

Delayed word processing could predict patients' potential to develop Alzheimer's disease

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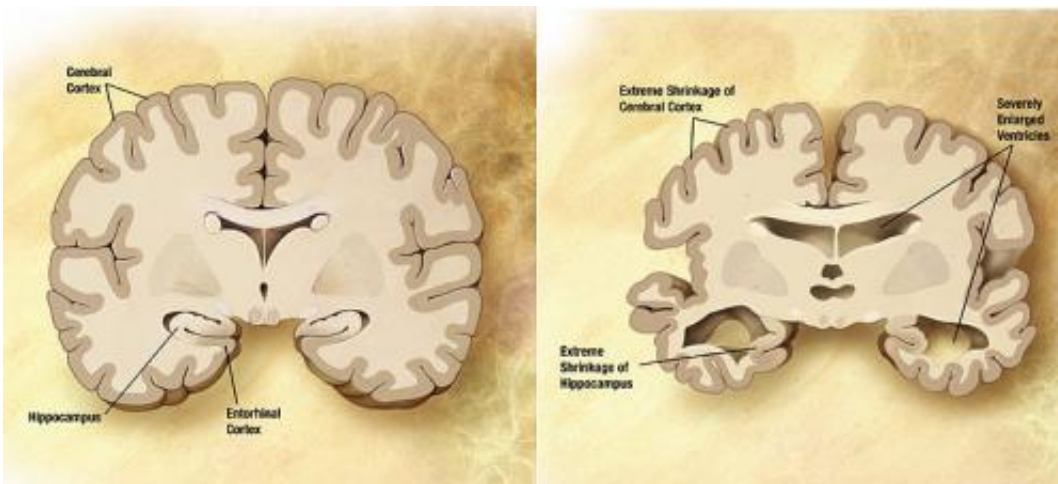


Diagram of the brain of a person with Alzheimer's Disease. Credit: Wikipedia/public domain.

A delayed neurological response to processing the written word could be an indicator that a patient with mild memory problems is at an increased risk of developing Alzheimer's disease, research led by the University of Birmingham has discovered.

Using an electroencephalogram (EEG) - a test that detects electrical activity in a person's [brain](#) via electrodes attached to their scalp - researchers studied the [brain activity](#) of a group of 25 patients to

establish how quickly they processed words shown to them on a computer screen.

The study, published in *Neuroimage Clinical*, was led by the University of Birmingham's School of Psychology and Centre for Human Brain Health and was carried out in collaboration with the Universities of Kent and California.

The patients who took part were a mix of healthy elderly people, patients with [mild cognitive impairment](#) (MCI), and patients with MCI who had developed Alzheimer's within three years of diagnosis of MCI.

MCI, a condition in which someone has minor problems with mental abilities such as memory beyond what would normally be expected for a healthy person of their age, is estimated to be suffered by up to 20 per cent of people aged over 65. It is not a type of dementia, but a person with MCI is more likely to go on to develop dementia.

Dr Ali Mazaheri, of the University of Birmingham, said: "A prominent feature of Alzheimer's is a progressive decline in language, however, the ability to process language in the period between the appearance of initial symptoms of Alzheimer's to its full development has scarcely previously been investigated.

"We wanted to investigate if there were anomalies in brain activity during language processing in MCI patients which could provide insight into their likelihood of developing Alzheimer's.

"We focused on language functioning, since it is a crucial aspect of cognition and particularly impacted during the progressive stages of Alzheimer's."

Previous research has found that when a person is shown a written word,

it takes 250 milliseconds for the brain to process it - activity which can be picked up on an EEG.

Dr Katrien Segaert, of the University of Birmingham, adds: "Crucially, what we found in our study is that this brain response is aberrant in individuals who will go on in the future to develop Alzheimer's disease, but intact in patients who remained stable.

"Our findings were unexpected as language is usually affected by Alzheimer's disease in much later stages of the onset of the disease.

"It is possible that this breakdown of the brain network associated with [language](#) comprehension in MCI patients could be a crucial biomarker used to identify patients likely to develop Alzheimer's disease.

"We hope to now test the validity of this biomarker in large population of [patients](#) in the UK to see if it's a specific predictor of Alzheimer's [disease](#), or a general marker for dementia involving the temporal lobe.

"The verification of this biomarker could lead the way to early pharmacological intervention and the development of a new low cost and non-invasive test using EEG as part of a routine medical evaluation when a patient first presents to their GP with concern over memory issues."

More information: Ali Mazaheri et al. EEG oscillations during word processing predict MCI conversion to Alzheimer's disease, *NeuroImage: Clinical* (2017). [DOI: 10.1016/j.nicl.2017.10.009](https://doi.org/10.1016/j.nicl.2017.10.009)

Provided by University of Birmingham

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