SCMS Seminar

CAUSAL ANALYSIS OF BRAIN-WIDE DYSCONNECTIVITY IN SCHIZOPHRENIA PATIENTS IDENTIFIES THE FRONTAL CORTEX AS THE PRIMARY SOURCE

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SCMS

Time: 10:00-10:30 am., Friday, March 31, 2017

Venue: Room 2201, East Main Guanghua Tower, Handan Campus

Abstract: Schizophrenia is characterized by widespread dysconnection in neural circuitry across many brain regions which contributes to its complex and often severe behavioral symptoms. A key unresolved question is whether these extensive neural changes are driven by specific core regions or occur independently. In this study, we first carried out a whole brain meta-analysis of resting-state functional magnetic resonance imaging (rs-fMRI) data including 469 schizophrenia (SZ) patients and 512 healthy controls. We identified 117 altered ($p < 0.001$) functional connections (FC), primarily involving the cerebellum, thalamus, motor cortex and frontal cortex and these were clustered by covariation analysis into four community-based groups. Principal component analysis identified the most influential networks in each community. Bayesian network analysis then revealed two frontal-based cortical networks as the primary drivers with a medial frontal network linked to thalamus, motor cortex and cerebellum strongly associated with negative symptom severity ($p<0.01$) and an inferior frontal gyrus-medial temporal gyrus-based network strongly associated with positive symptom severity ($p < 0.01$). The former involved cognitive and emotional control centers and their links with sensorimotor processing, and the latter involved primarily language processing networks. Overall we suggest that the kinds of causal approach we have used here to elucidate the key neural circuitry which contribute to the wide-ranging and complex changes which occur in the schizophrenic brain offer a promising basis upon which to target future therapeutic intervention. Such approach could be furtherly applied to other psychiatric studies.

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