

EASTERN MICHIGAN UNIVERSITY

Chemistry Department Seminar

Friday November 14, 2014

2:00 p.m.

Room 158, Science Complex

First Biochemistry Faculty Candidate

Insights into Motor Nerve Disease

Understanding molecular mechanisms that underlie axon degeneration will advance the ability to treat many disorders and develop specific therapies that reduce neurodegeneration.

One cause of neurodegenerative disorders is alteration of the phospholipase activity of the protein neuropathy target esterase (NTE). NTE is a target of exposure to organophosphorus (OP) compounds, and induces motor axon degeneration through irreversible active site inhibition. Large-scale and relevant exposures to neurotoxic OP compounds have resulted in thousands of people being paralyzed with a type of axon degeneration called OP induced delayed neuropathy (OPIDN).

Mutation in the gene that encodes for NTE leads to NTE related motor neuron disease and closely mirrors the axon degeneration in OPIDN. Since mutations in NTE have been discovered as the cause of corticospinal and peripheral motor axon degeneration highlights the importance of NTE in maintaining integrity of corticospinal and peripheral motor axons and supports the role of NTE abnormalities as important factors in the pathogenesis of OPIDN.

My long-term research aim is to elucidate molecular mechanisms that underlie neurodegeneration. Here I will present research investigating kinetics of inhibition of NTE through OP compound exposure, genetic causes of NTE related neurodegeneration, and development of model systems to investigate biomolecular causes of disease progression and pathogenesis caused by either exposure or genetic mutation.