



**CALIFORNIA STATE SCIENCE FAIR  
2003 PROJECT SUMMARY**

<b>Name(s)</b> <b>Christopher T. Lynch</b>	<b>Project Number</b>  23329
<b>Project Title</b> <b>The Effect of the Hormone Estradiol on the Thermo-Tolerance of Caenorhabditis elegans</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The purpose of my project was to investigate if <i>C. elegans</i> nematodes may be used as a bioassay to determine the health of an ecosystem. The human hormone estradiol is a common environmental water pollutant, and it was hypothesized that exposure to this contaminant would cause the nematodes to develop heat-shock proteins and survive longer under stress.</p> <p><b>Methods/Materials</b> <i>C. elegans</i> nematode worms were grown from eggs to adults in 20 deg. C conditions, exposed to 10 uM and 10 nM concentrations of estradiol, and compared to control. Additionally, a strain known as TJ1052 was tested, which has a mutation that extends longevity in heat-shock conditions. Standard heat shock was conducted by transferring the worms into 35 deg. C incubators, then observing them under a microscope to check for survival.</p> <p><b>Results</b> After 10 hours, the fraction of worms alive was not significantly different for either 10 uM (<math>p&gt;0.06</math>) or 10 nM (<math>p&gt;0.036</math>) estradiol compared to control, and was significantly less than the longevity of the TJ1052 strain (<math>p&lt;0.03</math>). The viability of the nematodes was assessed by a novel mechanism using a green fluorescent nucleic acid stain (SYTOX).</p> <p><b>Conclusions/Discussion</b> While my results showed no significant correlation between estradiol exposure and thermo-tolerance, a new method for evaluating vitality of nematode worms was tested using a fluorescent stain (SYTOX) that accumulated inside the dead worms. This new technique should save researchers significant time in future experiments.</p>	
<b>Summary Statement</b> This project investigates <i>C. elegans</i> thermo-tolerance as a bioassay for xenobiotic environmental contaminants, and also describes a new method to assess nematode longevity by fluorescent microscopy.	
<b>Help Received</b> Summer lab internship at the Buck Institute. Standard nematode culture and handling procedures were explained to me by members of my lab. Assistance with growing worms to adult size, as this is a time consuming process and only so many worm transfers can be done at once by one person.	