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Aberrant Functional Connectivity Within and Across the Default Mode, Central-executive, and Salience Network in Patients with Schizophrenia: a Resting-state FMRI Study

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Objective To explore the feature of functional connectivity of default mode network (DMN), central-executive network(CEN), and salience network (SN) in patients with schizophrenia during a resting state by functional magnetic resonance imaging (fMRI).

Methods The SPM8, DPARSFA, conn, REST softwares combined with data-driven region of interest analysis were used to compare the functional connectivity (FC) of the DMN, CEN, and SN in 74 patients with schizophrenia(SZ) and 79 age- and gender-matched normal controls(NC). Medial prefrontal cortex(MPFC)was selected as seed region for identifying DMN and CEN; right anterior insula(rAI) for SN.

Results Compared with NC, SZ showed increased FC with bilateral dorsolateral prefrontal cortex(DLPFC) and bilateral putamen of the MPFC, and increased FC with left middle frontal cortex and precuneus/posterior cingulate cortex(Pcu/PCC) of the rAI. SZ also showed enhanced interconnectivity strengths of CEN-DMN, CEN-SN, and DMN-SN($p < 0.05$). Correlation analyses showed that the increased FC between MPFC and left DLPFC significantly negatively correlated with PANSS-negative symptoms($r = -0.224, p = 0.030$) and increased FC between rAI and Pcu/PCC significantly correlated with PANSS-positive symptoms ($r = 0.243, p = 0.020$).

Conclusion This study provides evidence for resting state functional abnormalities of DMN, CEN, and SN in schizophrenia patients. These aberrant functional connectivities in some key brain regions of the three network could be responsible for the schizophrenic symptoms.