



**CALIFORNIA SCIENCE & ENGINEERING FAIR
2018 PROJECT SUMMARY**

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Project Title Saving Lives with Viruses: How Bacteriophages Can Kill Harmful E. coli Bacteria	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The problem we sought to solve with this project is food poisoning caused by E. Coli bacteria. Our objective was to demonstrate how T4r bacteriophage can reduce the number of E. Coli cells in inoculated tryptic soy broth and beef broth.</p> <p>Methods/Materials Materials: 2-mL Tubes of Soft Agar (6), 9-mL dilution tubes (24), 1- x 0.01 mL sterile pipettes (24), Sterile Petri Dishes (12), Bacterial Incubator, 37°C Beef Broth</p> <p>Methods: Day 1: Start the E. coli Culture. Day 2: Add only E. Coli B to one of the tubes (Amount varies depending on dilution on next day) Add E. Coli B and T4r Phage to one of the tubes (Amount varies depending on dilution next day) Shake tubes and put them back in the incubator for use the next day. Day 3: Now start the phage dilutions. Plaques should form 10-24 hours after plating. Day 4: Make a data table, with the dilutions you used in one of the columns.</p> <p>Results Our results show a 99.99% reduction in the number of E. Coli cells in tryptic soy broth and a 94.39% reduction in beef broth. This proves a strong correlation between the addition of T4r phage and reduction in the number of E. Coli cells.</p> <p>Conclusions/Discussion The findings of this project demonstrate that bacteriophages reduce the number of E. Coli colonies in inoculated beef broth by a factor of 94.39%. This affirms our hypothesis that the E. Coli population will diminish once the bacteriophage is added to the beef broth. Our results are highly applicable to process of meat sanitation; addition of phage to the meat would greatly reduce the chance of contamination.</p>	
Summary Statement We showed that adding the T4r bacteriophage to E. Coli-inoculated beef broth reduced the number of E. Coli cells by 94.39%.	
Help Received My partner and I both came up with the idea, and got help from Dr. Srividhya Ramamoorthy, the Lab Manager at the Sacramento Regional County Sanitation District in order to complete the experiment and interpret our results.	