

Alzheimer's cure may be a matter of size

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(Medical Xpress) -- Size really does matter according to scientists looking for ways to cure Alzheimer's disease.

Research conducted by scientists at the Queensland Brain Institute (QBI) at The University of Queensland (UQ) and Harvard University, has led to the discovery that treatment for Alzheimer's disease may lie in modifying the length of subcellular structures in the brain responsible for metabolising energy, [mitochondria](#).

The study found in cases where the mitochondria were abnormally long, they had a [toxic effect](#) inducing [cell death](#).

Director, Centre for Ageing [Dementia](#) Research (CADR) at QBI and co-author of the paper, Professor Jürgen Götz, said:

“Alzheimer's disease belongs to a group of neurodegenerative diseases termed ‘tauopathies’, characterised by clumps of the protein tau inside neurons.

“In instances where neurons express toxic levels of human tau, the mitochondria are elongated.

“All cells rely on mitochondria for energy metabolism, and neurons in particular, so controlling the length of these subcellular structures is very important for brain function.”

The research provides novel targets for therapeutic intervention.

“Treatments currently available for these diseases have at most modest effects, in part due to our limited understanding of how Alzheimer's disease starts and progresses,” Professor Götz said.

The good news is, genetic and drug interventions aimed at reducing mitochondrial length reverse the toxic effects of tau, and can now get underway.

“An aspect of mitochondrial regulation that is being increasingly appreciated are changes in size and shape of the organelle, through a process termed 'mitochondrial dynamics',” Professor Götz said.

Alzheimer's disease affects almost 280,000 Australians. This number grows by 1,600 each week and is expected to reach over 1 million people by 2050.

Alzheimer's disease

- Dementia is a term used for a range of conditions characterised by impairment of brain functions including language, memory, perception, personality and cognitive skills.
- The most common form of dementia is Alzheimer's disease, accounting for around 70 per cent of all cases.
- Conditions associated with dementia are typically progressive, degenerative and irreversible as there is symptomatic treatment but currently no cure.
- There are almost 280,000 Australians currently living with dementia. Each week, there are 1,600 new cases of dementia in Australia. This is expected to grow to over 1 million people by 2050 .
- By the 2060s, spending on dementia is set to outstrip that of any other health condition. It is projected to be \$83 billion (in 2006-07 dollars), and will represent around 11 per cent of the entire health and residential aged care sector spending.

- Dementia is currently the third leading cause of death in Australia, after heart disease and stroke, with one in four people over the age of 85 suffering from dementia.
- Between 2000 and 2008, deaths attributed to Alzheimer's disease increased 66 per cent, while those attributed to the number one cause of death, heart disease, decreased 13 per cent (www.alz.org/downloads/Facts_Figures_2012.pdf).
- A legitimate research breakthrough that could delay the onset of dementia by five years could mean 35.2 per cent fewer cases by 2020 (cumulative savings of \$13.5 billion) and 48.5 per cent fewer cases in 2040 (saving \$67.5 billion) .
- Increasing research funding to \$49 million per annum could generate a cure by 2040 and save the Australian economy \$4 trillion in future health costs.

More information: From the paper 'Tau promotes neurodegeneration via DRP1 mislocalization in vivo' for publication in *Neuron*, August 23, 2012 (print edition)

Provided by University of Queensland

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