**INTRODUCTION**

- Alzheimer's Disease (AD) is the most common cause of dementia [1]. It is growing increasingly pervasive as life expectancy increases.
- Projections estimate that by 2050, over 100 million individuals worldwide will be diagnosed with AD without any therapeutic intervention [2].
- AD is defined by its pathophysiology, which consists of abnormal protein deposits of β-amyloid plaques and neurofibrillary tangles of tau proteins [3].

**Figure 1. Patients diagnosed with AD have the β-amyloid plaques and neurofibrillary tangles which are composed of abnormal tau proteins, that are characteristic of the disease. These define AD as a unique neurodegenerative disease [3].**

- AD-related neuropathologic changes occur well before the onset of clinical symptoms [3], sometimes for decades in advance.
- These changes can be identified in vivo by cerebrospinal fluid (CSF) biomarkers [3], which are obtained via lumbar punctures.
- Lumbar punctures are not the most feasible method for routine check-ups [4].
- PET imaging is also a way to detect amyloid AD tau, but it is also invasive and expensive [5].
- Blood-based biomarkers are less invasive and less costly.
- Some studies, though limited, have indicated that biomarkers for blood plasma total tau (t-tau) and neurofilament light (NF-L) have potential for identifying individuals at risk for AD dementia and predicting cognitive decline [6, 7].

**Figure 2. Blood samples were collected from participants from the HOPE study, along with other data such as their age, gender, ethnicity, years of education, etc.**

- NF-L is a structural component of the neural cytoskeleton that can serve as a marker of neurodegeneration in AD and other conditions [7].
- Tau is a microtubule-associated protein that plays a critical role in maintaining the cytoskeleton of neurons and allows for appropriate communication, t-tau is viewed as a marker for neuronal injury and neurodegeneration. It is not specific to AD [3].

**HYPOTHEZED RESULTS**

- We hypothesize that higher levels of plasma t-tau and NF-L will be observed in individuals with MCI and dementia compared to those with normal cognition.
  - Individuals with higher levels of these biomarkers will be at elevated risk for subsequent cognitive decline.

**REFERENCES**