



**CALIFORNIA STATE SCIENCE FAIR  
2004 PROJECT SUMMARY**

<b>Name(s)</b> Chris D. Woodward	<b>Project Number</b> <b>J1929</b>
<b>Project Title</b> <b>The Freezing Tolerance of Mytilus edulis (Black mussel) and Perna canaliculus (Green mussel)</b>	
<b>Abstract</b> <b>Objectives/Goals</b> Cryobiologists are trying to develop procedures for freezing and thawing organs for transplant. Mussels produce a cryoprotectant to help them withstand cold temperatures. This study was conducted to determine if a mussel's cryoprotectant would raise its survival rate after freezing. I believe 100% of the mussels would survive freezing. <b>Methods/Materials</b> Phase I included 9 black mussels and 6 green mussels frozen in three batches in sea water at - 5. Phase II included 7 black mussels and 2 green mussels frozen in two batches without sea water. In both Phases the mussels were frozen for at least 5 hours. The mussels were then thawed, probed, and dissected to determine if they survived. 5 criteria were used to determine the mussels' vitality. <b>Results</b> In Phase I, the survival rate for the black mussels was 56% and for the green mussels was 83%. In Phase II, the survival rate for the black mussels was 86% and the green mussels was 0%. Overall 69% of the black mussels survived and 63% of the green mussels survived. <b>Conclusions/Discussion</b> The survival rate of the mussels was over 50% but less than the 100% I hypothesized. More experimentation would be helpful to determine the longest period a mussel could be frozen and survive. Utilizing a high-powered microscope, the actual change in the cell's structure during and after freezing could be observed.	
<b>Summary Statement</b> Black and green mussels were frozen, thawed and then checked for vitality to determine presence and effectiveness of cryoprotectants.	
<b>Help Received</b> Mother helped type report. Father cut open the mussels remaining after I cut my hand.	