Abstract 1.

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Abstract

Title: Electrophysiological evidence of noise-induced cochlear synaptopathy in humans

Background: Animal studies (mostly rodents) have demonstrated that the synaptic connection between inner hair cells and auditory nerve fibres is the element of the cochlea most vulnerable to noise exposure. The effects of cochlear synaptopathy can be observed as a reduced auditory brainstem response (ABR) wave I amplitude (A1) at suprathreshold levels. In humans, some authors suggest that cochlear synaptopathy is the cause of speech intelligibility deficits usually reported by subjects with normal pure-tone audiograms, however the prevalence of cochlear synaptopathy in humans is currently poorly understood.

Methodology: 74 subjects (37 females, 29-55 years) with normal or near normal audiograms participated. The ABR was recorded with clicks presented monaurally at 75 dB nHL. Lifetime noise exposure (LNE) was evaluated by an online survey developed by the research group.

Results: Consistent with animal studies, results show a mild, but statistically significant, negative correlation between LNE and A1.

Conclusions: These results suggest that noise exposure in occupational and recreational activities may deteriorate the neural encoding in the periphery of the auditory system. There is no known treatment for this type of pathology and therefore, prevention is key. Audiologists and clinicians play an important role in promoting healthy hearing habits and minimization of noise exposure, especially when counselling those who present clinically with problems understanding speech in noise despite a 'normal' audiogram.