**ABERRANT WIRING IN FRONTOSTRIITAL PATHWAYS IN CHRONIC SCHIZOPHRENIA**

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**Background**

- The striatum is comprised of limbic (LST), associative (AST) and sensorimotor (SMST) subregions, which receive input from the limbic, associative (rMFG, IFG), and sensorimotor cortices.
- These frontostriatal connections form limbic, associative and sensorimotor loops, creating frontostriatal thalamic (FST) circuits important in cognitive and emotional processes, which are, thus, relevant for neuropsychiatric disorders such as SZ.
- Here, we examine functionally corresponding (C) and non-responding (NC) frontostriatal tract C tracts in patients with chronic schizophrenia (SZ) and normal controls (HCs).

**Methods**

- Structural and diffusion-tensor MRI were acquired on a 3 T GE Echospeed magnet (27 chronic SZs, 26 HCs).
- Associative cortex was parcellated into rostral MFG (rMFG) and inferior frontal gyrus (IFG) using FreeSurfer. The striatum was manually parcellated into limbic (LST), associative (AST), and sensorimotor (SMST) subregions.
- Fiber tracts connecting the 4 ROIs (rMFG-AST, rMFG-SMST, IFG-AST and IFG-SMST) were extracted using two-tensor tractography, and fractional anisotropy (FA) and fiber counts were calculated.

**Results**

- We found significant group differences in FA, F(1,50)=5.5, p=0.02.
- NCs showed increased FA in left, but not right, IFG-AST (t=2.0, p=0.047); and in left, but not right, IFG-SMST (t=2.4, p=0.039).
- For NC tracts (rMFG-SMST, IFG-SMST), there was a significant main effect for group (F(1,50)=3.03, p=0.027) and for C tracts (rMFG-AST, IFG-AST) a trend toward significant main effect for group (F(1,50)=3.03, p=0.060), suggesting greater group differences in the NC versus C tracts.
- Using fiber counts, instead of FA, and covarying for intracranial content, showed similar results, F(1,49)=5.0, p=0.03.

**Discussion**

- Tractography results support a tripartite organization of the striatum in both groups as C tract fiber counts are greater than NC tract fiber counts (see Figure 4: A & B).
- Diminished fiber counts and FA, in both C and NC tracts, point to an abnormal ‘associative loop’ in FST circuitry in SZ compared to HCs.
- This group difference was stronger in NC than C tracts, which may represent a subtle disarray in the anatomical connections between the cortex and striatum in SZ, suggestive of a neurodevelopmental disturbance. As integration of different information domains occurs in NC connections, this aberrant wiring could, in part, explain impaired learning in SZ.
- Frontostriatal connections, as detected by our tractography methods, may serve as a promising biomarker in SZ.

**References**


