



**CALIFORNIA STATE SCIENCE FAIR  
2013 PROJECT SUMMARY**

<b>Name(s)</b> <b>Janie Kim</b>	<b>Project Number</b> <b>J1606</b>
<b>Project Title</b> <b>Solution Sensation: A Study of the Antimicrobial Effectiveness of Contact Lens Solutions Against MRSA</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of this experiment was to find which out of five RGP contact lens solutions: Boston Advance Conditioning Solution; Lobob Soaking Solution; Boston Simplus Multi-Action Solution; Menicare Multipurpose Solution; and Opti-Free GP Multi-Purpose Solution, prohibited the growth of MRSA strain TCH 1516 the most effectively.</p> <p><b>Methods/Materials</b> MRSA TCH 1516 was grown onto a Todd Hewitt Agar plate. A colony was put into 5 ml of Todd Hewitt Broth and was grown for 7 hours, was spun in a centrifuge for 6 minutes, then diluted to an optical density of 0.40 using a spectrophotometer. It was then diluted to 1:20 in phosphate buffered saline. 200 µl of each solution, 2 wells each, were pipetted into an assay plate, Row A. 100 µl of CA-MHB broth was added to all other wells. 100 µl from Row A was moved to Row B, then from B to C, etc until the last row. 90 µl of every well was moved to a new assay plate and a positive/negative control was added. 10 µl of the bacteria solution was added to every well except the negative control. The plates were parafilmmed then placed in a shaker incubator for 15 hours. After incubation, 10 µl of rezasurin was added, and the plates were incubated for 24 hours.</p> <p><b>Results</b> The saline averaged 45% in the percentage of solution in which bacteria began to grow, and the bacterial growth was extremely high. Advance averaged 1.58203125%, placing 2nd in terms of effectiveness after Simplus' 0.52734375%. There was a defined "dot" in the bottom center of the well, with a cloud of growth around it smaller than in saline. Lobob averaged 5.625%, Menicare averaged 2.8125%, and lastly, Opti-Free performed the "worst", averaging 14.0625%.</p> <p><b>Conclusions/Discussion</b> Boston Simplus, was most effective in discouraging growth of MRSA, and average of the percentage in which bacteria began to grow was 1.58203125%, rather than the hypothesized 2.8125%. Solution 2, Boston Advance, was second most effective and was most effective out of the two-step solutions, averaging 1.58203125%, rather than the hypothesized 2.8125%. The three other solutions did not perform as well (due to less thorough preservative combinations?). The sterile saline control averaged 45%, which proved that the preservatives did make a difference in antimicrobial strength. The two preservatives that seemed to be most effective in combination were Chlorhexidine Gluconate and Polyaminopropyl Biguanide, both contained in the top two solutions.</p>	
<b>Summary Statement</b> This project tested the antimicrobial effectiveness of 5 RGP lens solutions and a saline control against MRSA TCH1516.	
<b>Help Received</b> Used lab equipment at UCSD under supervision of Dr. Victor Nizet, Mr. Leo Lin and Wdee Thienphrapa. Mother and father drove me and bought lens solutions.	