

Brain changes linked to 'cocktail party effect' acts as early warning sign for dementia

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Researchers from UCL have shown that brain changes associated with perception and understanding of sounds occur in key regions affected by dementia and may flag early signs of disease. The work looks at the so-

called "cocktail party effect," a problem often seen in people with dementia, and is presented at Alzheimer's Research UK's 20th Annual Research Conference today (Friday 26 March).

In 2020 a landmark report by The Lancet Commission estimated that people with unaddressed midlife [hearing](#) loss are up to five times more likely to be affected by [dementia](#) than those without hearing loss. With no current treatments available that slow down or halt these diseases, understanding the complex relationship between hearing loss and dementia is even more important.

Most previous studies have focused on our ability to detect sounds and we tend to think of hearing problems as sounds seeming quieter and less likely to be noticed. But the ears are instruments that pick-up sound waves and send out nerve impulses, while our brains interpret these signals.

At Alzheimer's Research UK's 20th Annual Research Conference, supported by Iceland Foods Charitable Foundation, Prof Jason Warren presents findings of a series of linked experiments investigating the 'cocktail party effect.'

The [cocktail party effect](#) is the challenge people have focusing on a single speaker or conversation in a noisy environment. For example, most people talking to a friend at a bustling cocktail party are able to listen to and understand what they are talking about—and ignore what other people nearby are saying. This becomes increasingly difficult for many people with Alzheimer's disease.

Prof Warren's team assessed a process where sound information is extracted from noisy environments in patients with Alzheimer's disease, compared to healthy older individuals. They also designed new tests of the participants' ability to judge the location of a sound in a complex

auditory scene. To understand the impact on the [brain](#) they assessed [brain function](#) and structure using sophisticated MRI brain scans. The team also looked to see if a prescribed medication for [memory loss](#) in Alzheimer's disease helped improve the understanding of speech that is 'degraded' or mixed with noise.

People with Alzheimer's disease showed deficits in processing noisy environments and perceiving degraded speech. However, individuals who received a single dose of donepezil, the most widely prescribed Alzheimer's drug, showed improved understanding of degraded speech. They also showed retained ability to learn to understand noisy speech signals, similar to healthy older listeners.

Prof Jason Warren from University College London, said:

"While most people think of memory problems when we hear the word 'dementia,' that is far from the whole story. Vision and hearing problems are also common, even when there is nothing wrong with a person's eyes or ears.

"Hearing happens in the brain and there is a complex relationship between hearing changes and the onset of dementia. Our research simulating real-world hearing problems shows they are due to changes in brain structure linked with the development of diseases like Alzheimer's and other diseases that cause dementia.

"The brain is a fantastic organ and our work shows that despite damage that occurs during Alzheimer's [disease](#), the brain retains a remarkable ability to adapt. My hope for the future is that we explore the use of complex hearing tests for the early diagnosis of dementia and investigate potential drugs that may harness pathways associated with hearing and the plasticity of the hearing brain. This will help reduce the number of dementia cases and help people with dementia live and communicate

more successfully."

Dr. Rosa Sancho, Head of Research at Alzheimer's Research UK, said:

"While dementia is caused by a complex mix of age, genetics and lifestyle, research shows there are things within our control to change that may affect our risk, and that dementia is not an inevitable part of getting older. Gaining a deeper understanding of how the brain and the senses are linked is a hot topic in dementia research and we are pleased to be able to showcase this at the 20th Alzheimer's Research UK Conference."

To try to understand the links between hearing loss and memory and thinking further, national charities the RNID and Alzheimer's Research UK have teamed up to invest up to £200,000 into a new research project.

Dr. Ralph Holme from RNID, said:

"Hearing loss and dementia can have devastating consequences, and with an aging population it is an issue we can no longer ignore. I'm delighted that both charities have joined forces to fund research to better understand why hearing loss and dementia are linked. This could give us new insight into ways of improving hearing and preventing dementia."

Provided by Alzheimer's Research UK

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