Summer research on organic chemistry

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Isoquinoline alkaloid is a compound that is indicated to be useful in pharmaceutical and medical industry. Professor Anderson and Anderson research team are working on synthesizing isoquinoline alkaloid so that it could be further investigated and used. The proposed synthesis of isoquinoline alkaloid is composed of 4 or 5 steps in order to get the targeted product. The synthesis consists of rearrangement, Suzuki coupling, Chiral reduction, and heck coupling. The works before this summer had been successfully progressed until the Suzuki coupling in both methylated and hydroxylated rearranged products. The goal of our team was to push through materials and Suzuki products and attempt different conditions to proceed chiral reduction.

My job this summer was mostly to keep moving forward materials and get as many Suzuki products. The first step of research was to run each reaction such as making starting material, rearrangement, methylation reaction, hydroxylated Suzuki, and methylated Suzuki. Then, I had to work up all the reactions. Lastly, I had to column chromatograph the reactions that have been worked up. Skills that I had to learn and perform were how to use rotary evaporator, TLC plates, vacuum line, making solvents, taking solvents from solvent system, doing dishes, making NMR samples, reading NMR, etc.

The results of this summer can be said in two different topics. The percent yield and the amount of material produced were good. Then, we were also able to figure out how to oxidize tetrasubstituted pyridone ring. This would further help the synthesis by helping oxidize any alkene rings other than the central tetrasubstituted alkene bond. We still have to try out different catalysts for the chiral reduction, and now we know how to do oxidization to keep our pyridone ring.

The research has benefitted me in many ways. At first, I learned many things about myself. I enjoy doing chemistry such as setting up reactions and having my little space to do things in the right order. I am happy when things go as expected, but not so happy when they do not do so. I also need lots of time to get to know people. I think I enjoy both aspects of working with people and working alone. Then, I learned some practical applications when working on chemistry research. I learned how to prepare for presentations, make slides, and use chemdraw. I think all these will help more when I think about what I would want to do after I graduate.