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Alterations of central auditory system volume by acoustic white noise during the fetal and critical neonatal periods in rat

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Background and Aim : Along with industrial development, acoustic noise pollution from variety of sources considered as a serious health hazard. It is fully accepted that acoustic noise with enough intensity and duration could lead to temporary and permanent hearing threshold level shifts. Noise induced hearing impairment is fundamentally associated with spiral ganglion cell degeneration and/or cochlear outer hair cell loss, however entire central auditory system are affected. Nonetheless, whole aspects of its impact is not clear. Therefore, the aim of the present study was to evaluate the effect of long term, moderate level noise exposure during fetal to critical neonatal periods of rat infants on the volume of medial geniculate body (MGB) and auditory cortex.

Methods : Twenty four male offspring of 12 pregnant rats was divided into four groups: fetal to critical period group, which were exposed to noise from the last 10 days of fetal life till postnatal day 29; fetal period group, that exposed to noise during the last 10 days of fetal life; critical period group, exposed to noise from postnatal day 15 till 29, and control group. Here, white noise at 90 dB for 2 hours per day was used during the experiment. The volume was estimated using the Cavalieri's principle.

Results : No significant difference was detected in the volume of auditory cortex between groups while MGB volume in fetal to critical period group was higher than rest.



Conclusion : This increased volume of MGB can be assume as the consequence of inflammatory responses to long term, moderate level noise exposure during fetal to critical neonatal periods. Nonetheless, further validation studies are required to evaluate this finding.

Keywords : White noise; Medial geniculate body; Volume