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Poster Presentation

Brain Network as a Pivotal Part in Intelligence Function

Sajad Sahab Negah[1, 2], Zabihollah Khaksar[2*], Hamid Reza Moradi[3], Arezou Eshaghabadi[1]

[1]Shefa Neuroscience Research Center, Khatam Alanbia Hospital, Tehran, Iran

[2]Histology and Embryology group, Department of Basic Sciences, Faculty of Veterinary Medicine, Shiraz University, Shiraz, Iran

[3]Department of Basic Sciences, Faculty of Veterinary Medicine, Tehran University, Tehran, Iran

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Abstract

Neuroimaging findings have proposed that some brain regions including the precuneus, posterior cingulate, and medial prefrontal cortex play an essential role of a structural core in the brain. Network organization endures rapid alterations in development with changes in axonal synaptic connectivity, white matter volume, and the thickness of corresponding cortical regions. Structural maturation of white matter as well as cortical and subcortical areas is powerfully related with intellectual abilities from early childhood throughout adolescence. However, there is little investigation about the relationship of network properties derived from axonal white matter tracts such as network efficiency with intelligence during childhood has received. Intelligence can be described as the individual's capacity for mental functioning across a variety of domains including reasoning, executive function, information processing speed, memory and spatial manipulation - termed, general intelligence (g). Efficient and economical information processing among the distributed brain regions along white matter fibers is thought to contribute to general intelligence capacity. The parieto-frontal integration theory suggests that the dorsolateral prefrontal cortex and the parietal cortex comprise an important neuronal network associated with efficient intellectual functioning.A brain network perspective provides a quantitative model for elucidating the association between the efficiency of brain networks and intelligence. Since brain development in childhood is associated with large-scale changes in synaptic connectivity, gray matter thickness and myelination, these relationships could be quite different than those observed in the adult brain.

Key words: Neuroimaging, Brain, Intelligence.

Corresponding Author: Zabihollah Khaksar

E-mail: *khaksar@sirazu.ac.ir*