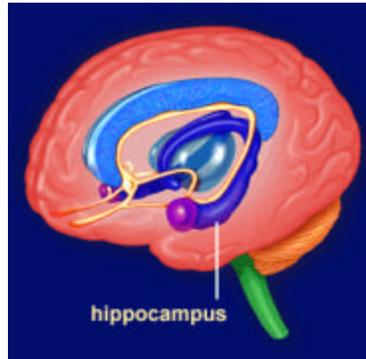


## The Hippocampus: A Brief Overview

The hippocampus is a specialized region of the "limbic cortex" located in the temporal lobe.



Human patients with extraordinary cases of amnesia have triggered a wealth of research on the role of the hippocampal formation in learning and memory during the last 40 years. The observation of anterograde amnesia (memory for events prior to the injury were intact whereas new declarative memories could not be performed) has triggered a number of theories about the role of the hippocampal formation in declarative memory [aside: amnesia is called retrograde when one cannot remember events that occurred before a brain injury, whereas anterograde amnesia refers to the fact that events that occur after the injury cannot be remembered].

[Aside: terms that have been used to describe two types of memories. The first type, often called procedural, implicit or non-declarative refers to perceptual learning or learning of actions that do not require a memory of these events. For example, amnesic subjects can acquire a nictitating membrane response, but will not remember having undergone the experiment later. The memory of the event itself would be called declarative, explicit or working memory by many researchers].

Spatial learning. Consistent impairments after hippocampal lesions were seen in animals that had to navigate. In relation to that, one of the most intriguing discoveries about the hippocampal formation was that observed by O'Keefe and colleagues in the early 1970's who recorded the activity of individual neurons in the hippocampus as an animal moved

around in an environment. They found that some neurons fired at a high rate ONLY when the animal was moving through a particular location in space. Different neurons had different spatial receptive fields. Interestingly, the spatial fields of the neurons would rotate with respect to the absolute orientation when exterior cues were rotated, spatial receptive fields in the same environment seem to be stable over repetitive placements in the same environment, and a cell can have multiple spatial fields if the rat is moved between environments.

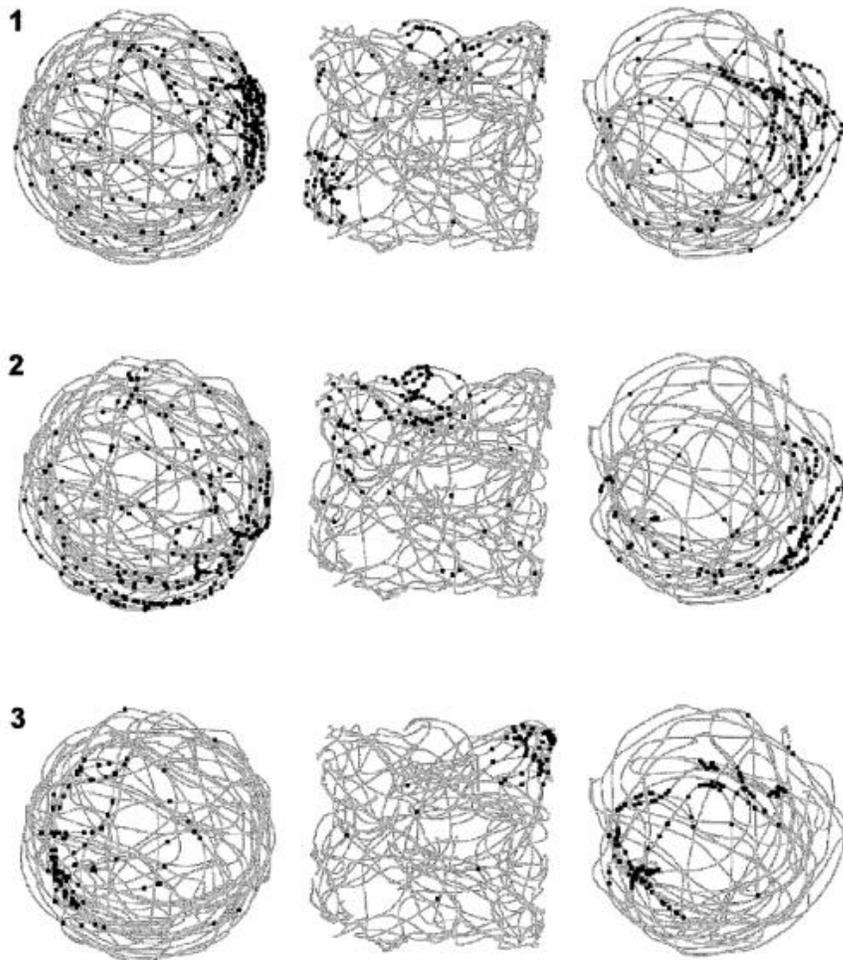


Figure .. self-made

