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Altered white matter connectivity as a neural substrate for social cognition in high-functioning autism: Diffusion tensor imaging study

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Introduction & Objective: It is known that many of the cognitive and social deficits associated with autism can arise from abnormal functional connectivity between brain networks. This aberrant functional connectivity in Autism Spectrum Disorders (ASD) can be explained by impaired integrity of white matter tracts that link distant regions of the networks.

Method: In the present study we investigated white matter in children and adolescents with High-Function Autism (HPA) compared to normal controls using diffusion tensor imaging (DTI). The aim of this research is to provide supporting evidence for abnormalities in neural connectivity as an underlying pathophysiology of the main characteristics of ASD. DTI was used to examine brain activations in 9 children with HPA and 13 typically developing controls.

Results: We found impairment of neural connectivity, mainly in association fiber tracts, in individuals with high-function autism as evidenced by decreased Fractional Anisotropy (FA), the index of white matter integrity, of these tracts. Among them, Inferior Fronto-Occipital Fasciculus (IFOF), which connects the social brain, had a significant relationship with various domains such as social interaction, communication, repetitive behavior, verbal Intelligence Quotient (IQ), performance IQ, and functional IQ. The Inferior Longitudinal Fasciculus (ILF) and Superior Longitudinal Fasciculus (SLF) also showed decreased FA in individuals with HFA. FA of ILF and SLF had negative correlations with scores of social interaction and repetitive behaviors and positive correlations with IQ.

Conclusion: These findings suggest that widespread abnormalities in association fiber tracts may contribute to both core and associated symptoms of ASD.

Biography

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