Changes in blood flow to the brain may be early feature of Alzheimer's disease

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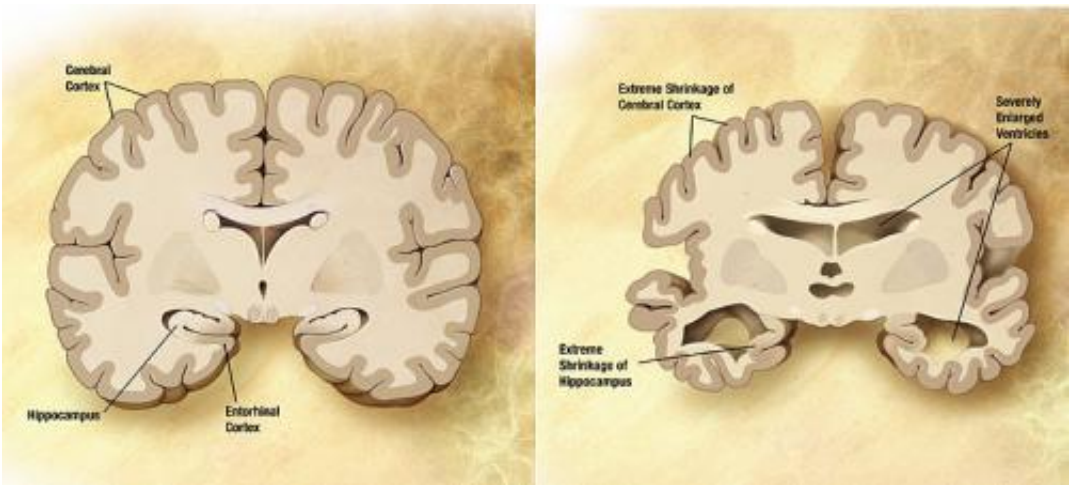

Diagram of the brain of a person with Alzheimer's Disease. Credit: Wikipedia/public domain.

A new study has shown that changes in blood flow to different brain areas may be one of the earliest changes in the brain linked to Alzheimer's disease. The research is published today in the journal *Nature Communications*.

Researchers at the Montreal Neurological Institute in Canada studied brain scans, blood samples and cerebrospinal fluid (CSF) samples from 1,171 people who were part of the Alzheimer's Disease Neuroimaging Initiative (ADNI). Some of the participants were healthy, while some had mild cognitive impairment (MCI) – problems with memory and

thinking not severe enough to be classed as Alzheimer's – and others had been diagnosed with Alzheimer's. The first changes in the brain in Alzheimer's disease are known to take place several years before symptoms such as memory loss appear, and the team set out to investigate some of these changes and understand the order in which they occur.

The researchers looked at several types of brain scan designed to measure different features that have been linked to the disease, including:

- build-up of the protein amyloid, a hallmark of Alzheimer's
- changes in glucose metabolism – an indicator of how much energy the brain is using
- blood flow to the brain
- brain activity
- brain shrinkage

They also studied changes in blood and CSF that research has suggested could be potential early indicators of the disease. The team looked for variations in these features in different groups of people – those with no memory or thinking problems, those with MCI, and those with mild, moderate or severe Alzheimer's disease – allowing them to map which of the changes appeared first.

Similar to previous studies, the results showed that amyloid build-up in the brain was one of the first changes to occur – but their analysis also showed that changes in blood flow occurred even earlier. The authors suggest that disruption to blood flow to the brain could be an important early event in the development of the disease, potentially working with other factors to drive the disease.

Dr Rosa Sancho, Head of Research at Alzheimer's Research UK, the

UK's leading dementia research charity, said:

"Alzheimer's is a complex and multifaceted disease, and a key focus for research is to understand which biological changes associated with the disease occur at what stage. It's long been known that people with Alzheimer's experience changes in blood flow to the brain, but this study suggests that vascular changes may occur earlier in the disease process than previously thought, offering new clues about the development of the disease. An important next step will be to understand how disruption to blood flow in the brain may link to other features of Alzheimer's and affect the way the disease progresses.

"A better understanding of the chain of events that occur in the brain as Alzheimer's develops and progresses is crucial, as this knowledge can be exploited in the search for new ways to fight the disease. Continued investment in research is vital if findings such as these are to be translated into new treatments and preventions that are so desperately needed."

Provided by Alzheimer's Research UK

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