



**CALIFORNIA STATE SCIENCE FAIR  
2009 PROJECT SUMMARY**

<b>Name(s)</b> <b>Stephen K. Lam</b>	<b>Project Number</b> <b>S2408</b>
<b>Project Title</b> <b>Effect of Toothpaste-derived Fluoridation on Sea Urchin Fertilization and Development</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> To test the potential effects of fluoride as derived from toothpaste on the fertilization and developmental process of sea urchins.</p> <p><b>Methods/Materials</b> Forced the release of gametes by injecting sea urchins with potassium chloride. Eggs and sperm acquired from this were mixed in solutions of seawater containing different dilutions of toothpaste. The success with which the eggs were fertilized was re recorded. Embryos were then allowed to develop overnight to observe the effects that the different concentrations of toothpaste-derived fluoride had on the developmental process of sea urchin embryos.</p> <p>Another trial was done to test the effects of a fluoridated environment on healthy and developing sea urchin embryos. This was done by isolating embryos into separate wells on a tissue sampling tray.</p> <p><b>Results</b> Toothpaste demonstrated an obvious and detrimental effect on the fertilization and development of sea urchins. Embryos fertilized and developed within toothpaste solutions were either killed or unable to continue developing normally.</p> <p><b>Conclusions/Discussion</b> Although the results of this project do not directly prove that fluoride causes the abnormal development of sea urchin embryos, toothpaste can. In all four trials conducted during this experiment, most samples subjected to unnatural concentrations of fluoride showed abnormal development.</p>	
<b>Summary Statement</b> This study tested the effects that toothpaste-derived fluoride has on the fertilization and development of sea urchins.	
<b>Help Received</b> Biology teacher (Dr. Jay Vavra) supervised experimentation; Dr. Vavra also dived for the sea urchins used in this experiment.	