Aging, but not tau pathology, impacts olfactory performances and somatostatin systems in THY-Tau22 mice

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A b s t r a c t

Somatostatin (SOM) cortical levels decline in Alzheimer's disease (AD) in correlation with cognitive impairment severity, the latter being closely related to the presence of neurofibrillary tangles. Impaired olfaction is another hallmark of AD tightly related to tau pathology in the olfactory pathways. Recent studies showed that SOM modulates olfactory processing, suggesting that alterations in SOM levels participate to olfactory deficits in AD. Herein, we first observed that human olfactory peduncle and cortex are enriched in SOM cells and fibers, in aged postmortem brains. Then, the possible link between SOM alterations and olfactory deficits was evaluated by exploring the impact of age and tau hyperphosphorylation on olfactory SOM networks and behavioral performances in THY-Tau22 mice, a tauopathy transgenic model. Distinct molecular repertoires of SOM peptide and receptors were associated to sensory or cortical olfactory processing structures. Aging mainly affected SOM neurotransmission in piriform and entorhinal cortex in wild-type mice, although olfactory performances decreased. However, no further olfactory impairment was evidenced in THY-Tau22 mice until 12 months although tau pathology early affected olfactory cortical structures. Thus, tau hyperphosphorylation per se has a limited impact on olfactory performances in THY-Tau22 mice.

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