UMD Department of Chemistry & Biochemistry
Spring 2021 Seminar Series
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Novel Silylated Small Molecule Derivatives as Anticancer Agents

Applications of silicon based protecting groups appear to not be limited to chemical synthesis, but also have practical drug applications. Implementation of novel silicon-based derivatives on pharmaceutically active templates is a simple tactic to decrease harmful side effects, increase drug permeability, while also providing a capable prodrug that's selective toward acidic environments. Metabolic enzymatic reactions convert therapeutics into polar metabolites that are easily removed from the body, however enzymatic reactions require specific ligand configurations. Silicon represents a foreign element that does not fit the metabolic configuration to be broken down. This slows metabolic processes increasing drug latency, maintaining therapeutic benefits, and eliminating toxic side effects from secondary metabolites. Silicon derivatives also show benefit by increasing lipophilicity compared to carbon. This increase in lipophilicity has led to many therapeutic benefits like improved cell penetration and increased drug permeability across the blood-brain barrier. In addition, silyl ether derivatives also have a suitable use as prodrugs of pharmaceutically active compounds, this would increase the drug latency and improve the drug selectivity to acidic environments commonly associated with cancerous tissues. With the added benefits of silicon derivatives on pharmaceutically active templates, it is hypothesized that silicon protecting will enhance the cytotoxicity and lipophilicity of the candidate compounds. Further investigation on the medicinal advantages of silicon derivatives on drug derivatives will be demonstrated using quinoline templates. Synthesized silicon drug candidates were tested on different cancer cells using MTT cell viability assay to evaluate the cytotoxic properties. In this seminar, I will present my synthetic and in vitro biological results.