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Title: Longitudinal analysis of auditory dysfunction in Alzheimer's disease mice 5xFAD

Abstract

In the present study, we performed longitudinal analysis of auditory dysfunctions in AD using 5xFAD Alzheimer's disease mouse model. Those animals were bred in CBA/B6 hybrid background to compensate the hearing loss deficits in C57/B6 strain. Consistent with previous studies, those animals showed accelerated age-related hearing loss with features of auditory neuropathy. Masked ABR and notched ABR tests were also performed on those animals, and results of those suggest auditory processing deficits in AD animals. ABR waveform analysis revealed enhanced central gain in the 5xFAD animals, which wasn't present in APP/PS1 animals with the same genetic background. Lastly, we analyzed amyloid deposition in the auditory brainstem in 5xFAD and APP/PS1 animals using publicly available databases. We find that in both lines, plaque accumulates in the auditory cortex and medial geniculate complex; however, in 5xFAD mice it also accumulates in the inferior colliculus and levels in the medial geniculate complex are much higher. Over all, our study showed that auditory dysfunction is a possible outcome of Alzheimer's disease. We conclude that amyloid beta plaque deposition in the auditory pathway may result in circuitry deficits.