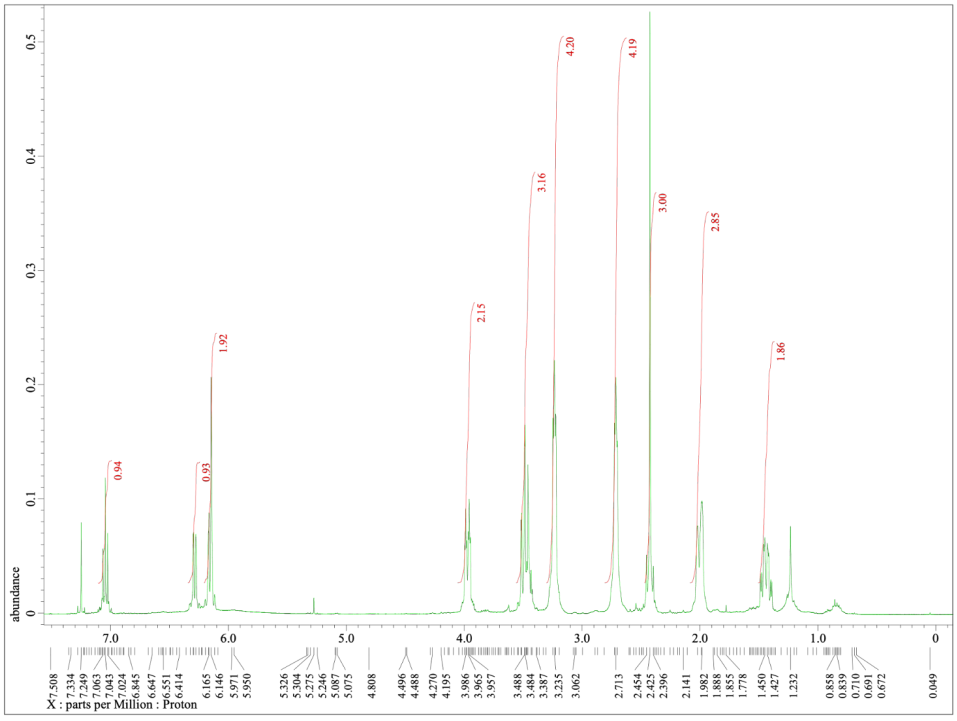
To the The Charles J. Strosacker Foundation thank you so much for funding my FURSCA project. This summer during my time with FURSCA I was working with Dr. Craig Streu on drug synthesis. I was attempting to recreate a drug called entrectinib with a special feature that would make it possible to turn the drug on and off around the body. The way we aimed to do this is with a nitrogen-nitrogen double bond. These bonds have the capability to change shape with the usage of UV-light. My goals for the project were to get as far as possible to synthesize my drug.

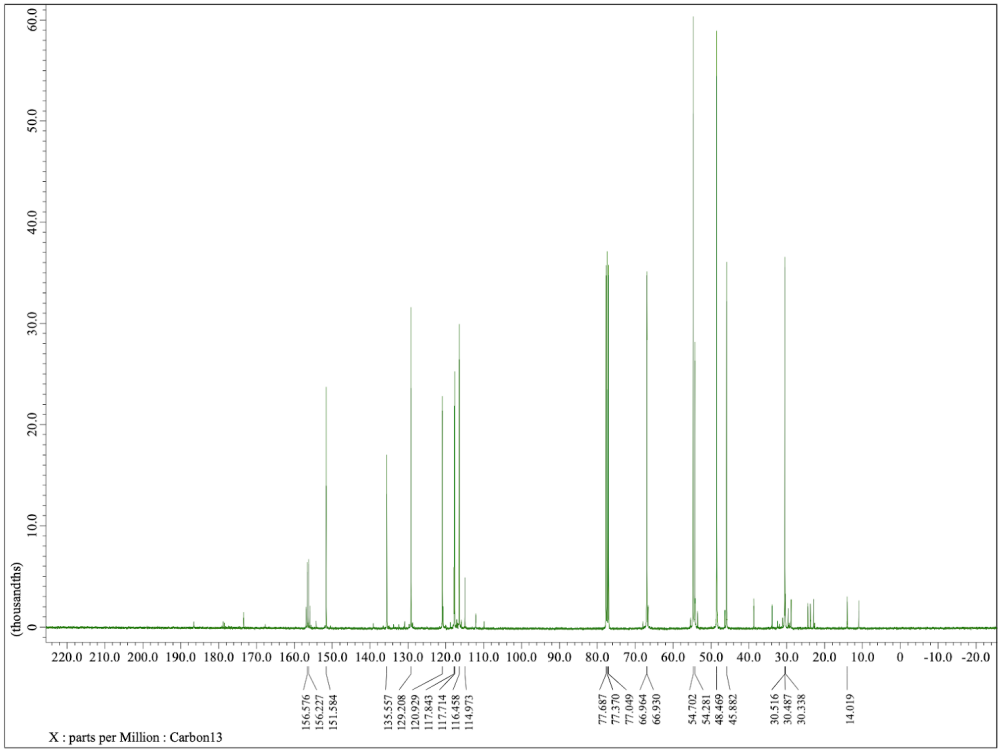
Over the course of the summer I used organic chemistry techniques to try and build my drug. My drug is intended to target cancer cells. Cancer cells form from mutations in the genetic code that allows for rapid and uncontrollable cell growth and division. These cells can be targeted in many ways by drugs and most of them aim to stop the cell cycle. My drug stops the cell cycle by binding to an enzyme involved in the growth and division of a cell. My drug is meant to function similarly to entrectinib. Entrectinib is a cancer therapy for non-small cell lung cancer. While entrectinib works it also comes with some harsh side effects. My planned drug contains a special group of atoms known as an azo that would allow the drug to be turned on and off around the body. Drug shape is the most important feature for binding to an enzyme. An azo can change shape with UV light so it can be turned on and off around the tumors. We can shine a light on the tumor where the drug is to make sure that only the tumor receives the treatment. By doing this the treatment does not impact cells outside of the tumor and the side effects are not as harsh.

Over the course of the summer I was able to synthesize the first half of my molecule and obtain the second half of my molecule. This process took most of my summer and only towards

the end of the summer was I able to begin testing methods that would allow me to attach both of these halves to each other.

Some of my results for my synthesis were these NMR photos.


abundance
0.94
0.93
1.92
2.15
3.16
4.20
4.19
3.00
2.85
1.86
X : parts per Million : Proton


(thousandths)
156.576
156.227
151.584
135.557
129.208
120.929
117.843
117.714
116.458
114.973
77.687
77.370
77.049
66.964
66.930
54.702
54.281
48.469
45.882
30.516
30.487
30.338
14.019
X : parts per Million : Carbon13

While I was not able to complete the synthesis of my drug I am excited to continue this work over the next couple semesters. My research over the summer has given me a much better understanding of what needs to be done and further researched in the following years. Some things I learned during the summer were different environments for my reactions to produce the best yields. I was able to write these conditions down so that people in the future can pick up where I left off.

This project was very important in continuing the research of Dr. Streu and his novel drug ideas. If I am not able to complete this project during my time at Albion, I will be able to pass this synthesis onto younger generations of students coming through Albion. I plan to present my findings at Elkin Isaac, ACS, and ASBMB. I will also be writing my thesis about my work in developing this drug. My time with FURSCA has been a great experience for me. I was able to get to know what life in a lab is like, I was able to make great friendships with people, and it really helped me better understand what I want to do in the future. My current goal is to become a physician. My FURSCA project has shown me a lot about things in labs and has helped me to better decide between med school and grad school. Ultimately I decided on med school because I want to spend more time talking with patients and helping them out on an individual level. The research I was able to do helped me to see how much hard work and resilience goes into making medicine. While creating treatments is one way to help patients, I would prefer to personally know each person I treat. Thank you so much for this opportunity.