



**CALIFORNIA STATE SCIENCE FAIR  
2011 PROJECT SUMMARY**

<b>Name(s)</b> Charulata Sinha	<b>Project Number</b>  31281
<b>Project Title</b> Repeated Use of Antimicrobial Mouth Rinses: Risk of Resistance Development	
<b>Objectives/Goals</b> My hypothesis is that oral bacteria will develop resistance to mouthrinses with repeated use, with maximum resistance buildup in mouthrinses containing chlorhexidine. This hypothesis was based on previous research on the growth of super-bugs after repeated exposure to the chemical triclosan in antimicrobial handsantizers. <b>Abstract</b> <b>Methods/Materials</b> Streptococcus Gordonii, a oral bacteria was used in this in-vitro study. The #Minimum Inhibitory Concentration# (MIC: the weakest concentration at which the mouthwash can inhibit growth) was determined for four mouthwashes (active ingredient in brackets): Listerine (Essential Oils), Natural Dentist (Aloe Vera), Rite Aid (Ceptylpyridinium Chloride), and Periogard (Chlorhexidine). Bacteria were inoculated into dilutions of each mouthwash and an optical plate reader was used to monitor growth. The bacterium was then grown in mouthwash at a concentration one less than the MIC value and the process was repeated 20 times. After 20 passages, the MIC was determined in the corresponding mouthwash. <b>Results</b> The MIC showed that chlorhexidine mouthwash was the most effective. The postpassage MICs were changed to higher concentrations. The Periogard and the Rite Aid were changed by a factor of 16, while the Listerine and Natural Dentist did not inhibit even at undiluted strengths. <b>Conclusions/Discussion</b> My results support my hypothesis that oral bacteria develop resistance to mouthrinse with repeated passage and the effect is strongest in the mouthwash that contains chlorhexidine.	
<b>Summary Statement</b> It explores if bacterial resistance builds up in oral bacteria with repeated use of mouthwash.	
<b>Help Received</b> Ms. Alyssa Jminez, senior in Dr. Doran's lab taught me the procedures used in this project. My sister helped me with the formatting and layout for the poster.	