Superolateral Medial Forebrain Bundle (slMFB)

The superolateral medial forebrain bundle (slMFB) is a subdivision of the broader medial_forebrain_bundle (MFB), characterized by its course through the ventral diencephalon and its role in integrating affective and reward-related signals.

Anatomical and Functional Description

The slMFB connects midbrain structures, such as the ventral_tegmental_area (VTA), with forebrain targets including the nucleus_accumbens, hypothalamus, and medial prefrontal regions.

It forms part of the mesolimbic dopaminergic system, mediating reward, motivation, and affect regulation.

It is situated superolaterally to the traditional MFB trajectory, allowing for more targeted neurosurgical access via deep brain stimulation.

Relevance in Deep Brain Stimulation (DBS)

The slMFB has been identified as a promising DBS target in the treatment of treatment-resistant_depression and treatment-resistant OCD.

It encompasses a network of fibers known as the ocd_response_tract, associated with clinical improvement in OCD.

The slMFB may serve as a common pathway, integrating multiple dysfunctional sub-networks implicated in neuropsychiatric disorders.

When stimulated near the VTA, it is capable of engaging reward-related circuits directly, with rapid clinical effects observed in some studies.

Research Highlights

According to Coenen et al. (Mol Psychiatry, 2025):

The slMFB includes the entire fiber composition of the average ORT, making it a comprehensive target for symptom modulation in OCD.

Its structural dispersion enables it to interact with all OCD-relevant sub-networks.

Comparative studies show that slMFB stimulation may offer broader therapeutic effects than more restricted targets like the anteromedial_subthalamic_nucleus (amSTN).