



**CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY**

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| Name(s) Alyssa T. Greene | Project Number 31614 |
| Project Title Studying the Link between Gastroesophageal Reflux Disease and Adenocarcinoma Esophageal Cancer in Humans | |
| Objectives/Goals My goal is to study which pH's of highly concentrated HCl acid can damage, morph, or kill epithelial cells. The purpose was to study the cell#s size, appearance, and numbers when in contact with acid, and determine if acid could cause esophageal cancer. My project was created to simulate acid reflux, back flowing into the esophagus and damaging the cells lining the esophagus. I am planning to re-do my experiment and i hope to study closely the cells at the 1st, 2nd, and 3rd doubling periods through what does occur to the cells, as in my previous experiments i proved that during the first 66 hours (2nd doubling period) was the most crucial and when the cells morphed before dying. My hopes is that i will be able to obtain enough data to successfully show how acid reflux does in fact effect epithelial cells of the esophagus. for my county project i studied the short term effects but for the state i want to also study the long term effects of acid on the cells. i want to dedicate all my research to my dad, who passed away from esophageal cancer and my hopes is to spread information about it initiating further research on this rare cancer. | |
| Abstract Methods/Materials Experimentally, I planned to simulate acid reflux's effect on cells. I decided to use Human Buccal Epithelial cells which are most similar to Human Esophageal Epithelial cells. My procedure consisted of using cheek cells cultured in DMEM media, combined with HCl acid(pH 1,3, and 5)/a buffer in a petri dish. After the cells cultured, I observed the short term effects of acid on the cells. | |
| Results I found that pH 1 acid had the most destructive effect on the cheek cells, quickly mutating the cells and then killing most of them. also, pH 3 seemed to mimic the effect of the cells of pH 1 at a slower rate. While pH 5 acid created the most sustainable environment for the cells to grow and divide. | |
| Conclusions/Discussion This experiment amazed my wonders at how destructive HCl acid actually can be. I was able to see that acid can mutate and truly wipe out a cell culture. Depending on the pH of the acid, determined how many cells could actually survive and maintain division. I found that the lower the pH of the acid the higher risk there was for corrosive mutations in the cell cultures. While the higher the pH of the acid the milder the effect there was on the cells. | |
| Summary Statement I tried to find which pH'S of HCl acid can morph epithelial cells | |
| Help Received used lab equipment at Baxter Bioscience laboratory under supervision of (unknown yet of who) | |