Research seeks ways to fight drug resistant bacteria

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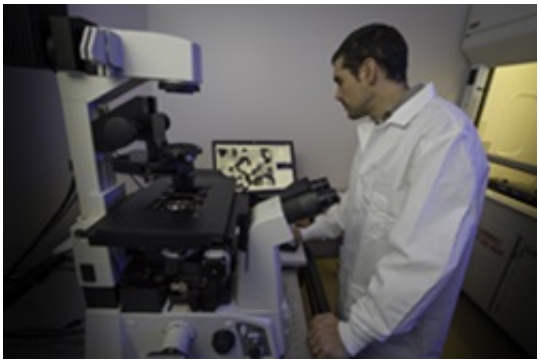

Prof. Eric Klein seeks ways to fight drug resistant bacteria.

If the best defense is a good offense, then a preemptive strike to prevent bacteria from sticking to a cell might be the best way to improve treatment for bacterial infections and fight off drug resistant bacteria.

"For many bacteria to infect you, they first stick to your cells, then get inside your cells and start dividing to cause havoc from within," says Eric Klein, an assistant professor of biology at Rutgers University–Camden. "That first step is critical because if these bacteria can't stick to a cell, then they can't get into the cell."

In order to disrupt the process, Klein is observing the genetic changes that bacteria undergo when adhering to cells.

"Every species of bacteria is different, so the mechanism by which they stick to cells differs from one species to the next," Klein explains. "However, if we can find some common pathway in many bacteria—the genetic expression changes upon adhesion—we can perhaps develop drugs that target the bacteria at the point of adhesion."

In his Rutgers–Camden lab, Klein and two undergraduate students are studying E. coli bacteria that cause urinary tract infections after adhering to the bladder. He says a number of drugs targeting the interaction between the bacteria and the bladder are being developed, but those drugs will only work for specific E. coli bacteria that bind to the bladder.

"It's a limited application," Klein says. "The question becomes, what is the common change in all bacteria that triggers the infection genes when stuck to tissue?"

Chris Cherfane, a junior biology major from Cherry Hill, and Abdullah Abdelaziz, a sophomore biology major from Little Egg Harbor, are analyzing bacterial strains as they adhere to a sugar and grow in Klein's lab.

"Anti-bacterial resistance is growing in many different strains and this research allows me to potentially have a significant impact on improving how we fight off that resistance," says Cherfane, a graduate of Cherry Hill High School West. "It's challenging, but it's helping me develop skills that could have so many different applications."

Outside the body, bacteria need oxygen to survive. Since oxygen is limited inside the body, Klein hypothesizes that the genetic changes bacteria undergo allow it to adapt to the conditions and thrive.

Abdelaziz, a graduate of Pinelands Regional High School, says, "Maybe there is a commonality shared by a majority of bacteria. This work

allows us to understand so many different concepts by actually testing them out in a lab setting. By doing this research, I can say that I had some positive impact on the community."

The research team already has preliminary data that shows how gene expression in E. coli changes when it is attached to a cell surface.

"The trick is to see how consistent that is across different bacteria," Klein says. "If the bacteria sticks and there is a change in the expression of a certain gene, what is the importance? Does that mean it's more virulent? Is it important for survival of the bacteria within the cell? We want to find out."

Provided by Rutgers University