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Bacteriophages, natural drugs to combat superbugs

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Viruses that specifically kill bacteria, called bacteriophages, might one day help solve the growing problem of bacterial infections that are resistant to antibiotic treatment.

Researchers at Baylor College of Medicine and the Michael E. DeBakey Veterans Affairs Medical Center have determined that phages can effectively reduce bacterial levels and improve the health of mice that are infected with deadly, antibiotic-resistant bacterial 'superbugs.'

Corresponding author Dr. Anthony Maresso, associate professor of molecular virology and microbiology at Baylor said, "Our research team set out to determine whether phages can be effective at killing a large group of bacteria that have become resistant to antibiotics and cause deadly diseases in people. We are running out of available options to treat patients who have these deadly bacterial infections; we need new ideas."

When bacteria grow out of control, they can enter the blood stream and infect vital organs in the body. The body's immune system, an army of cells and molecules that fights back infections and other diseases, responds to the bacterial attack, defending the body from the infection. However, the immune response sometimes is excessive and can lead to tissue damage, organ failure and death, a process called sepsis. To end sepsis, bacterial growth has to stop. Antibiotic treatment usually can control bacterial growth and prevent the deadly consequences of sepsis, but increasing number of bacteria is becoming resistant to antibiotics.

In this study, the researchers investigated the possibility of recruiting phages in the fight against antibiotic-resistant bacteria, reviving the original idea of Felix d'Herelle, proposed in 1926.

Co-author Dr. Robert Ramig, professor of molecular virology and microbiology at Baylor said, "The driving force behind this project was to find phages that would kill 12 strains of antibiotic-resistant bacteria that were isolated from patients. As the virologist on the team, my first contribution was to go phage hunting."