

The creation of new reactions to enantioselectively generate all-carbon quaternary centers (a carbon with four carbon-carbon bonds) is a subject of great interest in organic chemistry. These new reactions will allow chemists to more efficiently synthesize bioactive molecules with potential therapeutic applications. I will do this by synthesizing the starting materials using a three step sequence: Birch reduction-alkylation of salicylic acid derivatives, acid allylation and enol ether hydrolysis. An all-carbon quaternary center will be created from this material with a decarboxylative allylation reaction using a palladium catalyst with chiral ligands. The decarboxylative allylation will create a quaternary center that will specifically select for one enantiomer due to the influence of the chiral Pd ligands, which will sterically block one face of the molecule during the formation of the quaternary center. Previously reported work from the synthetic chemistry community has used a variety of substrates, but the current work is unique in utilizing a Birch reduction-alkylation to create the starting materials. The enantioselectivity of this reaction is of particular interest, and although palladium will be explored first, other transition metal catalysts, such as nickel, ruthenium, or rhodium, and various chiral ligands will be tested to find the optimum conditions.

