

Resting-State Functional Connectivity: Signal Origins and Analytic Methods

Review

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Abstract

Resting state functional connectivity (RSFC) has been widely studied in functional magnetic resonance imaging (fMRI) and is observed by a significant temporal correlation of spontaneous low-frequency signal fluctuations (SLFs) both within and across hemispheres during rest. Different hypotheses of RSFC include the biophysical origin hypothesis and cognitive origin hypothesis, which show that the role of SLFs and RSFC is still not completely understood. Furthermore, RSFC and age studies have shown an "age-related compensation" phenomenon. RSFC data analysis methods include time domain analysis, seed-based

correlation, regional homogeneity, and principal and independent component analyses. Despite advances in RSFC, the authors also discuss challenges and limitations, ranging from head motion to methodological limitations.

Keywords: BOLD signal; Brain connectivity; Functional MRI; Functional connectivity; Psychoradiology; Resting state; Resting-state functional connectivity.