



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

Name(s) Laika D. Roy	Project Number S1414
Project Title Antibacterial Effects of Low Voltage Electricity on E. coli and S. epidermidis	
Objectives/Goals The antibacterial effects of electrical stimulation on bacteria cultures have been examined to see if infections can be prevented or treated. Low-voltage pulsed current has been shown to promote tissue repair in vitro and in vivo. This experiment is focused on inhibitory effects of low voltage electricity on Escherichia coli and Staphylococcus epidermidis.	
Abstract	
Methods/Materials Different low voltage amounts were applied to agar plate cultures with stainless steel electrode pairs. The voltage amounts were 0V (0mA), 1.5V (6mA) and 3V (20mA). There were two groups: "Immediate treatment" meaning the agar plate culture was incubated for 24hrs with treatment and the second group was "Delayed treatment" meaning the agar plate culture was incubated for 24hrs (without treatment) and then after 24hrs of growth, it was treated for 24hrs. The results were measured by the area of the zone of inhibition.	
Results Immediate treatment was more effective than delayed treatment. In each trial for immediate treatment there was a zone of inhibition at both the anode and the cathode. In the trials of the delayed treatment, there was about a 17-33% chance that there would be a zone of inhibition around the anode/cathode.	
Conclusions/Discussion There is not a significant difference between the areas of the inhibition zone for E. coli positive/negative electrode and the S. epidermidis positive/negative electrode. 3V and 1.5V showed a difference in the area of the zone of inhibition compared to the 0V (control) in immediate treatment but the voltage amount did not make a difference in delayed treatment. The areas of the inhibition zone around the positive and negative electrodes in immediate treatment yielded similar areas within its group and so did the delayed treatment. There is a difference between the areas of the inhibition zones for immediate vs. delayed treatment. Immediate treatment was more effective in inhibiting the growth of E. coli and S. epidermidis.	
Summary Statement This experiment is focused on the inhibitory effects of low voltage electricity on E. coli and S. epidermidis in relation to see if bacterial infections can be prevented or treated.	
Help Received Mr. Linke ordered materials; under supervision of Mr. Linke; used equipment from Mt. Miguel Science department	