Andersen Lab

The focus of the Andersen laboratory is the mechanistic and therapeutic study of Parkinson’s disease (PD) and more recently, Alzheimer’s disease (AD.) The lab works with PD-related neurotoxic, genetic, and proteotoxic stresses in mouse, cell, and C. elegans model organisms.

**Background:** One of the mechanisms considered to cause Parkinson’s progression is alpha-synuclein protein aggregation. Alpha-synuclein is a synaptic protein, but its exact mechanistic roles are not entirely understood. Alpha-synuclein can form aggregates, and it is thought that these higher order proteins species spread between cells and cause progression of the disease.

**Therapeutic approach:** Exercise is currently considered to be the best medicine for Parkinson’s. A previous clinical study showed that high intensity exercise can significantly mitigate the progression of PD and even reverse symptoms.

**Model organism:** Recent research has shown that swimming exercise in C. elegans is a good model to study mammalian exercise. In addition, the comparative simplicity (every cell and neuron has been mapped), shorter lifespan (about 30 days as compared to 3 years for mice), and close homology to mammals (about 85%) can help us to understand these complex mechanisms. In addition, several C. elegans Parkinson’s models have been characterized, including models of alpha-synuclein aggregation.

**Project goal:** Previously, our research has shown that a short bout of swimming exercise in a C. elegans model of alpha-synuclein aggregation dramatically reduces aggregates and shows protection downstream. Our aim is to better understand the therapeutic effect of exercise for PD by better understanding exercise mechanisms in C. elegans, specifically, how they affect protein aggregation and nervous system response.

**Position:** We are looking for a student who is eager and excited to help better understand the therapeutic potential of exercise for Parkinson’s. Prior experience in a laboratory setting and specifically with experience in biological experimental techniques such as Western blot, cell culture, and/or C. elegans maintenance are a plus.

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