

Study in mice finds potential therapy to reverse memory loss from Alzheimer's

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Researchers from Macquarie University have discovered a world-first new treatment that reverses the effects of memory loss associated with Alzheimer's disease in a study of mice with advanced dementia.

The research, co-led by two brothers, Dr. Arne Ittner and Professor Lars Ittner, from Macquarie University Dementia Research Center, builds on their work begun in 2016 involving a ground-breaking gene therapy which uses an enzyme that is naturally present in the brain, known as p38gamma.

The researchers found that p38gamma, when activated, can modify a protein such that it prevents the development of Alzheimer's disease symptoms.

This latest finding, published in the September edition of the journal, *Acta Neuropathologica*, has gone a step further and showed that the gene actually improved or restored much of the memory in advanced Alzheimer mice. Importantly, their findings also suggest that the gene therapy may be effective in other forms of [dementia](#), including [frontotemporal dementia](#) which presents in much younger patients in their 40s and 50s.

Gene therapy is a process whereby [genetic material](#) is introduced into cells to replace abnormal [genes](#) or to make a beneficial protein.

Professor Lars Ittner, who is the Director of the Dementia Research Center at Macquarie University, says, "When we set out to develop this gene therapy we expected it to halt progression of dementia, but we were not expecting to see that it not only halts it, it completely reverted the memory loss that was already there when we started therapy."

The team showed furthermore that the gene therapy is safe even at high doses and when applied long term, with no adverse events observed during the study.

Dr. Arne Ittner, a lead author on the study, explains, "We need a better understanding of what happens to the molecules in the brain during

dementia. Our work delivers a very powerful piece in this puzzle."

The next step will be to transition to testing safety and efficacy in humans. Macquarie University is currently undertaking a detailed assessment of the development and regulatory pathway required to evaluate the [gene therapy](#) in human patients. Partnerships with potential investors and pharmaceutical partners are also being actively explored.

"It will be exciting to see how over 10 years of basic research to understand the mechanisms of Alzheimer's disease will finally transition into [clinical development](#) to eventually benefit those most in need, people living with dementia," Professor Lars Ittner said.

"This provides hope, as there is a lot of therapy out there focussed on prevention, but not much for those already affected by the disease."

The two researchers predict that possible success of this new [therapy](#) could be within reach of humans in less than 10 years, "This could even be as close as a five year timeline for us to see the success we have seen in mice."

More information: Arne Ittner et al. Reduction of advanced tau-mediated memory deficits by the MAP kinase p38 γ , *Acta Neuropathologica* (2020). [DOI: 10.1007/s00401-020-02191-1](https://doi.org/10.1007/s00401-020-02191-1)

Provided by Macquarie University

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