

This summer I participated in a research assistantship at The University of the South. Dr. Summers graciously accepted me, a mere first-year student with minimal college-level biology class credits, into her lab group after I expressed my interest in joining her lab group. The topic at hand in the lab is beyond just cancer, focusing mainly on *how* genes are activated, but also when and why. This is a fairly new idea in genetic studies: that our genes and the genetic code are the only factors that play into contracting the wide varieties of cancer. With many intricacies left to understand, “epigenetics” studies the regulation of genes, potentially unlocking answers to the killer disease cancer.

Dr. Summers’ lab focuses on one protein of interest that controls how DNA is spatially stored in the cell, called HDAC3. Histone Deacetylase 3, or HDAC3 for short, essentially controls the condensing of DNA so that it may fit compactly in the cell. When HDACs act, genes are not able to be read. In cancer cells it is not uncommon to see an overexpression of HDACs. This becomes especially intriguing when we see that *gimap7*, a gene crucial in T-Cell development and regulation, possibly has an effect on the onset of T-lymphopenia, leukemia, and autoimmunity. Based on past research in the lab, HDAC3 has been shown to regulate *gimap7*, but it is currently unknown in what way. My research this summer revolved around figuring out this relationship, and ultimately it’s importance. My responsibilities included isolating *gimap7* to then move on with the project.

I conducted a lot of polymerase chain reactions, meaning multiplying the specific targeted gene, *gimap7*, using the polymerase, primers for *gimap7*, and human DNA from cell

lines. After conducting PCR, I purified and ran the results on agarose gels in order to see if the targeted gene's band was confirmation of the isolation of *gimap7*.

The second week of research one of the members in the lab group would be absent the next week, and I was placed in charge of keeping up her cells in tissue culture. Immediately, I was thrust with the responsibility to take care of cancer cells, an experience that helped me gain confidence and experience in the world of research straight at the beginning of my time in the lab.

Another ongoing responsibility I had was to look over and take care of our lab mice. Changing their cages, feeding and giving water to them whenever needed is a collective responsibility of the lab group. I knew we had mice, and we used them in our projects for data, however, I was not prepared for the biggest event of the summer concerning the mice. About half-way through the summer, a mating pair had nine pups, a success! After watching them mature from tiny pink aliens, to small mice, we had to record their genotypes of HDAC3 in order to tag each one. Genotyping requires DNA, which requires a sample from the mice. After sedating and tagging each baby mouse with an ear tag and a number, I had to cut off a section of their other ear in order to procure a DNA sample. This was one of the most influential experiences I had all summer. As terrifying as it was to physically cut off a section of an ear and place it in a tube to bring back to the lab, it was thrilling to know that this cellular and molecular research I was doing actually pertained to real life physical beings, and with hope eventually humans.

This summer, I learned much about research in general, however, I believe I learned much more about myself and my options for a career. Before this summer, my two ideas as far

as my career went definitely concerned research, either as strictly a scientific researcher or a professor. Being a researcher would allow me to fully delve into my project, however being a professor would allow me to pursue both my growing passion for education *and* still continue to research. I definitely have confirmed that research is something I would love to do with my life.

However, being pre-med was not something I had considered outside the back of my mind until being surrounded by pre-med students in Spencer Hall almost everyday, and realizing how like-minded I am to them. I believe bringing biological research and solutions to people is really the ultimate goal of biology. Whether it is environmental and ecological or medical knowledge, implementing this information is what betters the world and continues global advancement.

Although I am not sure being a doctor is my ultimate goal right now, I know from my research experience it is absolutely something I would love. Helping people through knowledge is something truly special. This research experience definitely opened my mind to the possibility of that as my career.

Also, another point I have learned about myself and my passions this summer is that maybe I don't want to do molecular biology. I definitely missed the "bigger picture" biology with ecosystems and animals. My new plan is to take a variety of molecular biology and "bigger picture" biology classes next year to see what most sparks my passion in biology the most. I am so very thankful for being able to spend my summer doing research with Dr. Summers this summer, as this experience has allowed me to understand myself and especially my potential career passions.