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Keywords
Alzheimer's disease - tau protein - neurofibrillary tangles – adult neurogenesis – hippocampus - subgranular zone of the dentate gyrus

Research
Adult neurogenesis takes place in the subgranular zone of the dentate gyrus of the hippocampus (SGZ) and in the subventricular zone of the lateral ventricule (SVZ). The hippocampus is affected in Alzheimer's disease (AD) and in some other tauopathies and neurogenesis could be affected by the pathological process associated with these diseases, contributing to memory impairments. Neurofibrillary tangles (NFT) are intraneuronal aggregates of hyperphosphorylated tau protein, and are key-lesion in AD and in other tauopathies. The aim of this work was to study the potential effect of NFT development on adult neurogenesis in the SGZ in mouse model of tauopathies. We analyzed neurogenesis in the mutant tau model Tg30 (expressing a mutant tau transgene (1N4R human tau isoform) mutated at positions G272V and P301S, in tau KO mice (knock in of the EGFP coding sequence into the first exon of the tau gene), in tau KO/Tg30 mice (expressing the mutant tau transgene but not the murine tau) and in wild-type mice. Stereological analysis in 12 months-old mice with the Cavalieri method and the optical fractionator indicated a trend for decreased volume of the dentate gyrus and a decreased number of granule cells in Tg30 mice compared to other genotypes. Preliminary results aimed at estimating the number of cells expressing markers of neuronal differentiation indicate that the number of immature granule cells expressing the fetal tau isoform (0N3R) is decreasing in mutant tau Tg30 mice. These results suggest that overexpression of this mutant tau protein impairs adult neurogenesis and maintenance of granule cells number in the dentate gyrus.

Selected publications
S. Houben, E. Audouard, K. Leroy, V. Stygelbout, J-P. Brion (2014); Alzheimer's disease and tauopathies: Study of hippocampal neurogenesis in adult mice models. Présentation d'un poster au « First UNI General Meeting » (Ittre, 23 mai 2014).

S. Houben, K. Leroy, E. Audouard, K. Ando, V. Stygelbout, J-P. Brion (2014); Study of hippocampal adult neurogenesis in mice models for tau pathology in Alzheimer's disease and tauopathies. Présentation d'un poster au «IAP P7/16 Annual Scientific Meeting» (October 3, 2014).