Oral Defense Announcement
University of Missouri – St. Louis Graduate School

An oral examination in defense of the dissertation for the degree
Doctor of Philosophy in Chemistry with an emphasis in Biochemistry

Kapur B. Dhami

M.S., Chemistry, University of Missouri-St. Louis, 2019
M. Sc., Chemistry, Tribhuvan University, Kathmandu, Nepal, 2010
B. Sc., Chemistry, Tribhuvan University, Kathmandu, Nepal, 2008

Immune Cell-Protein Interactions in Alzheimer’s Disease

Date: July 22, 2022
Time: 9:00 a.m. to 10:30 a.m.
Place: 428 Benton Hall

Abstract
Misfolded protein aggregates are one of the significant contributing factors in many neurogenerative diseases including Alzheimer’s disease, Parkinson’s disease, Huntington’s disease, and others. My PhD research project was to study various aspects of amyloid-β peptide, a 40-42-residue peptide and the primary component of the senile plaques found in Alzheimer’s disease (AD) brains. One objective of my research was to purify and characterize the intermediate Aβ42 species using an array of biophysical techniques like size exclusion chromatography, fluorescence assays, circular dichroism, cellular assays, and protein assays. The other major research thrust of my project was to study the role of microglial cell derived extracellular vesicles in the aggregation of Aβ42. Isolation of extracellular vesicles with Aβ42 protofibrils from the primary microglial cells or BV-2 microglial cells and their characterization with dynamic light scattering, NBD fluorescence, flow cytometry, and microscopy techniques enabled to explore the effect of these vesicles in Aβ aggregation. Neuroinflammation is another important aspect of AD pathology. So, I was involved in the screening of several lipid A based organic compounds to study their potential to antagonize the release of inflammatory cytokine, TNF-α, induced by TLR4 ligands. We have identified and established the structure-activity relationship of the effective antagonists.

Defense of Dissertation Committee
Prof. Michael R. Nichols, Ph.D. (Chairperson)
Prof. Keith J. Stine, Ph.D.
Prof. Chung F. Wong, Ph.D.
Prof. Alexei V. Demchenko, Ph.D.