

Theme: Cognitive Neuroscience

Abnormal activation and connectivity patterns of Saliency Network regions in presymptomatic genetic frontotemporal dementia (FTD)

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Abstract:

The core neural mechanisms underlying Frontotemporal Lobar Degeneration Dementia (FTLD) are still unknown. There is intriguing evidence pointing towards a selective damage of von Economo neurons (VEN), located in the key hubs of the saliency network (SN). The study of asymptomatic mutation carriers may shed light on the earliest pathophysiological changes and if they occur selectively in these VEN-rich regions.

Here we investigated functional brain changes of the SN in genetically confirmed asymptomatic FTLD (n=11, compared to n=19 controls) cohort from the Genetic Frontotemporal Dementia Initiative (GENFI) using a fMRI 1-back working memory (WM) visual recognition task, which recruits this network as a neural switch hub. We hypothesized a differential pattern of activation of key SN regions in genetic carriers of FTLD (gFTLD). We found between-group differences in the BOLD response in important nodes of the SN in gFTLD carriers, suggesting early compensatory activation typical of early stages, including right anterior cingulate cortex and left anterior insula. Other SN regions not containing VENs showed the opposite pattern, particularly in subcortical domains.

Our findings bring novel insights into the pathophysiology of FTLD by demonstrating early asymptomatic task-related functional alterations in the SN, supporting the existence of compensatory mechanisms accounting for the maintenance of normal performance in the presence of early functional impairment.

Keywords: Dementia; Saliency network; von Economo neurons; neuroimage; BOLD