



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Kathleen N. Magness	Project Number S1315
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Project Title
Bacterial Transformations Using the Beta-Galactosidase Gene

Abstract

Objectives/Goals
Objectives/Goals: The object is to discover if bacteria can be successfully transformed without the presence of calcium chloride which is normally used to make the cells competent to take up DNA
Hypothesis: The plates with the calcium chloride present will successfully transform, the plates without the calcium chloride will not.

Methods/Materials
Methods/Materials: E-coli bacteria was placed in four test tubes labeled as followed: +Plasmid with calcium chloride, -Plasmid with calcium chloride, +Plasmid without calcium chloride, -Plasmid without calcium chloride. The tubes that were labeled #with calcium# had 250 µL of calcium chloride; those labeled #without calcium chloride# had 250 µL of ice water. The tubes labeled #+Plasmid# had 10 µL of plasmid DNA added to them. All of the tubes were heat shocked for 90 minutes, and then 250 µL of Luria Broth was added to them. Then 100 µL from each test tube is added to a set of plates labeled #LB,# #LB/Amp,# and #LB/Amp/X-gal# along with the label from that particular test tube. The plates incubated at 37°C for 36 hours, results were recorded.

Results
Results: My results were inconclusive because the experiment was unsuccessful. In the first run of the experiment, the plates labeled #LB# for all the solutions had substantial bacterial growth, as expected. All of the plates labeled #LB/Amp# had little or no growth, with the exception of the plate that contained no plasmid and no calcium chloride. This plate had a mold growing on it that could have occurred from contamination. This was also expected. However, the plates labeled #LB/Amp/X-gal# all had no growth. This was unexpected because the plate with the Plasmid and calcium chloride should have had colonies that were blue in color as a result of the color-marker gene. The same results came from the second run of the experiment.

Conclusions/Discussion
Conclusions/Discussions: The results were inconclusive so I am unable to determine whether or not calcium chloride is required to successfully transform bacteria. The possible reasons for this include the possibility that the ampicillin and x-gal solution denatured when exposed to the agar, improper storage of the materials, or improper preparation. Also, the plate that had the mold growing in it could have occurred because of contamination. The contamination would have occurred during the time when I was preparing the plates

Summary Statement
"Bacterial Transformations Using the Beta-Galactosidase Gene" tests success of transformation with the absence of calcium cholride to make the host bacteria competent.

Help Received
Help Received: I received help from Mrs. Sara Schlusel with the procedures, and using her lab to conduct the experiment.