

CHEMISTRY Departmental Seminar

Fall 2017
CHEM 285 Schedule
Tuesdays at 4:30-5:45PM
Room Duncan Hall 250

October 31, 2017

Ms. Allisa Jayne Clemens
(SJSU, Brook Lab)
MS Final Oral Seminar

Synthesis and characterization of novel verdazyl spin probes

The use of probe molecules has been integral to the understanding of protein structure and dynamics, and has led to the elucidation of protein function by precisely and quantitatively measuring the movements of molecules. Spin labels are commonly used as probes in molecules, such as phospholipids, peptides, proteins, or drugs *in vivo*. Nitroxides are the most widely studied and employed spin probes, despite being reduced to hydroxylamines by ascorbic acid *in vivo* in a matter of minutes. Verdazyls are defined by their 6-membered ring containing four nitrogen atoms, and are notable for their exceptional stability and high variability in substitution. The radicals are stable in solutions over a wide range of pH, resistant to reduction by ascorbic acid, and can quench the fluorescence of organic dyes. We have synthesized an aminomethyl and chloromethyl verdazyl as possible spin probes for biological molecules, as well as a fluorescence quenching agent, with the added benefits of having tunable conformation and hydrophobicity by altering the R1/R5 ligand groups. The aminomethyl verdazyl spin probe can be directly incorporated into the backbone of a protein or peptide as a C-terminus attached label, and the amino methyl verdazyl as a C-terminus attached label, well as a side chain attached label. The tetrazane species for both compounds was definitively identified by NMR spectroscopy, and the novel verdazyls by ESR, UV, and IR spectroscopy.