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This summer I continued my work with the ongoing project of the total synthesis of pochonin J and the glycodiversification of this chemical species under the direction of Dr. Rongson Pongdee in Sewanee's chemistry department. Specifically, my work involves the synthesis of a precursor to the final structure in our proposed synthetic pathway of this target molecule. I had a level of autonomy in my lab work that allowed me the unique opportunity to have a large part in the planning of each reaction, its execution, and interpretation of spectral data to determine its level of success.

This summer my work took a new approach from the fries rearrangements and palladium-catalyzed cross-couplings that I had focused on during the past two semesters. Instead, it shifted towards setting necessary stereocenters within the molecule by expanding on work with novel chiral auxiliaries initially explored by Myers' Harvard research group.

The goal of our research was to asymmetrically generate glycolates using a pseudoephenamine chiral auxiliary to influence stereochemistry within the target molecule. These chiral glycolate compounds would then hopefully be used to selectively open epoxides followed by the eventual cleavage of the auxiliary to stereoselectively afford certain alcohols. We began the exploration of this reaction class using the related chiral auxiliary pseudoephedrine, which had richer literature precedence with the formation of enolates, as a model.

Initial success with the glycolate generation using the pseudoephedrine auxiliary was promising, so we continued with (R,R)-pseudoephenamine substrate generously afforded to us by the Myers research group. These trials were also successful, however the higher yields and ease of generation of the pseudoephedrine substrates as well as our limited amounts of pseudoephenemine coupled with difficulties generating more left the pseudoephedrine compounds with greater feasible utility. We eventually decided to pursue the epoxide openings using the pseudoephedrine compounds themselves.

Difficulty was met, however, when using these glycolates to open epoxides. While several unique reaction conditions were explored as well as different epoxides, we were unable to coax the reaction to fruition. In the interest of time and pursuit of the same post-auxiliary cleavage target molecules, we began to explore Evans Oxazoladonone as a chiral auxiliary using some substrate we had on hand from previous work. Similar difficulties were met when opening epoxide rings with these compounds.

Despite our challenges concerning the epoxide openings, this summer's research session still found success with the early asymmetric glycolate synthesis leaving room for further investigation into novel uses for these compounds when more time is available.

The difficulties presented by this reaction were not a negative in my view of my internship experience, but rather a positive. The changes I had to make to the reaction conditions to encourage product formation were educational and challenged me to

push the limits of my chemical intuition and understanding far more than the execution of a preplanned cookbook reaction would have. I was afforded a level of autonomy in my work that allowed me to make decisions on what I thought was best for the project, rather than merely following directions. By the end of the summer, my day to day activity in the lab from deciding which reaction to run, setting up and running them in proper conditions, work-up of the reaction to extract purified product, and analysis of the final compound by NMR was almost entirely undirected.

Another way working on this project impacted me personally was by giving me exposure to a variety of synthetic and laboratory techniques commonly used in chemical research, both in academia and private industry. I learned how to run reactions at sub ambient temperatures as low as -98 degrees Celsius, how to handle pyrophoric reagents safely and effectively, and a plethora of new reaction conditions, solvent systems, and helpful techniques. It was exciting to gain experience exploring a chemical problem with a certain degree of freedom and independent problem solving unachievable in a teaching lab. Having the laboratory proficiency required to perform effective and meaningful research and the confidence to address synthetic challenges on my own has allowed me to become not only more competitive but impactful in my field.

My eventual goal is to pursue research on a graduate level and obtain a PhD in chemistry and continue research, either in academia or industry due to my passion for laboratory work, the atmosphere and camaraderie of the scientific community, and the rush of satisfaction that comes from the discovery of something new. My work this

summer not only continued my ongoing contribution to the pochonin J total synthesis project, but also increased my personal exposure to broader synthetic techniques as well as the legacy this project leaves behind for future Sewanee students.