

第41回 最先端脳科学セミナー

Representations of spatial information of self and other in the hippocampus

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場所: 日医工オーデトリウム (医薬イノベーションセンター1F)

要旨

A prominent theory states that the hippocampus provides internal representations of spatial maps of external worlds, embodied by assemblies of place cells which encode positional information of an animal. Spatial encodings of hippocampal place cells are often sensitive to external landmarks; place cells can capture even slight environmental changes and quickly remap their spatial encodings. These observations indicate that hippocampal spatial representations are allocentric and are not constructed simply from path-integrations. If hippocampal map is allocentric, however, the spatial information of external cues such as moving objects or other animals should be also represented in the map. Yet, no evidence that hippocampal neurons have spatial representations of other animals has been reported. Here we investigate whether and how the hippocampus represents the spatial information of external agents, by examining activities of hippocampal neurons while an animal is observing another individual in the same environment. We newly developed spatial observation task, which is carried out with two rats, a forerunner ('the other') and an observer ('the self'), in a T-maze. Central for this task is that a correct choice (i.e., left or right arm) for the observer rat is determined by the choice of the forerunner, that is, the observer is required to watch carefully the trajectory of the forerunner. Using this behavioral task, we have performed large-scale extracellular recordings from CA1 of the observer rats. We found a group of neurons which jointly represented the spatial information of the other and self during the task behavior. Our results suggest that hippocampal cell assemblies can also map the spatial information of the other, as well as that of the self.

Featured publication:

- ◆ Danjo, T., Toyozumi, T. & Fujisawa, S. Spatial representations of self and other in the hippocampus. *Science* 359, 213-218, doi:10.1126/science. aao3898 (2018).

※ 本セミナーは、生命融合科学教育部「脳認知学特論」の一環です。履修者は、レポートの提出が必要です。また、大学院の単位認定の対象となります。

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