

# Taming microbes to combat antibiotic resistance

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With antibiotic resistant infections on the rise and a scarce pipeline of novel drugs to combat them, researchers at the Los Angeles Biomedical Research Institute at Harbor-UCLA Medical Center (LA BioMed) are pursuing entirely new approaches to meet the challenge of drug-resistant infections by taming microbes rather than killing them.

Michael Yeaman, PhD, an LA BioMed researcher, recently received an Innovation Award for \$1.6 million from the National Institute of Allergy and Infectious Diseases at the National Institutes of Health (NIH) to develop novel anti-infectives designed to disarm methicillin-resistant *S. aureus* (MRSA) and reduce its resistance to antibiotics.

"Real-time adaptations in [microbes](#) that drive antibiotic treatment failures are known but have been poorly understood," Dr. Yeaman said. "Our approach interferes with the adaptations MRSA uses to survive in the body. Enhancing the effectiveness of existing antibiotics and minimizing resistance by dangerous microbes like MRSA are public health priorities directly addressed by our research."

Dangerous microbes that have survived traditional antibiotics now threaten to cause untreatable infections.

"Antibiotic resistance is a predictable result of microbial survival instincts in the face of drugs that are designed to kill them," Dr. Yeaman said. "New variations on old antibiotics may work in the short term, but inevitably microbes, such as MRSA, adapt to resist even the newest

forms of conventional drugs. By fundamentally changing our approach, we are exploring totally new ways to tame the microbes and slow their resistance."

The U.S. Centers for Disease Control and Prevention (CDC) estimate that more than 2 million Americans suffer from antibiotic [resistant infections](#) per year. More than 20,000 die from drug-resistant infections annually, and countless more undergo costly and prolonged hospital stays and exposure to ineffective antibiotics. Ironically, these conditions promote further drug resistance. Estimated costs of drug-resistant infections to the healthcare system range as high as \$20 billion per year in the U.S. alone – with up to \$35 billion in additional costs to society for lost productivity, according to the CDC.

This innovative research program includes LA BioMed researchers, Arnold Bayer, MD, and Yan Q. Xiong, MD, PhD. It builds on discoveries already patented by members of the team, and it leverages strategic anti-inflammatory drugs already approved by the Food and Drug Administration.

"Ultimately, results from this program may accelerate pre-clinical and clinical studies of new anti-infective combinations to improve treatment outcomes in life-threatening MRSA and other infections," Dr. Yeaman said. "Our program may also be able to avoid the prohibitive time and cost typical for discovery and development of new drugs and bring novel anti-infectives to market more quickly to address the significant and growing public health threat of antibiotic-resistant infections."

Provided by Los Angeles Biomedical Research Institute at Harbor

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