

Researchers move closer to delaying dementia

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(Medical Xpress) -- Scientists at University of Queensland's Brain Institute are one step closer to developing new therapies for treating dementia.

QBI's Dr Jana Vukovic said the work was aimed at understanding the [molecular mechanism](#) that may impair learning and memory in the [ageing population](#).

“Ageing slows the production of new [nerve cells](#), reducing the brain's ability to form new memories,” said Dr Vukovic, who performed the work in the laboratory of Professor Perry Bartlett, the Director of QBI at The University of Queensland.

“But our research shows for the first time that the brain cells usually responsible for mediating immunity, microglia, have an inhibitory effect on memory during ageing.

“Furthermore, they have shown that a molecule produced by nerve cells, fractalkine, can reverse this process and stimulate stem cells to produce new neurons.”

The discovery, published in *The Journal of Neuroscience* today, came after QBI scientists observed that the increased production of new neurons in mice that were actively running was due to the release of fractalkine in the hippocampus – the brain structure responsible for specific types of [learning and memory](#).

Professor Bartlett said it had been known for some time that exercise increased the production of new nerve cells in the hippocampus in young and even aged mice.

“But this study found that it is fractalkine that appears to be specifically mediating this effect by making the microglia produce factors that activate the stem cells that produce new nerve cells,” he said.

“Once the cells are activated they divide and produce new cells, which underpin the animal's ability to learn and form memories.

"This means that fractalkine may form the basis for the development of future therapies.

“The discovery is especially exciting because we have found that older animals suffering cognitive decline showed significantly lower levels of fractalkine.

“We are seeking ways of increasing fractalkine levels in patients with cognitive decline, and hoping this may be a new frontline therapy in treating [dementia](#).”

Dr Vukovic said that until relatively recently, it was thought the adult brain was incapable of generating new neurons.

“But work from Professor Bartlett's laboratory over the past 20 years has demonstrated that the brains of adult animals, including humans, retain the ability to make new nerve cells,” she said.

“The challenge is to find out how to stimulate this production in the aged animal and human where production has slowed.”

The latest work was a significant step toward achieving this goal, she

said.

More information: The article published today is titled *Microglia modulate hippocampal neural precursor activity in response to exercise and aging*. Its authors are Jana Vukovic, Michael J. Colditz, Daniel G. Blackmore, Marc J. Ruitenberg, Perry F. Bartlett

Provided by University of Queensland

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