

PHOSPHOPROTEOMICS

Post-translational modification of proteins plays a major role in regulating protein function. Phosphorylation is one of the more common modifications and it has been implicated in regulating a wide range of cellular processes including cell division, growth, differentiation and apoptosis . *Disregulation* of pathways that control the phosphorylation state of proteins is associated with many major diseases, such as diabetes, rheumatoid arthritis, cardiovascular disease and cancer. Therefore, it is important to understand the intracellular signaling events that control protein phosphorylation.

We are employing a number of strategies to investigate protein phosphorylation, including the use of phosphospecific antibodies, fluorescence-based detection of phosphoproteins in two dimensional gels, phosphopeptide enrichment by Immobilized Metal Affinity Chromatography (IMAC) and targeted mass spectrometry. One of our specific areas of interest involves characterization of molecular mechanisms by which various oncogenes contribute to cellular transformation. By employing a variety of technologies directed at the study of phosphoproteins, we hope to elucidate how the phosphorylation of specific proteins leads to the development and progression of cancer. This in turn may lead to the identification of phosphoproteins that will be useful as biomarkers or pharmaceutical targets.