



**CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY**

Name(s) Olivia J. Cevalco	Project Number J1605
Project Title Healing Tears	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this study is to determine if human tears can kill an equivalent amount of Staphylococcus aureus as Bactine, Neosporin, Isopropyl Alcohol, and sterile water.</p> <p>Methods/Materials I used the Kirby Bauer antibiotic susceptibility testing method. I built an incubator using a 18 1/4" x 18" x 16" cardboard box, desk lamp, and an insulated styrofoam board. I used 21 tryptic soy agar petri dishes, 100 6mm sensitivity discs, 1.2mL of human tears, Bactine, Neosporin, Isopropyl Alcohol, and sterile water, 21 sterile cotton swabs, tweezers, 5 sterile pipettes, and a Vernier Caliper. For my scouting experiments, I used 60 petri dishes, 300 sensitivity discs, and 3.6mL of human tears, Bactine, Neosporin, Isopropyl Alcohol, and sterile water.</p> <p>Results I used a Vernier Caliper to measure the zone of inhibition per sensitivity disc in millimeters and the results are as follows: human tears and sterile water killed less than 0.1mm of Staph. aureus, Bactine killed an average of 24mm of Staph. aureus, Neosporin killed an average of 18.3mm of Staph. aureus, and Isopropyl Alcohol killed an average of 15.86mm of Staph. aureus.</p> <p>Conclusions/Discussion My results indicate that Staph. aureus is resistant to human tears and sterile water, but Staph. aureus is susceptible to Bactine, Neosporin, and Isopropyl Alcohol. I believed that human tears would kill nearly an equivalent amount of Staphylococcus aureus to Bactine, Neosporin, Isopropyl Alcohol, and sterile water because tears contain antimicrobials, such as Lysozyme, that kill bacteria to keep bodies healthy on a daily basis. I disproved my hypothesis because tears and sterile water did not kill any bacteria, but Bactine, Neosporin, and Isopropyl Alcohol killed the bacteria. From my results, you can infer that if you have an open wound, applying Bactine to kill the bacteria would be the best option. For further study, I would use pure Lysozyme as my positive control and water as my negative control. Even though I found that tears cannot kill Staphylococcus aureus, I am determined to find a type of wound bacteria that tears can kill.</p>	
Summary Statement I found that human tears cannot kill as much Staph. Aureus as Bactine, Neosporin, Isopropyl Alcohol, and sterile water.	
Help Received I received no help for this experiment. I researched, preformed this experiment, and constructed an incubator independently.	