

Auditory brainstem gap responses start to decline in mice in middle age: A novel physiological biomarker for age-related hearing loss

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Abstract

The auditory function of the CBA/CaJ mouse strain is normal during the early phases of life and gradually declines over its lifespan, much like human age-related hearing loss (ARHL) but within the “time frame” of a mouse life cycle. This pattern of ARHL is similar to that of most humans: difficult to diagnose clinically at its onset and currently not treatable medically. To address the challenge of early diagnosis, we use CBA mice to analyze the initial stages and functional onset biomarkers of ARHL. The results from Auditory Brainstem Response (ABR) audiogram and Gap-in-noise (GIN) ABR tests were compared for two groups of mice of different ages, namely young adult and middle age. ABR peak components from the middle age group displayed minor changes in audibility but had a significantly higher prolonged peak latency and decreased peak amplitude in response to temporal gaps in comparison with the young adult group. The results for the younger subjects revealed gap thresholds and recovery rates that were comparable with previous studies of auditory neural gap coding. Our findings suggest that age-linked degeneration of the peripheral and brainstem auditory system begins in middle age, allowing for the possibility of preventative biomedical or hearing protection measures to be implemented in order to attenuate further damage to the auditory system attributable to ARHL.

Bio

Tanika Williamson is a proud ‘Nole-Bull, who received her BS in Chemical Engineering from Florida State University, and recently graduated with her MS and PhD in Biomedical Engineering from the University of South Florida. Her dissertation focused primarily on the neurological effects of hormone replacement therapy in the aging auditory system. She was awarded an NIH P01 Supplement Grant, a McKnight Fellowship, Graduate Researcher of the Year, and has produced numerous publications for national conference meetings and journals. She is currently working as a Postdoctoral Research Fellow and hopes to pursue a career in the pharmaceutical industry to help improve the quality of drugs, biomedical devices, and therapeutic treatments offered to patients.

