Testing the Use of Phage Andhra at Five pH Levels to Treat Skin Infections Caused by Three Strains of the Bacteria Staphylococcus epidermidis and Identifying Strains with the CRISPR-Cas9 System

Moulder, Summer (School: Pleasant Grove High School)

Antibiotics are a great way to treat infections caused by bacteria. However, bacteria are evolving to become more resistant to antibiotics. Because of this, new treatments must be found. One of the most promising is the use of bacteriophages. This project tested the use of the Staphylococcus phage Andhra to treat infections caused by three different antibiotic resistant strains (strain 1, strain A, and strain B) of the bacteria S. epidermidis, and the effect of pH on the treatment. It also identified any strains containing the CRISPR-Cas9 system. Each strain was grown in Heart Infusion Top Agar in the presence of the phage Andhra at five pHs, 6.5, 7.0, 7.4, 7.7, and 8.0. Each pH level had control plates without the phage. The phage forms plaques when it kills bacteria. After 48 hours, the number of plaques in each dish were recorded, along with any visible bacterial growth. Plates with the most plaques were determined to have the most effective treatment. Strains which contained no phage plaques when grown in the presence of the phage were determined to contain the CRISPR-Cas9 system. Strain 1 had the most phage plaques at a pH 8.0. Strain A had statistically equal amounts of phage plaques at pH 8.0, 7.7, and 7.4. Strain B did not have any phage plaques. The treatment was effective in strains 1 and A, but not in strain B. The treatment was most effective at pH 8.0 for strain 1, and pH 8.0, 7.7, and 7.4 for strain A. Strain B was determined to contain the CRISPR-Cas9 system.

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