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Aggregation propensity of critical regions of the protein Tau MICAIAH MUTHEE, AZKA AHMED, LUCA LARINI, Rutgers University-Camden — The Alzheimer's disease is an irreversible, progressive brain disorder that slowly destroys memory and thinking skills, which eventually leads to the ability to not able to carry out the simplest tasks. The Alzheimer's disease is characterized by the formation of protein aggregates both within and outside of the brain's cells, the neurons. Within the neurons, the aggregation of the protein tau leads to the destruction of the microtubules in the axon of the neuron.
Tau belongs to a group of proteins referred to as Microtubule-Associated Proteins. It is extremely flexible and is classified as an intrinsically unstructured protein due to its low propensity to form secondary structure. Tau promotes tubulin assembly into microtubules thereby stabilizing the cytoskeleton of the axon of the neurons. The microtubule binding region of tau consists of 4 pseudo-repeats. In this study, we will focus on the aggregation propensity of two fragments. In this study we will focus on the PHF43 fragment that contains the third pseudo-repeat and has been shown experimentally to aggregate readily. Another fragment that contains the second pseudo-repeat will be considered as well. Mutations in this region are associated with various form of dementia and for this reason we will consider the mutant P301L.

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