Fatigue-related reconfiguration of the functional network of the brain during cognitive load

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In this paper, we investigated the fatigue-related processes of reconfiguring the human brain functional network while solving the cognitive task. We analyzed the correlations between the psychophysiological state of the subject with the characteristics of neural activity. We found that the subject’s fatigue positively correlates with the average degree of functional connectivities between neural ensembles in the beta and alpha frequency ranges. The obtained results indicate the increase in the integrative processes of a functional neural network. We revealed that the increasing fatigue during the experiment does not decrease the efficiency of the task completion: the speed and correctness of responses do not change. This suggests that functional integration may reflect the optimization of the brain’s neural network during the experiment.