

## **Research Supervisor's Policy on Call for Application, Selection and Management of the Research Area (FY2009)**

The brain is an information processor consisting of an enormous number of neurons. Individual neurons do not work independently but are connected to each other via synapses and form local neural networks in various areas of the brain that execute local information processing. Thus, the brain is characterized as a large assembly of such local networks for higher order information processing. In order to understand the function and pathological conditions of the brain, it is necessary to evolve research at multiple levels from molecules to cells to local networks to systems and to integrate their findings. This research area focuses on investigation into the function of local networks, as well as attempts to elucidate the molecular and cellular mechanisms of their development, differentiation, and regeneration. Furthermore, it aims to figure out the interactive principles of local networks governing the system.

Brain science research has recently made dramatic progress thanks to advances in molecular biology, cell biology, and information science, and there is increasing public expectation and interest in brain science, specifically in the three fields of *brain and society and education*, *brain and mental and physical health*, and *brain and information and industry*. However, many questions remain to be clarified regarding the molecular aspects of the principle of neural network formation, the information processing mechanism in local networks, and the brain function as a system for integration of local network functions. In-depth research about these issues to further strengthen the infrastructure for practical research in the above three areas is now an important challenge.

In light of this, in this area, researchers are expected to propose projects related to research in the fields of molecular biology, cell biology, morphology, physiology, biochemistry, pharmacology, and behavioral science that aim at elucidating the principles of neural network formation and functions, particularly those where multidisciplinary approaches using molecular, cellular and system neuroscience techniques are adopted in order to understand brain functions from molecular to system levels. Although this area is mostly characterized by basic science, researchers are encouraged to present strategic creative research projects that aim to develop innovative technology to control the generation, development, regeneration, and function of the neural network and may help develop technologies for the prevention and treatment of brain diseases, for recovery from a disability, and for compensation for defective functions in the future.