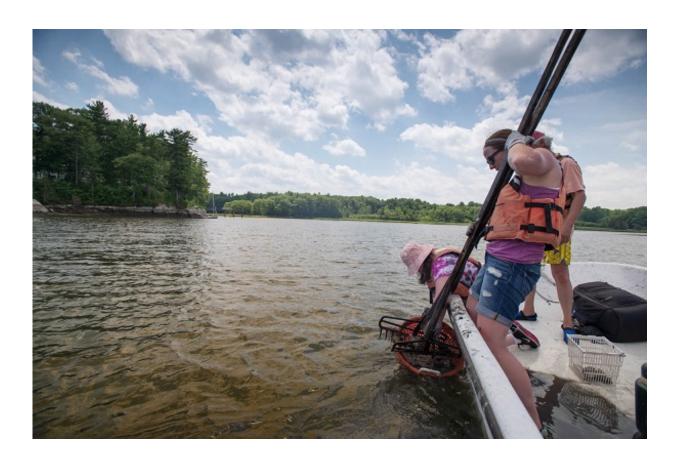# Researchers discover new method to detect most common bacteria contaminating oysters

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In New Hampshire's Great Bay, a team of UNH undergraduate and graduate students collect oysters to look at environmental conditions that might favor *V. parahaemolyticus*. Credit: Jeremy Gasowski, UNH Communications and Public Affairs

In a major breakthrough in shellfish management and disease

prevention, researchers at the University of New Hampshire have discovered a new method to detect a bacterium that has contaminated New England oyster beds and sickened consumers who ate the contaminated shellfish. The new patent-pending detection method - which is available for immediate use to identify contaminated shellfish - is a significant advance in efforts to identify shellfish harboring disease-carrying strains of *Vibrio parahaemolyticus*.

"Since 2012, the Northeast has been experiencing an ongoing outbreak caused by a non-native strain of *V. parahaemolyticus* that is endemic to the Pacific Northwest. A significant challenge for managing shellfish harvesting to prevent infections is that we were previously unable to tell the difference between this strain and harmless residents. The new detection platform will provide rapid, and more importantly, specific quantification of the invasive strain, we hope allowing more effective management of harvesting that will protect this important regional industry," said Cheryl Whistler, associate professor of molecular, cellular, and biomedical sciences.

The new detection method was developed by Whistler; Steve Jones, research associate professor of natural resources and the environment; and Vaughn Cooper, associate professor of molecular, cellular, and biomedical sciences. It was developed using genome sequencing and analysis. The research is presented in the forthcoming issue of the *Journal of Clinical Microbiology* in the article "Use of Whole Genome Phylogeny and Comparisons in the Development of a Multiplex-PCR Assay to Identify Sequence Type 36 *Vibrio parahaemolyticus*."

V. parahaemolyticus isthe most common bacterial infection acquired from seafood in the world. There are an estimated 35,000 cases each year in the United States. In recent years, there has been an increase in the incidence of shellfish contamination, which has caused costly recalls of shellfish and shellfish bed closures in Connecticut and Massachusetts.

Some strains of the microbe cause disease and others do not.

In a major breakthrough in shellfish management and disease prevention, UNH has applied for a patent for a new method of detecting a bacterium that has contaminated New England oyster beds and sickened consumers who ate the contaminated shellfish. Credit: NH Sea Grant

Whistler said the new detection method is available for immediate use, and can benefit researchers and managers, food inspectors, wholesalers, and retailers. It could form the basis for a diagnostic test for widespread use in both environmental detection and clinical diagnosis. In addition to enabling the research community, the UNHInnovation office will be seeking a partner to license the patent-pending innovation for

commercial applications.

"New ideas that create jobs and healthy communities are among the many advancements that have made the United States the leading economic power in the world. Much of this innovation takes place at top research universities like UNH. This patent and the research that led to it underscores the need for continued federal investments in scientific research that will allow the United States to remain an innovation leader," said Jan Nisbet, senior vice provost for research at UNH.

The new detection method identifies the Atlantic ST36 strain of the bacterium. UNH researchers used genotyping and whole genome DNA sequencing at the UNH Hubbard Center for Genome Studies on 94 clinical isolates collected from 2010 to 2013 in Massachusetts, New Hampshire, and Maine. They determined that it is this particular strain of the bacterium that has been responsible for the bulk of the Vibrio outbreaks in the Northeast in recent years. Researchers were able to identify specific genes found only in the invasive strain.

Details on the regional pathogens used to develop the new detection method are presented in the April issue of Frontiers in Microbiology in the article "Genetic characterization of clinical and environmental *Vibrio parahaemolyticus* from the Northeast USA reveals emerging resident and non-indigenous pathogen lineages."

"This important breakthrough is an example of the critical need to support a strong research portfolio that spans the range from solving immediate issues to developing fundamental knowledge about the agricultural, food, and environmental systems that are central to the experiment station's mission. At some point, the information we derive from what is commonly termed basic research becomes critical to solving new problems as they arise," said Jon Wraith, dean of the UNH College of Life Sciences and Agriculture and director of the NH Agricultural Experiment Station.

The presence of pathogenic *V. parahaemolyticus* is rare in the Northeast as cooler water temperatures protect against bacterial growth. However, with the regions' rise in ocean temperatures and unusually heavy, intermittent rainstorms, conditions have changed over time, generating a host of problems that impact people's health and the economy.

In the 1980s, UNH scientists were the first to detect Vibrio vulnificus - a potentially more serious species of Vibrio - north of Long Island Sound. Since then Vibrios have been studied throughout the shellfish and waters of the Great Bay Estuary.

Provided by University of New Hampshire