Deep brain stimulation induces rapidly reversible transcript changes in Parkinson's leucocytes.

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Abstract:

Subthalamic deep brain stimulation (DBS) reversibly modulates Parkinson's disease (PD) motor symptoms, providing an unusual opportunity to compare leucocyte transcripts in the same individuals before and after neurosurgery and 1 hr after stimulus cessation (ON- and OFF-stimulus). Here, we report DBS-induced reversibility and OFF-stimulus restoration in 12 of 16 molecular functions and 3 of 4 biological processes shown in exon microarrays to be differentially expressed between PD patients and controls, post-DBS from pre-DBS and OFF from ON states. Intriguingly, 6 of 18 inflammation and immune-related functions exhibited reversibility, and the extent of stimulus-induced changes correlated with the neurological DBS efficacy, suggesting mechanistic implications. A minimal list of 29 transcripts that changed in all three comparisons between states discriminated pre-surgery and OFF states from post-surgery and controls. Six of these transcripts were found to be able to distinguish between PD patients and both healthy controls and patients with other neurological diseases in a previously published whole blood 3' array data study of early PD patients. Our findings support the future use of this approach for identifying targets for therapeutic intervention and assessing the efficacy of current and new treatments in this and other neurological diseases.

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