

NAU researchers develop new device for finding bacteria

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Infection-causing bacteria can't hide from researchers at Northern Arizona University, who recently helped develop the first diagnostic tool to detect them.

A patent is pending for the new Lateral Flow Assay device to detect the microorganisms bound together in a protective wall, known as biofilms, which attach to inanimate substances, such as rocks in streams or catheters in humans, or to living tissue such as human heart valves and bone.

Certain bacteria produce biofilms, which act as a defense against drugs and the immune system, making it difficult to treat an infection.

Biofilms cause more than 70 percent of community and hospital-acquired infections, such as staph infections, according to the Centers for Disease Control and Prevention. The cost associated with treating these infections in the United States is about \$5 billion a year, said Jeff Leid, an associate professor in the Department of Biological Sciences and associate director for NAU's Center for Microbial Genetics and Genomics.

"Biofilms are an important problem with implanted medical devices as well as in the establishment of chronic infections," Leid said. "They are notoriously less susceptible to antibiotics than their single-cell, non-community orientated bacteria and are less susceptible to attack and killing from the human immune system."

Leid explained that because of this, patients often suffer chronic and recurring infections.

"Without a specific way for physicians and health-care workers to diagnose these infections, patient treatment may be delayed," he explained.

Developed by a team of faculty and students from NAU and the University of Maryland, the Lateral Flow Assay works in similar ways to the test used to diagnose strep throat. The device identifies the presence of biofilm-specific antibodies in patients by allowing the antibodies to bind to biofilm-specific proteins on the device.

"If physicians and other health-care workers can diagnose these infections early, there will be a much greater chance for clinical treatments to work and for patient health to improve dramatically," Leid explained.

Leid invented the device in collaboration with Tim Vail, an associate professor of Biochemistry at NAU, Jennifer Kofonow, an NAU biology graduate student, Mark Shirliff, an assistant professor in biomedical sciences at the University of Maryland, and Rebecca Brady, a biomedical sciences graduate student at the University of Maryland.

In March, the group presented the diagnostic assay at the international Biofilms 2007 meeting in Canada.

"When we showed the slide documenting the assay's utility in detecting a biofilm infection from the serum of an infected animal, the crowd of more than 500 scientists went silent in awe. It was amazing," Leid said.

Dr. Steve Fry at Airpark Medical Center in Scottsdale, Ariz., is hoping the Lateral Flow Assay will help him diagnose his patients' medical

problems faster. "This new device will allow doctors to test drugs and materials simultaneously and will save time and money," Fry said.

The researchers are working to fine-tune the treatment protocols for using the new device.

"The next move is trying to find a company that is interested in licensing the technology so that it can be developed and sold as a clinical product," Leid said.

Source: Northern Arizona University

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