Noise On The Brain:
A Current Review Of The Effects Of Acoustic Trauma

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The aim of this session is to provide a general understanding of how various levels and durations of environmental noise exposure affect the physiology of the inner ear and higher level brain areas, and to offer an understanding of how both temporary and permanent damage to these structures alter a listener's hearing. While damage to the inner ear is a primary concern when considering the effects of noise exposure, recent research has shown strong and rapid effects of noise exposure on the processing of acoustic stimuli in higher areas of the brain. We will discuss this research, as well as current research regarding cochlear damage and the implications for noise-induced hearing-loss and accompanying conditions such as tinnitus. Furthermore, new data suggest that simply being exposed to noise below critical levels for a long enough time can lead to neurological changes that result in threshold shifts. These changes are detectable using psychophysical tests intended to measure sensitivity to auditory parameters other than the absolute threshold of hearing. We will discuss when and why this happens and how these changes can affect the listener.

Biography

Dr. Crum is a research fellow in the Department of Biomedical Engineering at Johns Hopkins Medical School. Her work investigates neural circuits in the auditory cortex involved in analyzing and responding to a noisy auditory environment. This includes using both behavioral and physiological approaches to gain an understanding of intensity coding and scene analysis in an awake system. Dr. Crum completed her doctoral studies at the University of California Berkeley with an emphasis in neuroscience and psychoacoustics and her masters degree at McGill University with an emphasis in auditory scene analysis. She also holds a degree in violin performance from the University of Iowa. In addition to presentations directly related to her research, Dr. Crum has been invited to numerous society conferences to present lectures that offer an understanding of psychoacoustic phenomena through an integration of the underlying anatomy and physiology of the auditory system.