



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Sophia M. Hewitt	Project Number 34553
Project Title Inducing Cellular Senescence in Tetrahymena Thermophila Using Epigallocatechin Gallate to Shorten Telomeres	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Cancer cells, unlike healthy human cells, have perpetually active telomerase, which allows their cells to reproduce indefinitely. I wanted to see if I could interfere with this process in an organism that has telomere and telomerase properties similar to cancer cells. I tested epigallocatechin gallate, an organic compound found in green tea, as a telomerase inhibitor to see if it would cause a shortening of telomeres in the samples where it was applied.</p> <p>Methods/Materials I grew twelve samples of Tetrahymena thermophila divided equally into three groups: control (no EGCG), low dose (0.01 mg/ml), and high dose (0.1 mg/ml), for the duration of one week. The EGCG was replenished every other day, as it is an unstable compound. At the end of the week, I lysed the T. thermophila and extracted their DNA. I ran this DNA in a qPCR machine and measured for the amount of telomere in each sample (using primers of my own design) as well as the amount of a single copy gene in each sample. I divided the amount of telomere at the threshold by the amount of single copy gene at the threshold to determine the average length of telomeres in each sample.</p> <p>Results On average, the high dose group had the shortest telomeres, the low dose group had slightly longer telomeres, and the control group had the longest telomeres.</p> <p>Conclusions/Discussion This shows that the EGCG shortened the telomeres and that there was a dose dependent reaction. This means that EGCG has potential as a cancer treatment, though more tests would have to be run.</p>	
Summary Statement Can epigallocatechin gallate, a chemical found in green tea, shorten telomeres, thus interfering with cellular reproduction and ultimately leading to cell death in an organism that has properties similar to that of cancer cells?	
Help Received Used lab equipment at L.A. Biohackers lab under supervision of Cory Tobin (Caltech graduate student), interviewed the following doctors: Dr. Edward Miracco, Feigon Lab (Tetrahymena thermophila, telomerase), Dr. Qing-Yi Lu, UCLA (EGCG).	