

New Findings Surprise Researchers

By Wanda Cohen

Although VIMS researchers have studied the oyster pathogen, *Perkinsus marinus* for years, scientists say they've reached a new stage in the work. Recently, Drs. Fu-Lin Chu and Eric Lund determined that *Perkinsus marinus* is able to synthesize arachidonic acid, an essential fatty acid that animals and humans need. Arachidonic acid is important in making hormones and in cell communication – or “cell signaling.” The parasite needs the fatty acid for energy and to produce new cell membranes as it multiplies to spread through its host. In 1998, when the scientists turned their attention to how the parasite acquires and uses fats, they expected the organism to be

like related parasites. But it turned out that *Perkinsus* has a major distinction. While other parasitic pathogens could produce simple fatty acids, *Perkinsus* is able to make the more complex arachidonic acid. That is significant because it may help explain why the pathogen is so virulent in oysters.

Based on these findings, the National Science Foundation recently renewed funding to enable the researchers to expand their work. “We have several important questions we plan to address in this phase of the study,” said Chu. The team hopes to find out if the process of synthesizing the fatty acid takes place when the parasite is inside the oyster or when it is in the water column or both. For this



Drs. Fu-Lin Chu and Eric Lund led recent *Perkinsus* study.



This photo shows a healthy oyster on the left, and a diseased oyster on the right.

Annual Fund Board

At its June 5th meeting, the VIMS Annual Fund Board honored outgoing Chairman John Dayton for his numerous contributions over the past several years and named Peter Clay from Richmond as its new Chairman. The Board assists the institute in fundraising and community outreach activities. Annual Fund Board member Carrie Garland chaired the VIMS Auction in April to benefit the Hargis Library Endowment. President-elect Clay said, “I look forward to continuing in the path of John Dayton’s fine leadership over the past two years and supporting the mission of VIMS.”

Biotechnology Initiative

VIMS Director Don Wright was named to serve on the Governor’s Advisory Board for the Virginia Biotechnology Initiative, a panel charged with developing a comprehensive and coordinated statewide strategy to attract additional biotechnology investment in the Commonwealth. The Governor has instructed the Board to produce specific recommendations and actions for making Virginia a leader in the biotechnology industry by November 15, 2002.

portion of the study, molecular biologist, Dr. Kimberly Reece will work with Chu and Lund to identify the genes that are involved in the process of making arachidonic acid. If it turns out that inside the oyster the parasite loses its ability to make arachidonic acid, then the scientists will need to identify the underlying mechanisms that trigger the genes to turn “on” and “off.” “Either way this turns out, we will know a great deal more about this pathogen,” said Chu.

By understanding this aspect of the parasites physiology, scientists hope they can ultimately develop strategies that would interfere with the pathogens ability to multiply in the oyster and thus interrupt the disease process.

Some parasites, like *Plasmodium* that causes malaria, need carriers — like the mosquito—to spread. But

Perkinsus doesn’t appear to have a carrier, and scientists believe it floats in the water until finding oysters to infect. *Perkinsus* can survive outside the host for some time, but it does not multiply during this phase of its life cycle.

Perkinsus marinus, which causes Dermo disease in oysters, is one of the diseases that had devastated the native oyster populations in the Chesapeake Bay and along the east coast and Gulf coasts of the United States. In the past few decades, there has been a worldwide increase in the frequency and intensity of diseases that affect economically and ecologically important marine organisms. Several parasitic species from the genus *Perkinsus* have been associated with the outbreak of diseases and subsequent mortality in many cultivated and wild populations of shellfish.

What is Dermo?

Dermo was first documented in the Gulf of Mexico in the 1940s where it was associated with extensive oyster mortalities. The disease was found in Chesapeake Bay in 1949 and has been present in the Bay since that time. By the mid-1950s, Dermo had spread to Delaware Bay and since that time has been found in Connecticut, New York, Massachusetts, and Maine. The parasite thrives in warm water temperatures with high salinity.

In June 2001, the Office International des Epizooties (OIE), designated VIMS as the world reference laboratory for *Perkinsus* and *Haplosporidium*. These two pathogens cause disease in shellfish worldwide. (See CREST, Vol.3 No.2 Fall 2001.) Over the past fifty years, the institute has been a world leader in research on these pathogens. Today, most laboratories use techniques developed at VIMS for identifying the parasites. VIMS continues to lead the way in shellfish disease research that has economic impacts worldwide.