Cognitive reserve impacts on inter-individual variability in resting-state cerebral metabolism in normal aging.

Abstract:
There is a great deal of heterogeneity in the impact of aging on cognition and cerebral functioning. One potential factor contributing to individual differences among the elderly is the cognitive reserve, which designates the partial protection from the deleterious effects of aging that lifetime experience provides. Neuroimaging studies examining task-related activation in elderly people suggested that cognitive reserve takes the form of more efficient use of brain networks and/or greater ability to recruit alternative networks to compensate for age-related cerebral changes. In this exploratory multi-center study, we examined the relationships between cognitive reserve, as measured by education and verbal intelligence, and cerebral metabolism at rest (FDG-PET) in a sample of 74 healthy older participants. Higher degree of education and verbal intelligence was associated with less metabolic activity in the right posterior temporoparietal cortex and the left anterior intraparietal sulcus. Functional connectivity analyses of resting-state fMRI images in a subset of 41 participants indicated that these regions belong to the default mode network and the dorsal attention network respectively. Lower metabolism in the temporoparietal cortex was also associated with better memory abilities. The findings provide evidence for an inverse relationship...
between cognitive reserve and resting-state activity in key regions of two functional networks respectively involved in internal mentation and goal-directed attention.