

Christy Lucas

Graduation Year: Senior

College: Science

Major(s): Science Pre-Prof and Psychology

Minors(s): n/a

Scholar Group Membership: No

Did you received other funding for this project?: No

Could you have completed this project without CUSE funding? No

More details on CUSE funding assistance? n/a

Project Title: Role of Rab8A and Med16 in Chemotherapy Response

Project Location: Univ. of Notre Dame

ND Faculty Mentor: Dr. Amy Stark of the DNA Learning Center

Project Type: Research

Why did you undertake this project/experience? Deepen your knowledge of a topic or issue, Prepare for professional school (MD, MBA, JD), Career discernment and/or preparation

Did your funded experience help you:

[Deepen your understanding of your coursework or field of study]: Very Much

[Discern your interests and post-bac goals]: Yes

[Become confident in your ability to set and achieve your goals]: Very Much

[Gain a more nuanced view of local, national, or global communities]: Not Applicable

[Improve your written and verbal communications skills]:Yes

Tell us about your experience.

In my project, which will last the entire spring semester, I am trying to see if this one gene is the puppet master behind a patient's response to Capecitabine. Capecitabine is an oral chemotherapeutic, used commonly for breast and colon cancers, and last fall, I found a statistically significant overlap between the SNP of this gene (MED16) and the chemo response. I later found out that the SNP is housed in Rab8a, a known oncogene, which I hypothesized has down stream effects on MED16, mediating chemo response. Currently, I am in the process of growing cells. Sadly, my first batch of cells overgrew in late December and died. With more careful planning and researching the optimum reagents, and realizing such was for the best since Christmas break was coming up, I starting over. Growing cancer cells isn't as easy as it sounds! It takes hard work and careful maintenance every other day of the week. I learned that although my research question is pretty straight forward, my answer and the path to that answer is not. Now, I am learning how to do quantitative PCR to perform after I transfect my cells with the siRNA I ordered to measure knockdowns and gene expression. I have never done this method before, and so I am excited to have the opportunity. Finally, I never realized how expensive science and experimentation is, so I learned the importance of coming the methods and results sections of relevant literature to maximize success and minimize wasted reactants and funds. In two weeks, it should be cell transfection time!

Describe the impact this project had, both on you as a student-scholar and on the people you worked with.

This project has been a lot of fun because my only other research has been working as a research assistant for an autism study. It has been so cool to explore the other side, and more biological, side of science. Also, this time, I get to answer, or attempt to answer, my own research question. I feel that I have grown as a scientist and a thinker, and I have developed a love for PubMed. Combing through the literature so frequently has also made me a better scientific reader, learning how to summarize vast information and articulate the main idea of a study. Additionally, I have also enjoyed the mentor-ship of Dr. Stark, learning more about chemotherapy and genetics each Monday that we meet. Pharmacogenetics is a very fascinating field, and I'm lucky to have been able to be funded and have such a great mentor to investigate my research question.

Describe how this experience is connected to your plans as a student or future professional.

When "I grow up" in 99 short days and graduate from Notre Dame, I will be going to medical school. Pediatric hematology/oncology has always been my dream, which is why I was so interested in cancer research to begin with. Investigating my hypothesis, filling out the experimental plan for the grant, performing statistical analyses back in the fall, and searching PubMed for relevant guidance has even inspired me to consider working toward an MD/PhD. This experience has helped me realize that I don't want to stop researching my questions when I graduate, but rather, I want to find more answers.

What advice would you give other students who are planning to pursue similar projects?

I would tell students who embark on similar projects to plan carefully. Scientific reagents are really expensive, so it is important to comb the scientific literature for information and have a mentor to bounce ideas off of to make sure that the reagents you order have a high likelihood of working. For instance, I spent three hours researching Lipofectamines to transfect my cells with because there were 4 versions of the reagent, each "super" or "ultra" and much more expensive. Upon review of the literature and discussion with Dr. Stark, I was able to realize that the second version of the product, not the 4th, 5th, or 6th, was actually the "gold standard" for the breast cancer cells I'm using. Second, I would advise students to practice new methods (i.e.- qPCR) with cheap reagents first to make sure you know how to perform the test, and not run it for the first time on the cells you spent weeks growing and transfecting. Practice makes perfect, but practice should not be on your pride-and-joy-cells. Finally, I would tell students to just go for it. Figure out what question you want to ask, find a mentor, design an experiment, and try to find your answer.

I acknowledge that this form has been filled out truthfully and to the best of my ability. I understand that this information will be shared with many different CUSE constituencies. As such, I have provided as much useful information as I was able. I understand that CUSE will not complete my award disbursement until this form is successfully completed. If I have any

