

# Olfactory system pathology in Alzheimer's Disease

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Propositions belonging to the PhD thesis

## **Olfactory system pathology in Alzheimer's Disease: evidences from rodent and human studies**

Gwooon Son

Maastricht, 26th of May 2021

1. Olfactory dysfunction is present in the early stages of Alzheimer's disease (AD) and in probable AD patients who have mild cognitive impairment. (*This thesis, Ch.2*)
2. The spatially conserved map in the olfactory system may play a critical role in the manifestation and progression of olfactory impairment in AD. (*This thesis, Ch.2*)
3. Early accumulation of  $\beta$ -amyloid in specific regions of the olfactory system including the olfactory epithelium in AD mouse model. (*This thesis, Ch.3*)
4. Decreased olfactory sensory neuron-derived activity and odor detection in AD mouse model are negatively correlated with  $A\beta$  oligomers. (*This thesis, Ch.4*)
5. In the primary olfactory system, the domain where the olfactory sensory neurons regenerate greatly may provide the pathogenic pool and initiate a vicious cycle of AD pathogenesis derived from  $A\beta$ , such as hyper inflammation as well as HP- $\tau$ . (*This thesis, Ch.4*)
6. The first synapse in the primary olfactory processing pathway, the olfactory glomeruli showed plausible degeneration with  $A\beta$  accumulation and microgliosis in AD patients. (*This thesis, Ch.5*)
7. Nasal fluid from the olfactory epithelium is feasible material containing high-throughput biological information that mirrors pathological changes in the olfactory system. (*This thesis, Ch.6*)
8. The presence of oligomeric  $A\beta$  proteins in nasal discharge is a potential surrogate biomarker of AD and an indicator of cognitive decline progression. (*This thesis, Ch.6*)
9. Olfactory neuropathology may provide a new platform for conducting preclinical and clinical studies to improve diagnostics in AD and better understand the mechanisms behind neurodegeneration in AD. (*This thesis, Valorization*)
10. "Research is to see what everybody else has seen, and to think what nobody else has thought." *Albert Szent-Gyergyi*
11. "The stability of the internal environment [*the milieu int rieur*] is the condition for the free and independent life." *Claude Bernard – This is the underlying principle of homeostasis, a term coined by Walter Cannon.*