



**CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY**

Name(s) Jane Chen; Elora Lyda	Project Number S1409
Project Title The Effect of Tc-99 on the Genetic Transformation of E. coli and L. lactis	
Abstract Objectives/Goals This project was designed to test whether or not genetic transformation of the pGLO gene was possible in species of Monera after they were mutated by radiation exposure. By doing this experiment, one can see how mutations caused by radiation affect gene transfer and DNA replication. Methods/Materials Results from a previous experiment showed that both Escherichia coli and Lactococcus lactis were able to express the green fluorescent protein if cultured under normal conditions. In this experiment, both bacteria were exposed to Technetium-99 for 15 and 30 minutes. Then, using a genetic transformation procedure, the pGLO gene, originally derived from the jellyfish Aequora victoria, was inserted into the bacteria. The bacteria were then allowed to grow for three days. Bacteria that underwent successful genetic transformation were able to express the green fluorescent protein that coded for a glowing of the bacteria colonies under an ultraviolet lamp. This bioluminescent trait and the resistance to ampicillin were two visible traits of a successful genetic transformation in the bacteria. Results The Escherichia coli bacteria exposed to Technetium-99 for fifteen minutes and the Lactococcus lactis bacteria exposed to the radiation for fifteen minutes were able to express the green fluorescent protein. The Lactococcus lactis strand that was exposed to 30 minutes of radiation was not able to express the pGLO gene. Conclusions/Discussion In conclusion, radiation does affect genetic transformation of the pGLO gene in Monera. The Escherichia coli exposed to fifteen minutes and thirty minutes of Technetium-99 and the Lactococcus lactis exposed to fifteen minutes of radiation were able to successfully express the green fluorescent protein by genetically transforming the pGLO plasmid. On the other hand, the Lactococcus lactis exposed to fifteen minutes of radiation was unable to express this gene. This is due to the fact that the radiation altered the DNA plasmid of the bacteria so that the restriction enzymes could not cut the nucleotide sequences in the correct places to allow for the insertion of the new DNA. Thus, the bacteria were not able to incorporate the new gene into their genome and express the green fluorescent protein.	
Summary Statement The effect of Tc-99 on the genetic transformation of the pGLO gene in Escherichia coli and Lactococcus lactis	
Help Received Used radiation source at Corona Regional Medical Center	