

Bacteria cause plague in coral reef

Just in time for the underwater version of flu season, researchers have identified the bacterium responsible for an unusually virulent coral disease.

Plague type II first appeared on the Florida Reef Tract in June 1995 and had spread along 200 kilometers of the Florida Keys by October. It advanced through healthy tissue at rates of up to 2 centimeters in 24 hours, killing corals in a few days. Plague type I, which appeared in the 1970s, spread only a few millimeters a day and took 3 to 4 months to kill.

Type II flared up again in 1996, and reef biologists fear that this summer will bring a new wave of the disease.

Identifying the bacterium "is the first step in deciding how to treat these diseases," says Laurie L. Richardson of Florida International University in Miami. Type II plague comes from a previously unknown species of *Sphingomonas*, Richardson and her colleagues report in the April 9 *NATURE*. They do not know where the species comes from, why it attacked suddenly, or whether it's related to the first plague.

The new study represents the most rigorous application so far of classic mammalian pathology to a coral disease, Richardson says. Her team used Koch's postulates, named after a 19th-century founder of microbiology, Robert Koch. The criteria are applied to determine that a microorganism is actually causing a disease rather than just thriving in sick tissue. Koch's procedure involves isolating the suspected villain from diseased tissue, using that microorganism to infect a healthy creature, and then isolating the organism from the sick test animal.

Success with Koch's postulates has been rare in the world of coral disease, Richardson says. Twenty years' worth of effort by other researchers has failed to yield consistent identification of a pathogen in another affliction, white band disease. The organism behind plague type I also remains unknown.

In one disease, an ailment called black band, Richardson and a group of colleagues have identified a complex cause. The dark band that creeps over coral and destroys tissue comes from a consortium of blue-green algae, a deadly layer cake of cooperating organisms from three genera that secrete toxic sulfides from its bottom tier.

John C. Ogden, director of the Florida Institute of Oceanography in Saint Petersburg, praises the Richardson team's approach to disease identification as "exactly what's needed." Without pathogen research, reef biologists are stuck trying to diagnose diseases by blatant symptoms like color changes.

The problem is like a doctor trying to diagnose human disease just "by counting spots," he says.

Little research has explored treat-

ments for coral maladies, he observes. Sometimes black band eases when divers enclose a sick coral in a bag of antibiotic solution or just vacuum away the killer goo. This time-consuming treatment "only makes sense on very old, highly beloved corals on trails that are visited by thousands of people each year," Ogden says.

Another researcher studying coral diseases, James M. Cervino of the Global Coral Reef Alliance in New York City, points out that plague type II is "the fastest-spreading disease, and it affects the most species [of coral]." At the end of 1997, he saw it hit sites in the southern and central Caribbean, beyond its original Florida range.

He's convinced that reef diseases are growing more common, possibly as a result of increased stress on the organisms. He does offer some good news, however. A disease he's been tracking, rapid-wasting syndrome, seems to be



By beginning to identify the pathogens that attack coral, researchers are figuring out how to keep reefs healthy.

slowing. He's exploring the hypothesis that it came from a rash of unusually deep parrot fish bites that became infected by a pathogen not yet described in a publication.

—S. Milius

Carotid surgery comes with complications

More than 500,000 people suffer strokes in the United States each year, but the number would be higher without a procedure in which surgeons clear blockages inside the carotid artery. The surgery facilitates blood flow to the head and is particularly useful for people who don't have symptoms of stroke but who do have dangerously clogged carotid arteries.

The surgery poses a risk of stroke even for these outwardly healthy people, but new research shows that the risk is greater than previously thought. Moreover, for ailing, high-risk patients, another approach altogether may be advisable.

Scouring out the Y-shaped carotid artery in the neck is common surgery in the United States. In 1995, 132,000 people had such a carotid endarterectomy. To assess the risk of stroke associated with the procedure, scientists recently reviewed the cases of 463 asymptomatic patients at 12 medical centers who had the operation between 1987 and 1990.

Shortly after the surgery, 13 patients suffered a stroke or died, apparently because of obstructed blood flow during the operation or because bits of plaque shaken loose from the blood vessel wall during surgery lodged in the brain, says study coauthor Larry B. Goldstein, a neurologist at Duke University Medical Center in Durham, N.C.

This 2.8 percent complication rate, reported in the April *STROKE*, is nearly double the 1.5 percent rate found in a 1996 report.

The findings may differ because of the surgeons involved, Goldstein says. The earlier report monitored only doctors who had performed at least 12 such

operations a year with high success rates. In contrast, Goldstein and his colleagues reviewed operations done by doctors who didn't necessarily have as much experience with the procedure.

The new report may actually understate the risk, says Goldstein. In the earlier report, patients were tracked for 30 days after surgery. Goldstein's team analyzed data on patients only until discharge from the hospital, usually after a few days, yet it found a higher rate of complications.

The researchers also found that women faced a 5.3 percent complication rate, whereas men encountered only a 1.6 percent rate.

Many of the people in direst need of a carotid endarterectomy face the greatest danger from the operation. The risk of complications rises to 10 to 20 percent for patients who are over 80, who have had previous carotid surgery, or whose blood flow to the brain is otherwise restricted, says cardiologist Gary S. Roubin of Lenox Hill Medical Center in New York City. Also boosting the risk are heart disease and blockage that occurs in a part of the carotid artery that is difficult to reach.

For such high-risk patients, Roubin implants a stent—a cylindrical device that props the vessel open while holding back the arterial wall with a fine mesh that prevents bits of plaque from entering the bloodstream. In the April 7 *CIRCULATION*, Roubin and his colleagues report that, compared to carotid endarterectomies, stents halved the complication rates in most high-risk patients and reduced even further the problems encountered by those who had very large blockages.

—N. Seppa