In conclusion, the authors of the paper want to show 1) application of optogenetic techniques in-vivo using APP Tg mice to study AD and 2) a causal relationship between hyper activation of the neurons in the perforant pathway and the increase of ISF Aβ42 level.

We saw in the previous optogenetic experiment that about 20% increase in the hippocampal interstitial fluid of Aβ42 level immediately following opsin light activation. In this experiment we want to show a pathophysiological relationship between Aβ accumulation and increase phosphorylation of tau. We want to show that tauopathy in the brain is aggravated by increased accumulation of APP fragments leading to increase induction of neurofibrillary tangles (NFTs). Mature tau pathology in turn spreads and could aggravate Aβ-associated neuronal dysfunction and aberrant signalling , leading to a harmful feedback loop.

For the research, we will use the Tg mice EC-Tau/hAPP mice, which overexpress a mutant amyloid precursor protein (hAPP).They generate both hAPP/Aβ and specific entorhinal cortex (EC) tau pathology in the brain.