

Study of EEG signals in a wide range of frequencies in schizophrenia

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Abstract: The appearance of oscillations in all frequency bands is associated with networks of brake interneurons. Coordinated modulation of membrane potentials of pyramidal cell networks allows groups of neurons to work synchronously in the form of vibrational electrical activities. Numerous publications on the study of EEG in schizophrenia have shown that considering only alpha, beta, gamma, delta and theta ranges separately can lead confusions. For example, a decrease in the power and synchronization of the gamma range is recorded in schizophrenia in a stationary state, sensory gating, arithmetic task, speech, the situation of a random event (oddball), etc. However, there are opposite conclusions. Namely, increase of brain activity in the gamma range has been described in other works for somatosensory stimulation, visual recognition tasks and non-drug treatment in schizophrenia. Recent studies using higher sampling rates (2000 Hz and higher) have shown that high-frequency EEG oscillations can have physiological and pathological significance for humans. A comparative analysis of the results of healthy people and symptoms of schizophrenia for a certain age group is carried out. We have employed Fourier and wavelet analyses, autocorrelation function, Lyapunov exponents analysis, etc. It is shown that high-frequency oscillations (up to 5000 Hz) can serve as a new biomarker for determining schizophrenia.

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