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## **Bacteriophage: New tool to MDR bacteria**

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The introduction of antibiotics transformed medicine by making untreatable diseases to be treatable and allowing medical procedures like surgery. As result, millions of people have been saved. But this time, antibiotics are running out. Multi-antibiotic-resistant bacteria (MDRO) are already endemic and responsible for 1.2 million deaths a year. Hence, urgent action is required to improve the situation. While the discovery of new antibiotics has been halted. Solid organ transplants have high rates of both infection and colonization with MDRO causing infections leading to antibiotic pressure. MDRO prevalence has been reported from ~10% in renal transplant recipients to 50% in lung transplant recipients. In the past, new antibiotic develop was the easiest solution to overcome AMR. However, due to financial and scientific huddles, the research and development moved away to other therapeutic areas. Currently, alternative ways to provide treatment tools have been suggested including bacteriophages (phages), synthetic microbiota, old but new tricks, anti-virulence, etc. Phages were initially discovered by in-vitro lytic activity on agar plates in the early 20th century and were used as a treatment for infections, such as diarrhea, urinary tract, and skin infections in the pre-antibiotic era. Cystic fibrosis patients have up to 73% MDRO colonization rates, in particular, *Pseudomonas aeruginosa* and *Staphylococcus aureus*. *Burkholderia cepacia* and *Mycobacterium abscessus* are associated with high rates of pan-resistance. Hence, *B. cepacia* or *M. abscessus* infection in the pre-transplant setting is considered a contraindication to lung transplant. In these cases, phage therapy has shown the effect on infection cure. The first is a personalized approach to make a big phage library having lytic activity on certain groups of pathogens. The bacterial isolate is used to find optimal phage regimens from the library. The second is to make a fixed phages consortium, which means a cocktail. The approach is to make an off-the-shelf product with a fixed combination of phages having a broad lytic activity against a broad range of strains In summary, phage therapy has been spotlighted as a promising measure to control or overcome AMR infections. Although more research and regulatory work is needed to be listed as a regular regimen for infection, phage therapy has appeared to be safe and efficacious in transplant-related infections.