Webb Lab

Dr. Webb is an Associate Professor at The Buck Institute for Research on Aging. The Webb lab investigates the molecular mechanisms of brain aging and neurodegeneration, with a focus on transcriptional and epigenetic mechanisms. Aging is the greatest risk factor for a number of diseases, including neurodegenerative conditions such as Alzheimer's disease. The Webb lab uses a combination of cell culture systems, *in vivo* mouse models, and genomics, with the goal of identifying targets to improve healthy aging and treat neurodegeneration. The lab has active projects on two different areas of the brain - the hippocampus and the hypothalamus – and more detail on the projects is described below.

Projects include:
Project #1: The Webb lab has a long-standing interest in the mechanisms of adult hippocampal neurogenesis – the process of new neuron formation in the adult brain – and why neural stem cells fail to regenerate neurons in the aging brain. The lab has identified transcriptional and epigenetic changes linked to impaired proteostasis and metabolism in aged neural stem cells. The lab's recent work implicates similar mechanisms as responsible for defective neurogenesis in Alzheimer's models as well. The Webb lab has exciting projects underway to:
- Investigate mitochondrial turnover in neurogenesis and how it is impaired with age.
- Leverage spatial transcriptomics to understand how cells in the neurogenic environment impact new neuron formation in models of Alzheimer's disease.

Project #2: In a newer direction, the Webb lab is studying the mechanisms of hypothalamic aging. The hypothalamus is a well-conserved brain region that controls homeostatic and survival-related behaviors such as sleep, circadian rhythms, metabolic homeostasis, reproduction, and hormone status. The lab has identified cell-type specific transcriptional changes with age associated with these processes and discovered sex-specific features of the aging hypothalamus. The lab is currently seeking new lab members for the following projects:
- Identify the sex-specific chromatin changes in hypothalamic neurons with age.
- Explore aging phenotypes in hypothalamic neurons regulating sleep, circadian rhythms, and metabolic homeostasis.
- Identify transcriptional networks that change with in single-cell transcriptome datasets (requires some computational experience including basic coding skills in R).

Desired skills:
- Foundational coursework in cell biology, molecular biology, and chemistry.
- Independent thinking skills, and the ability to balance independence with teamwork.
- Attention to detail.
- A positive attitude and a desire to learn!