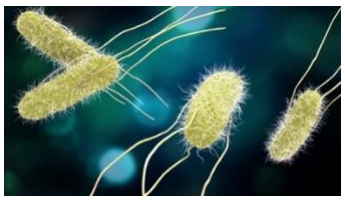
Center for Biomedical Sciences

Aquatic Disease Project



Water is an essential molecule that underpins all known forms of life. It plays a critical role in physiological processes, ecological balance, and public health infrastructure. For humans, access to clean and safe water is not merely a convenience but a biological necessity—survival without water is typically limited to approximately three days. However, this same essential resource also serves as a highly efficient medium for the transmission of infectious diseases, particularly in the aftermath of environmental disruptions.

Waterborne diseases remain a significant global health concern, with the World Health Organization estimating that over 2 billion people worldwide consume water contaminated with feces, leading to approximately 485,000 diarrheal deaths annually. In the United States, the Centers for Disease Control and Prevention (CDC) reports thousands of cases of waterborne illness each year, many of which are linked to natural disasters that compromise water treatment and sanitation systems.

Our local community is not immune to these risks. Pathogens such as *Giardia*, *Cryptosporidium*, *Cyclospora*, *Salmonella*, *Shigella*, *Escherichia coli* and Hook worm are all capable of contaminating water supplies and causing widespread illness. These microorganisms can lead to symptoms ranging from mild gastrointestinal distress to severe, life-threatening conditions, particularly in vulnerable populations such as children, the elderly, and immunocompromised individuals.

The threat of waterborne disease is especially acute following natural disasters. In coastal regions like ours, hurricanes and tropical storms not only cause physical destruction but also disrupt municipal water systems, overwhelm wastewater infrastructure, and increase the likelihood of pathogen infiltration into drinking water supplies. Floodwaters can carry a wide array of contaminants, including human and animal waste, directly into community water sources.

In response to these challenges, the **CCU Disease Hunters** at Coastal Carolina University are actively engaged in the development and refinement of genomic methodologies for the detection of waterborne pathogens. By employing advanced molecular techniques such as Polymerase Chain Reaction (PCR) our research aims to identify pathogenic organisms in environmental water samples with high sensitivity and specificity.

The overarching goal of this initiative is to establish a rapid-response diagnostic framework that can be deployed in the aftermath of natural disasters. By providing timely and accurate data on the presence of harmful microorganisms in local water supplies, we aim to support public health decision-making, inform emergency response efforts, and ultimately safeguard the health and well-being of our community.