Name(s)
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Project Number
J1703

Project Title
The Effect of T4 Bacteriophages on Antibiotic Resistant E. coli

Abstract

Objectives/Goals
Our experiment seeks to find a different way to solve the problem of antibiotic resistant bacteria, or superbugs, by using bacteriophages. We look at the effect of T4 coliphages, viruses that specifically attack strains of E.coli, including antibiotic resistant strains. We hypothesized that bacteriophages when used in combination with antibiotics will be a more effective treatment plan against antibiotic resistant bacterial infection.

Methods/Materials
Used 15 pre poured LB agar plates, E.coli, T4 coliphage, iodine, blank discs, tetracycline, bleach, 70% isopropyl alcohol, hockey stick spreaders, and an incubator. Prepared lawn culture of E.coli on the plates for 5 groups with 3 trials in every group following sterile techniques. In group 1, added tetracycline to each plate. In group 2, added the T4 coliphage to each plate. In group 3, added both tetracycline and coliphage. Groups 4,5 were positive and negative control groups respectively. Incubated the plates at 37 degree C for 6 days, and measured the diameters of the zones of inhibition where applicable. Disinfected all contaminated hockey stick spreaders and petri dishes with 10% bleach solution before disposal.

Results
The tetracycline yielded an average zone of inhibition of 21 mm in diameter. When tetracycline was combined with bacteriophage yielded an average zone of inhibition of 29 mm in diameter which is 40% more effective than tetracycline itself. The average zone of inhibition for positive control using iodine was 29 mm in diameter.

Conclusions/Discussion
The results supported our original hypothesis that when the bacteriophages and tetracycline are used in tandem they form a more effective treatment for antibiotic resistant bacteria as evident by the largest zone of inhibition. This is because the bacteriophages can efficiently wipe out antibiotic resistant bacteria which cannot be treated by antibiotics. The real world applications of our experiment are tremendous. Bacteriophages provide an individualized approach to treating dangerous, antibiotic resistant bacteria, with the possibility of saving millions of lives.

Summary Statement
Our project tests how effective T4 Coliphages are at wiping out antibiotic resistant strains of E.coli.

Help Received
We designed, built, and performed the experiments. Our teacher Mrs. Kathy Peng reviewed our work and was present during our work at school.