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Discoveries of flaws in tuberculosis research system earns professor an award for innovation

October 5, 2009

A Colorado State University researcher's discovery that how tuberculosis is studied in laboratory settings across the world may not realistically model many human infections has earned her a New Innovator Award from National Institutes of Health.

Microbiology Assistant Professor Diane Joyce Ordway has been awarded the NIH New Innovator Award for her tuberculosis discovery.

$1.5M grant part of award

The award, which comes with a $1.5 million grant over five years, recognizes Diane Joyce Ordway, an assistant microbiology professor.

Ordway discovered that laboratory strains of tuberculosis used in research programs do not invoke the same response in hosts as current strains of tuberculosis that infect most of the people in the world. Many of these strains of high virulence are resistant to multiple drugs - called MDR-TB strains that are commonly seen in humans - belong to the W-Beijing family of the bacteria that causes the disease.

Developing new model

Ordway has initial proof that some of the W-Beijing strains of *Mycobacterium tuberculosis* causes the immune system in the host to stop working, making the illness particularly lethal and difficult to treat. Ordway also discovered that the current laboratory models to study the how tuberculosis infections work in the host may not accurately reflect the immune system response of humans when infected with these highly virulent clinical isolates of tuberculosis. She's developing a new model that accurately reflects that response.

"I think we're missing some meaningful information in the way we are currently working to develop drugs and vaccines against tuberculosis and researching the disease," Ordway said. "We aren't using laboratory models that are a realistic depiction of what is actually happening in clinical human cases. This could be why we haven't found a drug that works better than the ones currently on the market – we've completely overlooked the role of the host's immunosuppressant response in research efforts so far."

Important for vaccines

Ordway points out that the majority of potential vaccine developed to date have only been tested against the laboratory bacterial strains which may not accurately reflect what's happening in real human infections.

Colorado State University has one of the leading tuberculosis research programs in the nation, and it strives to find new tests, treatments and vaccines against the disease. Ordway is a professor in theDepartment of Microbiology, Immunology and Pathology, which is in the College of Veterinary Medicine and Biomedical Sciences.

TB continues to mutate, become resistant to current drugs

A drug that treats tuberculosis in a novel way has not been developed in decades, and the bacterium that causes the disease continues to mutate to become resistant to current drug approaches. About 9 million people are infected with tuberculosis each year and 2 million die. Of the 9 million new cases each year, close to half a million are resistant to multiple drugs that once were effectively used to treat the disease. In 1993, the World Health Organization declared tuberculosis a global health emergency, a situation that continues today.

The National Institutes of Health awarded a total of $348 million to encourage researchers to explore bold ideas that have the potential to catapult fields forward and speed the translation of research into improved health. The awards were given in three categories – the NIH Director's Transformative R01 Awards, Pioneer Awards and New Innovator Awards. The New Innovator Awards, such as the one that Ordway received, are also supported by funding from the American Recovery and Reinvestment Act. Ordway received one of 55 New Innovator Awards given to early-stage researchers across the nation.

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