bleeding, and heart as well as skin problems. The researchers do not yet know how mutations in the gene, which seems to be involved in transporting material in and out of cells, lead to the disease. One puzzle is that the gene is most active in the liver and kidneys, and the researchers have found very little evidence of the protein in the skin, as they would have expected. That leads Uitto to speculate that "it may well turn out that PXE is primarily a metabolic disorder, and the connective tissue manifestations are secondary phenomena." He adds, "Once we figure out what the normal gene does, we might be able to help these patients."

The hunt for this gene has been long and frustrating. Indeed, several groups put their efforts on hold in the late 1980s, and the search languished until around 1994. Then, after a chance meeting, Lindpaintner teamed up with Kenneth Neldner, a dermatologist at Texas Tech University Health Sciences Center in Lubbock. Neldner had been working with NAPE, an organization started in the late 1980s by Diane Clancy, a PXE patient in Albany, New York, out of her living room. The two researchers contacted NAPE members and got PXE patients and their families to donate the blood samples they needed to track down the gene. By 1997, Neldner and Lindpaintner had narrowed their search to the short arm of chromosome 16; Bergen had also found a connection between PXE and that part of chromosome 16.

Shortly before that connection was made, Sharon and Patrick Terry entered the picture. Concerned that too little work had been done to understand PXE, they turned to the Washington, D.C.–based Genetic Alliance, an umbrella group of patient organizations, for advice on setting up their own advocacy group. After consulting with geneticists, the Terrys established a blood bank, persuading PXE patients and families from all over the world to send in blood samples and to have their family histories documented. When she learned about Lindpaintner's and Bergen's success in localizing the gene, Sharon Terry helped organize a meeting of all the researchers on the trail of the PXE gene. At first it seemed the groups would collaborate. But tensions arose over sharing data and, eventually, NAPE and Lindpaintner went their own way.

Because the relevant section of chromosome 16 had been sequenced and studied by then, the various teams knew there were six genes in that region. None looked like an obvious candidate for causing the disease, so the researchers simply scanned for mutations, working painstakingly one gene at a time. Boyd recounts that his team found nothing interesting in the first five genes they examined. But "the moment we started looking at the ABCC6 gene, we ran into mutations," he says. Individuals with PXE had several distinctive changes in the gene, whereas DNA samples from 100 healthy individuals showed no mutations. The evidence, Lindpaintner agrees, "is very much cut and dried," leaving little doubt that this is the right gene.

Even before the gene's function is understood, it may prove useful in diagnostic tests. PXE symptoms and age of onset vary quite a bit. Now it should be easier to get definitive confirmation of the disease, says Boyd, and also to identify asymptomatic carriers. Both Boyd and Lindpaintner suspect that, depending on the mutation, apparently asymptomatic carriers may face unrecognized risks—such as a greater propensity toward heart disease or eye problems early in life that might be reduced by modifying the diet or monitoring eyesight carefully to detect early signs of vision loss.

Both the patient groups and the researchers are now planning their next steps. "We realize [the gene] is not the end of the road," says NAPE spokesperson Carol Daugherty. In the works are efforts to learn more about how the gene functions in cells and whether the variability in the disease's course is linked with particular mutations. Daugherty says she regrets that NAPE and PXE have been unable to join forces. Nevertheless, she adds, "each group takes its separate road to what I'm sure is a common goal—improving the lot of individuals with PXE."

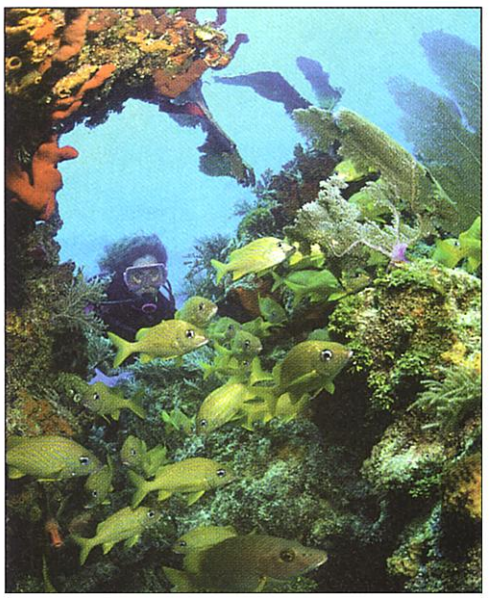
–ELIZABETH PENNISI

OCEANS POLICY

Clinton to Expand Marine Reserve Areas

A wave of announcements last week lifted the spirits of marine conservationists and researchers. Standing on a sun-dappled Virginia beach, President Bill Clinton on 26 May ordered federal agencies to develop an expansive new network of marine reserves in U.S. waters. The move came a few days after The Pew Charitable Trusts established a high-profile oceans commission that supporters hope will energize efforts to study and protect the sea. Adding to the bounty, federal officials also announced that they will shift shipping lanes away from environmentally sensitive areas off California, while researchers began an ambitious effort to count all forms of marine life (see p. 1575).

In his appearance at the Assateague Island National Seashore, Clinton outlined a new executive order that seeks to protect a bigger portion of U.S. waters—which stretch for 320 kilometers offshore—from fishing, drilling, and other activities. Currently, less than 1% of the vast U.S. coastal territory is protected, demarcated by a dozen marine sanctuaries and other wildlife refuges or parks (*Science*, 25 July 1997, p. 489). To boost the total, Clinton ordered the Interior and Commerce departments to come up with a plan for designating and managing an integrated system of marine protected areas. To start, he wants improved safeguards for 12,000 square kilometers of coral reefs in the Northwest Hawaiian Islands, home to nearly 70% of U.S. reefs.



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Sunken treasures. Executive order would strengthen safeguards on coral and other marine resources.

While it's not clear if such bureaucratic efforts will pay off, "I can't think of a better way to begin the first summer of the new century," said Elliott Norse, president of the Marine Conservation Biology Institute in Redmond, Washington. He and others are pushing to increase U.S. protected waters to 20% of the total by 2015.

The new Pew Commission on Oceans, to be led by New Jersey's Republican governor, Christine Todd Whitman, and packed with political and business heavyweights, hopes to repeat the impact of an earlier oceans panel. The 1969 Stratton Commission, chartered by Congress, sparked the creation of the National Oceanic and Atmospheric Administration and new coastal conservation legislation. But it also unintentionally encouraged overexploitation of the sea's once seemingly limitless resources, says Carl Safina of the National Audubon Society in New York City.

The new panel, Safina says, has a chance to take a "clear, cold look at what's needed and what is appropriate now—and that's long overdue." The commission will hold its first meeting in July, with a final report due in 2002.

–DAVID MALAKOFF