Toxic fish can sicken seafood eaters

By Kate Spinner
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The toxic fish act normal and taste delicious, but inside lurks a poison that has no smell, no taste and cannot be destroyed by cooking or freezing.

People who eat the fish rarely die, but suffer upset stomachs, strange tingling sensations and a scrambled sense of touch that can last months. One victim said putting his hands in cold water felt "unbearably hot."

The culprit is a toxic algae, and the poison it produces — ciguatera — sickens hundreds of thousands of people globally each year, including dozens or more in Florida. It easily eclipses red tide as the largest human health threat triggered by toxic algae.

Although ciguatera is uncommon compared to food-borne illnesses caused by bacteria such as salmonella, it is a top cause of food poisoning from seafood, and the problem seems to be on the rise.

The algae that causes ciguatera is showing up in more places in the Gulf of Mexico, the Atlantic and worldwide, leading to concerns that it could become a significant health issue and an economic problem for communities that rely on safe local seafood.

As Americans eat and import more seafood, their risk of exposure is increasing.

The Florida Department of Health recorded a total of 276 cases statewide since 2001, including 52 last year. Annually, the American Association of Poison Control Centers cited slightly less than 200 cases each year nationwide since 2006.

But studies suggest that only 2 to 10 percent of cases get reported, likely because the illness is not typically fatal and many physicians are not aware of it.

Donna Blythe, a retired Miami doctor who spent a large part of her career treating ciguatera patients, said she knows of one emergency room in Miami that sees an average of 10 cases each week.

Mild cases subside in about a week, but some can last for more than a year. Symptoms also can return when victims drink alcohol or eat nuts.

Bottom feeders first ingest the toxin, which then makes its way up the food chain. Blythe said people should avoid eating barracuda, a voracious predator that is the most common carrier. But grouper, snapper, amberjack and several other large tropical fish are also occasional carriers.

Having fallen ill herself with a mild case of ciguatera from hogfish, Blythe said the key is to buy whole fish that are no bigger than a plate.

"We generally have a very good food safety system, but this is a cause for concern," said Marc Suddleson, director of a program that monitors and predicts blooms of harmful algae for the National Oceanic and Atmospheric Administration.
Currently, the only test for ciguatera requires a quarter-pound of suspect fish and a week's worth of lab work.

NOAA recently awarded a team of scientists, headed by Michael Parsons of Florida Gulf Coast University, a $4 million grant to research ways to predict and prevent ciguatera outbreaks in the U.S. and Caribbean.

"It is actually an increasing issue worldwide," said Alison Robertson, who is working on the research at the Food and Drug Administration's Gulf Coast Seafood Laboratory in Alabama. "For the FDA this becomes a very, very important human health issue. We want to reduce the risk as much as we can."

**Toxic bottom dweller**

Gambierdiscus toxicus is the algae responsible for ciguatera poisoning. It grows in warm water from the deep tropics to the northern Gulf of Mexico. Unlike red tide algae, which floats on its own, Gambierdiscus is a bottom dweller that attaches to seaweed.

The algae flourish in disturbed areas, such as damaged coral reefs, or on artificial reefs and oil platforms where large seaweeds dominate. It also occasionally hitchhikes a ride on floating seaweed.

In recent years it was found for the first time as far north as the Carolinas and in the northwestern Gulf of Mexico, where it has caused several cases of poisoning in Texas.

Scientists are trying to determine whether the algae are actually more prevalent now, or if it seems that way because more people are looking for it, Parsons said.

When small reef fish eat Gambierdiscus, the toxin builds in their bodies. If larger fish eat several of the smaller fish they accumulate more toxin. The bigger and more voracious the predator, the more likely it is to be poisonous to people. The toxin does not harm the fish or affect how it tastes.

Barracuda is the most common carrier because it tends to eat fish susceptible to harboring the toxin, Parsons said.

In people, poisoning causes gastrointestinal problems, followed by a variety of neurological symptoms ranging from tingling or itching skin, irregular heartbeat, toothaches and difficulty sensing temperature.

**Building defenses**

Alan Farago came down with ciguatera 25 years ago, along with his wife, after eating hogfish filets in Key West. He remembers they both felt numbness and tingling in their extremities.

"Another one of the stranger symptoms for us — putting our hands in cold water felt the sensation of being unbearably hot," Farago said.

Since then, few improvements have been made to test for the toxin or anticipate when fish are likely to become contaminated.

"There hasn’t been a major investment yet until now from NOAA in trying to develop that predictability," said Suddleson, the NOAA program director.

If regulators know when conditions are ripe for a Gambierdiscus bloom, they may be able to react, either by testing more fish for toxins or closing contaminated reefs.

That is where Parsons' work comes in: He is creating a computer model to figure out what leads to Gambierdiscus blooms.
Parsons' work, focused on the Florida Keys and the Caribbean, builds off a model he created while doing similar research in Hawaii, where he noticed the algae bloomed mainly in warm months.

He collected samples of the algae and took water quality measurements year round. He also grew some in the lab and subjected it to different conditions.

"We came up with several mathematical equations to simulate how light, salinity and temperature changes in Hawaii, and predict how Gambierdiscus would respond," Parsons said. "We got a pretty good result."

His team is building a new model for South Florida and the Caribbean, using some of the same sampling techniques and lab work.

The research also looks at the health of coral reefs as a potential indicator for toxic blooms.

The ultimate goal, after five years, is to also demonstrate how the toxin moves through the food chain.

On the food side, Robertson is trying to come up with a rapid test for the poison that can be used at docks and ports where fish come in.

It takes a very small amount of toxin to render a fish dangerous to eat, making it difficult for food regulators to test for it now.

Until a faster test is developed, all the FDA can do is quarantine imports from certain areas until lab tests clear them, up to a week later. The agency also sends out advisories to fishermen when ciguatera outbreaks are traced to U.S. waters.

"Our best defense for ciguatera is improving the tools society uses to mitigate the impacts," Suddleson said.

Right now that best defense is caution, Blythe said.