



**CALIFORNIA STATE SCIENCE FAIR  
2009 PROJECT SUMMARY**

<b>Name(s)</b> <b>Evan R. Lew</b>	<b>Project Number</b> <b>J2313</b>
<b>Project Title</b> <b>Green Fluorescent Protein</b>	
<b>Objectives/Goals</b> To determine if inorganic mercury is able to penetrate the cell membrane of mammalian neurons.	
<b>Abstract</b> <b>Methods/Materials</b> Materials: The Mutant GFP and mercury (HgCl <sub>2</sub> )The fluorometer, fluorescence microscope, sonicator, centrifuges, UV spectrophotometer, pH meter, rat brain neurons. We will use a fluorescence microscope to visualize the light emitted from the rat neurons. The fluorescence microscope will be used at UCSB. Mercury (HgCl <sub>2</sub> ), Buffer, Salt, Culture media, Virus. Methods: A. Treatment of Purified GFP with Mercury Measure Fluorescence Emission (Using a fluorometer) # Ignite the xenon lamp with 40,000 volts # Load GFP sample into cuvette # Load cuvette into fluorometer # Determine the excitation wavelength maximum by detecting fluorescence emission at 512nm and then scanning the excitation wavelengths from between 350nm to 500nm (Fig. 7) # Set excitation wavelength to 466 nm for all experiments. # Add mercury to GFP in different amounts # Record the fluorescence emission at 513 nM (Fig. 8) Treatment of Neurons with Mercury Expression of GFP in Mammalian Neurons # GFP gene is cloned into a virus for infection of neurons # Neurons are taken from the brains of rat fetuses and kept alive in cell culture # Then neurons are infected with the GFP-containing virus # The GFP protein is expressed in the neurons # Mercury is added to the neurons and GFP fluorescence was then examined under a fluorescence microscope (Figs. 10 & 11) # Pictures were taken and analyzed	
<b>Results</b> We found that the inorganic mercury was not able to penetrate in the 5 minute time limit we gave it but only after 9 hours did the mercury get into the neurons.	
<b>Conclusions/Discussion</b> the mercury was not able to penetrate the cell membrane	
<b>Summary Statement</b> To determine if inorganic mercury is able to penetrate the cell membrane of mammalian neurons.	
<b>Help Received</b> Dad described lab concepts and techniques. Handled mercury. Showed me how to use instruments;Lingyan Zhang Handled mercury. Used fluorescence microscope. Treated neurons with inorganic mercury; Dylan Peterson Described lab concepts and techniques. Showed me how to use	