

Presenter: Sifan Yang

Category: Graduate Student

Authors: SIFAN YANG, Andrew V Samuelson

Title: THE SUMO PROTEASE ULP-1 IS A KEY REGULATOR OF STRESS RESPONSE, PROTEOSTASIS, AND LONGEVITY IN CAENORHABDITIS ELEGANS

Abstract: Aging is characterized by the decline of cellular processes that maintain protein homeostasis through a proteostasis network (PN). The network includes various specialized stress response systems. During aging, the inducibility of stress response processes declines and results in collapse in proteostasis. However, it is poorly understood why the inducibility of the stress response processes declines. Understanding the mechanisms of stress response inducibility decline will provide insight into the PN function deterioration with aging and its subsequent impact on neurodegenerative protein aggregation and age-associated neurodegenerative diseases. Our lab previously identified SUMOylation as a candidate for repressing stress response inducibility during aging. SUMOylation plays a regulatory role implicated in aging, proteostasis, and neurodegenerative diseases, but how SUMOylation affects longevity is poorly studied. We have discovered a key role for SUMO protease ULP-1 (SEN1/2) in regulation of heat shock response, proteostasis, and longevity. Loss of ULP-1 reduces *C. elegans* lifespan under mild heat stress but not under normal conditions, while loss of ULP-1 reduces molecular chaperone induction after acute heat shock. Further elucidating mechanisms through which SUMOylation acts to maintain proteostasis could provide insight into developing targeted interventions of protein misfolding neurodegenerative diseases and improve healthy aging.