

Red tide hurts, but could it also cure diseases?

By Kate Spinner

SARASOTA - Ten years of research on red tide in Southwest Florida produced several groundbreaking discoveries, some of which promise to improve public health and could lead to new treatments for debilitating respiratory illnesses.

Overall, findings from the research, funded by a \$15.8 million federal grant, underscored that red tide — caused by toxic algae in the Gulf of Mexico — poses significant health problems, especially for people with asthma and other respiratory disorders.

Even brief exposure for the most sensitive people can make them sick for a week or longer.

"It's an environmental, chemical intoxication. Prior to this study we had no idea what people were being exposed to," said Daniel Baden, who directed the research program. He also is director of the Center for Marine Science at the University of North Carolina in Wilmington. "People get sick and we have the numbers to show that."

Red tide algae are naturally occurring, but in large concentrations — known as blooms — they kill fish, sea turtles and marine mammals, such as dolphins. The toxins make shellfish poisonous to eat and also become airborne. Onshore breezes can push the toxins more than a mile inland, research showed.

A large number of severe red tide outbreaks occurred between 2000 and 2006 in Southwest Florida, triggering concern over public health. The concern prompted extensive research, including the health studies led by Baden.

For reasons scientists cannot explain, red tide has been largely absent from area beaches for about five years.

A trip to the beach during red tide is an unpleasant experience. Most people complain of coughs, itchy eyes and wheezing. For those with asthma, too much red tide exposure can result in a visit to the emergency room.

"The next time we have red tide, we'll have a much better health message on how to keep people healthy during red tide," said Barbara Kirk-



Red tide killed fish along Siesta Key in September 2001.

patrick, a senior scientist with Mote, who led field research for the study.

The studies, along with additional on-going research, will improve upon the state's beach monitoring program run by Mote. Mote developed the program to warn people in real-time when and where red tide is present. In the future, the program will give an account of how much red tide toxin is lingering in the air at any given time — much like national warning systems for smog, mold and pollen.

Even during periods without red tide, trace amounts of red tide toxins are sometimes present in the air, the research showed. Scientists, including Kirkpatrick, are just beginning to establish the threshold at which people react to the toxin.

For asthmatics the threshold is extremely low.

Sarasota's lifeguards acted for years as lab rats for the research, showing that red tide causes breathing problems and lung constriction even in healthy people. Those symptoms went away the lifeguards left the beach or when red tide disappeared.

For those with asthma, the effects were much worse and lingering, said Lora Fleming, professor in the Department of Epidemiology and Public Health at the University of Miami. Fleming recently finished analyzing seven years of data, which shows just one hour on the beach can make an asthmatic person sick for a week or longer. Additionally, in the

days following that hour of exposure, asthmatic people became more sick before the symptoms went away.

"To us that means you need to take that seriously," Fleming said. She said the toxins do not seem to cause longer-term damage, at least for healthy people and those with mild or moderate asthma. About 6 to 10 percent of the population has asthma.

In addition to improving scientific understanding about the way red tide wreaks havoc on people, researchers discovered a potentially life-altering treatment for cystic fibrosis and chronic obstructive pulmonary disorder.

Red tide algae produce 12 different toxic substances, but they also produce three non-toxic substances, one of which — called Brevenal — is actually beneficial. It blocks irritants from causing reactions in people with cystic fibrosis and chronic obstructive pulmonary disorder.

Baden said Brevenal is a million times more effective than any other existing treatment for cystic fibrosis and is now undergoing clinical trials to ensure its safety.

Brevenal also shows promise for treatment of seafood poisoning from red tide and the algae that causes ciguatera poisoning, both of which are potent neurological toxins that cannot be cooked out.

"It's a shift in the toxicology paradigm, to have a toxin and an anti-toxin in an organism," Baden said.

Going forward, the research focusing on asthma, Brevenal and enhancements to Mote's beach conditions report will continue as long as other sources of funding become available, scientists said.

If one related grant comes through for Mote, Sarasotans could soon see a robotic child strolling the beach each day, taking air and sand samples to supplement the beach conditions report.

Fleming said red tide scientists were fortunate that the federal grant, made by the National Institute of Environmental Health Sciences, lasted as long as promised. The institute also is funding additional research for several red tide projects related to health, including further Brevenal research.

"Funding is going to be an issue, but the expectation was never that this would go beyond 10 years," Fleming said.

Earlier

Aside from making healthy people cough and wheeze, red tide can have serious health consequences, scientists have documented after a decade of research. Just one hour of exposure to red tide causes people with asthma -- about 6 to 10 percent of the population -- to suffer breathing problems for up to a week.

Red tide is a type of harmful algae that naturally occurs in the Gulf of Mexico. Occasionally, the algae accumulate and grow into a bloom that emits toxins that kill fish and marine mammals. Wind can also blow the toxins toward the beach and more than a mile inland.

The research, discussed today by scientists congregating at Mote Marine Laboratory, puts scientific evidence behind assertions that red tide causes health problems, including weaker immune function and long-lasting breathing problems in people with asthma.

In addition to documenting red tide's harm, scientists discovered a unique anti-toxin also produced by red tide. Surprisingly, the substance could be used to help people with chronic respiratory problems, such as cystic fibrosis, asthma and COPD.