

The importance of precision: a model for movement and movement disorders.

<https://neurodegenerationresearch.eu/survey/the-importance-of-precision-a-model-for-movement-and-movement-disorders/>

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Research Abstract

Parkinson's disease is the second most common neurodegenerative disorder in the world, affecting ~7 million people, with ~130,000 patients in the UK. Parkinson's patients have pronounced movement tremor and are hypokinetic in their movements, presenting with akinesia, bradykinesia, freezing and rigidity. The aim of the work proposed here is to test a novel theoretical account of movement and movement disorders, investigating whether this account can explain some of the hypokinetic symptoms observed in Parkinson's disease. In particular, this research will test a theory of the functional role of sensorimotor beta oscillations that could explain beta power modulations in healthy subjects and the increase in beta power

observed in Parkinson's disease patients. Finally, based on this theoretical framework we propose to test a new non-invasive intervention that could ameliorate some of the hypokinetic symptoms of Parkinson's disease. It has been known for over 50 years that power in the beta frequency range (~15-30 Hz), originating in the sensorimotor cortices in healthy human subjects, is modulated during action execution. However, despite extensive research into these neuronal oscillations their functional role, if any, remains unknown. The importance of understanding their functional role is highlighted by the observation that Parkinson's disease patients have a pathologically higher amplitude of beta oscillations, both in the cortex and sub-cortically in the subthalamic nucleus. In Parkinson's disease patients it has been proposed that this pathologically high amplitude of beta oscillations can lead to some of the motor symptoms of Parkinson's disease. Here, we propose to test a novel theory of the functional role sensorimotor beta oscillations, namely that they are causally linked to the imprecision or demodulation of proprioceptive predictions.

Further information available at:

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