Tau overexpression substantially increase GFAT expression without direct interation

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Abstract

Tau neurofibrillary tangles play major pathogenic role in Alzheimer's Disease (AD), which is considered a "type-3" diabetes. Specific sites of tau like Ser396 and Thr205 undergo ethier phosphorylation or *O*-GlcNAcylation, which the imbalance exists in AD mice. Only co-dephosphorylation and deglycosylation of AD P-tau restores the microbule polymerization activity, and deglycosylation causes paired helical filaments (PHFs) into straight filiaments (SFs). Inhibition of glutamine fructose-6-phosphate aminotransferase (GFAT) supresses PKA-CREB pathway and causes memory and learning deficits in AD. To our knowledge, the interaction between GFAT and tau has never been studied. Here we show that overexpression of tau in *E. Coli* (BL21DE3) induce GFAT expression at high level and could be co-purified by Ni-NTA . Anion exchange column was used to seperate tau in elution and GFAT in flow through. We use cross-linking reagents followed by mass spectrum to identify the proteins and detect the protein-protein interaction. Tau protein in elution has the pathogenic seeding activity and could form filbrils from TEM. This study could be used to understand the intrinsic relationship of tauopathy and metabolic disorder.

Keywords

tau, tauopathy, glutamine fructose-6-phosphate aminotransferase, GFAT, cross-linking mass spectrum, TEM, tau seeds