

EFFECTS OF INTERMITTENT HYPOXIA ON DEPRESSION-LIKE BEHAVIOR AND SEROTONERGIC SYSTEM IN RODENT MODEL

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BACKGROUND AND AIM: Hypoxia can affect many organ systems. The aim of the present study was to investigate the effects of intermittent hypoxia on serotonin levels and depression-like behaviors in different neuroanatomical regions.

METHODS: Sixteen adult Wistar albino female rats, 8 in the control group and 8 in the hypoxia group, were used in the experiment. Hypoxia group will be exposed to 3000 meters, 69.3 kPA, 3000 (520 mm-Hg, approximately 14% O₂) protocol for 14 days, 5 hours a day. Locomotor activity with the open field test and depression-like behaviors with the forced swimming test were examined. The subjects were sacrificed under 50 mg/kg sodium thiopental anesthesia. Prefrontal cortex, striatum, thalamus, hypothalamus, hippocampus and serum were analysed for serotonin level by ELISA. Normal distribution was analysed by Shapiro Wilk test as a statistical method. The difference between the groups was analysed by Student-t test. All procedures were carried out under the approval of the Ankara University Experimental Animals Ethics Committee, and the approval reference number is 2023-9-79, meeting date: 10.05.2023.

RESULTS: Intermittent hypoxia induced no change in locomotor activity ($p>0.05$) but increased depression-like behavior ($p<0.05$). Swimming behavior associated with the serotonergic system was significantly reduced ($p<0.0001$). Intermittent hypoxia decreased serotonin levels in the prefrontal cortex ($p<0.005$), and striatum ($p<0.05$). No significant changes were seen in other anatomical regions and serum ($p>0.05$).

CONCLUSIONS: In the present study, intermittent hypoxia both induced depression-like behaviors and decreased serotonin levels in the prefrontal cortex and striatum. It should also be assessed for brain health, including hypoxic conditions seen in some diseases such as sleep apnea. More studies on hypoxia, behavior and serotonin are needed.

Keywords: Depression-like behavior, forced swimming test, intermittent hypoxia, prefrontal cortex, serotonin, striatum