Common Pathway Hypothesis

The common pathway hypothesis is a conceptual model in neurosurgery and psychiatric_neuromodulation proposing that different anatomical targets for deep_brain_stimulation (DBS) in neuropsychiatric disorders may ultimately converge on a shared functional circuit responsible for symptom improvement.

Origin and Application

Initially formulated to explain why distinct DBS targets—such as the subthalamic_nucleus, internal_capsule, or superolateral_medial_forebrain_bundle—can lead to similar therapeutic outcomes in conditions like treatment-resistant_obsessive-compulsive_disorder (TR-OCD) and treatment-resistant_depression.

The hypothesis suggests that different anatomical entry points modulate a core subcortical-cortical network, yielding therapeutic effects through a final common pathway.

Role in DBS for OCD

In the context of OCD:

The hypothesis has been used to justify multiple DBS targets including the anteromedial_subthalamic_nucleus and the superolateral medial forebrain bundle.

The ocd_response_tract (ORT) has been proposed as the anatomical correlate of this common pathway.

Criticism and Reappraisal

Recent studies, such as Coenen et al. (Mol Psychiatry, 2025), challenge the oversimplification of the common pathway hypothesis:

The slMFB appears to encompass a wider range of OCD sub-networks, suggesting a more distributed and nuanced connectomic model.

The overlap between ORT and specific targets like the amSTN may not fully account for clinical efficacy.

The idea of a singular common tract may mask the functional diversity and anatomical specificity of DBS effects in OCD.

Alternative Views

network_neuroscience and individualized connectomic_analysis are emerging as more precise tools to understand DBS mechanisms.

These approaches emphasize targeting personalized dysfunctional circuits rather than relying on a single tract or common endpoint.