CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY

Name(s)

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Project Number

J1702

Project Title

An In vitro Approach to Finding a Treatment for Developed Antibiotic Resistance in Escherichia coli with Coliphage T4

Abstract

Objectives/Goals

At which concentrations is antibiotic resistance developed in Escherichia Coli and is Coliphage T4 a viable treatment for the developed resistance?

Methods/Materials

Coliphage T4, e. Coli, nutrient agar plates, Amoxicillin, saline, microscope.
Inoculate the agar plates with the e. Coli. Allow bacteria to culture for 3 days. Dilute the amoxicillin and create a 100%, 75%, 50%, and 25% concentration. Add solution to the plates once every day and count the bacterial colonies for 5 days. Observe the bacterial colonies. Dilute the Coliphage T4 and administer solution to the agar plates for 3 days. Observe the bacterial colonies.

Results

After 5 days of testing with the antibiotic solution the 25% solution had 42% more bacteria than originally starting. The 50% concentration had grown 7% more bacteria. The 75% concentration had killed 11% of the bacteria. The 100% concentration had decreased 32% than originally starting. After 3 days of testing with the Coliphage solution the 25% concentration had killed 45% of the bacteria, the 50% killed 53% of the bacteria, the 75% killed 44% of the bacteria, and 58% of the bacterial colonies were killed in the 100% concentration plate.

Conclusions/Discussion

After a 8 day testing period antibiotic resistance developed at the lowest concentrations and had gained more than 42% more bacterial colonies than originally starting. The Coliphage T4 had killed 58% of the bacteria in just two days. The Coliphage T4 not only worked in the plates that had developed antibiotic resistance but also in the ones that hadn't. Countries in the east, such as Georgia, have adopted bacteriophages to treat antibiotic resistance.

Summary Statement

I found that antibiotic resistance is developed at a low concentration of antibiotics in Escherichia Coli and Coliphage T4 proved as an effective treatment to treat developed antibiotic resistance.

Help Received

Mr. Sean Gillette provided guidance throughout the experiment. Dr. Akhil Sharma provided antibiotic samples for the purpose of the experiment and the medical advice.