP)**

PSP is characterized by paresthesias of the mouth, lips, face and extremities. In severe cases, dyspnea, dysphagia, muscle weakness or frank paralysis, ataxia and respiratory insufficiency may occur. Respiratory failure may occur during the first 12 hours of the illness. Some patients also have nausea, vomiting, and diarrhea.

The disease is caused by neurotoxic substances in dinoflagellates, one of which is known as *saxitoxin*. Bivalve mollusks feed on these dinoflagellates; the toxins are concentrated in their flesh but do not affect the mollusks. Saxitoxin is a heat stable toxin that blocks the propagation of nerve and muscle action potentials. Duration of the illness ranges from a few hours to a few days.

NSP onset of symptoms occurs within 1 hour of ingestion, but the incubation period may be longer if small amounts of toxin were ingested (3 to 12 hours). The clinical features of NSP are similar to those of PSP, but without paralysis. Several poorly characterized neurotoxins responsible for this illness are found in *Gymnodinium breve*, the responsible dinoflagellate. One of these neurotoxins stimulates postganglionic cholinergic nerve fibers. Duration of the illness ranges from a few hours to a few days.

ASP starts with non specific clinical features including vomiting, abdominal cramping and diarrhea. Confusion, amnesia, coma and cardiovascular instability follow within hours in severe cases; these signs tend to occur in older persons and in persons with underlying renal disease. The hallmark of the disease is antegrade amnesia. The disease is caused by domoic acid, a toxin produced by the dinoflagellate, *Nitzschia pungens* and is concentrated in the flesh of mollusks. Amnesia is the result of bilateral destruction of the hippocampi by the toxin and can be permanent.

Fish and Shellfish Poisoning Syndromes

<i>Syndrome</i>	<i>Incubation Period</i>	<i>Duration</i>	<i>Geographic Location *</i>	<i>Season</i>
Histamine fish poisoning (scombroid)	5 min–1hr	Few hours	Primarily coastal areas (Hawaii, California)	Year-round
Ciguatera	1–6 hr	Few days to few months	35 degrees N to 35 degrees S latitude (Hawaii, Florida)	Feb.–Sept.
Paralytic shellfish poisoning	5 min–4 hr	Few hours to few days	Above 30 degrees N and below 30 degrees S latitude (New England, West Coast)	May–Nov.
Neurotoxic shellfish poisoning	5 min–4 hr	Few hours to few days	Gulf and Atlantic coasts of Florida (Florida)	Spring, Fall
Amnesic shellfish poisoning	15 min–6 hr	Few days to permanent	Coastal areas?	Uncertain