



**CALIFORNIA STATE SCIENCE FAIR  
2002 PROJECT SUMMARY**

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<b>Project Title</b> <p align="center"><b>Battling Bacteria II: The Mutating Microbes Return</b></p>	
<p align="center"><b>Abstract</b></p> <p><b>Objectives/Goals</b>          My objective was to determine whether anti-microbial soaps really were able to kill or inhibit the growth of bacterial microbes, or are they already resistant to these products? Since these products are used in health care facilities, I wanted to see if these anti-microbials really work or have bacteria become resistant to them?</p> <p><b>Methods/Materials</b>          I obtained twelve different anti-microbials soaps from John F. Kennedy and Eisenhower hospitals in my area. They were Bacti-stat, Beta-sept, Provon, Cida-stat, Hibiclens, OK Scrub, Episoft, EZ Scrub 106, EZ Scrub 116, EZ Scrub 160, EZ Scrub 245, and EZ Scrub with PCMX. I took sterile petrie dishes with nutrient agar and introduced bacteria from a drain hole in my sink. I labeled each petrie dish with the name of the anti-microbial soap I had introduced. For a two week period I daily watched and recorded the growth in each petrie dish. At the end of the two week period I examined the bacterial colonies under a digital microscope and took pictures. I also took some of the bacteria from each petrie dish and applied it onto a slide and look at them under a microscope.</p> <p><b>Results</b>          My constant had the highest rate of growth as it just had the nutrient agar and the bacteria. What I found interesting is that the Bacti-Stat, Beta-sept, Cida-stat, EZ Scrub 106, EZ Scrub 116, EZ Scrub 245, EZ Scrub PCMX, for the first three days it was hard to see any growth and then on the fourth day it really became evident and grew at a tremendous rate. The anti-microbials with the chemical Parachlorometazylenl or PCMX had the least amount of bacterial growth.</p> <p><b>Conclusions/Discussion</b>          I learned that bacteria will do anything to survive. Man cannot kill them he can only inhibit them for a short time until they mutate and become resistant to the antibiotic or anti-microbial agent we use against them. The PCMX anti-microbial had the least amount of growth, however, it could not stop bacterit growth. Man will always have to develop new antibiotics and antimicrobials as the bacteria mutate and become resistant to what they are used to.</p>	
<p><b>Summary Statement</b>          Do anti-microbial products, such as hospitals use, kill or inhibit the growth of bacteria, or do they become resistant and mutate to survive in their environment?</p>	
<p><b>Help Received</b>          My mother helped me drive to the hospitals to pick up the anti-microbial soaps, and Mr. Harper and Mr Sarver provided me with the microscopes I used to examine the bacterial colonies.</p>	