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Uncertainty monitoring vs. inhibition of action in obsessive-compulsive disorder: role of the subthalamic nucleus and effects of stimulation in humans and rodents (TYMON)

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Obsessive-Compulsive Disorder (OCD) is among the most common anxiety disorders. Its most severe forms exact a high cost on the affected individuals and society. 20-30% of OCD patients do not respond to the pharmacological and psycho-therapeutical interventions currently in use. Recent clinical trials have demonstrated the clinical efficacy of deep-brain stimulation of several subcortical nuclei or fibers in patients with severe treatment-resistant OCD. The TYMON Project focuses on the subthalamic nucleus (STN), which has proven to be a potent target. Current knowledge regarding the role of the STN in the psychopathological processes underlying OCD and the therapeutic mechanisms triggered by high-frequency stimulation of this area, however, is very limited. TYMON will assess the role of the STN in OCD, focusing on two specific cognitive processes that, when dysfunctional, could lead to compulsive checking: (i) uncertainty-monitoring - repetitive checking to reduce uncertainty before making a choice and (ii) inhibitory control - the inability to put a sequence of checking actions to an end. The project partners will experiment with mice models of OCD as well as with human OCD patients in order to: (a) analyse the role of the STN in these cognitive processes; (b) identify circuitry dysfunction in OCD; and (c) assess the mechanisms of deep brain stimulation that may revert compulsive checking.

