

Scientists' discovery leads to greater understanding of Alzheimer's disease

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Dr. Anurag Singh. Credit: University of Otago

Otago scientists have made an important discovery in understanding the role a particular protein plays to impair memory in Alzheimer's disease, which could lead to more effective treatment in future.

Professor Cliff Abraham and Dr. Anurag Singh from the Department of

Psychology have identified that a protein in the brain—tumor necrosis factor-alpha (TNF α)—normally associated with inflammation, becomes abnormally active in the Alzheimer's brain, impairing the memory mechanism.

The overproduction of this protein (TNF α) may be one of the reasons behind the disease-related impairments of memory formation in the brain.

"While TNF α has been linked previously with Alzheimer's and memory studies, it has not been understood that neural overactivity can drive the production of this protein to inhibit memory mechanisms in the brain," Professor Abraham, a Principal Investigator with the University's Brain Health Research Centre, explains.

"We are pleased with our findings that links this inflammatory protein to impaired memory mechanisms. It's one more step forward towards finding a more effective treatment for Alzheimer's than those currently available."

Research has been carried out internationally using blockers of TNF α as a therapeutic for [inflammatory diseases](#) and cancer, Professor Abraham says. However, there are only a few studies testing TNF α therapeutics in Alzheimer's conditions. Getting good penetration of therapeutics into the brain is still a problem that needs solutions, he says.

"There is a huge international effort aimed at preventing Alzheimer's disease onset, or treating it once it develops. Lifestyle changes and improved healthcare are having some impact already in delaying onset," Professor Abraham says.

"However, we still need drugs to treat those with the disease already and we hope our work adds to that body of knowledge to support further

work on TNF α -based therapies which will improve the resilience of the [brain](#) to the pathological insults."

The Otago scientists have been working on this project for the past six years. Dr. Singh explains the finding is significant given the [protein](#) has a role to play in regulating [memory](#) mechanisms in both healthy and diseased conditions.

"In healthy conditions, TNF α is involved in the sleep/wake cycle, normal learning and in food and water intake however, in diseased conditions it is involved in neurological disorders such as Alzheimer's and Parkinson's Disease."

The research paper has just been published in the scientific journal, *The Journal of Neuroscience*.

More information: Anurag Singh et al. Tumor Necrosis Factor- α -Mediated Metaplastic Inhibition of LTP is Constitutively Engaged in an Alzheimer's Disease Model, *The Journal of Neuroscience* (2019). [DOI: 10.1523/JNEUROSCI.1492-19.2019](https://doi.org/10.1523/JNEUROSCI.1492-19.2019)

Provided by University of Otago

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