



**CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY**

Name(s) Jack R. Walsh	Project Number 31605
Project Title How Does Exposure to Estrogen Affect the Aggressive Response of Male Siamese Fighting Fish?	
Abstract Objectives/Goals To determine if and how unnaturally high levels of the hormone estrogen would impact the normal instinctive aggressive response of male Siamese Fighting Fish (<i>Betta splendens</i>). Healthy male Siamese fighting fish have a normal, easily recognizable aggressive response when they feel threatened by another male Betta. These are instinctive responses - they are genetically programmed and do not have to be conditioned or learned. Instinctive behaviors like this impact or control the feeding, sexual and social behaviors of all animals. My hypothesis was that short term exposure (1 week) to unnaturally high levels of the hormone estrogen would impact the normal instinctive aggressive response of male Fighting Fish to perceived threats. Methods/Materials My project exposed normally aggressive male Siamese fighting fish to estrogen to see if exposure to this form of pollution changes their normal aggressive behavior. I dissolved a single estrogen birth control pill and added this estrogen solution to the water in each of the 1 liter containers of the two fish selected to be "dosed." I also had two "non-dosed" control fish that were kept under identical conditions as the dosed fish, minus the estrogen. After one week of exposure to the estrogen in their water I tested the dosed fish for the normal aggressive responses they displayed prior to estrogen exposure and recorded results. I also conducted a second trial of this experiment using four new fish to confirm my results. Results My hypothesis that short term exposure to increased estrogen levels would have an impact on the normal instinctive aggressive response of male Siamese Fighting Fish was proven by the data collected in the experiments conducted. In both trials of my experiment, after just one week exposure to unnaturally high levels of estrogen in their water, the aggressive response of male Siamese Fighting Fish to stimuli were considerably altered. Conclusions/Discussion This experiment provides concrete evidence that estrogen contamination and pollution has the potential to seriously impact genetically programmed instinctive responses in creatures that are exposed to it and raises a number of other questions and opportunities for other scientists to look deeper at these issues.	
Summary Statement My project exposed male Siamese Fighting Fish to unnaturally high levels of estrogen to determine if this type of pollution would alter their normal genetically programmed instinctive aggressive response.	
Help Received My parents drove me around to purchase the fish and materials needed for the experiment and helped with the typing of the report and construction of the display boards.	