Effect of Anzerut (*Astragalus fasciculifolius*) on Spatial Memory Impairment and Its Potential Antioxidant Effects in a Rat Model of Multiple Sclerosis

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ABSTRACT

Introduction: Multiple Sclerosis (MS) is an inflammatory autoimmune disease in which the myelin sheaths of nerve cells are damaged in the brain and spinal cord. Cognitive changes, including memory impairment, are common in MS patients, and there is still no definitive treatment available. Plants of the genus Astragalus from the legume family contain more than 900 species of annual and perennial herbaceous plants in Iran, most of which are endemic to the region. Recent studies have shown that the Astragalus has antioxidant, neuroprotective, and anticonvulsant effects. Anzerut is a species on which limited studies have been conducted. Considering the various biological effects of the Astragalus genus, we aimed to investigate the impact of Anzerut on spatial memory impairment in a rat model of MS.

Methods and Materials: In the present study, 42 male rats weighing between 230-280 g were randomly divided into six groups of seven rats each. Ethidium bromide was used to induce MS. Then, doses of 150, 450, and 800 mg/kg of Anzerut extract were administered intraperitoneally for 14 days. Behavioral testing using the Morris water maze, hippocampal malondialdehyde (MDA) level measurement, and total antioxidant capacity were evaluated. Finally, one-way ANOVA followed by Tukey's test will be used to compare the data.

Results: The injection of ethidium bromide caused a significant decrease in the time spent (p = 0.01) and distance traveled (p = 0.001) in the target quadrant on the test day compared to the control group. Treatment with Anzerut at a dose of 150 mg/kg for 14 days significantly increased the time spent and distance traveled (p = 0.05) in the target quadrant on the test day compared to the MS group. Additionally, the injection of ethidium bromide resulted in a significant increase in hippocampal MDA level and a decrease in the total antioxidant capacity of the hippocampus.

Conclusion and Discussion: The injection of ethidium bromide into the CA1 region of the hippocampus induces MS, while the administration of Anzerut extract improves learning and memory in the experimental MS model. This effect appears to be mediated through antioxidant pathways in the brain.

Keywords: Antioxidant; Astragalus plant, Multiple sclerosis

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