WESTERN MICHIGAN UNIVERSITY

Western Michigan University
The Department of Chemistry Presents:

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Biography: Dr. Ahn received his B.S. and M.S. degrees in Chemistry from Pohang University of Science and Technology (POSTECH) in Korea. He received his Ph.D. in Bioorganic Chemistry from New York University working with Professor Young-Tae Chang. His research focused on the development and application of fluorescent bio-imaging probes. He did his post-doctoral research in Pharmacology at Johns Hopkins University School of Medicine with Professor Philip A. Cole. His post-doctoral research focused on investigating cysteine-based signaling pathways with chemical probes. He began his tenure-track faculty position in the Department of Chemistry at Wayne State University in 2012 and was promoted to Associate Professor in 2018.

Title: Chemical Approaches to Investigate Protein Glutathionylation

Abstract: Reactive oxygen species (ROS) are emerging signaling molecules whose overproduction is closely associated with cardiovascular diseases, including cardiomyopathy. At a molecular level, ROS induce various protein oxidations, including glutathionylation that involves disulfide bond formation of protein cysteine residues with intracellular glutathione. Therefore, identification of glutathionylated proteins serves as an important goal to understand functional implication of ROS associated with cardiac dysfunction. Although several biochemical methods to identify glutathionylation are available, individual approach has its own limitations. In order to identify and characterize protein glutathionylation, we have developed a chemical method, namely clickable glutathione, that selectively detects glutathionylation in response to ROS. With a clickable glutathione approach, we have established chemoproteomic strategies to identify glutathionylated proteins by optimizing chemoselective enrichment, isotopic labeling, and tandem mass analysis. Chemoproteomic and biochemical analysis with clickable glutathione were then used to identify glutathionylated proteins, finding muscle-specific proteins susceptible to glutathionylation that may be associated with cardiomyopathy. In this talk, I will present our clickable glutathione approach, chemoproteomic strategy to identify glutathionylated proteins under ischemic stress, and functional analysis of glutathionylated proteins.