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Researchers immunize mice against antibiotic-resistant bacteria, report potential for future vaccine

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A groundbreaking study by LA BioMed researchers shows promising results for a potential vaccine for deadly drug-resistant bacteria, also known as "superbugs."

"This study is a milestone for LA BioMed, opening a new era of therapies for preventing and treating infectious diseases," said LA BioMed CEO David Meyer, Ph.D. "We are proud to be at the forefront of innovations that improve how we heal patients."

The study, considered the first of its kind, shows that bacteria in deadly hospital-acquired infections can be targeted with a protein found in common fungal infections. The discovery paves the way for a vaccine to prevent a range of infectious diseases, including those caused by Acinetobacter baumannii, an antibiotic-resistant bacterium that is expensive to treat and often fatal. "A scarcity of deadly bacteria-fighting therapies and the emergence of new drug-resistant bacteria increasingly threaten global and personal health," said researcher Ashraf Ibrahim, Ph.D.

There are few antibiotics that kill deadly bacteria, and treatments that do exist are highly toxic. Antibiotic-resistant bacteria infect patients being treated in healthcare facilities for other conditions. About 23,000 people die each year from bacterial infections, according to the Centers for Disease Control and Prevention.

A. baumannii causes infections in patients with weakened immune systems suffering from ailments including pneumonia, urinary tract infections, and skin and wound infections. A. baumannii often struck members of the U.S. military serving in Iraq and Afghanistan suffering from wounds sustained on the battlefield.

In a study conducted on mice, researchers found the Hry1 protein directed antibodies to effectively target bacteria responsible for infections, including those caused by medical devices in healthcare settings. The antibodies also lowered the concentrations of currently-used antibiotics needed to impair growth of the bacteria.

Next, the study will consider a vaccine of two antigens that allows the targeting of at least three priority pathogens such as Candida, MRSA and Acinetobacter. Simultaneously, researchers will work to develop an antibody for passive immunization against Acinetobacter infections.

More information: Uppuluri P, Lin L, Alqarihi A, Luo G, Youssef EG, Alkhazraji S, et al. (2018) The Hyr1 protein from the fungus Candida albicans is a cross kingdom immunotherapeutic target for Acinetobacter bacterial infection. PLoS Pathog 14(5): e1007056. DOI: 10.1371/journal.ppat.1007056

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