

Oceans May Contain Cures For Diseases

BY DONALD SMITH

National Geographic News Service

Tottering on the edge of a dock in Woods Hole, Massachusetts, biochemist Douglas Prasher dips a net into Vineyard Sound and scoops up an oozing mass of jellyfish. He gingerly nudges the blob, which is slightly smelly and looks like several spoonfuls of clear Jell-O.

"The uniqueness of this organism is very important to me," Prasher says. "The ocean provides completely different kinds of animals to work with."

Back in his lab at Woods Hole Oceanographic Institution, Prasher cuts off the outer ring of tentacles and places the jellyfish in a large freezer. Stored at minus 158 Fahrenheit, the small, doughnut-shaped chunk of organic ice will wait to be defrosted, ground into mush and launched in the war against human suffering.

The ocean is yielding an increasing number of previously unknown chemical compounds manufactured by animals such as jellyfish. Scientists hope that one day these substances may cure cancer; lung diseases, including asthma and emphysema; and inflammatory ailments such as arthritis and psoriasis. Some even hold out hope that an AIDS immunization will emerge from the sea.

"About half of all drugs known today are derived from plants or animals, including quinine, quinidine, digitalis, cortisone—even aspirin, which comes from tree bark," says pharmacologist Robert Jacobs of the University of California at Santa Barbara. "But over the past 200 years we've not been able to study marine organisms systematically, the way we've studied terrestrial organisms. Now we have the technology to do it."

Testing of a promising anti-cancer drug called didemnin B in cancer patients at about 20 clinics is now nearly complete. Developed from tunicates—commonly called sea squirts—didemnin B also has proved useful against herpes, equine encephalitis and yellow fever. By suppressing the body's immune system, it could help counter organ rejection after transplants.

The tunicate-derived compound ecteinascidin, whose toxicity in animals is now under study, is also being considered as a cancer treatment.

"We have here two classes of compounds that look very promising as anti-tumor agents," Kenneth L. Rinehart, a chemist at the University of Illinois at Urbana-Champaign, tells *National Geographic*. "What's exciting is that they're quite different from any others currently in use, both in the way they work and the chemical entities they provide."

Scientists reason that many sea creatures—especially soft-bodied animals such as tunicates and sponges—contain chemical structures not found on land because of the way they evolved defenses against predators.

Unable to move about and lacking hard shells or weapons such as claws or teeth, these animals evolved chemical compounds that repel or kill predatory fish. These same com-

pounds are being found to have useful pharmaceutical properties such as killing cancer cells in test tubes.

After only about two decades of development, the relatively new field of marine bio-organic chemistry and pharmacology has been growing quickly in recent years. Japan has launched major efforts to develop marine resources for medicine as well as food.

In the United States, the National Cancer Institute, the National Science Foundation and the National Sea Grant College Program have been awarding study grants. All major U.S. pharmaceutical companies have initiated projects aimed at testing promising compounds and bring-

ing successful ones to the market.

At a meeting in Chicago last October, a Sea Grant College Program committee proposed a "national strategic research initiative" that would allocate \$1.5 million a year for six years to support more research and postdoctoral fellowships in the field.

As in the threatened South American rain forest, where scientists are regularly finding new chemical compounds, potential medical miracles from the ocean are in danger of being lost forever due to pollution, according to the Sea Grant Program committee.

The ocean's "unique marine resources are rapidly declining because

of the changes caused by human activities, which are modifying coastal waters and in some cases destroying the reef habitats that harbor the greatest diversity of marine organ-

isms," the report states.

"Extinction—the death of birth—is removing these chemical factories at a much greater rate than they can be explored."

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