



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

Name(s) Sara J.W. Pachelbel	Project Number J1323
Project Title Lysozyme vs. Odor	
Abstract Objectives/Goals The objective is to determine if lysozyme, an enzyme used to kill gram positive bacteria, can be used to control odor in shoes. Methods/Materials Two identical pairs of shoes were purchased. Samples of the insoles were removed and stored in a sterile container. Over a period of three weeks, Pair A and Pair B were worn for eight hours a day (without socks) on alternating days. At the end of each day, Pair A was sprayed with a lysozyme solution. Pair B was sprayed with a sterile water solution. Samples of the insoles were removed and plated along with the original insole samples. The shoes were submitted to a blind smell panel for odor evaluation. Results Pair A, the lysozyme treated shoes, had ten times less bacteria than pair B, the sterile water treated shoes, as determined by the plating results. This supported the idea that lysozyme inhibited bacteria growth in shoes. However the lysozyme treated shoes were judged to have the worst odor as determined by the blind smell panel. Conclusions/Discussion Lysozyme is an enzyme used to kill gram-positive bacteria in the food and pharmaceutical industries. It kills the bacteria by destroying the cell membrane causing the cell to collapse. It only kills gram-positive bacteria. Foot odor, a problem everyone has experienced, can be hard to get rid of. Foot odor might be caused by bacteria in the shoes. The data suggests that lysozyme helps to control the bacteria, but it also contributed to the odor in the shoe.	
Summary Statement My project is about the effect of lysozyme on shoe odor.	
Help Received Rodger and Cheryl Pachelbel, smell test panel volunteers, and GusmerCellulo (use of lab equipment under the supervision of Lars Petersen.)	