



Mark Smeltzer, PhD

From Pandemics to Personalized Care

Arkansas Researcher Leads the Way in Infectious Disease Research

Dr. Mark Smeltzer’s work focuses on advancing the understanding of infectious diseases by studying how harmful microorganisms work, how they cause diseases, and how they affect our body’s immune and inflammatory responses. The ultimate goal is to develop effective treatments and interventions, improving patient outcomes.

Dr. Smeltzer leads lifesaving research on infectious diseases as director of UAMS Center for Microbial Pathogenesis and Host Inflammatory Responses (CMPHIR). Funded by the National Institutes of Health’s COBRE program, the Center is dedicated to unraveling the mysteries of infections and their impact on human health.

More About CMPHIR

The Center brings together talented young researchers who are mentored by experienced senior faculty members. Their research aligns with the theme of understanding and combating infectious diseases in a way that benefits patients. So far, the Center has been awarded \$26 million in federal funding and has recruited 10 new researchers to Arkansas.

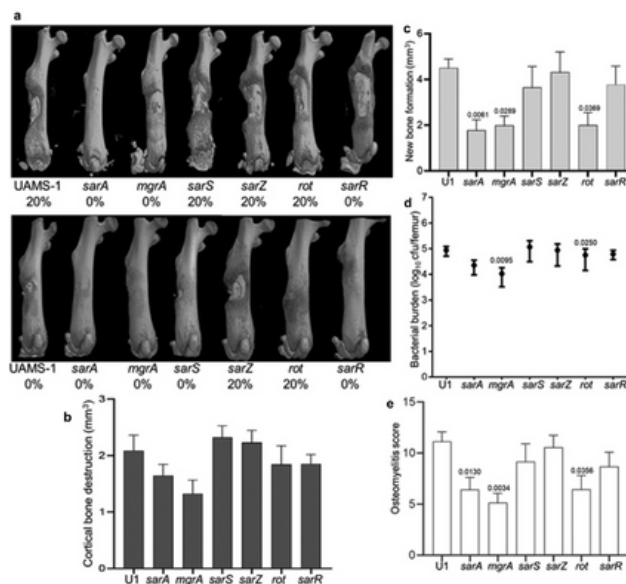
Dr. Smeltzer aptly describes the goal of the Center’s work: “If we can understand what the bacterium is doing to fight its part of the battle, we can develop therapeutic strategies that prevent it from doing that and tilt the balance in favor of you.”

The Challenge

Infectious diseases have posed a threat throughout human history—especially recent history—and continue to pose significant challenges globally. Despite advances in medicine and technology, new germs emerge, and existing ones can evolve or develop resistance to treatments. We saw this firsthand with the Covid-19 global pandemic, which has caused millions of deaths.

Additionally, the study of infection is essential to every other medical specialty. Infections can have significant implications for the development and progression of various illnesses. For example, cancer and its treatments make patients more susceptible to infections by weakening the immune system.

Infection is an expensive problem as well. In orthopedics alone, implanted medical device infections cost a staggering \$1.62 billion annually. As our population continues to age, and particularly as hip and knee replacements rise, this financial burden is only expected to escalate.



From the article, "The major role of sarA in limiting Staphylococcus aureus extracellular protease production in vitro is correlated with decreased virulence in diverse clinical isolates in osteomyelitis." February 2023

The Solution

The Center is making great strides in understanding the mechanisms underlying infections and their impact on human health. By studying the intricate relationship between pathogens and the human immune system, Dr. Smeltzer hopes to continue to develop effective treatments and interventions.

Because infection can happen anywhere in the body, a deeper understanding of its mechanisms has far-reaching implications, improving patient outcomes across the board. Understanding infection in the context of cancer is vital for optimizing treatment outcomes, minimizing complications, and improving the overall well-being of cancer patients. It allows healthcare providers to implement targeted preventive measures, choose appropriate treatment approaches, and provide comprehensive supportive care tailored to the unique needs of cancer patients.

Dr. Smeltzer's most recent research in infectious diseases is yielding significant advancements. Recently, Dr. Smeltzer and his team explored the functions of proteins in *Staphylococcus aureus*, a bacterium that causes staph infections. They found that a protein called SarA enhances disease, so if it can be prevented from doing its job, that would limit *S. aureus* from causing infection. This research provides valuable insights for developing effective strategies to combat infections and safeguard public health.


The Center is a key player in preventing another devastating global pandemic. Understanding the patterns of disease transmission, the behavior of infectious agents, and the factors that contribute to their emergence and spread allows for the early detection of potential pandemic threats.


Next Milestone & Ask

The next milestone for CMPHIR is to secure sustained funding as the Center's COBRE grant period comes to an end. Sustained funding would allow the Center to continue and expand investigations, attract additional talented investigators, and accelerate the pace of discovery.

CMPHIR stands at the forefront of understanding how infections work and ultimately creating effective treatments, addressing a pressing challenge that has far-reaching implications. By supporting their research, you contribute to the development of innovative solutions and the advancement of patient care.

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