

Early abnormalities of Alzheimer's disease: It takes two (proteins) to tango

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Credit: McGill University

For years, neuroscientists have puzzled over how two abnormal proteins, called amyloid and tau, accumulate in the brain and damage it to cause Alzheimer's disease (AD). Which one is the driving force behind dementia? The answer: both of them, according to a new study by researchers at the Douglas Mental Health University Institute.

In the journal *Molecular Psychiatry*, the team led by Dr. Pedro Rosa-Neto, a clinician scientist at the Douglas and assistant professor of Neurology, Neurosurgery and Psychiatry at McGill University, reports for the first time evidence that the interaction between amyloid and tau proteins drives brain damage in cognitively intact individuals.

"We specifically found that both proteins mutually enhance their individual toxic effects and cause a brain dysfunction considered to be a

signature of AD. This finding challenges previous polarized theories that a single protein abnormality was the major driving force of disease progression," explains Dr. Rosa-Neto, whose team is part of the CIUSSS de l'Ouest-de-l'Île-de-Montréal research network.

Toward new therapeutic strategies

This research also points toward new therapeutic strategies to mitigate the progression of AD.

"Until now, therapeutic clinical trials have targeted a single pathological process. Our result paves the way for new therapeutic strategies for prevention or stabilization of AD. For example, combination therapies should be used simultaneously against both amyloid and tau protein accumulation", says Dr. Tharick A. Pascoal, lead author of the study.

Rosa-Neto's team analyzed the performances of 120 cognitively intact individuals over two years (equal gender distribution; average age 75). By measuring amyloid levels using PET scans and tau proteins through cerebrospinal fluid analysis, the researchers were able to identify the patients at risk of [brain damage](#) associated with AD.

According to the World Health Organization, Alzheimer's disease is the most common cause of dementia, affecting more than 30 million people worldwide in 2015. In 2011, 747 000 Canadians were living with Alzheimer's disease and other forms of dementia, and the combined direct (medical) and indirect (lost earnings) costs of dementia amounted to \$33 billion (Alzheimer Society of Canada).

More information: T A Pascoal et al. Amyloid- β and hyperphosphorylated tau synergy drives metabolic decline in preclinical Alzheimer's disease, *Molecular Psychiatry* (2016). [DOI: 10.1038/mp.2016.37](https://doi.org/10.1038/mp.2016.37)

Provided by McGill University

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