Sod1 and Sod2 genes overexpression underlies the attenuation of the noise-induced oxidative stress in D-methionine treated mice

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ABSTRACT

The intervention with the use of antioxidants has been proposed as an effective rescue method of hair cell survival and associated hearing loss after acoustic trauma. In our previous study we noticed that the protective effect depends on the dose of D-methionine (D-met) and is fully expressed only when the drug is administered at the dose of 400 mg/kg.

The aim of this study was to assess the changes in superoxide dismutases (Sod1 and Sod2) expression following noise exposure in relation to the intervention with D-met treatment.

The auditory brainstem responses and expression of Sod1 and Sod2 were measured in the C57BL/6 mice cochleas 1, 7 and 14 days after noise exposure (4 kHz octave band at the intensity of 110 dB SPL for 8 hours). D-met was administered 1 h before and 1 h after noise exposure, and on days 1, 2 and 3 after noise exposure.

Audiometric threshold shifts were significantly smaller in animals injected with D-met comparing with the noise-exposed group. Noise exposure caused significant decrease in the expression of Sod1 and Sod2 comparing with the control group. Administering D-met resulted in the significant increase in Sod1 expression 7 days after exposure, whereas that of Sod2 decreased. The increase in Sod2 expression level was noticed 14 days after noise exposure.

The findings of this study confirm at the genes level that the intervention with D-met at the dose of 400 mg/kg attenuates the noise-induced oxidative stress in mice cochlea and associated functional hearing loss.