



CALIFORNIA SCIENCE & ENGINEERING FAIR 2018 PROJECT SUMMARY

Name(s) Kate L. Popky	Project Number 38231
Project Title The Effects of Temperature on the Responsiveness of Escherichia coli to Ampicillin	
Abstract Objectives/Goals The study will be conducted to evaluate how temperature affects E. Coli responsiveness to ampicillin. The key variable of this experiment is the temperature of the environment in which the E. Coli is incubated. Using the Bauer-Kirby Disk Susceptibility Test, the study results will suggest whether treating fever in the setting of a bacterial infection is helpful or harmful. Methods/Materials Four incubators were set to their assigned temperatures and E. coli was grown in petri dishes in the presence of ampicillin disks. A second round of incubation was then performed that followed the same procedures, using the surviving E. coli from each incubator. Results After the first round of incubation, the 37°C petri dishes had an average zone of inhibition of 25mm, the 38°C petri dishes had an average zone of 24.7mm, the 39°C petri dishes had an average zone of 23mm, and the varied temperature (37-39°C) petri dishes had an average zone of 23.3mm. After the second round of incubation, the 37°C petri dishes had an average zone of inhibition of 24mm, the 38°C petri dishes had an average zone of 23.7mm, the 39°C petri dishes had an average zone of 22.7mm, and the varied temperature (37-39°C) petri dishes had an average zone of 23.3mm. Conclusions/Discussion The results do not support the original hypothesis that using ampicillin to treat E. Coli at the average human body temperature (37°C) will allow for the least E. Coli growth, compared to E. Coli incubated at higher temperatures. Although the antibiotic was less effective in the presence of higher temperatures, its effectiveness did not decline in the second round of incubation as much as in the 37°C environment. In the varied temperature environment, designed to simulate the varying body temperature of a person with fever, the E. coli's level of responsiveness to ampicillin remained the same over the two stages of incubation. At higher temperatures, the E. coli was less responsive to ampicillin than in the incubators with lower temperatures. However, the responsiveness remained more constant at these higher temperatures. The environment that had the least decline in responsiveness between the two stages was in the incubator with a varied temperature.	
Summary Statement Through measuring the zones of inhibition of petri dishes of E. coli placed under different temperatures, I found that having a fever could be beneficial in the presence of an E. coli infection.	
Help Received My biology teacher, Mrs. Kiest, helped to review my writing, and my dad helped me with placing E. coli onto petri dishes.	