Question/Biological Problem

Alzheimer's Disease is a progressive neurologic disorder that causes atrophy in the brain and brain cell death [1]. Many studies have been conducted for the detection of amyloid(Aβ) plaques which are considered a key pathological hallmark of Alzheimer's Disease (AD). Detection of amyloid plaques is a key factor for the diagnosis of Alzheimer's Disease. There is a growing interest to develop imaging techniques to visualize Aβ plaques in-vivo because the definitive diagnosis of AD is based on histological confirmation during postmortem examination [2].

AIM: To build a model that shows how the mutation of amyloid precursor protein (APP) can cause amyloid plaque buildup.

Research Model and Plan:

- To find how the mutation of amyloid precursor protein leads to neurodegeneration of AD patients, I need to build a model that mimics the build up of amyloid plaques in the neocortex, hippocampus, and amygdala of the brain.
- IPSCs generated from familial Alzheimer's Disease fibroblasts will be used to replicate the overexpression of the APP gene which causes Aβ plaque build-up.
- IPSCs are the best cell line for this model because they can provide a more direct resemblance of pathogenic conditions in vitro.
- IPSCs are easy to obtain and allow the in-vitro recreation of an affected cell type.

[1] Mayo Foundation for Medical Education and Research. (2021, June 26). *Alzheimer's disease*. Mayo Clinic. https://www.mayoclinic.org/diseases-conditions/alzheimers-disease/symptoms-causes/syc-20350447.
[2] Wadghiri YZ, Li J, Wang J, Hoang DM, Sun Y, et al. (2013) *Detection of Amyloid Plaques Targeted by Bifunctional USPIO in Alzheimer's Disease Transgenic Mice Using Magnetic Resonance Microimaging*. PLOS ONE 8(2): e57097. https://doi.org/10.1371/journal.pone.0057097