Analytical Seminar

"New mass spectrometry technologies for proteomics & applications in tissue engineering"

Tissue engineering through the directed growth of cells on a biological scaffold has tremendous potential to transform human medicine. A key challenge lies in understanding the process of removing cells and immunogenic material from a donor tissue or organ while maintaining the biochemical and biophysical properties of the scaffold that will promote growth of newly seeded cells to create a functioning tissue/organ. We are collaborating with medical researchers from UW-Madison and Harvard University to examine this process using mass spectrometry-based proteomics on samples from animal and human vocal folds, liver, and lung. We aim to provide crucial information regarding the extracellular matrix (ECM) proteins of the scaffold as well as any remnants of antigenic cellular proteins. We have recently extended this work to look at turnover of the ECM proteins during the re-growth period after cells have been seeded onto the biological scaffold.

Toward the end of the talk, I will outline a couple proteomics technologies we have been developing to increase the protein sequence coverage observed by mass spectrometry. These strategies employ peptide-labeling chemistries that alter peptide properties to improve chromatographic separation, ionization, and fragmentation. The chemical modifications bring additional peptide sequences into the sweet spot of mass spectrometry, which has the potential to reveal additional protein isoforms and post-translational modifications for a more complete biological understanding.

Dr. Brian Frey

Smith Research Group

Thursday, November 14, 2013
12:15 p.m. in 1315 Chemistry