Neurobiological basis of bipolar disorder

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Bipolar disorder is characterized by recurrent episodes of mania and depression. Lithium is known to be effective for prevention of relapse. Though genetic and environmental factors are known to contribute to its etiology, neurobiological basis of the disease has not been well understood. Recent genome wide association analyses showed the association with polymorphisms of calcium channel genes including \textit{CACNA1C}. Mendelian diseases accompanying bipolar disorder or depression include Darier's disease, Wolfram disease, and a mitochondrial disease, chronic external ophthalmoplegia (CPEO). Causative genes of these diseases are related to endoplasmic reticulum and mitochondria, which accumulate calcium intracellularly.

More recently, next-generation sequencing technologies facilitated the understanding of genetic architecture of neuropsychiatric diseases. In autism and schizophrenia, the role of de novo point mutations was suggested. Furthermore, somatic mutations in the brain were recently suggested to play a role in schizophrenia. Although the roles of de novo or somatic mutations are still under-studied in bipolar disorder, it is assumed that a variety of genetic factors would also be related to bipolar disorder.

To understand the neurobiological basis of bipolar disorder, the neuronal phenotypes at the microscopic levels should be investigated using animal models, postmortem brains, and patients' derived neuronal cells. In this presentation, recent findings of ongoing research project in our laboratory will be presented.

References