



**CALIFORNIA STATE SCIENCE FAIR  
2015 PROJECT SUMMARY**

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<b>Project Title</b> <b>Is Sugar Killing You? The Effects of Sugar and Aspartame on the Longevity of <i>C. elegans</i></b>	
<b>Objectives/Goals</b> Diabetes and obesity are affects millions of Americans each year. The objective of my experiment was to determine if Equal brand aspartame would be a viable dietary substitute for glucose by studying how it impacts the longevity of <i>C. elegans</i> .	
<b>Abstract</b> <b>Methods/Materials</b> <i>C. elegans</i> share key genetic traits with humans. The experiment varied concentrations of glucose and Equal brand aspartame to levels shown by previous studies to produce the intracellular concentration found in poorly managed diabetic patients of 40mmol/L (G40 and A40) and half of the diabetic patient level of 20mmol/L (G20 and A20) Five groups of N2 strain <i>C. elegans</i> were stored at 20 degrees Celsius on Fluorodeoxyuridine (FUdR, an additive that prevents progeny) agar plates with different concentrations of glucose and aspartame. Each treatment had about 75 to 100 worms on five different plates. The groups were labeled and studied in longevity trials by checking for movement.	
<b>Results</b> The average lifespan of the <i>C. elegans</i> decreased with the increased concentration of glucose. Equal brand aspartame at the 20mmol/L concentration actually caused a more drastic mean lifespan that of the glucose at double the concentration (40 mmol/L). However, the aspartame 40mmol/L treated <i>c. elegans</i> had a lifespan that was similar to the control group and therefore was not considered significant ( $P=0.7491$ ). This suggests that the Equal brand aspartame had detrimental effect but an inversely proportional relationship between concentration and decreases in lifespan, a counterintuitive relationship which should, and will, be investigated further.	
<b>Conclusions/Discussion</b> Glucose consumption was shown to decrease the lifespan of <i>C. elegans</i> and as concentration of glucose increased, longevity is decreased further. However, the Equal had more acute negative effects than glucose of the same level, but interestingly as concentration of aspartame was increased, the effect was less detrimental. This is an interesting relationship that I hope to explain in future studies involving the diffusion rate through the cuticle of the worm at different molarities. This data suggests that glucose should be consumed in moderation and that aspartame has un-interpreted health effects and should be consumed with awareness of possible repercussions.	
<b>Summary Statement</b> This project tested the impact of sugar and Equal brand aspartame on the longevity of <i>C. elegans</i> .	
<b>Help Received</b> Used lab equipment at UCSB under the supervision of Andrew Swafford and Dr. Joel Rothman.	