



**CALIFORNIA SCIENCE & ENGINEERING FAIR
2018 PROJECT SUMMARY**

Name(s) Ryan S. Belkin	Project Number J2301
Project Title The Path to Immortality: The Effect of Albuterol, Atorvastatin & Erythromycin on the Lifespan of Caenorhabditis elegans	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this experiment is to determine if the medications: albuterol, erythromycin, and atorvastatin, all of which slow down mitochondrial function, have a positive impact on the lifespan of C. elegans, a nematode.</p> <p>Methods/Materials C. elegans worms were separately incubated in the medications: albuterol, erythromycin, and atorvastatin at a concentration of 10 micrograms/ml at the start of the L1 phase of their life cycle. The worms were closely monitored and manually counted using a microscope on a daily basis throughout the duration of their lifespan.</p> <p>Results I found that albuterol, erythromycin, and atorvastatin all increased the mean lifespan of C. elegans by 3.4, 2 and 1.7 days respectively, compared to the control group.</p> <p>Conclusions/Discussion The medications albuterol, erythromycin, and atorvastatin all affect mitochondrial function and ultimately decrease the amount of oxygen-free radicals produced during cellular respiration. Since oxygen-free radicals are implicated in the aging process, their reduced production counteracts the aging process, thereby leading to increased longevity. If applied to a human being, then the average human being's life span would change from 79 to at least 101 years of age. Additionally, 20% of the worms in the albuterol group lived extraordinarily longer compared to other long-living albuterol worms, which raises the possibility that a mutant albuterol-sensitive worm exists, allowing for longer life.</p>	
Summary Statement By incubating C. elegans worms in medications that slow mitochondrial function, I demonstrated that albuterol, atorvastatin & erythromycin all significantly extend the lifespan of C. elegans.	
Help Received I designed and carried out the experiment by myself at home. Professors Rothman and Joshi from the Department of Molecular, Cellular & Developmental Biology at UCSB met with me to discuss my experimental design and to provide the worms and petri dishes. I got help in understanding the statistical	