CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
Susanna M. Shin

Project Number
S0421

Project Title
Is Genetic Transformation of the pGLO Gene Possible Between any Species of Monera?

Abstract

Objectives/Goals
The objective of this project was to determine if all species of Monera were able to express the pGLO gene(originally derived from the jellyfish, Aequora victoria) with the means of genetic transformation.

Methods/Materials
Using the process of genetic transformation, recombinant DNAs were attempted to be created with five different strands of bacteria including: Bacillus megaterium, Escherichia coli, Lactococcus lacti, Micrococcus luteus, and Serratia marcescens. The genetically transformed bacteria were cultured for full growth, then later observed under the ultra violet lamp. In the bacteria strands that had successful transformations/creations of recombinant DNAs, the Green Fluorescent Proteins(GFP) were switched on to glow bright green under the UV lamp. This bioluminescent trait, as well as the resistance to ampicillin, were two visible traits of a successful genetic transformation in the bacteria.

Results
The Bacillus megaterium, Escherichia coli, and the Lactococcus lactis species of Monera were able to successfully express the Green Fluorescent Protein by genetically transforming the pGLO plasmid into their own DNA strand. On the other hand, the Micrococcus luteus and Serratia marcescens were unable to express this gene.

Conclusions/Discussion
The pGLO gene was unable to be expressed in just any species of Monera. This is due to the fact that not all the strands of bacteria has the correct restriction sites/complementary sticky ends for the "new" gene to be inserted into its DNA strand successfully. Bacteria such as, Bacillus megaterium, Escherichia coli, and Lactococcus lactis were able to express the GFP because each of them had the correct nucleotide sequences required for a specific cut into its own DNA and for the insertion of the new DNA, in order to create the recombinant DNA.

Summary Statement
The genetic transformation of the pGLO gene into several species of Monera was tested.

Help Received
Used lab equipment at Centennial High School under the supervision of Mrs. Houseman.