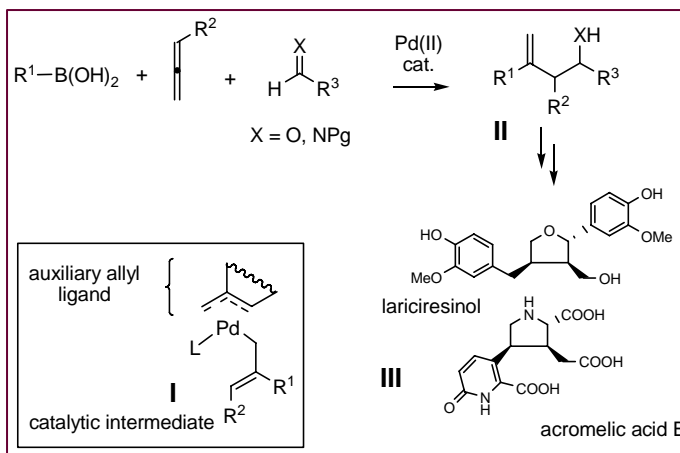


Allylpalladium coupling strategies: Development of new Pd-catalyzed multi-component reactions for organic synthesis

(Prof. Helena C. Malinakova). This project contributes fundamental insights into the chemistry of nucleophilic allylpalladium(II) complexes, and provides new synthetic methods essential for the pharmaceutical industry. Recently, Prof. Malinakova's team has discovered a Pd(II)-catalyzed three-component coupling method for the construction of homoallylic alcohols and amines. The 2007-2009 REU projects in her group will encompass



areas of structural and mechanistic organometallic chemistry, and organic synthesis. Specifically, the REU researcher will investigate how the structure of the auxiliary “nontransferable” allyl ligands in stable stoichiometric bis- π -allylpalladium(II) complexes **I** controls their reactivity, and will perform a quantitative kinetic study to elucidate the reaction mechanism. In addition, cyclization strategies for efficient elaboration of the homoallylic amines and alcohols **II** into biologically active heterocycles **III** will be sought. REU participants will gain diverse research skills, including: (i) organometallic and organic synthesis, (ii) kinetic measurements, and (iii) handling and purification of organic and organometallic compounds under inert atmosphere. Prof. Malinakova has recently published two papers with REU co-authors.^{42,43}

PUBLICATIONS WITH REU RESEARCHERS

(1) Portscher, J. L.; Lilley, S. E.; Malinakova, H. C. “Ligand-Controlled Asymmetric Induction at a Transition Metal-Bonded α -Carbon in Ester and Amide Enolates. Diastereoselective Formation of Oxapalladacycles Applied to the Synthesis of a Chiral Nonracemic 2H-1-Benzopyrans” *Organometallics* **2003**, 22(14), 2961-2971.

(2) Hopkins, C. D.; Guan, L.; Malinakova, H. C. “Regiocontrolled, Palladium-Catalyzed Bisfunctionalization of Allenyl Esters. Multicomponent Coupling Approaches to Highly Substituted α,β -Unsaturated- δ -Lactones” *J. Org. Chem.* **2005**, 70(17), 6848-6862.