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Differential susceptibility to noise-induced permanent threshold shift between albino and pigmented guinea pigs

John W. Conlee^{1, 2}, Khader J. Abdul-Baqi⁴, Geary A. McCandless³, Donnell J. Creel^{1, 2}[Show more](#)[https://doi.org/10.1016/0378-5955\(86\)90177-2](https://doi.org/10.1016/0378-5955(86)90177-2)[Get rights and content](#)

Abstract

Evidence that reduced levels of cochlear melanin are associated with increased auditory sensitivity, increased levels of auditory fatigue and an increased susceptibility to noise-induced hearing loss led us to investigate the effects of noise exposure on the cochlear microphonic (CM) in albino and pigmented English shorthair guinea pigs. CMs were recorded from the round window prior to and at 90 min and 7 days after exposure to 45 min of 126 dB noise. Thresholds for the first detectable elicitation of the CM for four pure tones were determined and the output voltage of each cochlea was measured in 10 dB steps through intensity levels which produced a maximum voltage amplitude in the CM and voltage rollover. This analysis demonstrated that:

- (1) albino guinea pigs displayed significantly lower auditory thresholds than did pigmented animals before exposure to noise;
- (2) thresholds were elevated to comparable levels in both groups 90 min after noise exposure;
- (3) pigmented guinea pigs showed a reliable recovery in CM thresholds 7 days after exposure to noise while thresholds in the albinos remained elevated to the same degree at both 90 min and 7 days after noise;
- (4) 90 min after noise exposure, the maximum voltage output of albino cochleas was significantly less than that recorded from the cochleas of the pigmented guinea pigs. These

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high intensity noise than pigmented guinea pigs. Converging evidence indicates that some aspects of cochlear function involve melanin pigment and that its absence may produce auditory abnormalities. Reduced melanin pigmentation may also contribute to such phenomena as noise-induced threshold shifts and individual differences in noise-induced hearing loss.

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Keywords

albinism; pigmentation; auditory system; noise-induced hearing loss

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