



CALIFORNIA STATE SCIENCE FAIR 2009 PROJECT SUMMARY

Name(s) Heidi S. Hirvonen	Project Number S1812
Project Title Effects of Estrogen Pollution in the Environment	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this project is to test possible negative effects of estrogen pollution in water on wildlife and to prove that this particular drug pollution, which is a result of excess estrogen from birth control pills flushed through human waste, may be a concern in ecosystems.</p> <p>Methods/Materials Five ten-gallon fish tanks, each filled with de-chlorinated room temperature water, were set up and fifteen feeder goldfish were placed in each tank, where they were allowed to acclimate. Over a period of approximately two months, four of the tanks were routinely given a specific dosage of either an estrogen-progestin (or combination form) birth control pill or a pure estrogen pill. The fifth tank remained as the control group and so received no dosage of any kind throughout the experiment. The fish were periodically weighed by water displacement to test for mass increase or decrease. Changes in behavioral patterns were monitored.</p> <p>Results While not all goldfish were expected to survive throughout the experiment (an inference based upon prior knowledge that not all fish would survive the acclimation process), death rates of goldfish were charted as higher in the four dosed tanks than in the fifth control tank. Mass increase occurred in all four dosed tanks while the control tank experienced no fluctuation in mass. The tank with the greatest change of mass recorded was a tank receiving a dosage of one estrogen-progestin pill every other day. Behavioral changes included a decrease in reaction time to food and observed slower movements.</p> <p>Conclusions/Discussion Increases in mass as well as decreases in organism populations may disrupt functions of water organisms as well as hinder survival abilities. While estrogen pollution is the main concern (as estrogen is the active drug in birth control pills) progestin may be a concern to water organisms as well, seeing as data suggests that fish dosed with estrogen-progestin pills experience a greater increase in mass than those dosed with estrogen pills. This suggests that combination pills may be more harmful to wildlife than pure estrogen pills. Seeing as combination pills are the most common form of birth control pill, it may be considered wise for medical drug professionals to rethink the drugs used in pills for the sake of preserving the environment.</p>	
Summary Statement This experiment tests the possible long and short-term effects of estrogen on goldfish, based off of a concern of possible negative effects of excess estrogen flushed into the environment through human waste.	
Help Received Professor Nick Anast provided fish tanks and mentorship.	