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**COMPARISON OF PHAGE AND ANTIBIOTIC COMBINATION (PAC)  
TREATMENTS AGAINST MONOMICROBIAL & POLYMICROBIAL BIOFILMS**

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Bacterial infections continue to overwhelm the healthcare system due to the rise in antibiotic resistance. Additionally, infections involving biofilms, a complex matrix of bacterial cells, have proven especially difficult to eradicate. A potential solution to treating biofilm-associated antibiotic-resistant infections is with bacteriophages — viruses that specifically target bacterial cells. Success in using these bacteriophages (phages) in combination with antibiotics has shown promise; however, the efficacy of such treatments can be quite variable.

This study examined the efficacy of phage and antibiotic combination (PAC) treatments against *in-vitro* dynamic biofilms composed of methicillin-resistant *Staphylococcus aureus* (MRSA) and *Pseudomonas aeruginosa*. Biofilms were grown over a 72 hour period and were comprised of a single organism (monomicrobial) or a mixture of both organisms (polymicrobial). After establishing robust biofilms, they were treated with: antibiotic(s); phages; or a combination of antibiotic(s) and phages. Following a 24 hour treatment, concentrations of viable cells in the biofilm and those present in the media (planktonic) were quantified. Results showed that the PAC treatment was consistently the most effective against the planktonic cells, reducing the bacterial concentration below the level of detection (i.e., <100 CFU/mL) in all trials. The concentration of cells remaining in the biofilm, however, varied between the monomicrobial and polymicrobial biofilms. When compared to an untreated monomicrobial biofilm, the PAC treatment resulted in a 6 log reduction in MRSA concentration. However, the concentration of MRSA in the polymicrobial biofilm following the PAC treatment was the same as the untreated biofilm. These results show that the efficacy of PAC treatments against MRSA infections can depend on the composition of the infection, including both the presence of biofilms and other bacterial organisms.