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for his work :

“ Resting state networks change in clinically isolated syndrome.”



Abstract:

Resting state networks change in clinically isolated syndrome

Stefan D. Roosendaal, Menno M. Schoonheim, Hanneke E. Hulst, Ernesto J. Sanz-Arigita, Stephen M. Smith, Jeroen J. G. Geurts and Frederik Barkhof.
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Task-functional magnetic resonance imaging studies have shown that early cortical recruitment exists in multiple sclerosis, which can partly explain the discrepancy between conventional magnetic resonance imaging and clinical disability. The study of the brain 'at rest' may provide additional information. We questioned whether functional changes exist at rest in the early phase of multiple sclerosis, and addressed this question by a network analysis of no-task functional magnetic resonance imaging data. Fourteen patients with symptoms suggestive of multiple sclerosis (clinically isolated syndrome), 31 patients with relapsing remitting multiple sclerosis and 41 healthy controls were included. Resting state functional magnetic resonance imaging data were analysed using multi-subject independent component analysis and individual time-course regression. Eight meaningful resting state networks were identified in our

subjects and compared between the three groups. Additionally, quantitative measures of structural damage were obtained. Patients with clinically isolated syndrome showed increased synchronization in six of the eight resting state networks, including the default mode network and sensorimotor network, compared to controls or relapsing remitting patients. No significant decreases were found in patients with clinically isolated syndrome. No significant resting state synchronization differences were found between relapsing remitting patients and controls. Normalized grey matter volume was decreased and white matter diffusivity measures were abnormal in relapsing remitting patients compared to controls, whereas no atrophy or diffusivity changes were found for the clinically isolated syndrome group. Thus, early synchronization changes are found in patients with clinically isolated syndrome that are suggestive of cortical reorganization of resting state networks. These changes are lost in patients with relapsing remitting multiple sclerosis with increasing brain damage, indicating that cortical reorganization of resting state networks is an early and finite phenomenon in multiple sclerosis.

