

第18回 最先端脳科学セミナー

大学院生命融合科学教育部 特別講演・セミナー

日時： 2014年9月16日（火）16:00～18:30

場所： 薬学部研究棟Ⅱ 7階 セミナー室8

Optogenetic Manipulations of Memory Engrams

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要旨

It has long been hypothesized that memories are stored in the brain as “engrams”, yet the identity and nature of such engrams remains elusive. To identify and control the neuronal ensembles for an engram underlying a particular memory, we combined optogenetics with an activity-dependent, doxycycline-regulatable system. Using channelrhodopsin-2, we labeled neurons active during contextual fear conditioning in the dentate gyrus of the hippocampus, and later selectively activated these cells with light. By doing so, we induced fear recall in a context different from the original context. Light-activation of these engram-bearing cells allowed us to create memories that never existed in reality. Recently, we found we can also switch the emotional valence of a memory with this method. This system grants us the ability to dissect and control memory, thus greatly enhances our understanding for the mechanisms of learning and memory.

Mutual interaction between spatial information processing and adult neurogenesis in the dentate gyrus

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要旨

Neurogenesis continues to occur in specific regions of the adult brain. One of those brain areas is the dentate gyrus, a subregion of the hippocampus that is crucial in cognitive functions such as learning and memory. Accumulating evidence has suggested that these new neurons in the adult dentate gyrus have a role in spatial memory, although it is still unclear how they contribute to the memory functions. In this seminar, I will present our recent results indicating mutual interaction between spatial processing and neurogenesis in the dentate gyrus: 1) how spatial processing regulates neurogenesis and 2) how newly-generated neurons contribute to spatial processing.

※ 本セミナーは、大学院の単位認定の対象となります。

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