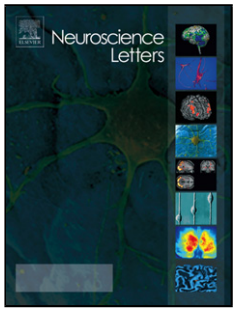

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Resting-State Functional Connectivity in prefrontal cortex investigated by functional near-infrared spectroscopy: A longitudinal and cross-sectional study

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Highlights

- fNIRS is used to investigate the stability of resting state functional connectivity (RSFC) in the prefrontal cortex.
- Longitudinal study showed that there was no significant variation with time in RSFC.
- Lower bound with 85% confidence level for healthy adults was given from cross-sectional study for each ROI (SFG, MFG and IFG).

Abstract: Functional near-infrared spectroscopy (fNIRS) was used to investigate the stability of resting state functional connectivity (RSFC) in the prefrontal cortex. In a longitudinal study for investigating the stability of RSFC with time, we recruited 6 healthy adult subjects to undergo a 10-min resting state fNIRS scan once per day for 7 consecutive days. In a cross-sectional study, 62 healthy subjects underwent a single 10-min RSFC measurement. Three regions-of-interest (ROIs) were studied, the superior frontal gyrus (SFG), the middle frontal gyrus (MFG), and the inferior frontal gyrus (IFG). Homologous RSFC between the left and right hemisphere was computed for each ROI. The longitudinal RSFC study showed no significant variation with time in each ROI, implying that a one-time scan was sufficient for evaluating RSFC for an individual. The cross-sectional study showed significant difference in RSFC between SFG and MFG/IFG. Based on these observations, a lower bound of RSFC with an 85% confidence level for healthy adults was given for each gender: in IFG, 0.6894 (male) and 0.5392 (female), in MFG, 0.6487 (male) and 0.5713 (female), and in SFG: 0.8042(male) and 0.7436(female). To test ability of the lower bound to differentiate between healthy adults and adults with neurological disorders (showing weaker RSFC), 15 patients with affective disorders or sleep disorder were recruited for the resting state scan. The results showed that IFG was