عنوان مقاله:

Exposure to Chronic Noise Reduces the Volume of Hippocampal Subregions in Rats

محل انتشار:

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خلاصه مقاله:

Objective The hippocampal circuit integrity is crucial for learning and memory. Despite the existing reports on hippocampal–dependent memory impairment due to noise stress, there are only a few studies on the effect of noise stress on anatomical structure of hippocampus. The present study is aimed to investigate the likely effects of chronic noise exposure on the volume of rat hippocampus. Materials and Methods Two-month male Wistar rats were randomly divided into three groups (n=۱۰ in each group). In the control group rats were maintained under standard laboratory conditions (۱۵۰ days). In the noise-exposed group: Rats were exposed to ۴۰ dB unmodulated sinosoidal noise with a frequency of ۱۱۰۰ Hz for ۲۰ mins, three times per day for ۹۰ days. The recovery group rats were exposed to noise for ۹۰ days and allowed to survive without further treatment until the day of sacrifice (۱۸۰th day). The right hemispheres were selected for stereological study. Twenty five µm thick sections were cut along the entire extent of the hippocampus. Using systematic uniformly random sampling, one section from every twenty sections was analyzed. Volume estimation was performed using Cavalieri principle. Results Statistical analysis revealed that noise stress induces a significant reduction in volume of all layers of hippocampal subdivisions, except CA۱ hippocampal field. In addition, we found that rats which were allowed to recover from noise displayed larger volume ofdentate gyrus and CA۳ hippocampal field in comparison to noise-exposed rats. Conclusion Reduced volume of hippocampal layers most probably reflects structural alterations in the neurites of related neurons. These results provide a neuroanatomical basis that may be relevant to the reported memory disturbances in human and animals following noise stress.

کلمات کلیدی:

Hippocampus, Noise pollution, Volume estimation