World Health Organization
Ciguatera Fish Poisoning: Questions and Answers

What is Ciguatera Fish Poisoning and where does it occur?
Ciguatera fish poisoning (CFP) is a common foodborne disease related to the consumption of subtropical and tropical marine finfish which have accumulated naturally occurring toxins through their diet. The concerned –ciguatoxic -fish are either feeding on small algae species known as dinoflagellates or feeding on toxic herbivore fish. The main toxic dinoflagellate is Gambierdicus toxicus which is found primarily in sub- and tropical areas where it lives in association with other algae on dead corals.

Are all tropical area and coral reefs toxic?
No. The majority of coral reefs are not ciguatoxic. Outbreaks of ciguatera are limited in distribution and time and are usually very localised. Thus knowledge of toxic areas is usually based on local experience from fishermen and consumers. Toxic fish may be found in the Pacific and Indian Ocean regions and in the tropical Caribbean. In the Indian Ocean, endemic areas are known to be around the Reunion island, parts of Madagascar and Indonesia. Ciguatera poisoning is virtually unknown in the Maldives.

Will the recent Tsunami increase the risk of Ciguatera in the region?
As with any event, either natural or man-made, that significantly disturbs coral reefs and the associated eco-systems, there is an increased short- and long-term risk for ciguatera. This results from the decay of live corals that provides opportunities for proliferation of seaweeds, on which benthic toxic microalgae responsible for ciguatera grow. Therefore, increased screening for the occurrence of these toxic microalgae and for contamination of endemic coral fish species for ciguatera toxins in areas affected by the Tsunami is recommended. In addition, public education programmes should be carried out.

How to detect ciguatera fish poisoning?
Determinations for ciguatera are usually limited to symptomatic diagnoses. Clinical symptoms vary widely but are characterized by gastrointestinal, neurological and cardiovascular disturbances often within 10 min but also up to 24 h after ingestion of toxic fish. The initial symptoms are similar to any other food poisoning (abdominal pain, nausea, vomiting and diarrhea). The most common neurological symptoms are tingling and numbness in the mouth and the extremities, muscle cramping and sensation of temperature reversal (a sensory inversion whereby hot or warm objects feel cold and cold objects may feel warm). Other symptoms include headache, vertigo, hallucinations, salivation, and perspiration. Hallucinations seem to be more often reported in cases in the western Indian Ocean than from other part of the world. The disease is generally non-fatal and of short duration. However, in a few severe cases, symptoms can persist for months or even years.

Detection for ciguatera requires specialized analytical methods and/or particular bioassays. The most common assay are mouse assays. In recent years, new rapid tests have been developed and are being evaluated. It is worth nothing that the toxins isolated in the Pacific, the Caribbean and in the Indian Ocean all differs slightly and therefore caution should be taken in using reference material or tests developed from another region. The pathogenic dose for humans is 23-230 µg and usual regulatory tolerance is that it must not be detected in a product. These clinical determinations are limited in practice and depend on a sample of the actual suspect fish.

What to do in case of a suspected ciguatera fish poisoning case?

In case of a suspected ciguatera fish poisoning, consult a medical doctor. Many physicians are not familiar with ciguatera in particular in areas where this toxin is not endemic. One should therefore describe the symptoms and concerns. Unfortunately, there is no single specific remedy for the treatment of ciguatera fish poisoning. The most successful management of the disease has been accomplished by supportive and symptomatic treatment such as induced vomiting. It is important to try to obtain portions of the meal and in particular the fish to assist in confirming the diagnosis. These portions should be packaged and frozen for any subsequent analysis.

What can be done to prevent or avoid ciguatera fish poisoning?

The ciguatoxin is very heat-stable. Normal household cooking (e.g boiling, steaming, frying) will not reduce or eliminate the toxin. Consumers should exercise caution in areas of concern for particular tropical species. In areas prone to ciguatera Improved hazard analysis for ciguatera should be established to determine locations, seasonal variation, species involved, consumers at risk, sources of contaminated fish, etc.

In Cuba, for example, detailed analysis of epidemiological records on ciguatoxin poisonings has led to dose/response data being defined as functions of the size of fish consumed and have allowed limit weights (critical limits) to be set for five of the most important species and potential toxicity to be set for another 15 species (regardless of their weight). Similar work could be done elsewhere to get a better knowledge of size and species of fish to avoid in a particular area. Targeted information campaigns can then be designed in the areas and during the periods of the year where the problem is more likely to occur, to inform target populations of the risk.

Which fish can be ciguatoxic ?

Ciguatoxin is produced initially by a microscopic alga and is stored in the tissues of fish species consuming these algae, increasing in concentration in large carnivorous fishes. Fishes from some reef areas may be toxic, while those from others may not be. The same species of fish that is ciguatoxic in one area may be safe in another.

By talking to local fishermen one can learn which areas to avoid and which fishes may be dangerous to eat. It is the location where a fish is caught, more than its species, that determines whether a fish is ciguatoxic. Therefore, a comprehensive list of non-ciguatoxic fishes cannot be provided. Between 300 to 400 species of fish have been implicated in ciguatera fish poisoning. If no information is available, it is wise not to eat any large reef fishes, since such specimens may have accumulated sufficient toxin during their lifetimes to be. However, among the large reef fish only very few have been found to be poisonous

Further reading:

Assessment and Management of Seafood Safety and Quality, By H.H. Huss, L. Ababouch, L. Gram,Food and Agriculture Organization (FAO) of the United Nations, Rome, 2003
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How to perform a semi-quantitative risk assessment: Ciguatera Fish Poisoning. From : Application of Risk assessment in the Fish Industry, by J. Sumner, T. Ross and L. Ababouch, Food and Agriculture £organization (FAO) of the United Nation, Rome, 2004.
http://www.fao.org/documents/show_cdr.asp?url_file=/docrep/007/y4722e/y4722e07.htm
Ciguatera Fish Poisoning, A Review in a Risk assessment Framework., by L. Lehane, National Office of Animal and Plant Health, Canberra, 1999.
http://www.affa.gov.au/corporate_docs/publications/pdf/animalplanthealth/chief_vet/ciguatera.pdf