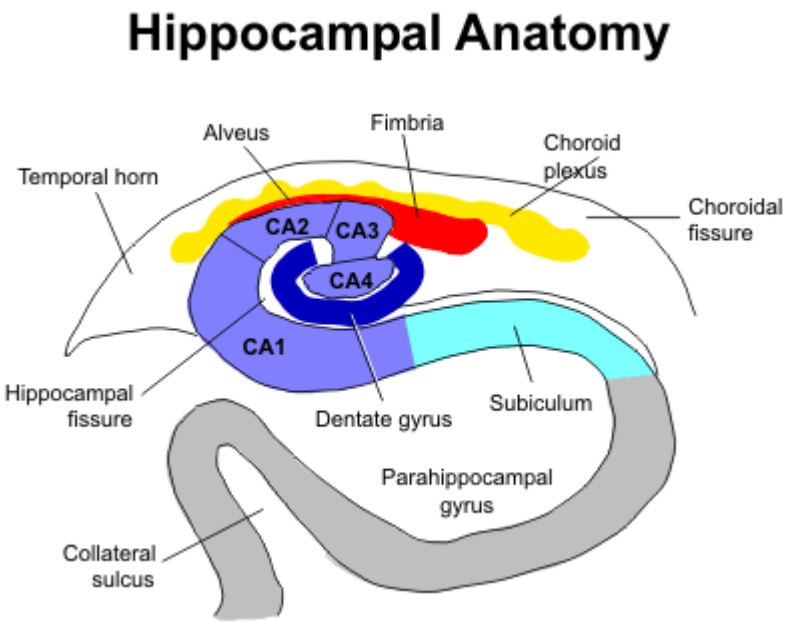
Subiculum



The subiculum is a pivotal but under-investigated structure positioned between the hippocampus proper and entorhinal cortex and other cortices, as well as a range of subcortical structures. The subiculum has a range of electrophysiological and functional properties which are quite distinct from its input areas; given the widespread set of cortical and subcortical areas with which it interacts, it is able to influence activity in quite disparate brain regions. The rules governing plasticity of synaptic transmission in the hippocampal-subicular axis are poorly understood; this axis appears to share some properties in common with the hippocampus proper, but behaves quite differently in other respects. Equally, its functional properties are not well understood; it plays an important but ill-defined role in spatial navigation, mnemonic processing and control of the response to stress. O'Mara reviewed investigations of synaptic plasticity in the hippocampal-subicular pathway, recordings of subicular neurons in the freely moving behaving animal, the effects of behavioural and other stressors on subicular synaptic plasticity, and anatomical data on the dorso-ventral organization of the subiculum in relation to the hypothalamic-pituitary-adrenal (HPA) axis. I argue that there is a dorso-ventral segregation of function within the subiculum: the dorsal component appears principally concerned with the processing of information about space, movement and memory, whereas the ventral component appears to play a major regulatory role in the inhibition of the HPA axis [1)].

Evidence has been provided that the subiculum may play an important role in the generation of seizures.

The aim of a study was to assess neuropsychological correlations with the T2* relaxation time (T2*-RT) of hippocampal subregions in adolescents using ultra-high-field (UHF) 7T magnetic resonance imaging (MRI).

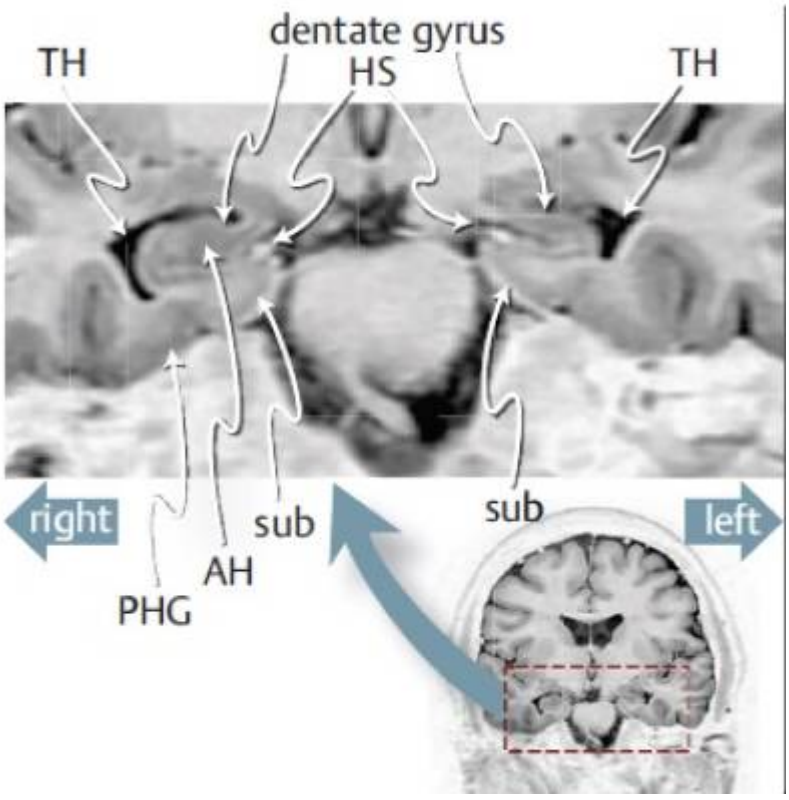
They assessed the T2*-RTs of hippocampal subregions in 31 healthy 11th- or 12th-grade high school students using an UHF 7.0 T MRI system. T2*-RTs of the cornu ammonis (CA) 1, CA2, CA3, and CA4 subregions and the subiculum were calculated for both the left and right hippocampus. Seven

subtests of the Cambridge Neuropsychological Test Automated Battery were administered to the subjects to assess visuospatial memory.

Poor performances in delayed recall in the pattern recognition test were significantly correlated with longer T2*-RTs in the bilateral subiculum (right, r=-0.480, p=0.006; left, r=-0.648, p<0.001) and the left CA2 (r=-0.480, p=0.006).

This study showed that longer T2*-RTs in the subiculum were associated with poorer performances in delayed recall in the visual memory tasks. This finding suggests that the subiculum might play a predominant role in delayed recall in adolescents [2].

Subiculum stimulation



see Subiculum stimulation

1)
O'Mara S. The subiculum: what it does, what it might do, and what neuroanatomy has yet to tell us. J Anat. 2005 Sep;207(3):271-82. doi: 10.1111/j.1469-7580.2005.00446.x. PMID: 16185252; PMCID: PMC1571536.

2)
Jeon S, Hwang SI, Son YD, Kim YB, Lee YJ, Kim SJ. Association between delayed recall and T2* relaxation time of the subiculum in adolescents: Implications for ultra-high field magnetic resonance imaging. Psychiatry Clin Neurosci. 2019 Mar 30. doi: 10.1111/pcn.12843. [Epub ahead of print] PubMed PMID: 30927296.