hyposmia

Severe hyposmia is a risk factor of dementia in Parkinson's disease (PD), while the underlying functional connectivity (FC) and brain volume alterations in PD patients with severe hyposmia (PD-SH) are unclear.

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METHODS: We examined voxel-based morphometric and resting state functional magnetic resonance imaging findings in 15 cognitively normal PD-SH, 15 cognitively normal patients with PD with no/mild hyposmia (PD-N/MH), and 15 healthy controls (HCs).

RESULTS: Decreased gray matter volume (GMV) was observed in the bilateral cuneus, right associative visual area, precuneus, and some areas in anterior temporal lobes in PD-SH group compared to HCs. Both the PD-SH and PD-N/MH groups showed increased GMV in the bilateral posterior insula and its surrounding regions. A widespread significant decrease in amygdala FC beyond the decreased GMV areas and olfactory cortices were found in the PD-SH group compared with the HCs. Above all, decreased amygdala FC with the inferior parietal lobule, lingual gyrus, and fusiform gyrus was significantly correlated with both reduction of Addenbrooke's Cognitive Examination-Revised scores and severity of hyposmia in all participants. Canonical resting state networks exhibited decreased FC in the precuneus and left executive control networks but increased FC in the primary and high visual networks of patients with PD compared with HCs. Canonical network FC to other brain regions was enhanced in the executive control, salience, primary visual, and visuospatial networks of the PD-SH.

PD-SH showed extensive decreased amygdala FC. Particularly, decreased FC between the amygdala and inferior parietal lobule, lingual gyrus, and fusiform gyrus were associated with the severity of hyposmia and cognitive performance. In contrast, relatively preserved canonical networks in combination with increased FC to brain regions outside of canonical networks may be related to compensatory mechanisms, and preservation of brain function ¹⁾.

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Yoneyama N, Watanabe H, Kawabata K, Bagarinao E, Hara K, Tsuboi T, Tanaka Y, Ohdake R, Imai K, Masuda M, Hattori T, Ito M, Atsuta N, Nakamura T, Hirayama M, Maesawa S, Katsuno M, Sobue G. Severe hyposmia and aberrant functional connectivity in cognitively normal Parkinson's disease. PLoS One. 2018 Jan 5;13(1):e0190072. doi: 10.1371/journal.pone.0190072. eCollection 2018. PubMed PMID: 29304050.

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