



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Nicole A. Sousa	Project Number S1320
Project Title Commensal E. coli Mutants, Biotypes, and You (2)	
Abstract Objectives/Goals The purpose of this project was to observe whether or not multiple biotypes of Commensal E. coli thrive within the intestine simultaneously and occupy the human intestine over time, and also to investigate the cause of the mutation in Commensal E. coli samples number 7 and 8 that I isolated last year. Methods/Materials Commensal E. coli was isolated, biotyped, and tested for antibiotic sensitivity. Samples 7 and 8 from last year were revived, and had plasmids extracted from them. The plasmids were later used in a transformation. Results Using the data from last year's Commensal E. coli samples, it was determined that 3 new biotypes of E. coli are now present in my intestine and that multiple biotypes of Commensal E. coli can occupy the intestine simultaneously. Through the transformation, it was determined that the mutation in samples 7 and 8 is most likely present in the samples' genetic information. Conclusions/Discussion Within hours of birth, warm-blooded animals acquire Commensal E. coli. After this acquisition, the biotypes of the bacteria shift and new biotypes come about, a phenomenon that scientists cannot explain. My data demonstrates that multiple biotypes of E. coli thrive in the intestine simultaneously, and new biotypes appear over time in the intestine. This suggests that through bacterial conjugation, new biotypes of E. coli are introduced to the human body. This is supported by the successful transformation that I conducted with cells susceptible to antibiotics, and with plasmids from samples 7 and 8 that have an intermediate and/or resistant reaction to 4 antibiotics. These cells acquired the same mutations that samples 7 and 8 have, demonstrating the likelihood that the mutations were present within the genetic information of samples 7 and 8. This is significant because doctors need to be extremely careful in dispensing antibiotics to their patients in treating Commensal E. coli-related infections because a mutant biotype could be infecting the patient, making certain antibiotics ineffective. Also, this information could possibly aid researchers in pinpointing where these antibiotic-related mutations within Commensal E. coli are occurring, and what is the most effective way in dealing with them.	
Summary Statement This project demonstrates genetic variation in the human intestine with Commensal E. coli and a possibility as to why and how Commensal E. coli mutates	
Help Received Belinda Schmahl aided me in ordering materials, Dr. Recht of SJSU allowed me to use her lab, Sarah Thaler was my lab mentor, and Darcy Levee aided me in lab preparation and materials	