

SENSORY MOTOR FUNCTIONS IN THE STRIATAL NETWORK IN HEALTH AND DISEASE.

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Sweden

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SENSORY MOTOR FUNCTIONS IN THE STRIATAL NETWORK IN HEALTH AND DISEASE.

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Research Abstract

The basal ganglia have been traditionally studied with respect to their role in motor functions and decision making, both of which rely on proper integration of sensory information. Surprisingly little is known about sensory processing by the basal ganglia, and how it is modulated by motor behavior. We have recently demonstrated that multisensory integration is performed by individual neurons in the mouse striatum and our next aim is to answer the fundamental question of how motor activity affects sensory perception. Elucidating the sensory

functions of the basal ganglia is also important for our understanding and early detection of basal ganglia related diseases, in particular Parkinson's Disease. We aim to unravel network properties of the basal ganglia, underlying sensory-motor processing in the healthy and diseased basal ganglia. The specific questions I aim to answer are: – How is sensory processing in striatum modulated by behavior? – How do the different types of neurons in the striatum integrate afferent inputs? -How is the striatal microcircuitry organized to support sensory integration? In particular, the role of interneurons in mediating feed-forward inhibition and regulating the activity of MSNs. -How is sensory integration networks altered in Parkinson's Disease? The means to achieve these aims are the following: -In vivo whole-cell patch-clamp recordings from mouse striatum during sensory stimulation and movement. -Simultaneous whole-cell recordings from multiple neurons in corticostriatal and thalamostriatal slices combined with fluorescent microscopy and Calcium imaging. -Optical manipulation of identified neuronal subpopulations and pathways using optogenetics in slices and in vivo. -Experiments using animal models for Parkinson's disease for studying alterations in striatal sensory processing and the underlying microcircuits.

Further information available at:

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