SL16

Calcium Channels and Neurological Disorders

Keiji Imoto

National Institute for Physiological Sciences, School of Life Science, the Graduate University for Advanced Studies (SOKENDAI)

Mutations of the $Ca_V2.1$ (P/Q-type) voltage-gated calcium channel alpha-1 subunit gene cause a wide spectrum of neurological disorders in mice and human. In mice, the prominent features are cerebellar ataxia and absence epilepsy. We have studied the pathophysiological mechanism of the neurological symptoms at synaptic and network levels, using mutant mouse strains, *tottering* and others. Although the $Ca_V2.1$ calcium channel is a major calcium channel and is expressed widely in the brain, impairments of synaptic and network functions are confined to limited areas, whereas other parts of the brain retain apparently normal functions, presumably owing to compensation by other types of calcium channels. On the other hand, calcium channel mutations cause alterations in expression of other functional molecules to cause various kinds of symptoms. These observations tell us some suggestion for the strategy of therapeutics.