



Title of Project : Principles of memory dynamics elucidated from a diversity of learning systems

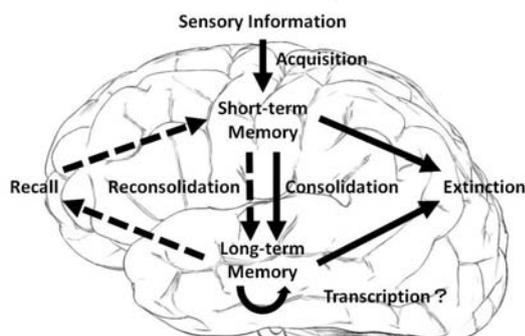
Minoru Saitoe

(Tokyo Metropolitan Institute of Medical Science, Department of Motor and Sensory System, Investigator)

【Purpose of the Research Project】

Memory is dynamic. During acquisition, associations are formed between incoming sensory information, and these associations are converted into memory. However, this is not a one-time event. Different memory phases are made at different times, and memories are continuously being modified. In addition, higher order processes, including mood, motivation, and attention, allow various external or internal conditions, such as aging and food availability, to influence memory formation, recall, and likely maintenance, adding a further layer of dynamism to the memory process. In our research projects, we expect to develop a model of memory mechanisms incorporating the formation and conversion of different memory phases to elucidate the fluidity of memory and understand how memory interacts with other higher order functions.

Conversion of Memory Information



【Content of the Research Project】

In our research, we will study a combination of different animal models, each of which has useful phenotypes and methodological advantages in areas of memory research. Using this approach, we can identify memory processes commonly used in most organisms, as well as processes that are specific to a particular organism.

1. Acquisition and stabilization of memory: We

will explore neural and genetic networks that associate sensory inputs and convert this to memory. We will also elucidate networks, which consolidate labile short-term memory to stable LTM.

2. Reconsolidation and extinction: Even “stable” long-term memories (LTM) become labile upon recall, and are then either reconsolidated for further storage or extinguished. We will investigate how LTM is destabilized upon recall and study similarity and differences between initial consolidation and reconsolidation.

3. Flexibility of memory mechanisms : Using *in vivo* and *in vitro* imaging techniques and behavioral genetics, we will investigate which internal and external conditions affect memory formation, retention and retrieval and how they affect neuronal and molecular dynamics.

【Expected Research Achievements and Scientific Significance】

By studying memory while it is being formed or recalled using real-time analysis technique, we will identify dynamic memory processes that cannot be identified using conventional, static methods. Also using various tagging techniques, we will identify how memories move during formation, maintenance, and recall. Since our projects study many different animal models, we expect to make breakthroughs in problems that are difficult to resolve using single animal systems.

【Key Words】

Memory dynamism: Refers to the constantly changing fluid nature of memory and how this fluidity allows memory to interact with other higher order brain functions.

【Term of Project】 FY2013-2017

【Budget Allocation】 1,210,100 Thousand Yen

【Homepage Address and Other Contact Information】

<http://memory-dynamism.jp>