This past summer I was able to do organic chemistry research because of the funding that you provided. I am a Biochemistry major and am going into my junior year at Albion College. The research was really exciting this summer because I have been working in this organic chemistry lab since my freshman year. It was very exciting to be able to do research all day and do reactions that I haven’t done yet.

My summer project was on Synthesis of a Photoactive Tubulin Inhibitor to Target Dividing Tumor Cells. I did this by the formation of Azo bonds which are Nitrogen – Nitrogen double bonds. These bonds are special because they are light sensitive and can be manipulated using light of different wavelengths which allows shape change in the molecule. Once manipulated it can change shape and overtime slowly go back to the original shape. This is important because it can be applied to drugs. Figure one demonstrates how Photoactive drugs works in comparison to fully active drugs.

Figure 1: Photoactivated Cancer Drugs

Trans and Cis formations are like two different keys. One key is expected to fit well, while the other is not. When the key is inserted it prevents a biomolecule from doing something it should not. Microtubules are required for segregation and separation of chromosomes when cell division occurs.

My workflow looked similar to Figure 2 sometimes running a reaction would take all day and another step that took a long time was Flash Chromatography. Doing summer research allowed me to complete more things then during the school year.

Figure 2: Daily steps

My results from over the summer are below in Figure 3. Over the summer some of my reactions did not work but we later figured out that the THF had water in it which causes the reaction not to work. Below I have included my synthesis and have added what worked and what did not. All reactions that did not work the first time were redone at least one more time to ensure that it did not work versus a lab mistake.

Figure 3: Synthesis to create compound

Hopefully this project will help to make a new cancer drug or help other researchers who are also studying Azo’s. This work will be the start/part to my senior thesis for Prentiss M. Brown Honors Program. I would love to present this work at the next Elkin Isaac Symposium. I think this experience will helped reinforce what career path I would like to pursue. This research also helped to improve my laboratory techniques.