

*The role of sleep in the organization of spatial representations during memory formation*

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The development in the study of place cells discovered by O'Keefe (1971) has put the focus on the study of spatial representation of the environment in the processes and functions lead by the hippocampus. Among these functions, the hippocampus plays a preponderant role in the establishment of spatial memory, in which sleep is fundamental, suggesting a possible relationship between sleep and the establishment of spatial representations by place cells.

In this line, there is a query if sleep participates in the consolidation and configuration of spatial representations. One possibility is that sleep affect the configuration of place fields in a post-sleep exploration when place cells are reactivated during slow wave oscillations in a post-learning sleep.

In this study we will evaluate the influence of sleep on the variations in the configuration of a spatial map given by changes in spatial context during a spatial memory task. Specifically, we will analyze the features of place cells recorded in hippocampal CA1 in terms of firing rate and localization of place fields of adult Long Evans rats during object in place recognition (OPR) task performance and the reactivation and temporal coupling of place cell activity with the slow wave oscillations during the post-learning sleep phase.

Here we will present our preliminary results showing that post-learning sleep enhances performance in the OPR task. We expect to find that the coupling of place cells activity with hippocampal oscillatory activity during sleep helps to establish spatial representations that allow to improve the performance of spatial memory.

The study of sleep's influence on spatial representations given by place cells in the hippocampus will allow us to understand the importance of this process in the performance of a cognitive function such as memory.

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