



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Vincent Lok	Project Number 34273
Project Title Effects of Pesticides on Mitochondrial Activity and DNA Levels in Mouse Myoblast Cells	
Abstract Objectives/Goals The focus of this project was to determine whether pesticides permethrin, carbaryl, and imidacloprid, affected mitochondrial activity and mitochondrial DNA levels in C2C12 mouse myoblast cells. Methods/Materials Cells were treated with dosages of pesticide with similar concentration to the LD50 and LD25 toxicity in rats for 24 hours. The mitochondrial activity was measured as the basal and maximal oxygen consumption rates (OCR) in the mitochondrial stress test. To determine the amount of mitochondrial DNA, the ratios of mitochondrial DNA to nuclear DNA were determined from treated samples by amplification using live Polymerase Chain Reaction. Results The LD50 permethrin treatment significantly reduced the basal OCR ($p = 0.04$) but not the maximal OCR. The LD25 permethrin treatment and carbaryl and imidacloprid treatments did not have significant effects on basal and maximal OCR. All the pesticide treatments did not affect mitochondrial DNA levels except for the LD50 imidacloprid treatment, which significantly affected the mitochondrial DNA levels ($p = 0.05$). Conclusions/Discussion Permethrin and carbaryl affected the mitochondria's ability to make ATP not by lowering amount of viable mitochondrial DNA, but by affecting the electron transport chain.	
Summary Statement I investigated whether pesticides adversely affected the mitochondria.	
Help Received I used lab equipment at Gonda Center under the supervision of Dr. Laurent Vergnes.	