# Fast new test for terrible form of food poisoning

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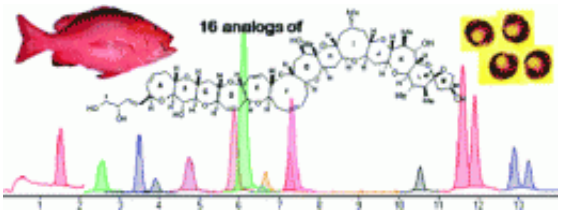


Scientists are reporting development of a fast, reliable new test that could help people avoid a terrible type of food poisoning that comes from eating fish tainted with a difficult-to-detect toxin from marine algae growing in warm waters. The report appears in ACS' journal *Analytical Chemistry*.

Takeshi Yasumoto and colleagues explain that 20,000-60,000 people every year come down with ciguatera poisoning from eating fish tainted with a ciguatoxin -- the most common source of food poisoning from a natural toxin. Fish, such as red snapper and sea bass, get the toxin by eating smaller fish that feast on marine algae that produce the toxin in tropical and subtropical areas, such as the Gulf Coast of the U.S. There's no warning that a fish has the toxin -- it smells, looks and tastes fine. But within hours of ingesting the toxin, people with ciguatera have symptoms that often include vomiting, diarrhea, numbness or tingling in the arms and legs and muscle and joint aches. Debilitating symptoms may last for

months. The current test for the toxin involved giving it to laboratory mice and watching them for symptoms. It is time-consuming, may miss the small amounts present in fish, and can't tell the difference between certain forms of the disease. That's why Yasumoto's group developed a faster, more sensitive test.

They describe development of a new test, using standard laboratory instruments, that avoids those draw backs. Yasumoto's team proved its effectiveness by identifying 16 different forms of the toxin in fish from the Pacific Ocean. Clear regional differences emerged -- for example, snappers and groupers off Okinawa shores had one type, whereas spotted knifejaw captured several miles north of Okinawa had another type. They also identified 12 types of toxin in a marine alga in French Polynesia, which could be the primary toxin source. The researchers say that the method outperforms current detection methods and in addition to helping diagnose patients, it will also help scientists study how the toxins move through the food chain from one animal to another.

**More information:** Detailed LC-MS/MS Analysis of Ciguatoxins Revealing Distinct Regional and Species Characteristics in Fish and Causative Alga from the Pacific, *Anal. Chem.*, Article ASAP. DOI: 10.1021/ac200799j

**Abstract**
Toxin profiles of representative ciguatera species caught at different locations of Japan were investigated in fish flesh by high-performance liquid chromatography tandem mass spectrometry (LC-MS/MS) analysis. Identification and quantification of 16 toxins were facilitated by the use of 14 reference toxins prepared by either synthesis or isolation from natural sources and the previous LC-MS data thereof. Sodium adduct ions [M + Na]+ were used as parent and product ions. Distinct regional differences were unveiled: ciguatoxin-1B type toxins were found in snappers and groupers from Okinawa, ciguatoxin-3C type

toxins were found in a spotted knifejaw, Oplegnathus punctatus, from Miyazaki located 730 km north of Okinawa, and both types of toxins were found in a red snapper, Lutjanus bohar, from Minamitorishima (Marcus) Island. Twelve toxins were identified in a dinoflagellate, Gambierdiscus toxicus, collected as the primary toxin source in French Polynesia. Occurrence of M-seco-toxins in fish and oxidized toxins in the dinoflagellate was confirmed for the first time. The present LC-MS/MS method is rapid, specific, and accurate. It not only outperforms the currently employed mouse bioassays but also enables the study of the toxin dynamics during the food chain transmission.

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