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Autore	Lenneberg, Eric Heinz
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Sommario/riassunto	Neurofibrillary tangles (NFTs) composed of intracellular aggregates of tau protein are a key neuropathological feature of Alzheimer’s Disease (AD) and other neurodegenerative diseases, collectively termed tauopathies. The abundance of NFTs has been reported to correlate positively with the severity of cognitive impairment in AD. However, accumulating evidences derived from studies of experimental models

have identified that NFTs themselves may not be neurotoxic. Now, many of tau researchers are seeking a “toxic” form of tau protein. Moreover, it was suggested that a “toxic” tau was capable to seed aggregation of native tau protein and to propagate in a prion-like manner. However, the exact neurotoxic tau species remain unclear. Because mature tangles seem to be non-toxic component, “tau oligomers” as the candidate of “toxic” tau have been investigated for more than one decade. In this topic, we will discuss our consensus of “tau oligomers” because the term of “tau oligomers” [e.g. dimer (disulfide bond-dependent or independent), multimer (more than dimer), granular (definition by EM or AFM) and maybe small filamentous aggregates] has been used by each researchers definition. From a biochemical point of view, tau protein has several unique characteristics such as natively unfolded conformation, thermo-stability, acid-stability, and capability of post-translational modifications. Although tau protein research has been continued for a long time, we are still missing the mechanisms of NFT formation. It is unclear how the conversion is occurred from natively unfolded protein to abnormally mis-folded protein. It remains unknown how tau protein can be formed filaments [e.g. paired helical filament (PHF), straight filament and twisted filament] in cells albeit in vitro studies confirmed tau self-assembly by several inducing factors. Researchers are still debating whether tau oligomerization is primary event rather than tau phosphorylation in the tau pathogenesis. Inhibition of either tau phosphorylation or aggregation has been investigated for the prevention of tauopathies, however, it will make an irrelevant result if we don’t know an exact target of neurotoxicity. It is a time to have a consensus of definition, terminology and methodology for the identification of “tau oligomers”.