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With the aging of the population, various central nervous system disorders including Alzheimer's disease and Parkinson's disease, in which aging is regarded as the main risk factor, have become a social problem. Thus, clarification of the mechanisms of higher brain functions as well as pathophysiologic processes leading to functional and structural abnormalities in the brain is eagerly anticipated and even regarded as a responsibility of those working in life sciences today. Multiple levels of investigations seem to be required to tackle these various problems in brain sciences, for example, analysis of signal transmission between single neurons at the microscopic level on the one hand and behavioral analysis of animals at the macroscopic level on the other. This symposium focuses on recent findings of young investigators aiming to elucidate higher brain functions and/or the pathophysiology of central nervous system disorders, based on original approaches and viewpoints. Experimental procedures range from cell cultures and brain tissue cultures to whole animals including lower animals and genetically modified mammals. Future prospects including viewpoints on drug discovery and development will be discussed on the basis of new experimental findings with regard to crucial issues in brain sciences, such as the mechanisms of signal transmission of neuronal cells, physiologic roles of neuropeptides, and pathogenic processes of neurodegenerative disorders including Alzheimer's disease and Parkinson's disease.