Worms reveal link between dementia gene and ageing

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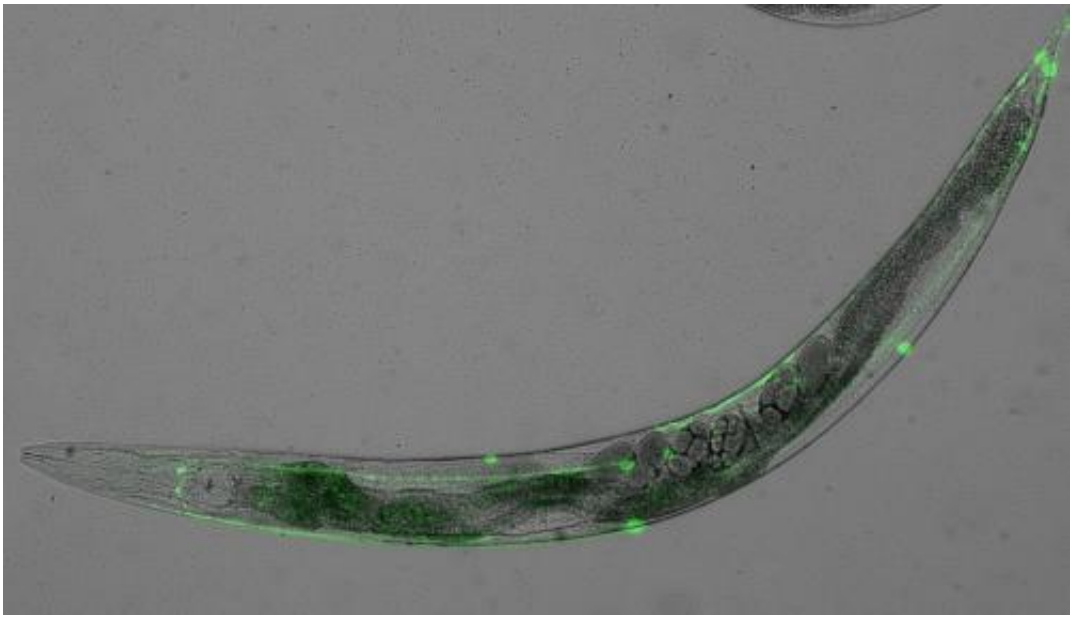

The discovery of a link between a specific gene and ageing in a species of worm could reveal valuable lessons for the treatment of Alzheimer's disease.

Low levels of the protein generated from the gene known as 'tau'—also present in humans—not only hastens age-related changes in the brain of the worm, but also shortens the worm's life, Sydney University PhD candidate Yee Lian Chew has found.

"We found that worms lacking tau lived almost one third shorter than worms that have tau, providing startling evidence that the gene is important in regulating overall lifespan," said Yee Lian.

Her findings – together with related experiments on mice and other models – could be very important for future Alzheimer's Disease treatments.

"One theory of dementia suggests that lowering the activity of this gene in a patient will lead to some degree of cognitive improvement," she said. "However, too little is also bad. It needs to be a balance."

Yee Lian's work at the university's School of Molecular Bioscience uses a species of nematode worm called Caenorhabditis elegans, which is see-through and just one millimetre long.

The worms are an exceptional way to study brain ageing, she says, as their transparency allows her to easily examine the changes that emerge in older brain cells and to study how fast the brain ages.

"Humans are certainly more complex than worms, but at a molecular level there are many striking similarities," Yee Lian says. "The lack of complexity is also an advantage – worms have 302 brain cells whereas humans have billions. It is much simpler to study brain ageing in an animal where individual cells can be easily observed."

In humans, aging is associated with subtle changes in the brain. These changes are comparable to those observed in worm brains, such as the growth of structures called branches and beads along nerve fibres known as axons.

"Our most exciting discovery is that worms lacking tau display these abnormal structures at early and middle age, while normal worms that

have tau only show these structures late in life," said Ms Chew.

"This suggests that the lack of tau causes worm brain cells to age faster."

The discovery, which was published in the *Journal of Cell Science*, may lead to valuable clues for the treatment of Alzheimer's Disease, a devastating condition which affects one in four people over the age of 85.

"Our research provides an important stepping stone towards the ultimate goal of improving diagnostic tools and treatments for those suffering from this condition," she said.

Ms Chew is one of 12 early-career scientists unveiling their research to the public for the first time thanks to Fresh Science, a national program sponsored by the Australian Government through the Inspiring Australia initiative.

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