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NEUROSCIENCE AND PHYSIOLOGY SEMINAR SERIES

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"Sound-Induced Plasticity of the Lateral Olivocochlear Efferent System"

Every living being has a unique history of sound experience. While intense noise can damage the inner ear, moderate sounds can also shape auditory function. Understanding when sound exposure is beneficial vs. harmful is key to promoting healthy hearing. Additionally, hearing in noisy environments presents a significant challenge, even for individuals with normal hearing. The lateral olivocochlear (LOC) efferent system is thought to modulate auditory nerve activity to support hearing-in-noise, yet its precise role remains elusive. Sound exposure alters neurotransmitter expression in LOC neurons, suggesting a form of plasticity that could influence auditory function. However, most studies have been confounded by noise-induced hearing loss, making it difficult to isolate LOC effects on hearing. In this talk, I will review what is known about the LOC system and its role in hearing. Then, I will present experiments probing the dynamics of sound-induced changes to the LOC system in mice, using cochlea and brainstem histology and noninvasive electrophysiological measures of hearing. I will conclude by outlining next steps to clarify how sound experience and LOC function interact to shape hearing-in-noise, particularly in the context of hearing loss.

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