



**CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY**

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Project Title The Characterization of Arabidopsis Mutants	
Abstract	
Objectives/Goals To analyze the response of Cd Tolerant Arabidopsis mutants in terms of their root growth, shoot growth and Cd accumulation.	
Methods/Materials Root Assay: I grew Mutants and Col. on Petri dishes with 0 μ M of Cd. Then I transferred the seeds to 20 μ M of Cd and 40 μ M of Cd. After 3 days, I measured their root lengths. Shoot Assay: I recorded the percentage of green color in cotyledon Mutants and Col. For this test I used higher concentrations of Cd; 150 μ M and 500 μ M. Cd Accumulation: I grew Arab. mutants and Col. on 0 μ M of Cd. After 3 days I transferred them to 20 μ M of Cd mixed with 80ml hydroponic solution and left them there for 5 days until they had accumulated some Cd. I dried the tissue and weighed the plant. I measured the Cd accumulation in their roots/shoots by using the ICP machine.	
Results Root Assay Results: Cd 29 Activation Tagged (Act.Tag.) reached a length of 6mm, which is the longest length for Act.Tag root growth in 40 μ M of Cd. Cd 16 (EMS) grew 3.7mm, which is the longest root growth for EMS mutants in 40 μ M of Cd. Shoot Assay Results: Act.Tag. Mutants and the EMS Mutants also had a greater percentage of green shoots in 500 μ M and 150 μ M of Cd compared to Col. Cd 29 (Act.Tag.) had 86 percent of its cotyledons green, while the Col only had 26 percent of its cotyledons green. Cd 11 (EMS) had 76 percent of its cotyledons green meanwhile the Col only had 10 percent of its cotyledons green. Cd Accumulation: EMS Graph shows that roots collected more Cd compared to shoots. EMS Mutants reached levels up to 1.7 ppm of Cd in the accumulation process.	
Conclusions/Discussion The response of Arab. mutants and Col. to cadmium helps us analyze the phenotype of the plants. I found that most of the mutants grew longer roots than the control and had greener shoots. Since the roots have easy access to the Cd, they collected more Cd than the shoots. Since the Mutants have their genes mutated differently some had a different response to Cd. Since there are so many mutants it is important that we continue this experiment and analyze the different phenotypes these mutants in Cd.	
Summary Statement Analyzing the phenotype of Arabidopsis mutants in Cadmium in terms of their root growth, shoot growth and cadmium accumulation.	
Help Received Used lab equipment at Muir College under supervision of Alice Chen, Dad drove me to lab, Mom and brothers helped make the board.	