



**CALIFORNIA STATE SCIENCE FAIR  
2017 PROJECT SUMMARY**

<b>Name(s)</b> Sarah M. Hansen	<b>Project Number</b> <b>J1607</b>
<b>Project Title</b> <b>Do Yeast Adapt to Environmental Stress Faster with an Increased Mutation Rate?</b>	
<b>Abstract</b> <b>Objectives/Goals</b> I wanted to see if yeast introduced to environmental stress will eventually recover and grow at a rate similar to non-stressed yeast. I also wanted to see if the stressed yeast would recover faster with an increased mutation rate. <b>Methods/Materials</b> Yeast were grown in YPD medium as a baseline. YPD medium with high NaCl concentration or with vinegar were inoculated from the YPD culture. Two tubes of each condition were created and passaged daily for 21 days. One set of yeast were subjected to UV light every other day to increase the mutation rate. The yeast growth rates were calculated from optical density measurements over multiple hours of growth but during the logarithmic growth phase. <b>Results</b> Yeast introduced to environmental stress did have lower growth rates but recovered in the case of high salt conditions but not under vinegar conditions. An increased mutation rate did not help the yeast adapt to environmental stress. Rather, the UV treated yeast actually showed a slightly slower growth rate. <b>Conclusions/Discussion</b> It was surprising that the vinegar condition did not recover because in a previous study, yeast grown under acidic conditions did adapt. I noticed that over time the vinegar media became cloudy and material collected on the side of the tube. I suspect that this changed the available nutrients for the vinegar yeast. If I were to do this experiment again I would measure the growth rates more frequently during the adaptation phase rather than a single growth rate measurement after 21 days.	
<b>Summary Statement</b> I grew yeast under environmental stress to see if they would adapt faster if they had an increased mutation rate from UV light.	
<b>Help Received</b> My dad helped me learn lab techniques, do statistics and get a shaking incubator to grow the yeast. My mom helped with the poster layout. Several mentors from the San Carlos district helped by giving me tips and ideas.	