Developing an Effective Phage Therapy for Treatment of Methicillin-Resistant Staphylococcus aureus

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Bacteriophages have potent abilities in eliminating deadly bacterial infections. Bacteriophage K, a member of the lytic bacteriophage family Myoviridae, is a virus that uses bacteria to reproduce and destroys it in the process. In this experiment, various solutions of differing Bacteriophage K concentrations were tested on agar plates with colonies of the Methicillin-resistant Staphylococcus aureus (MRSA) bacteria to test an alternative treatment that aims to combat antibiotic resistance in our modern day society. Three concentrations were tested; 10^8 phages/mL, 10^6 phages/mL, and 10^4 phages/mL. Each concentration was tested with and without a 1M bismuth (III) oxide solution which assists in quickening the viral infection of the bacteria. It was hypothesized that the 10^8 phages/mL w/ bismuth (III) oxide would kill the most bacteria. The number of bacteria killed was measured through plaque forming units (PFUs), circular clearings in the plate indicating areas where the bacteria had been killed. The results collected during this investigation were that the 10^6 phages/mL w/ bismuth (III) oxide had the highest amount of PFUs, clocking in at around 5.74 x 10^8 PFUs/mL of phage stock after 2 hours. The hypothesis was refuted, and the results were attributed to the fact that the extremely high concentration of phage in the 10^8 phage/mL solution caused the bacteria to lyse too quickly, not allowing for optimal viral proliferation. It was concluded that the combination of bismuth (III) oxide and a medium concentration of phage allowed for the greatest viral proliferation, and in turn, the most bacteria destroyed.

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