

Man vs. Microbe

After the Centers for Disease Control and Prevention (CDC) published a paper about a mysterious bacterium that appeared to be the cause of several human deaths, graduate student Michael Poole was hooked—he decided to devote his graduate research to the topic.

That was 1976.

“Mike drove down to CDC (in Atlanta), picked up some cultures and brought them back to the lab,” said UNC Charlotte Professor of Biology James Oliver.

The cultures contained a bacterium that has since been named *Vibrio vulnificus*, or *Vibrio* for short—and it has gained a reputation as the deadliest known food-borne pathogen in the world.

Poole, now a surgeon in Savannah, subsequently earned his Ph.D. and M.D., and Oliver has become an internationally recognized expert on *Vibrio*.

“We have been studying it and publishing about it now for 35 years,” Oliver said.

Since the discovery of *Vibrio*, Oliver has over 150 publications to his credit. In 2010, he presented at a World Health Organization meeting on key aspects of the topic. A steady stream of graduate students has worked with Oliver in his lab; the 50th graduate student will complete his or her graduate degree this year. The vast majority of Oliver’s students research some aspect of *Vibrio*.

“We study virtually anything that has to do with this bacterium—how it causes disease, how it survives in its environment, its genomics, metabolism, physiology, any aspect you can imagine,” Oliver said.

Rare but Fatal

Though cases of food-borne illness caused by salmonella and other more widely recognizable organisms occur at far higher rates than those caused by *Vibrio*, the fatality rates for *Vibrio* give one pause.

“*Vibrio* is about 50 percent fatal,” Oliver said. “If you come down with the infection, typically after eating raw or undercooked oysters, you have a 50/50 chance of dying.”

I doubt we’ll ever know this bacterium completely, but our hope is that through our research we can help decrease the pain and deaths caused by this pathogen.

— *James Oliver, Professor of Biology*

Most bacteria have a single portal of infection; for instance, the only way to acquire salmonella is to eat food contaminated with the bacteria. Few bacteria have more than one portal of entry, but *Vibrio* has two—ingestion and wound infection.

Once ingested, *Vibrio* crosses the intestinal wall, enters the bloodstream and multiplies rapidly.

However, Oliver noted, there is good news.

Research has confirmed that the average healthy person rarely comes down with a *Vibrio*-induced infection. There are a number of underlying diseases that predispose people to the infection, including alcoholic cirrhosis of the liver, diabetes and hepatitis. The bacteria require high levels of iron, and individuals with these conditions have far more iron in their blood than healthy individuals.

Though the number of oyster-related *Vibrio* cases reported annually in the United States ranges from 30 to 40, more than 15 million Americans have at least one of the diseases that would predispose them to infection.

***Vibrio* on the Rise**

In the United States, raw oysters are the primary vehicle for transmission of *Vibrio* to humans.

Around the world, millions of pounds of oysters are consumed each year. By comparison, the chances of contracting *Vibrio* infection are extremely small.

Though rates of infection are low, the infection caused by *Vibrio* is terribly efficient. Symptoms including fever, chills, nausea, and greatly reduced blood pressure, usually begin the day after the oysters are consumed.

If you have one of the diseases that could predispose you to *Vibrio* infection, you shouldn't eat raw oysters, Oliver cautioned.

Oliver hopes that the recognition that this bacterium exists, and increased awareness among individuals with diseases that predispose them to infection, will stem the rise in *Vibrio* infections.

In the meantime, Oliver, his students and colleagues plan to delve further into the world of a tiny organism that remains cloaked in complexity.

"I doubt we'll ever know this bacterium completely, but our hope is that through our research we can help decrease the pain and deaths caused by this pathogen," Oliver said.