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The Volume Differences in the Basal Ganglia and Cerebellum between Autistic Subjects and Healthy Controls and the Volumetric Correlations between Repetitive Behaviors in Autism

**BACKGROUND:** The phenomenology and neurobiological substrate of the repetitive behaviors domain in autism is still not well delineated. This study explores the relationship of basal ganglia and cerebellar structures to the severity of high vs. low order repetitive behaviors in adults with autism.

**METHODS:** Thirteen subjects with autism by DSM-IV, Autism Diagnostic Interview (ADI-R) and Autism Diagnostic Observation schedule (ADOS-G) and 13 matched controls completed a 3 T magnetic resonance image (MRI) of the brain. Two blinded researchers, with good inter-rater reliability, outlined the right and left caudate, putamen, globus pallidus and cerebellum. The groups were compared in terms of volumes of these structures, as well as corrected volumes for full scale IQ and total brain volume (TBV). Volumes within the autistic group were correlated with the ADI-R Repetitive Behavior scores (ADI-C domain).

**RESULTS:** There were no statistically significant differences between groups for basal ganglia and cerebellar volumes. There were also no statistically significant differences in full scale IQ or total brain volume between groups. However, within the autism group, left and right putamen volumes significantly correlated with the high order repetitive behavior score of the ADI and this correlation became stronger when covarying for TBV and full scale IQ. In addition, left and right caudate volumes significantly correlated with the lower order repetitive behaviors score of the ADI, and this correlation became stronger when covarying for TBV and full scale IQ. Lastly the volume of the right cerebellum significantly correlated with lower order repetitive behaviors when controlled for total brain volume.

**CONCLUSIONS:** Within the autism group, the volumes of putamen vs. caudate and cerebellum seem to preferentially correlate with high vs. low order repetitive behaviors respectively, suggesting differential roles for these structures in the development of repetitive behaviors in autism.

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