

Project Name: Cellular recycling: Role of autophagy in aging and disease

Project Description: Cells in our body have a remarkable capacity to keep themselves healthy. In the Hansen lab, we study how the basic biological process called autophagy (for 'self-digestion') contributes to such cellular homeostasis. Autophagy is much like our household recycling: In a complex, multi-step process, intracellular vesicles (called autophagosomes, akin to 'trash bins') picks up damaged and unwanted molecular and organelles (i.e., 'trash') and fuse with acidic lysosomes (i.e., 'recycling plants') that secure the degradation and subsequent recycling of the materials that can be used to ensure homeostasis of the cell, and by extension the rest of the body.

For our studies, we use mammalian cell cultures and the short-lived and genetically tractable model organism *C. elegans* to understand in detail the role and regulation of autophagy in aging and in different disease models. While we know most of the players in this complex process, we still do not fully understand how autophagy is regulated in the different tissues of the body during aging. We also need to know more about the different types of 'trash' (e.g., damaged mitochondria (mitophagy), aggregated proteins (aggrephagy), or lipids (lipophagy)), that the cell selects for degradation by so called autophagy receptors. Knowledge of such autophagy receptors are likely going to be key for our detailed understanding and ability to design possible interventions for autophagy as a means to improve healthy aging. We are seeking undergraduate student researchers to assist other laboratory personnel in our efforts to move towards this research goal.

Desired Skills or Experience: Completed coursework in biology, biochemistry, and genetics desired but not necessary. Familiarity and proficiency with the following techniques desirable: *C. elegans* husbandry, PCR, cloning, and fluorescence microscopy.

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