



**CALIFORNIA STATE SCIENCE FAIR  
2007 PROJECT SUMMARY**

<b>Name(s)</b> <b>Vivian N. Rotenstein</b>	<b>Project Number</b> <b>J1433</b>
<b>Project Title</b> <b>Who Will Win the Battle against Bacteria?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> Nowadays there is a variety of antibiotics that can fight bacteria, yet we are still looking to nature for answers and continue to try to emulate it. It is the danger of antibiotic resistance and the high cost of these medications that make us look for other sources for treatments. Based on prior research regarding the antibacterial properties of lysozymes in saliva, chamomile tea, and lysozyme in a concentrated powder form, extracted from egg whites, I hypothesized that while lysozyme in human and canine saliva, chamomile tea extracts, and lysozyme in concentrated form all have antibacterial properties, the lysozyme in concentrated form will fight bacteria more effectively.</p> <p><b>Methods/Materials</b> I swabbed the nose of human subjects and distributed the mucous bacteria on agar plates that I placed afterwards in the incubator. I swabbed the mouth of dog subjects for canine saliva, as close as possible to the dog salivary glands (back by the molars). Then I swabbed human saliva (from a person with braces, who salivated more abundantly). The canine saliva, human saliva, chamomile extract, and lysozyme in concentrated form were placed over the bacteria cultures in separate agar plates and together with the control (with no antibacterial agent) in the incubator. I measured the growth of the zones of inhibition for each culture.</p> <p><b>Results</b> For human saliva, zones of inhibition were small but rose steadily at a rate of 1mm-1.5mm per day. For canine saliva zones of inhibition increased at comparable rate due probably to the small amount of saliva collected. For chamomile tea, there was no zone of inhibition evident or the zones of inhibition were very small, and grew steadily at rate of 0.5 mm per day. For concentrated lysozyme, the zones of inhibition were much larger initially, then grew at a rate of 0.5mm-1mm. The control had no antibacterial agent, there were no zones of inhibition and a high concentration of Staphylococcus aureus could be noticed over the agar.</p> <p><b>Conclusions/Discussion</b> As my hypothesis stated, the lysozyme in concentrated form from egg whites did have the highest antibacterial properties. However, one of the conditions of my experiment that could have altered the results of my project could have been the amount of canine saliva I was able to obtain. For my further work, I plan using Ready-Lyse Lysozyme Solution: specific activity of Ready-Lyse Lysozyme is 200-fold higher than that of egg white lysozyme.</p>	
<b>Summary Statement</b> Checking the antibacterial properties of human saliva, dog saliva, chamomile tea and lysozyme in a concentrated powder form extracted from egg whites.	
<b>Help Received</b> Medea Creek Middle School laboratory under the supervision of my science teacher Ms. Jennifer Nelson, Dr.Keith Garb provided agar plates, MPBiomedicals provided the lysozyme concentrate from egg whites.	