Diana Kernen

End of Summer FURSCA Report 2022

My research focused on synthesizing a light sensitive version of BMS-1166, a small molecule immunotherapy drug. BMS-1166 targets a certain interaction between a cancerous cell and an immune system cell. Cancer cells have found certain ways to evade the immune system and this drug elicits the immune system to attack cancer cells. The goal of my research is to create a version of this drug that can be activated and inactivated by light. The photokinetic properties of the molecule would allow patients to take the inactive version of the drug and only allow the drug to be turned on at the site of the tumor by using specific wavelengths of light. By selectively targeting the cancerous cells, healthy cells would not be harmed in the body.

This summer, I have been able to get halfway through my synthesis. The first two steps of my synthesis worked out really well on the first try; however, my third step was proving more difficult than expected. One of the starting materials for my third step required a protecting group to be put on the molecule. This required many different trial and error procedures to figure out which protecting group would work best within my synthesis. I had to spend the majority of my summer figuring this out because the first two protecting groups used did not prove to be successful. Once I found a protecting group that worked, the yield on that reaction was not very high and therefore required me to do this reaction many times to get enough material to continue on into the synthesis. By the end of the summer, I had been able to figure out how to successfully get the highest yield possible for the reaction.

From there, I have been able to successfully complete steps three and four in my synthesis. Additionally, I have been rerunning steps one and two to be able to have enough material to continue the following synthesis steps. Although I was not able to get as far as I might have planned, I have made significant progress that I could not have accomplished without these ten weeks with FURSCA.

For the fall and the future, I hope to be able to finish my synthesis and develop biological assays to test my drug. I plan to present my research at both the Elkin R. Isaac Research Symposium and the American Society for Biochemistry and Molecular Biology Conference. Also, I plan on writing my senior thesis on the research I have completed during this summer and hope to complete in the following school years. I would like to thank Dr. Craig Streu, my advisor, for the opportunity to be a part of this research as well as for all his support in all aspects of my academic career. I would also like to thank FURSCA for this incredible experience to do research here at Albion.

**To the Orpha Leiter Irwin Fellowship:** Thank you so much for giving me this opportunity to participate in Albion College’s FURSCA program this summer. This summer provided many benefits that will greatly influence my future education and research endeavors. Also, I have been able to improve my lab techniques, problem-solving skills, and leadership abilities. Thank you!