

SFB/TR 8 Spatial Cognition / IQN Video Conference

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The Hippocampus, a Cognitive Map?

In 1978, John O'Keefe and Lynn Nadel published their influential book „The hippocampus as a cognitive map“, which was to an important extent based on the finding of place cells in the rat's hippocampal formation. However, in humans the role of the medial temporal lobe for spatial cognition is much less evident. Most theories on the function of the human hippocampus emphasize its role in declarative and episodic memory, since the most obvious deficit after bilateral hippocampal lesions is anterograde amnesia, i.e., the inability to encode novel episodic memories. Moreover, studies using functional magnetic resonance imaging (fMRI) during simple navigation tasks often do not show increased activity the hippocampus while navigating. We thus investigated in several fMRI studies whether the hippocampus formation is specifically involved in spatial tasks ranging from imagery over sequence learning to exploration. We conclude that spatial behavior alone does not lead to significant hippocampal activity unless the behavior is coupled to encoding or decoding spatial memory. Furthermore, our data support the view that the hippocampus plays a specific role for self-related, i.e., episodic memory.

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