2024 Summer Scholar Profile: Seth Ashby

My name is Seth Ashby. I'm a rising senior at the University of Maine studying microbiology. I have spent most of the last two years studying under Dr. Suzanne Angeli, where we research how processes regulating mitochondria can help extend lifespan in a small transparent worm called *C. elegans*. My work in the lab focuses on how activation of stress responses in a regulated manner can increase lifespan by placing the cell in a state of constant awareness. This work may help decipher different mechanisms that regulate aging in humans. At the Buck Institute for Research on Aging, I worked in Dr. Julie Anderson's lab with my mentor Dr. Minna Schmidt on understanding how exercise reduces symptoms related to Parkinson's disease (PD).

PD is the second most common age-related neurological disorder, estimated to affect over 500,000 Americans nationwide. Patients with PD often experience numerous symptoms, including a reduction in movement, difficulty keeping posture, and loss of gait. Patients can often relieve these symptoms through exercising, but this is inherently harder for patients with more severe symptoms. In the Anderson Lab, we are focused on how we can mimic exercise's benefits chemically to help reduce symptoms for patients with PD.

To chemically mimic exercise, Dr. Schmidt and I searched for compounds associated with exercise and benefits regarding brain health in times of distress, specifically exploring lactate. Lactate is a carbohydrate that is upregulated when exercising and helps the body keep its much-needed energy demands in check. We treated a special kind of *C. elegans* which contains synthetically added proteins that are commonly associated with PD's progression in its muscles. These proteins which normally cluster in the brain and gut of patients with PD are contributing factors to the loss of motor functions seen in patients. Using microscopy, we observed how *C. elegans* treated with lactate were different from those that were not in clustering of these proteins. We then explored whether these changes in clustering would be beneficial or non-beneficial to mobility. The results of this project show that lactate may be acting beneficially in reducing symptoms of PD in *C. elegans*, but the mechanism it uses remains unknown. These projects will act as the groundwork for future research on how lactate could be beneficial for PD patients and give preliminary data for future experiments with more complex models such as mice and humans.