Original Paper

# The effect of spatial learning on the number of astrocytes in the Rat's dentate gyrus

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## Abstract

**Background and Objective:** Dentate gyrus is a part of hippocampal formation that plays an important role in memory and learning. Astrocytes are one of the important glial cells in nervous tissue that play a more active role in neuronal activity, including regulating ion flux currents, energy production, neurotransmitter release, and synaptogenesis. The aim of this study was to determine the spatial memory effect on the number of astrocytes in Rat's dentate gyrus.

**Materials and Methods:** This experimental study, was done on 18 male Wistar Rats with using Morris water maze and Reference and Working memory methods. After spatial learning the Rat's brains was carried out and histological preparation was carried out, the slices were with PTAH method. The data analyzed, using T-test and One-way ANOVA.

**Results:** The results showed significant difference in astrocytes number in dentate gyrus area between Reference memory ($300.57\pm5.98$) and control ($73.73\pm22.61$) groups ($P<0.05$). The difference between working memory ($375.77\pm4.11$) and control groups was significant. Comparing two groups there was a significant difference of number of astrocytes cell between the working memory and Reference memory group ($P<0.05$).

**Conclusion:** This study showed that spatial learning such as Reference memory and Working memory increase the number of astrocytes in dentate gyrus and this increase can be due to duration of learning.

**Keywords:** Dentate gyrus, Astrocyte, Spatial learning, PTAH staining