

## The hippocampus: Memory in space and time

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The hippocampus is essential to episodic memory, which is characterized by our ability to recall the spatial and temporal organization of events that constitute a specific past experience. An understanding of how the hippocampus supports episodic memory would benefit by using an animal model to identify neural coding mechanisms for the spatial and temporal organization of memories within the hippocampus. With regard to spatial organization, I will describe an experiment using multivariate pattern analysis (MVPA) adapted for characterizing the activity patterns of neural ensembles, showing that the hippocampus creates a highly organized, hierarchical network representation of features of events and the places and contexts in which they occurred. With regard to temporal organization, I will describe recent evidence that hippocampal “time cells” (as contrasted with the famous hippocampal “place cells”) encode specific moments in the course of temporally extended experiences, and I will describe pattern analyses showing that time cell networks encode specific memories and predict memory success. These findings show that pattern analysis is useful for characterizing the activity of neural populations in support of an emerging view that the hippocampus serves episodic memory by creating a scaffold for the organization of events within their spatial and temporal context.