Journal of Acoustical Engineering Society of Iran, Vol. 5, No. 1, 2017

Effect of sound waves on cholinergic system and locomotor activity in rat

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Abstract

Today, sounds in the environment are a stressor and can damage different systems of the body. Neuronal messages are controlled and regulated by enzymes. Among these enzymes, acetylcholine esterase enzyme is more important in memory and learning. The aim of this study is to investigate the effect of mechanical waves on cholinergic system in rat behaviors in stressful environments. In this study, 10 adult male rats were used. The rats were exposed to 528 Hz and 100 dB 2 hr per day for 21 days. The activity of acetylcholinesterase enzyme was measured. The plus maze test was used to measure anxiety behavior. The results showed that the sound increases the activity of acetylcholinesterase enzyme, which causes memory impairment. The percentage of time in the open arm decreases, in addition, the percentage of enter into the open arm decreases, which indicate an increase in anxiety. Moreover, corticosterone level has increased. Results reveal that sound changes memory and anxiety behaviors by distrupting the cholinesterase enzyme activity and neurotransmitter secretion.

Keywords: Acetylcholinesterase enzyme, Sound waves, Corticosterone hormone, Anxiety.

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[DOR: 20.1001.1.23455748.1396.5.1.6.0]

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