



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Joseph P. Antonios	Project Number S1403
Project Title A Study of the Effects of Variable Gravitational Environments on Genetic Transformation in E. coli	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals This scientific experiment sought to measure the effects of microgravity (zero gravity) on bacterial genetic transformation in comparison with those of normal gravity through the use of the pGLO plasmid, which provides for both the increased resistance to antibiotics and the ability to luminesce under ultraviolet light.</p> <p>Methods/Materials Of the plates prepared, one-third were used in a control situation; as such, they were exposed to a constant gravitational environment and hindered from the uptake of the pGLO gene. The remaining two-thirds were introduced to the pGLO gene under variable conditions: one-third was kept in normal gravity (as in the control situation) and the final four plates were placed in the clinostat.</p> <p>Results In addition to a general increase to the amount of colonies present, those in the clinostat exhibited the greatest percentage of transformed colonies. They also expressed the pGLO gene earlier than the plates that were growing at normal gravity.</p> <p>Conclusions/Discussion It can be clearly stated that E. coli grown in a microgravity environment exhibits the greatest adeptness at genetic transformation in that it is able to express the gene at a greater rate efficiency. Combining bacterial replication, genetic recombination, and the use of microgravity conditions may be the key to processing medicines more effectively. The first would ensure quantity (production), the second, efficiency, and the third, speed.</p>	
Summary Statement This experiment examined bacterial genetic transformation in simulated microgravity environments in order to find a way to produce organic medicines, such as insulin and interferon, more efficiently.	
Help Received School provided lab and most equipment; science teacher provided	