## **Pallidofugal pathway**

Nerve fibers that conduct impulses from the globus pallidus across the internal capsule and fields of Forel to the thalamus and nearby areas.

The pallidofugal and striatonigral fiber tracts form a functional part of the basal ganglionic neuronal networks.

For deep brain stimulation, precise localization of pallidofugal pathways may be of particular clinical relevance for correct electrode positioning.

The pallidofugal pathways were identified using patient-specific tractography, and steering the current toward this white matter structure resulted in complete resolution of the severe dyskinesias <sup>1</sup>).

Pallidofugal and striatonigral fiber tracts have been visualized in vivo for the first time by using susceptibility-sensitive image contrasts. Considering the course of pallidofugal pathways, in particular for deep brain stimulation procedures in the vicinity of the subthalamic nucleus, could provide landmarks for optimal targeting during stereotactic planning<sup>2)</sup>.

Previous histological and histochemical studies have provided evidence that the globus pallidus (external pallidal segment) as conventionally delineated in the rat extends ventrally and rostrally beneath the transverse limb of the anterior commissure, invading the olfactory tubercle with its most ventral ramifications.

This ventral pallidum (VP) is most selectively identified by being pervaded by a dense plexus of substance-P-positive striatofugal fibers; the extent of this plexus indicates that the VP behind the anterior commissure continues dorsally over some distance into the anteroventromedial part of the generally recognized (supracommissural) globus pallidus; the adjoining anterodorsolateral pallidal region, here named dorsal pallidum (DP), receives only few substance-P-positive fibers, but contains a dense plexus of enkephalin-positive striatal afferents that also pervades VP. Available autoradiographic data indicate that VP and DP receive their striatal innervation from two different subdivisions of the striatum: whereas VP is innervated by a large, anteroventromedial striatal region receiving substantial inputs from a variety of limbic and limbic-system-associated structures (and therefore called "limbic striatum"), DP receives its striatal input from an anterodorsolateral striatal sector receiving only sparse limbic afferents ("nonlimbic" striatum) but instead heavily innervated by the sensorimotor cortex. The present autoradiographic study has produced evidence that this dichotomy in the striatopallidal projection is to a large extent continued beyond the globus pallidus: whereas the efferents of DP were traced to the subthalamic nucleus and substantia nigra, those of VP were found to involve not only the subthalamic nucleus and substantia nigra but also the frontocingulate (and adjoining medial sensorimotor) cortex, the amygdala, lateral habenular and mediodorsal thalamic nucleus, hypothalamus, ventral tegmental area, and tegmental regions farther

caudal and dorsal in the midbrain. These findings indicate that the ventral pallidum can convey striatopallidal outflow of limbic antecedents not only into extrapyramidal circuits but also back into the circuitry of the limbic system <sup>3)</sup>.

1)

Avecillas-Chasin JM, Jimenez-Shahed J, Miravite J, Bressman S, Kopell BH. Deep Brain Stimulation of the Pallidofugal Pathways to Rescue Severe Life-Threatening Dyskinesias after STN-DBS Lead Implantation. Stereotact Funct Neurosurg. 2021 Oct 14:1-4. doi: 10.1159/000519578. Epub ahead of print. PMID: 34649247.

Susceptibility Sensitive Magnetic Resonance Imaging Displays Pallidofugal and Striatonigral Fiber Tracts Till M.Schneider - Andreas Deistung - Uta Biedermann - Cordula Matthies - Ralf-Ingo Ernestus -Jens Volkmann - Sabine Heiland - Martin Bendszus - Jürgen R.Reichenbach - Operative Neurosurgery -2016

Haber SN, Groenewegen HJ, Grove EA, Nauta WJ. Efferent connections of the ventral pallidum: evidence of a dual striato pallidofugal pathway. J Comp Neurol. 1985 May 15;235(3):322-35. PubMed PMID: 3998213.

From: https://neurosurgerywiki.com/wiki/ - Neurosurgery Wiki

Permanent link: https://neurosurgerywiki.com/wiki/doku.php?id=pallidofugal\_pathway



Last update: 2024/06/07 02:52