



**CALIFORNIA STATE SCIENCE FAIR  
2006 PROJECT SUMMARY**

<b>Name(s)</b> Sarah A. Kletzer	<b>Project Number</b> <b>J1418</b>
<b>Project Title</b> <b>The Tell-Tale Heart: The Effect of Common Drugs on the Heart Rate of Daphnia magna</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of this experiment is to investigate the effect of readily available drugs (caffeine, cough and cold medicine, allergy medicine, and a sleep aid) on the heart rates of daphnia magna.</p> <p><b>Methods/Materials</b> Suspensions of four commonly available over-the-counter medications were prepared (distilled water (separately) with caffeine (from No-Doz#), Non-drowsy Claritin# (pseudoephedrine and loratadine), Simply Sleep# (diphenhydramine) and NyQuil# (acetaminophen, dextromethorphan, doxylamine, alcohol). Using one daphnia magna, a control (non-drugged) heart rate was established, using repeated counts. The treatment involved applying one droplet of the drug suspension, followed by repeated counts of the heart rate. Each of the four drug treatments involved repeated trials. Due to the rapid beating of the daphnia magna heart, 10-second heart rate counts were used to calculate an estimated 60-second heart rate.</p> <p><b>Results</b> All four medications produced a change in the heart rate. No-Doz has caffeine as its active ingredient, and applying it to the daphnia increased the heart rate by an average of 39 percent. Simply Sleep has diphenhydramine as its active ingredient, and it slowed down the heart rate of the daphnia. The average change in the heart rate was -15 percent. Non-Drowsy Claritin contains pseudoephedrine and loratadine as active ingredients, and it increased the heart rate of the daphnia, by an average of 23 percent. NyQuil contains acetaminophen, dextromethorphan, and doxylamine as active ingredients, with alcohol as one of the inactive ingredients. The NyQuil produced a very slight increase in the heart rate, an increase of 5 percent on average.</p> <p><b>Conclusions/Discussion</b> The increase in the heart rate observed with the treatments of caffeine and pseudoephedrine are consistent with their labeling as stimulants. Depressant effects, seen as a lowering of the heart rate, were observed with the treatments using diphenhydramine, an antihistamine, and dextromethorphan and doxylamine, also antihistamines. The widespread use of stimulants and depressants suggests a need for more public awareness of the effect of these types of medication on heart rate.</p>	
<b>Summary Statement</b> My project is an investigation of the effect of over-the counter (OTC) medications, categorized as either stimulants or depressants, on the heart rate of daphnia magna.	
<b>Help Received</b> Mother helped with heart rate count.	