



**CALIFORNIA STATE SCIENCE FAIR  
2005 PROJECT SUMMARY**

<b>Name(s)</b> <b>Evan T. Morikawa</b>	<b>Project Number</b> <b>S1913</b>
<b>Project Title</b> <b>Parthenogenesis: Optimizing Virgin Birth in Sea Urchins</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> This experiment was designed to test the most effective measures to parthenogenically activate sea urchin eggs of the purple sea urchin (<i>Strongylocentrotus Purpuratus</i>). The study of parthenogenesis is the ability to artificially induce asexual reproduction in living creatures. This unique field of study is finding new applications in modern stem cell research. Parthenogenic eggs are being investigated as an alternative means to create embryos that stem cells may be harvested from</p> <p><b>Methods/Materials</b> For my experiment, I activated the eggs of <i>Strongylocentrotus Purpuratus</i> by exposing them to a hypertonic shock of a pure Sodium Chloride (NaCl) solution. The two experimental variables were the concentration of the hypertonic solutions (ranging from a 3.4% to a 5.3% NaCl solution) and the length of suspension in those solutions (ranging from 30 to 105 minutes). I suspended the eggs in six different solutions for six different suspension times to yield thirty-six different tests, plus an additional thirty-seventh test in which I normally fertilized eggs as an alternate control. I then counted the percentage of eggs in each test that showed signs of activation and calculated basic statistical data such as standard error of the mean.</p> <p><b>Results</b> I discovered that eggs placed in a 4.8% concentration of a NaCl solution had the highest egg activation percentage by a statistically significant margin and hence was the most successful concentration. The amount of time the eggs were suspended did not produce statistically significant results and yielded inconclusive data; however, eggs immersed from 30-45 minutes seemed to show slightly higher activation percentages.</p> <p><b>Conclusions/Discussion</b> What I found indicated that an extremely precise set of conditions in salinity needed to exist in order to successfully activate the eggs through parthenogenesis. Out of my thirty-six different tests, only two showed signs of significant activation percentages. Knowing the set of conditions that function most efficiently, I would want to continue this experiment in the future by experimenting with other variables to further optimize the process of parthenogenesis.</p>	
<b>Summary Statement</b> This project artificially induces asexual reproduction in sea urchins through parthenogenesis.	
<b>Help Received</b> Used lab equipment at High Tech High School	