Relationships between brain metabolism decrease in normal aging and changes in structural and functional connectivity.

Normal aging is characterized by brain glucose metabolism decline predominantly in the prefrontal cortex. The goal of the present study was to assess whether this change was associated with age-related alteration of white matter (WM) structural integrity and/or functional connectivity. FDG-PET data from 40 young and 57 elderly healthy participants from two research centers (n=49/48 in Center 1/2) were analyzed. WM volume from T1-weighted MRI (Center 1), fractional anisotropy from diffusion-tensor imaging (Center 2), and resting-state fMRI data (Center 1) were also obtained. Group comparisons were performed within each imaging modality. Then, positive correlations were assessed, within the elderly, between metabolism in the most affected region and the other neuroimaging modalities. Metabolism decline in the elderly predominated in the left inferior frontal junction (LIFJ). LIFJ hypometabolism was significantly associated with macrostructural and microstructural WM disturbances in long association fronto-temporo-occipital fibers, while no relationship was found with functional connectivity. The findings offer new perspectives to understand normal aging processes and open avenues for future studies to explore causality between age-related...
metabolism and connectivity changes.

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