CALIFORNIA SCIENCE & ENGINEERING FAIR
2018 PROJECT SUMMARY

Name(s)
Alexa D. Le

Project Number
38751

Project Title
Superphages: A Revolutionary Weapon in the War against Superbugs

Abstract

Objectives/Goals
The objective of this study is to test if T4 bacteriophages can be used to fight E. coli better than our conventional antibiotics (Penicillin, Tetracycline, Erythromycin).

Methods/Materials
MATERIALS: E. coli culture, T4 type bacteriophages, antibiotic disks (Erythromycin, Penicillin, Tetracycline), blank disks, distilled water, agar Petri dishes and an incubator.
METHODS: Place five different disks (bateriophage, 3 antibiotics, blank) in the divided Petri dish that has already been spread with E. coli on agar. Incubate overnight and when finished, measure the zone of inhibition of all disks. Repeat 5 more times for a total of 6 trials. Take the zone of inhibition averages for each type of therapy.

Results
The zone of inhibition averages of all the types of therapies varied. Tetracycline had the largest zone of inhibition of 24mm. Erythromycin had the second largest zone of inhibition of 13.5mm. The Penicillin and bacteriophage therapies had the exact same zone of inhibition, 8.83mm. As expected, the distilled water had the smallest impact on the E. coli, an average of 0mm.

Conclusions/Discussion
Although my hypothesis was not fully supported by the results, the bacteriophages had the same zone of inhibition as the Penicillin. This appear to show that bacteriophages may have promising potential in the antimicrobial war against superbugs. Evidently, further research is required using higher concentration of bacteriophages or possibly phage therapy cocktails used alone or in combination with conventional antibiotics. The further development of different bacteriophages may be an alternative option to combat the growing antibiotic resistant bacteria.

Summary Statement
With the rising concern of superbugs resistant to conventional antibiotics, I am testing the effect of bacteriophages as opposed to current antibitiotics against the multi-drug resistant E. coli.

Help Received
My teacher Mrs. Conklin was extremely helpful in this project by facilitating me in my school's science laboratory, teaching me how to use the incubator and guiding me through the process of E. coli distribution.