

Symposium | Schizophrenia : [Symposium 28] Neurophysiological studies from a perspective of predictive coding in psychiatry

📅 Fri. Sep 26, 2025 9:00 AM - 10:30 AM JST | Fri. Sep 26, 2025 12:00 AM - 1:30 AM UTC 🏛️ Session
Room 6 (Conference Room B)

[Symposium 28] Neurophysiological studies from a perspective of predictive coding in psychiatry

Moderator: Kenji Kirihaara (Center for Coproduction of Inclusion, Diversity and Equity, The University of Tokyo)

[SY-28-02] Predictive coding studies using mismatch negativity in schizophrenia

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The predictive coding hypothesis postulates that the brain creates a model based on bottom-up sensory input from the environment, uses that model to predict the next sensory input in a top-down system, and then updates that model by calculating the prediction error between the actual sensory input and the prediction. Recent studies suggest altered predictive coding in patients with schizophrenia. Mismatch negativity (MMN) is thought to be a useful biological indicator that reflect prediction error. Auditory MMN has been repeatedly reported to be reduced in amplitude in patients with schizophrenia and is a biological index of electroencephalography (EEG) reflecting glutamatergic neuronal dysfunction, a leading pathological hypothesis for schizophrenia. We found that MMN amplitude is already reduced before the onset of schizophrenia and is associated with overall levels of social adjustment. We also found that MMN is hierarchically related to social adjustment level via negative symptoms and cognitive dysfunction. In order to investigate whether reduced MMN amplitude reflect altered predictive coding or altered adaptation, we deconstructed MMN into the adaptation component and the deviance detection component. We found that the deviance detection component, but not adaptation component was impaired in patients with schizophrenia. The results indicated that auditory MMN impairment in patients with schizophrenia reflects altered predictive coding in schizophrenia. We also estimated the sources of MMN reduction in patients with schizophrenia using EEG, identified the sources in the frontal and temporal cortices, and provided spatial information of neural networks underlying MMN. These studies bridge animal and clinical studies and greatly contribute to establish MMN as a biological index reflecting predictive coding to understand the pathophysiology and develop novel therapeutics of schizophrenia.