Continued Synthesis of Substituted Isoquinoline Alkaloids

Frndak, Anderson, NSF
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The Anderson research group focuses on finding and optimizing new methods of synthesizing a group of heterocycles known as pyridones. Pyridones are a class of organic molecules in which a nitrogen occupies one of the positions of a classic benzene ring while a carboxyl group extends from any other carbon in the ring system. In our case, the carboxyl group is located adjacent to the nitrogen. An alkyl chain is also coordinated directly to the aforementioned nitrogen giving our particular substrates the name *N*-alkylated 2-pyridones. My project this summer was to further the synthesis of targeted substituted isoquinoline alkaloids by performing a chiral reduction of a tetra-substituted alkene.

The sterically hindered nature of this tetra-substituted alkene proved to be much more of an issue than I had originally thought. Original attempts to reduce the alkene with Palladium on Carbon were unsuccessful. However, upon exposure to PtO_2 in the presence of H_2, the reaction did proceeded but not without also reducing the alkene adjacent to the carboxyl group of the pyridone ring. It was not until later in the summer that it was discovered that the tetra-substituted alkene had indeed not been reduced, only the pyridone.

Once this was noted, it became my goal to regenerate the pyridone. The most successful of the reactions conditions run incorporated MnO_2 as an oxidizing agent. This, however, was only the case for the hydroxylated, not the methylated substrate. Efforts are currently focused on finding reaction conditions that will successfully oxidize the methylated substrate. My hope is that this work will aid future steps of target synthesis by providing reliable method(s) of regenerating the pyridone post successful reduction of the tetra-substituted alkene.

Lab work aside, Emily Zerull, Dr. Anderson and myself also had the pleasure of attending the National Organic Symposium at UC Davis this summer. Emily and I had the opportunity to present our research, learn about other areas of organic chemistry and post-graduate programs as well as interact with many of our peers. This trip to UC Davis provided a wealth of insight regarding my own professional goals, the broader interactions of the Chemistry community, and what areas of Organic Chemistry are subject to change within the upcoming century.

All things considered, my time spent working with the Anderson research group has been invaluable. Not only has my chemical knowledge grown, but I have learned much in the ways of research methodology. I have grown in my ability to communicate my research to peers, and have gained insight into what aspects of Chemistry captivate me most. It is my belief that this summer has given me a clearer idea of what the future may hold for me, which for any rising senior is a rare and precious thing.