



CALIFORNIA STATE SCIENCE FAIR 2012 PROJECT SUMMARY

Name(s) Diego J. Magana	Project Number J1721
Project Title Drugs and Their Effects on the Body	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals This experiment will explore the science of drugs and their physical and biochemical effects on the human body using <i>Daphnia magna</i> as a living model. It will show people who smoke or heavily drink, the negative effects they have on the body.</p> <p>Methods/Materials If I expose the <i>Daphnia magna</i> to the same amount of three different drug solutions: caffeine, alcohol, and nicotine, for one minute, then nicotine will increase heart rate the most, alcohol the second most, and caffeine the least. In that, the independent variable is the different drug solutions, and the dependent variable is the heart rate of the <i>Daphnia magna</i>. To keep things fair and balanced, controls were set on the <i>Daphnia</i> species, type of water, amount of each drug solution, place in room, type of microscope, same amount of time each trial, and the same concentration in the caffeine, alcohol and nicotine solutions.</p> <p>Under a microscope, the heart rate of the flea is measured and recorded. Then the water is removed from the slide, replaced with a caffeine solution, and the pulse is taken again. After four more trials using caffeine, repeat the same procedure using alcohol and nicotine.</p> <p>Results Caffeine accelerated the heart rate with average increase of 16 beats per minute. The alcohol decreased the heartbeat radically to an average difference of 139.2 beats per minute. Nicotine increased heart rate twice as much as the caffeine solution, and the average difference was 36.8 beats per minute.</p> <p>Caffeine caused the <i>Daphnia</i> to become jittery, active, and evident in tachycardia. Alcohol made it less animated and caused arrhythmia, and bradycardia. Nicotine paralyzed the flea but sped the pulse significantly.</p> <p>Conclusions/Discussion A minor problem in the experiment was that the cigarette company could not provide me with the nicotine content information, claiming that their sources were unreliable, therefore, the concentration of the nicotine solution may not be equal to the concentrations of the other solutions.</p> <p>Further investigations include noting brain activity, observing how long it would take to recover from each drug, and exposing the same <i>Daphnia magna</i> to different drugs to study drug interaction.</p>	
Summary Statement This experiment will explore the science of drugs and their physical and biochemical effects on the human body, particularly the heart, using <i>Daphnia magna</i> as a living model.	
Help Received Mother helped by ordering <i>Daphnia magna</i> and depression slides; Brother and Sister helped as lab assistants; Father paid for supplies and edited report; Miss Renee Rakestraw and Miss Michelle Mullen helped me as advisors	