Differential Associations between Cortical Thickness and Striatal Dopamine in Treatment-Naïve Adults with ADHD vs. Healthy Controls

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Alterations in catecholamine signaling and cortical morphology have both been implicated in the pathophysiology of attention deficit/hyperactivity disorder (ADHD). However, possible links between the two remain unstudied. Here, we report exploratory analyses of cortical thickness and its relation to striatal dopamine transmission in treatment-naïve adults with ADHD and matched healthy controls. All participants had one magnetic resonance imaging (MRI) and two \([11C]\)raclopride positron emission tomography scans. Associations between frontal cortical thickness and the magnitude of \(d\)-amphetamine-induced \([11C]\)raclopride binding changes were observed that were divergent in the two groups. In the healthy controls, a thicker cortex was associated with less dopamine release; in the ADHD participants the converse was seen. The same divergence was seen for baseline D2/3 receptor availability. In healthy volunteers, lower D2/3 receptor availability was associated with a thicker cortex, while in the ADHD group lower baseline D2/3 receptor availability was associated with a thinner cortex. Individual differences in cortical thickness in these regions correlated with ADHD symptom severity. Together, these findings add to the evidence of associations between dopamine transmission and cortical morphology, and suggest that these relationships are altered in treatment-naïve adults with ADHD.