



## 2025 Summer Scholar Profile: Suhjin (Angela) Lee



Hello everyone! My name is Suhjin (Angela) Lee, and I am a rising senior at Saint Louis University (SLU) where I am double majoring in health management and bioethics. At SLU, I have been conducting research since my freshman year under the direction of Dr. Uthayashanker Ezekiel. Our lab is interested in understanding how neurodevelopmental processes, such as cell adhesion and motility, are affected in patients with hypotonia, ataxia, developmental delay, and tooth enamel defects syndrome (HADDTS) – a rare neurodevelopmental disorder – through an in-vitro model of patient-derived induced pluripotent stem cells (iPSC) in which we derive neural stem cells and

neurons. At the Buck Institute, I was a summer scholar in the laboratory of Dr. Ashley Webb under the mentorship of Dr. José Arevalo. The Webb Lab is interested in understanding how and why hippocampal neurogenesis, the formation of new neurons, declines throughout aging, specifically in the context of neurodegeneration such as Alzheimer's Disease (AD).

This summer, I focused on understanding the role of FOXO3 throughout neurogenesis in Early Onset Alzheimer's Disease (EOAD). EOAD is characterized by an onset of AD at an age of 50 years old or younger and is strongly associated with a genetic mutation in comparison to late onset AD which can be impacted by lifestyle factors. FOXO3 is a transcription factor that has been implicated in cellular and protein homeostasis (proteostasis) and aging in worms and mammals. Within the brain, FOXO3 maintains neurogenesis which declines with age progression, but more drastically in AD patients. By focusing on an EOAD model, we were able to specifically focus on the hallmarks commonly seen in AD, such as a decline in neurogenesis and an increase in protein aggregate accumulation, while also being able to engineer isogenic controls with patient-derived cells that were reverted to the wild-type sequence.

We worked with EOAD-patient derived iPSCs and differentiated them through the process of neurogenesis to obtain neural progenitors, early neurons, and mature neurons. We hypothesized a decline in activated FOXO3 throughout neurogenesis which we tested through Western blots. The second part of my project focused on understanding how FOXO3 regulates protein accumulation throughout neurogenesis. We hypothesized that the levels of protein aggregate accumulation would increase throughout neurogenesis as FOXO3, a gene that plays an integral role in the regulation and autophagy of protein aggregate accumulation, would become less activated. We measured these changes by immunocytochemistry and a protein aggregate assay.