



**CALIFORNIA STATE SCIENCE FAIR  
2014 PROJECT SUMMARY**

<b>Name(s)</b> Cody L. Lim	<b>Project Number</b>  34549
<b>Project Title</b> <b>Pb and Sugar Sandwich: The Effects of Lead (II) Ion on Glucose Metabolism Rates in Saccharomyces cerevisiae</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The objective of this project was to determine whether lead (II) ion would have an adverse effect on glucose metabolism rates in <i>Saccharomyces cerevisiae</i> (baker's yeast), a eukaryotic model for glucose metabolism.</p> <p><b>Methods/Materials</b> I exposed baker's yeast to either 1 M lead (II) nitrate, 1 M sodium nitrate, or distilled water, and let it soak in a beaker for 24 hours at 4 degrees Celsius in a refrigerator. Then, I washed the yeast with distilled water and filter paper, added the yeast back into its beaker, added 50 mL of 1 M dextrose solution, and incubated the solution at 37 degrees Celsius for 100 Celsius. Following this, I added 10 mL of Benedict's Reagent, boiled for 10 minutes and let cool for 20 minutes. Finally, I centrifuged the solution at 3200 rpm for 5 minutes and measured the supernatant's absorbance of light at 730 nm; the absorbance reading was converted to concentration of glucose left in solution using Beer's Law and a self-made calibration curve.</p> <p><b>Results</b> The yeast exposed to lead (II) nitrate had the highest average concentration of glucose left behind in solution (0.31 M), followed by the yeast exposed to sodium nitrate (0.28 M), while the yeast exposed to only distilled water had the lowest concentration of glucose left behind (0.16 M).</p> <p><b>Conclusions/Discussion</b> Yeast exposed to 1 M lead (II) nitrate metabolizes glucose at a slower rate (more glucose is left behind in solution) than yeast exposed to 1 M sodium nitrate or yeast exposed only to distilled water. The data support my hypothesis. This knowledge can be applied to helping diabetics in developing nations who are very likely to consume lead-contaminated groundwater or produce; the lead contamination is now known to exacerbate the diabetics' inability to metabolize glucose, an effect with little potential for treatability without access to insulin and other diabetes medications.</p>	
<b>Summary Statement</b> My project determined the effects of lead (II) ion, relative to sodium ion and distilled water, on glucose metabolism in <i>Saccharomyces cerevisiae</i> .	
<b>Help Received</b> Mother bought yeast and distilled water; Father bought dextrose and helped with display board; Mr. Morgan provided reagents for lead (II) nitrate and sodium nitrate solutions; Mrs. De La Cruz provided supervision, advice, and materials.	