The role of dopamine on cortical plasticity and striatal structure in Dopamine-responsive Dystonia

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Research Abstract

Cortical plasticity is a physiological process, by which the strength of synaptic connections can be adapted to environmental needs. In Dystonia, a common movement disorder symptom, cortical plasticity is consistently increased and this is considered a core electrophysiological substrate of the disease. In a particular dystonia syndrome called dopamine-responsive dystonia (DRD), dystonia is effectively reversed by the dopaminergic medication. Similarly, in young-onset Parkinson`s disease (PD) dopaminergic medication has the same clinical effect. However, in healthy controls dopamine is known to increase cortical plasticity.
It is therefore proposed to study the influence of dopamine on cortical plasticity in DRD and young-onset PD, since these dystonia syndromes offer the possibility to challenge the current understanding of cortical plasticity in dystonia. The application of transcranial magnetic stimulation paradigms established in dystonia research is planned to answer this question. Furthermore, according to current knowledge of histological changes in dystonia, changes in the striatal ultrastructure will be studied in comparison to young-onset PD and healthy controls. Additionally, we will for the first time histologically characterize neuropathological changes in tyrosine hydroxylase deficiency, an autosomal-recessive form of DRD.

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