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OP-105 EFFECTS OF SILICA NANOPARTICLES ON AUDITORY SYSTEM

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Aim: Nanotechnology is defined as nanoscale materials and structures, usually in the range of 1 -100 nm. Among the various types of nanoparticles (NPs), silica nanoparticles have become popular as drug delivery, cosmetic, textile and optical imaging agents. In spite of their widespread use, silica nanoparticles (SiO_2 NPs) toxicity and safety to mammalian and the environment have not been extensively investigated. In the present study, we aimed to investigate the effects of 20 nm sized Silicon dioxide (SiO_2) NPs on rat auditory system.

Material and Methods: In this study twelve male Wistar albino rats were used. The animals were divided into two groups as control and experimental group. The rats in the control group were injected with intratympanic 0.5 mL 0.9% saline for 7 days. The rats in the experimental group exposed to intratympanically 500 µg/mL/day (0.5 mL) dissolved SiO_2 nanoparticles in saline for 7 days. The hearing functions of all rats were evaluated using recordings of brain stem auditory evoked potentials (ABR) and distortion product otoacoustic emissions (DPOAE). Structural changes were determined using field emission scanning microscopy (FE-SEM) and light microscopy.

Results: From ABR recordings, the peak latencies (PLs), interpeak latencies (IPLs), and amplitudes were measured. In the experimental group, amplitude of II. and III. waves were decreased significantly with respect to control group. PLs of III. waves and IPLs of I-III waves in experimental group were longer compared to control group. In DPOAE evaluation, statistically significant differences were observed between groups in 4 kHz stimulus. In this frequency, DPOAE value in experimental group increased with respect to control group, significantly. In light microscopic and electron microscopic examination deformation in hair cells and decrease