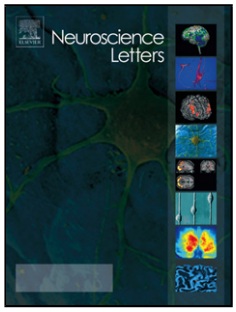

Title: New Perspectives on the Hippocampus and Memory

Author: Mariam Aly

PII: S0304-3940(18)30398-7
DOI: https://doi.org/10.1016/j.neulet.2018.05.047
Reference: NSL 33626

To appear in: *Neuroscience Letters*

Author: Charan Ranganath

PII: S0304-3940(18)30398-7
DOI: https://doi.org/10.1016/j.neulet.2018.05.047
Reference: NSL 33626

To appear in: *Neuroscience Letters*

Please cite this article as: Charan Ranganath, New Perspectives on the Hippocampus and Memory, Neuroscience Letters https://doi.org/10.1016/j.neulet.2018.05.047

New Perspectives on the Hippocampus and Memory

Introduction to the Special Issue

Mariam Aly[1] and Charan Ranganath[2,3,4]

[1]Department of Psychology, Columbia University; New York, NY, 10027
[2]Center for Neuroscience, University of California, Davis; Davis, CA 95618
[3]Memory and Plasticity (MAP) Program, University of California, Davis; Davis, CA 95618
[4]Department of Psychology, University of California, Davis; Davis, CA, 95616

correspondence: ma3631@columbia.edu; cranganath@ucdavis.edu

Memory research underwent a renaissance after the groundbreaking report of severe amnesia following resection of the hippocampus and medial temporal lobe cortex by Scoville and Milner in 1957 [1]. Milner's case reports on H.M., and her subsequent studies of amnesic patients, launched an entire field of research on the role of the hippocampus and surrounding medial temporal lobe cortex in the formation and retention of memories, and research on this topic grew exponentially over the next 60 years.

Over time, the myth of H.M. came to overshadow the complexities of the neurobiology and cognitive sequelae of amnesia. The majority of neuroscience and cognitive psychology textbooks now ascribe to the hippocampus and medial temporal lobe cortex a specialized role in episodic or declarative memory, to the exclusion of other functions, such as perception, working memory, and implicit memory. Moreover, brain areas outside of the medial temporal lobe are given limited consideration for their role in episodic memory.

Modern research, however, has shattered many of the myths described in the textbooks. It is still clear that the hippocampus is involved in, and critical for, episodic memory, but its role appears to be more nuanced than we initially thought. It is also clear that episodic memory depends on a network that extends beyond the hippocampus. Moreover, accumulating evidence suggests that the hippocampus contributes to many cognitive domains beyond long-term memory. These findings have prompted many of us to question long-held dogmas about the hippocampus, along with the idea that memory is an ability that can be separated from other forms of cognition.

The goal of this special issue is to call attention to new perspectives on the functions of the hippocampus, how it performs these functions, and how future research can address outstanding controversies and better characterize the hippocampus and the networks with which it interacts.

A great deal can be understood about the hippocampus by taking a phylogenetic perspective. **Murray, Wise, and Graham** [2] take such an approach, and they delve into how the functions of the hippocampus might have developed over the course of evolution. Specifically, the development of foveal vision in primates enabled our ancestors to forage in an extensive spatial environment, requiring decisions to be made at a distance based on information in the visual scene. The authors argue that these developments enabled specialization of the primate hippocampus in the representation of visual scenes, as well as more abstract spatial representations. They suggest that these basic functions of the hippocampus are recruited to represent temporal and spatial information that supports perception, implicit memory, and explicit memory.