Gold(I)-catalyzed Rearrangement of *N*-Propargyloxypyridines

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N-alkyl pyridones are a class of compounds prevalent in both natural products and pharmaceuticals. They can serve as models for many chemically and biologically active processes and are of interest to the synthetic organic chemistry field. The Anderson lab has previously shown that they can produce these compounds and their analogues with a variety of different metal catalysts, including lithium iodide and a number of differently substituted gold (I) and gold (III) catalysts. Depending on the catalyst use in the reaction, different products can be obtained, one of which is an *N*-alkenyl pyridone and is of particular interest to the Anderson Lab. It is produced using gold(I) catalysis, and is commonly referred to as the "ether".

Significant previous optimization has been done on the gold(I) system to give the best yields of the desired product. This involved running through many different catalysts, solvents, additives, temperatures and durations. Many of the compounds used in these reactions are air-sensitive and must be set up in an air-free glovebox, so the first part of my summer included training to use that tool. After that, I continued to optimize the reaction, which was actually done by temporarily switching to platinum(II). We wanted to ensure that a one of the platinum catalysts did not work better than the gold(I) catalysts and it turns out that the platinum catalysts did not work quite as well as the gold. We decided to stick with gold and were able to get 50% yield of the ether.

From there, I went on to run the reaction scope, which involved changing the starting material slightly in order to get slightly different substituted products. I ran through 15 starting material substrates, and roughly half of them yielded the desired product. With the new products, I had to do extensive characterization so we could have data for eventually publication. Now that we have the data from this summer, we are very close to submitting a paper for publication.

Being able to do research this summer has been an amazing opportunity. It is really cool to get to apply all of the science that I learned in my first two years. I especially appreciate how my lab skills have improved, which will help me throughout college and my future career. The connections I have formed with professors, faculty, and other students is will be very valuable in the future. Undergraduate research is an awesome experience for students, and I believe Calvin does it exceptionally well. In conjunction with what I learned last summer, this summer has helped me gain a clearer vision what it is like to be in a research lab, and that will be invaluable when I move past Calvin. I am very grateful for this opportunity.