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Gray matter atrophy and abnormal connectivity in the cerebellum of SAOA patients

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Goal of this study was to investigate the structural and functional changes in the cerebellum in sporadic ataxia with adult onset (SAOA), and to test for potential associations between structural-functional alterations in the cerebellum and disease duration. 37 SAOA patients (62.38±9.53 years) and 49 healthy controls (HC) (65.08±6.85 years) underwent a structural and resting state functional MR (rsfMRI) scan. Focusing on the cerebellum, we performed voxel-based-morphometry and a network analysis based on rsfMRI using degree centrality (DC) as key marker for network integrity. In order to investigate the role of the disease duration, we further divided the SAOA group into one group with long disease duration (n=15, duration = 13.27±3.75 years) and one with short duration (n=14, duration = 2.91±1.72 years). Group differences were calculated using two-sample t-tests, controlling for age, gender and total intracranial volume (only structure) ($p<0.01$; FWE corrected, cluster-extent 20 voxels). Grey matter atrophy in SAOA was detected in bilateral cerebellar lobules I-V, V, VI, IX and X but no differences were found between SAOA long- and short-duration groups. Higher DC values were found in right cerebellar lobules VIII A/B and the dentate nucleus in SAOA patients when compared to HC. An increased DC was found in right cerebellar lobule V in SAOA patients with long as compared to short disease duration. The regions found are known to be involved in sensory-motor processing, being in line with clinical appearance of SAOA. Interestingly, the functional and structural findings do not overlap, potentially indicating that the structural alterations may cause the connectivity changes.

Biography

X Jiang is doing her PhD study in Germany Center for Neurodegenerative Disease, DZNE. She finished her Bachelor's degree in Applied Mathematics and Master's degree in Psychology. She has published three papers in reputed journals (e.g. *Human Brain Mapping*).

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