

Research Interests:

My area of research revolves around developing the methods for isolation of natural products, synthesis of bioactive molecules, and analytical method development that are critical for the development of the field of medicinal chemistry. I am currently focusing on cranberry chemistry with respect to isolating bioactive high molecular weight proanthocyanidins, flavonols and other bioactives. I am also integrating various sophisticated analytical instruments such as LC-MS, LC-MS-MS, HPLC, MALDI-TOF, and NMR techniques for the isolation and characterization of the parent molecules and their daughter metabolites *in-vivo* and *in-vitro* model. By advancing the state of art required for using these analytical techniques to study the biological matrix, we have critically determined how the discovered chemical entities are absorbed; distributed; metabolized and excreted in various tissues and organs. This would eventually help in understanding the signaling cascades in the biological matrices with respect to human disease models in rats, mice, and horse. These modeling studies are of vital importance for generating an effective predictive model for human safety studies. Another part of my work has revolved around understanding the biological activities of isolated bioactive molecules using *in-vitro* and *in-vivo* systems, as well as with specific human disease conditions such as type2 diabetics. These important clinical trials are being carried out in collaboration with various groups of clinicians and researchers at Rochester Medical School, Brown University, Winona State University and at Rutgers University. I am also involved in biological screening procedures for evaluating anti-bacterial mechanisms of cranberry bioactive associated with UTI infections, oral mucosal infections, and dental carries. I have examined the metabolism of cranberry compounds in diabetics. Additionally, I have been at the leading edge for the characterization of cranberry anti-cancer activity in ovarian cancer and sensitization potential against chemotherapy resistant cancers. Other collaborative works include comparative analytical fingerprinting of polar, high molecular weight components of cranberry and other bioactive natural products. My work in the fast changing field of plant medicinal chemistry has been demanding and challenging, but the potential health benefits to our society make it above all rewarding.