

Dementia plaques attack language center of brain

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The recent ability to peer into the brain of living individuals with a rare type of language dementia, primary progressive aphasia (PPA), provides important new insights into the beginning stages of this disease—which results in language loss—when it is caused by a buildup of a toxic protein found in Alzheimer's disease.

The research also offers additional insight into why this type of dementia causes people to lose the ability to express themselves and understand language.

Using a special imaging technique, Northwestern Medicine scientists have discovered the toxic build-up of amyloid protein is greater on the left side of the brain—the site of language processing—than on the right side in many individuals living with PPA.

Previously, amyloid accumulation in the brain could only be studied after an individual with Alzheimer's disease had died. This snapshot in time was after the disease had run its full course, and amyloid had spread throughout the entire brain. Now, a new technology called Amyloid PET Imaging allows researchers to study the build-up of the toxic amyloid during life.

"By understanding where these proteins accumulate first and over time, we can better understand the course of the disease and where to target treatment," said Emily Rogalski, the lead study investigator and research associate professor at Northwestern's Cognitive Neurology and

Alzheimer's Disease Center (CNADC).

"It is important to determine what Alzheimer's looks like in PPA, because if it's caused by something else, there is no sense in giving a patient an Alzheimer's related drug, because it would be ineffective," Rogalski said.

The goal is to diagnose Alzheimer's disease during life in order to guide treatment and identify regions to target for future drug trials.

"This [new technology](#) is very exciting for Alzheimer's research," said Adam Martersteck, the first author and a graduate student in Northwestern's neuroscience program. "Not only can we tell if a person is likely or unlikely to have Alzheimer's disease causing their PPA, but we can see where it is in the brain. By understanding what the brain looks like in the beginning stages of Alzheimer's, we hope to be able to diagnose people earlier and with better accuracy."

This is the first study to examine and compare beta-amyloid buildup in the brain using the Amyvid amyloid PET imaging tracer between individuals with PPA and those with Alzheimer's memory dementia, the more common disease that causes memory problems. Both types of dementia (memory and language) can be caused by an accumulation of beta-amyloid, an abnormal [toxic protein](#) in the brain.

By using Amyloid PET Imaging, Northwestern scientists at CNADC showed the toxic [amyloid protein](#) was distributed differently in people that had the PPA language dementia versus the memory dementia in the early stages. Researchers found there was more amyloid in the left hemisphere parietal region of individuals with PPA compared to those with Alzheimer's memory dementia.

Scientists scanned 32 PPA patients, and 19 of them had high amounts of

amyloid and were likely to have the Alzheimer's pathology. They were compared to 22 people who had the Alzheimer's memory dementia. Those with the memory dementia had the same amount of amyloid on the left and right side of the [brain](#).

More information: The paper is titled "Is in vivo Amyloid Distribution Asymmetric in Primary Progressive Aphasia?"

Provided by Northwestern University

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