Bridging the Gap Between Early Non-Invasive Markers and Neural Changes in Neurodegenerative Diseases

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Neurodegenerative diseases such as Alzheimer's Disease (AD) and Frontotemporal Degeneration (FTD) are major public health challenges, with a need for early, non-invasive markers to aid in diagnosis and monitoring. Recent research suggests that subtle changes in speech patterns could serve as an early indicator of these diseases. However, further research is needed to fully map speech changes associated with neurodegeneration and understand the underlying brain mechanisms driving these alterations.

This interdisciplinary project aims to link changes in speech to their neural origins by studying both human participants and mouse models of neurodegeneration. Mice communicate through ultrasonic vocalisations (USVs), while humans use speech – both of which will be analysed for changes in acoustic features and compared across species. From the insight gained from the acoustic changes, electrophysiological analyses will be applied to identify chaired disruptions in brain circuits.

By combining behavioural studies with neurophysiological investigations, this research seeks to uncover the neural basis of these early disease markers. Ultimately, identifying these connections could open new avenues for early diagnosis and therapeutic interventions, with the goal of slowing disease progression before significant cognitive symptoms develop.