ORGANIC SEMINAR

Madison Snyder

Graduate Student | Ramachandran Group | Purdue University

"α-(aminomethyl)-γ-butyrolactones as a New Class of Antibiotics"

Antimicrobial resistance (AMR) is a growing threat to global human health. As first-line drug therapies become less efficient and fatalities tied to AMR associated infections rise, new antibiotics are desperately needed. α-(methylene)-γ-butyrolactones, a moiety common to 10% of all discovered natural products, have long been known for their anti-cancer properties. The α-(aminomethyl) derivatives of these lactones have recently demonstrated potential to help fill the need for new antibacterial medications. Our lab has extensively developed new methodologies which make synthetic α-(aminomethyl)-γ-butyrolactones, particularly those containing aryl groups at the β- and γ - positions, readily available.

The CDC has identified methicillin-resistant Staphylococcus aureus and Clostridioides difficile as serious and urgent AMR related threats, respectively. Our structure activity relationship (SAR) studies utilizing α-(aminomethyl)-γ-butyrolactones against these two bacteria have highlighted potent and specific lead compounds which show no toxicity in in vivo models. Lastly, the development of new synthetic routes to the α-(aminomethyl)-γ-butyrolactam analogs will enable an expansion of the SAR studies.