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Remodeling of Cortical Structural Networks in Multiple Sclerosis

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Multiple sclerosis (MS) is one of the most frequent immune-mediated disorders of the central nervous system. Pathological events occurring within the white matter and gray matter compartments can be reliably tracked *in vivo* by magnetic resonance imaging (MRI) but conventional imaging parameters do not reflect the remodeling processes of the brain. Here, we sought to investigate the reorganization of cortical structural networks in a group of patients with MS. For this, 40 patients (mean age ± standard deviation 31.2 ± 7.0 years, 14 males) with relapsing-remitting MS and 40 healthy subjects (27.1 ± 5.0 years, 14 males) were included in the study. From T_1-weighted MR image-derived cortical thickness values, connectivity matrices were generated and network measures of integration and segregation compared between the groups. MS patients presented higher modularity, clustering coefficient and local efficiency but lower global efficiency when compared to healthy subjects. These results indicate that remodeling of cortical structural networks in patients with MS occurs towards the strengthening of intramodular connectivity and local processing. Presumably, this reorganized network architecture topology is an adaptation response required to maintain brain networks' functionality in conditions of ongoing tissue damage.