

Brain changes may help track dementia, even before diagnosis

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Even before a dementia diagnosis, people with mild cognitive impairment may have different changes in the brain depending on what type of dementia they have, according to a study published in the September 11, 2019, online issue of *Neurology*, the medical journal of the American Academy of Neurology.

"These differences may reflect underlying changes in the [brain](#) that could be used to track early changes in people who are going to develop either Alzheimer's disease or dementia due to [cerebrovascular disease](#)," said study author Juan "Helen" Zhou, Ph.D., of Duke-NUS Medical School in Singapore and a member of the American Academy of Neurology.

The study involved people recruited from Samsung Medical Center in South Korea: 30 people with [mild cognitive impairment](#) including memory problems, which is often considered an early stage of Alzheimer's disease, and 55 people with mild cognitive impairment with damage to small blood

vessels in the brain, which is an early sign of vascular dementia, or dementia due to cerebrovascular disease.

The participants had [positron emission tomography](#) (PET) scans at the start of the study to see if they had amyloid-beta plaques in the brain that are associated with Alzheimer's disease, and structural MRI scans to see if they had the signs of cerebrovascular disease associated with vascular dementia. The functional MRI scans were used to measure how brain regions are functionally connected. These scans were repeated every year for up to four years.

The functional MRI scans were looking at functional networks in the brain—the executive control network, which is engaged during activities such as use of working memory and switching between tasks; and the default mode network, which has been linked to memory retrieval.

The researchers found that the interactions in the default network declined more steeply over time in the people who had amyloid-beta plaques in the brain confirming Alzheimer's disease than in people in early stages of vascular dementia and without amyloid-beta plaques in the brain. Specifically, the rate of annual decline in the default mode network connections was on average 13.6 times faster in the people who had amyloid-beta plaques in the brain confirming Alzheimer's disease than in people in the early stages of vascular dementia and without amyloid-beta plaques.

Researchers also found that the rate of annual increase in interactions in the executive control network was on average three times faster in people in the early stages of vascular [dementia](#) and without amyloid-beta plaques than in people in the early stages of Alzheimer's disease.

"More studies are needed with larger numbers of participants and longer follow-up periods, but these

results suggest that these changes in brain network connections could potentially be used to track early changes in Alzheimer's disease and cerebrovascular disease," said study author Sang Won Seo, MD, of Samsung Medical Center in South Korea.

Limitations of the study were the small number of participants and the relatively short time for follow-up.

Provided by American Academy of Neurology

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