

Bankhead-Coley Cancer Research Program

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*2008 Program
New Investigator (3-year project)*

Project Title: Chemical Tools for Proteomic Profiling

Project Summary: Proteomics is a relatively novel technique that allows the investigation and study of all the proteins in a cell. Most of the time, proteomics is heavily dependent on analytical techniques such as gel electrophoresis or mass spectrometry. Although these analytical techniques are considered classical for chemical and biochemical studies, recent advances have actually made studies of the entire cell content possible. We aim at developing chemical tools that will allow us to study and quantify the biochemical processes in a complex mixture, such as can be found inside a cell. Our approach is based on the synthesis of small molecules, which can be attached to certain proteins upon irradiation of UV light.

The small molecules we will synthesize are closely related to adenosine, one of the major components in a cell. It has been shown that cancer cells quite often express different types or different levels of proteins, which then cause cancer. We think that our molecules will enable us to determine and quantify the extent of aberrant proteins. This method has tremendous potential in the development of methods for the early diagnosis of cancer, for the assessment of the severity of cancer, for the identification of new targets for the development of novel anticancer drugs, and for the evaluation of the selectivity of these newly developed drugs.