



**BILKENT UNIVERSITY**

**unam** - INSTITUTE of MATERIALS SCIENCE & NANOTECHNOLOGY

**FACULTY OF SCIENCE**

**MATERIALS SCIENCE and NANOTECHNOLOGY**

**GRADUATE PROGRAM SEMINAR**

**“Synthesis of Hydrazine-Based Bioorthogonal Fluorophores:  
A Logical Approach to Turn-On Targeting”**

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UNC-Chapel Hill, School of Medicine, Department of Pharmacology*

Site specific chemical labeling of proteins using bioorthogonal chemistry is a very challenging area in chemical biology. Reactive partners must form covalent bonds with each other, but not with other functional groups in a protein. Furthermore, the reactions must take place at physiological pH and temperature. Aldehyde or ketone functional groups can be introduced into peptides and proteins using chemical or biochemical methods. The design of suitable fluorophores for biological labeling requires consideration of both the reactivity of the nucleophilic functional group and the spectroscopic features of the fluorophore. We have selected aromatic hydrazine-containing fluorophores as synthetic targets. Several hydrazine-based fluorescent probes have been synthesized and their spectroscopic properties have been characterized. The fluorophores react with the modified protein electrophile at or near physiological conditions to form a stable product, which is called as a hydrazone. Hydrazone formation alters the optical properties of the fluorophore, resulting in a significant increase in emission quantum yield upon covalent bond formation. In some cases, hydrazone formation also causes a red shift of the absorption and emission maxima. Background fluorescence due to unreacted fluorophore is therefore minimal, which will be a very useful feature for fluorescent imaging of labeled proteins in living cells. This approach should be generally applicable for fluorescent labeling of aliphatic and aromatic carbonyls at a specific site in proteins.

**Date : January 24, 2011 (Monday)**

**Time : 15:40**

**Place : Faculty of Science Building, A Block, Seminar Room (SA 240)**

**Tea and cookies will be served after the seminar**