Leveraging Molecular Interactions for Neurodegenerative and Infectious Diseases

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Chemistry Seminar on the use of molecular interactions to study neurodegenerative diseases

Monday September 29 at 4 pm in 126 Schrenk

Please contact Dr. Amitava Choudhury at choudhurya@mst.edu for further information.

MISSOURI S&T

Abstract: Banerjee lab is interested in elucidating the molecular basis of amyloid formation of proteins linked with human diseases such as Parkinson's and Alzheimer's by integrating biochemical and biophysical approaches with novel nanotechnology platforms. Identifying the underlying mechanism of interactions between amyloid proteins, nanoparticles and small molecules would aid in designing better therapeutic strategies for neurodegenerative diseases. In this direction, a small library of nanoparticles with distinct surface conformations have been developed and their effect on the fibrillation kinetics of α-synuclein and other model proteins such as insulin have been investigated. Another research focus of Banerjee lab is towards development of nanoscale enzyme mimics with enhanced catalytic activity for colorimetric applications.

About the speaker: Dr. Banerjee is an Assistant Professor of Chemistry and Biochemistry at Missouri State University, MO. She is a Biochemist by education and molecular microbiologist by professional training. While pursuing her Masters in Biochemistry, Dr. Banerjee developed a keen interest in protein-folding problems. When she joined Indian Institute of Technology-Bombay to pursue her doctoral degree, she was particularly interested in Dr. Kishore's research aimed at characterizing protein folding intermediates. As a postdoctoral scholar at Dr. Teter's lab at University of Central Florida, Orlando, Dr. Banerjee worked on several AB-type protein toxins including cholera toxin, pertussis toxin, and ricin for deeper understanding of cellular and molecular mechanisms of their pathogenicity. As a Research Scientist at Pittsburg State University, she worked in collaboration with Dr. Santra to develop biomimetic nanoparticles for biological applications. In August 2021, she joined Missouri State University Springfield. Her lab research is supported by federal agencies including NSF, NIH and USDA. Dr. Banerjee has served as Early Career Reviewer for NIH study section and reviewer for NSF-Major Research Instrumentation (MRI) proposals. Banerjee lab research focuses on the following areas: i) Development of library of conformationally-tunable nanoparticles for targeting amyloid aggregation pathways of biomarker proteins associated with neurodegenerative disorders for effective therapeutic interventions, ii) Development of nanoscale enzyme mimics (nanozymes) for colorimetric applications.