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

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

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

[SY-28-01] Revealing predictive coding impairments in schizophrenia through mismatch negativity: from neurophysiology to clinical implications

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Mismatch negativity (MMN) is an event-related potential component that reflects the brain's automatic detection of unexpected changes in auditory stimuli. It is widely recognized as a neural index of the predictive coding system, which continuously generates and updates internal models to anticipate sensory input. Within this framework, MMN is thought to be elicited by the detection of a mismatch between predicted and actual auditory input—signaling a prediction error. Consequently, impaired MMN in individuals with schizophrenia has been interpreted as evidence of disrupted predictive coding, contributing to their difficulties in interpreting and adapting to sensory environments. Such MMN impairments have been consistently observed not only in individuals with chronic schizophrenia but also in those at earlier stages of illness, including patients with first-episode psychosis (FEP) and individuals at clinical high risk (CHR) for psychosis. These findings suggest that MMN could serve as a transdiagnostic and stage-sensitive biomarker of neurophysiological dysfunction in psychotic disorders. In this talk, we will review recent electrophysiological research employing MMN paradigms to explore predictive coding deficits in schizophrenia and related conditions. Special emphasis will be placed on how MMN alterations are associated with clinical trajectories, functional outcomes, and symptom dimensions. We will also discuss the potential utility of MMN as a biomarker for early detection and prognosis, and its integration into translational research aiming to guide individualized treatment strategies in psychosis.