The Role of the Hippocampus Outputs via the Dorsal Fornix for Spatial Memory

Giang Tran and Raymond Kesner
Department of Psychology

The CA1 subregion of the rat hippocampus mediates retrieval of spatial information. Previous literature suggests that the efferent pathway of the CA1 subregion projects to the medial septum (MS) via the dorsal fornix. To investigate the role of this efferent pathway for encoding and retrieval of spatial information, the dorsal fornix was transected under electrophysiological control. The transection disrupted the output pathway from CA1 to MS, but did not affect any inputs from the MS to the hippocampus. Animals were tested on a modified Hebb-Williams maze. Animals learned to travel the maze to get to the goal box with as few errors as possible. The number of errors was used as a measure of learning and remembering. An encoding index was calculated by subtracting the average number of errors made per trial during the last five trials of Day 1 from the number of errors made during first five trials of Day 1.

The retrieval index was calculated by subtracting the average number of errors made during the first five trials of Day 2 from the number of errors made during last five trials of Day 1. Animals with dorsal fornix transections showed a deficit for retrieval, but not encoding. The results suggest that the CA1 output pathway to MS plays an important role for retrieval of spatial information.

This research is supported with funding from The National Science Foundation.

Giang Tran is supported with funding from The University of Utah, Department of Biology, Neuroscience, Undergraduate Research Program.