



**CALIFORNIA STATE SCIENCE FAIR  
2016 PROJECT SUMMARY**

<b>Name(s)</b> Michelle Essien; Everett Kim; Dianna Kwong	<b>Project Number</b> <b>S1506</b>
<b>Project Title</b> <b>Comparing the Efficiency of Viral Phages to Those of Antibiotic and Antibacterial Compounds in Combating E. coli B</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> This study examined the effectiveness of Micro-phages versus antimicrobial disinfectants and antibiotics in combating E. Coli B. It was predicted that the antimicrobial &amp; antibiotic compounds would be more immediately effective than the Viral phages in eliminating the growth of the E. Coli B. However, the phages are predicated to be ultimately more efficient because the phages should theoretically increase in population exponentially.</p> <p><b>Methods/Materials</b> The TSA media was poured over 36 plates and the TSB distributed using auto pipettes. Then the growth media should be autoclaved. The given culture of Escherichia Coli B, was transferred using an inoculating loop from the original slant culture to the TSB, then cultured for a period of 36 hours. Individual disposable pipettes were used to distribute 2ml to the plates. The plates were then incubated for 36 hours to ensure a full carpet of bacteria. The bacterial combatants were prepared through sequential dilutions 30 minutes before applying them to the cultured plates. The same process would be repeated for the t4r Phage, the t4 phage, and the Neomycin based antibiotic. Using new pipettes, 2 ml of each dilution was spread evenly over the plates at 3pm on Friday. A control plate was taken for each sample as well.</p> <p><b>Results</b> It was found that the phages were about three times more efficient than the other compounds over a 36 hour interval with an average efficiency of phage remaining consistently at or above three times to those of the antibiotic/antibacterial compound remaining consistently at or above three times at about (6,000 mm<sup>2</sup>).</p> <p><b>Conclusions/Discussion</b> This study's results provide a pivotal comparison and understanding of the microbiological application of phages in potentially replacing disinfectants and antibiotics in domestic, medicinal, agricultural and other contexts where sterilization or combating pathogenic growth is necessary. These results are reflective of the actual uses of disinfectants in average day-to-day applications -the antimicrobial substances are diluted and dissociated through a liquid media versus a concentrated pad. The virus is durable in versatile environments versus the antimicrobials which expire after reaction. This and following research will pave the way for the long-term, cost-efficient, internationally and socioeconomically accessible solution.</p>	
<b>Summary Statement</b> This study examined the effectiveness of Micro-phages (T4 & T4r) versus antimicrobial disinfectants composed of Triclosan & Triclocarban and antibiotics composed primarily of Neomycin Sulfinamide in combating Escherichia Coli strain B.	
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