A Bio-mimetic Approach to Pramanicin Through Metal Carbenoid Cascade Reactions

Project Description:

The best chemist known to man is Mother Nature, who has been an inspiration for drug molecules for centuries. Today, 78% of current antibiotics and 62% of anticancer drugs are either directly coming from or inspired by Mother Nature. Natural Products have proven to be an excellent source of clinical agents and have provided the basis for countless biologically important molecules in drug discovery. To take advantage of the molecules provided to us by Mother Nature in drug discovery, there are two general approaches: Extraction/Isolation and Total Synthesis. Molecules that are highly abundant in nature can be simply extracted from natural resources and isolated in gram scale quantities for use as therapeutic agents. On the other hand molecules that have negligible quantities in nature must be efficiently synthesized completely by skilled chemists if there is any hope to exploit their therapeutic activity.

The Sharma Lab is currently engaging in a quick and efficient synthesis of pramanicin, an antibiotic that has activity against *Bacillus subtilis*, through a novel route that consists of metal carbenoid reactivity.

What the student will do:

An undergraduate student that chooses to join The Sharma Lab will have the chance to conduct the synthesis of Pramanicin under the guidance of Dr. Sharma and his research team. This includes conducting and managing organic reactions, the use of analytical and spectroscopic techniques (Mass Spectrometry that consists of an Advion TLC Mass Spectrometer that allows direct mass analysis from TLC plate, 1H NMR, 13C NMR) to correctly identify molecules, and lastly learning how to take advantage of the knowledge provided by Mother Nature and applying it to chemical synthesis through mimicking her enzymatic pathways. Outside of research, Dr. Sharma will provide a mentor/mentee relationship that will help to guide the student through their academic and professional career.