Disorder-Specific Alteration in White Matter Structural Property in Adults With Autism Spectrum Disorder Relative to Adults With ADHD and Adult Controls


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Abstract

Objective
Autism spectrum disorder (ASD) and attention deficit hyperactivity disorder (ADHD) are not only often comorbid but also overlapped in behavioral and cognitive abnormalities. Little is known about whether these shared phenotypes are based on common or different underlying neuropathologies. Therefore, this study aims to examine the disorder-specific alterations in white matter (WM) structural property.

Method
The three comparison groups included 23 male adults with ASD (21.4 ± 3.1 years), 32 male adults with ADHD (23.4 ± 3.3 years), and 29 age-matched healthy male controls (22.4 ± 3.3 years). After acquisition of the diffusion spectrum imaging (DSI), whole brain tractography was reconstructed by a tract-based automatic analysis. Generalized fractional anisotropy (GFA) values were computed to indicate tract-specific WM property with adjusted P value < 0.05 for false discovery rate correction.

Results
Post hoc analyses revealed that men with ASD exhibited significant lower GFA values than men with ADHD and male controls in six identified fiber tracts: the right arcuate fasciculus, right cingulum (hippocampal part), anterior commissure, and three callosal fibers (ventrolateral prefrontal cortex part, precentral part, superior temporal part). There was no significant difference in the GFA values of any of the fiber tracts between men with ADHD and controls. In men with ASD, the GFA values of the right arcuate fasciculus and right cingulum (hippocampal part) were negatively associated with autistic social-deficit symptoms, and the anterior commissure GFA value was positively correlated with intelligence.

Conclusions
This study highlights the disorder-specific alteration of the microstructural property of WM tracts in male adults with ASD.