

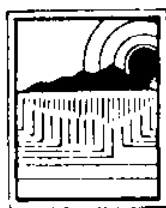
CIGUATERA FISH POISONING

QUESTIONS AND ANSWERS

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What is Ciguatera (sig-wa-té-ra) Fish Poisoning?

It is a human ailment occasionally resulting from the consumption of tropical, reef-associated fish which contain ciguatoxin (CTX).

What Are the Symptoms of Ciguatera?

The symptoms of ciguatera usually occur within two to twelve hours after eating ciguatoxic fish. Initially, there are gastrointestinal symptoms similar to food poisoning, abdominal pain, nausea, vomiting and diarrhea. However, because CTX is a neurotoxin, it can be distinguished from food poisoning by the symptoms affecting the nervous system. These may include itching or tingling of the lips, tongue, mouth, skin, palms and soles; aching and weakness in muscles and joints and the sensation that hot is cold and cold is hot. There is no test for ciguatera and its diagnosis is made on the basis of your having recently ingested fish and the symptoms you manifest. The ciguatera symptom complex may persist for days, weeks, months, or even years in severe cases. The symptoms may recur after the initial intoxication, becoming less frequent and less pronounced over time. The severity of the intoxication depends upon the toxicity of the fish, the amount consumed, and the body size and health of the victim. Subjective factors such as a person's threshold to and tolerance of discomfort affect the perception of ciguatera.

If I Get Ciguatera Fish Poisoning, What Should I do?

Depending upon the severity of the symptoms, you may wish to contact your physician or go to a clinic or the emergency room. Unfortunately there is no rational therapy nor antidote for ciguatera. Treatment is directed at relieving symptoms and their consequences with results which are often far from satisfactory. If you feel you are suffering a serious case of ciguatera, by all means obtain professional medical care. Fatalities due primarily to ciguatera are very rare; but do not gamble, particularly if you already have another health condition.

Is the Incidence of Ciguatera Increasing?

This is a difficult question to answer. Ciguatera has been a problem for a very long time, probably centuries. Epidemiologists from the Centers for Disease Control (CDC) in Atlanta conducted a survey on St. Thomas in 1980 and reported an incidence rate of less than 10 cases per 1,000 population per year.

Can It Happen to Me More Than Once?

Yes. The CDC survey revealed that nearly one-third of those who reported experiencing ciguatera had had a previous poisoning episode in the preceding five years. There is no evidence of a developed immunity to CTX. In fact there are indications that many, possibly most victims become sensitized in some way after a first poisoning and may become more susceptible subsequently. There may be a subjective element underlying this phenomenon. CTX may also be only slowly removed or detoxified in the human body, much as it is retained in fish. This plausibly explains why subsequent poisonings are more severe and how two people may eat the same fish with only one becoming ill. The sensitization response may result in a mild recurrence of symptoms upon the ingestion of alcoholic beverages or nontoxic fish, such as canned tuna or sardines. If you have had ciguatera, consume these with care.

What Causes It?

Ciguatoxin is a naturally occurring substance produced by marine microorganisms called dinoflagellates, one-celled plants. CTX enters the food web when the microorganism is consumed by fish and other animals grazing around reefs. CTX is concentrated at each link in the foodchain, so that predatory fish, the lions of the ecosystem, contain the largest amounts.

Can Ciguatoxic Fish be Identified?

Despite a rich but largely erroneous folklore which surrounds many aspects of the ciguatera story, there

is no scientific evidence to support the detection of ciguatera toxicity in fish by its appearance, smell, texture or taste. A number of tests involving flies, ants, silver coins and so on are legendary, but in the opinion of all competent experts I know, such "tests" are completely unreliable. Some people feed an animal a portion of a fish, such as the liver. But the animal must be closely monitored to assure that the sample is not vomited. Even then, for a host of reasons, the results may be ambiguous. Or, your pet cat may be paralyzed or killed. Unless you really know what you are doing, I do not recommend feeding suspect fish to animals.

Does the Manner of Preparation Affect the Risk of Ciguatera?

When cleaning a fish, you should discard the liver and other internal organs (viscera) since these may contain higher concentrations of CTX. No manner of further preparation or cooking will detoxify contaminated fish flesh. CTX is a heat stable toxin which means that cooking, refrigerating or freezing will not change its toxicity.

Should I Avoid Eating Local Fish?

If you wish absolutely no risk do not eat local fish, but you will be sacrificing fabulously good eating to achieve zero risk. This is an extreme strategy for a healthy person although it may be prudent for pregnant women or one with a significant health condition, e.g., heart disease. The assessment of risk in any situation is usually quite difficult; often sophisticated experts cannot agree on an estimation. Do you wear your seat belt? Do you smoke? The annual average risk of cancer-related death from regular smoking is 1 in 800. In Japan puffer fish or fugu is an enormously popular delicacy and, if properly prepared, safe to eat. Yet in 1984, 67 fugu mortalities occurred there. (The agent responsible, tetrodotoxin, is unrelated to ciguatera.)

Are Some Fish a Higher Risk?

Generally speaking, predatory fish, those which hunt other fish on reefs, may be more toxic than their prey. Fish included in this category are barracuda, kingfish, many species of jacks, and certain snappers and groupers. Large, presumably older carnivorous fish cause most of the severe ciguatera poisonings. It is also a historical fact, based on experience over many decades, that these fish varieties are more frequently toxic when taken from the southside of the island chain running from Puerto Rico to Anegada. I have consumed local fish regularly for many years without a problem at restaurants or from vendors in whom I have confidence. Deep water (pelagic) fish like dolphin (mahi-mahi, dorado), tuna, marlin and swordfish pose no risk of ciguatera.

Does Ciguatera Occur Elsewhere?

Yes, stated broadly, it is a public health problem in the tropics around the world. Ciguatera is widespread and common on many islands in the Caribbean and Indo-Pacific Oceans. Except for southern Florida and Australia (Great Barrier Reef), it is rare on tropical continents. There are probably thousands of cases annually worldwide.

What Is the Current State of Research on Ciguatera?

Ciguatera research is being actively pursued at a dozen or more institutions around the world. Progress is indeed being made along many important avenues but, because of the complexity of the problem, often not at the rate one would wish. One fact from many serves to illustrate this. CTX is extremely potent and is concentrated, even in very toxic fish, at the order of one part per billion (ppb, one CTX molecule for every 1,000,000,000 other molecules). This causes a supply problem for research and makes CTX difficult to detect in fish. The desirability of a simple, reliable and inexpensive test for ciguatoxicity in fish is universally recognized. Advancement to this objective has been encouraging but it may be some time before it is achieved.

What Ciguatera Research Is Currently Conducted at Caribbean Institutions?

The Ciguatera Project at the College of the Virgin Islands has been involved in research on many aspects of the ciguatera problem under my direction since 1978. Funding sources include the National Marine Fisheries Service, the National Institutes of Health, the U.S. Food and Drug Administration, and the College of the Virgin Islands --Agricultural Experiment Station.

Founded in 1979, the Ciguatera Research Group at the University of Puerto Rico is under the direction of Drs. T.R. Tosteson, D.L. Ballantine, and H.D. Durst. Research efforts are supported by the University of Puerto Rico Sea Grant Program.

Additional research is underway at several major cosmopolitan institutions around the world.

Because ciguatera occurs in the tropics, Caribbean researchers have certain advantages compared to scientists at other locations. Through collaborative efforts, however, we seek to combine these efforts with the technological resources at other institutions. No matter where it is made, progress is the only goal.

Can I Help Further the Ciguatera Research Effort?

Yes, indeed! If you or someone you know becomes ill after eating local fish, please (1) place the remaining portions of the fish (including any viscera) in a plastic bag and freeze them; and (2) phone, as soon as possible, the ciguatera project nearest you. In the Virgin Islands area, contact the Ciguatera Research Project, College of the Virgin Islands, St. Thomas, (tel) 774-5366. In Puerto Rico, contact the Ciguatera Research Group through the University of Puerto Rico Sea Grant Program, Mayaguez (tel) 832-3585.

Guidelines for Minimizing the Risk of Ciguatera Fish Poisoning

1. Eat only the flesh of fish. Do not consume the liver, intestines, gonads, or other viscera.
2. Avoid consuming particularly large, predatory reef fish of the species notorious for harboring CTX.
3. Do not eat large quantities of potentially ciguatoxic fish at one time. Do not eat more of any fish if the first meal caused any peculiar symptoms. It is amazing how frequently people are poisoned by a subsequent meal in spite of warning signs from their own bodies.
4. Do not consume reef fish caught in areas where ciguatera cases have been reported recently.
5. Enjoy the prudent eating of local fish. At the same time, be mindful of the realities of the ciguatera problem.

For further information, contact the Ciguatera Research Project (774-5366) or the Virgin Islands Marine Advisory Service (776-9200 ext. 1242). J.P. McMillan, Ph.D., Associate Professor of Biology and Director of the Ciguatera Research Project Division of Science and Mathematics, College of the Virgin Islands, St. Thomas, USVI, 00802.

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