



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Evan R. Lew	Project Number J2313
Project Title Green Fluorescent Protein	
Objectives/Goals To determine if inorganic mercury is able to penetrate the cell membrane of mammalian neurons.	
Abstract Methods/Materials Materials: The Mutant GFP and mercury (HgCl ₂)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 ₂), 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	
Results 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.	
Conclusions/Discussion the mercury was not able to penetrate the cell membrane	
Summary Statement To determine if inorganic mercury is able to penetrate the cell membrane of mammalian neurons.	
Help Received 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	