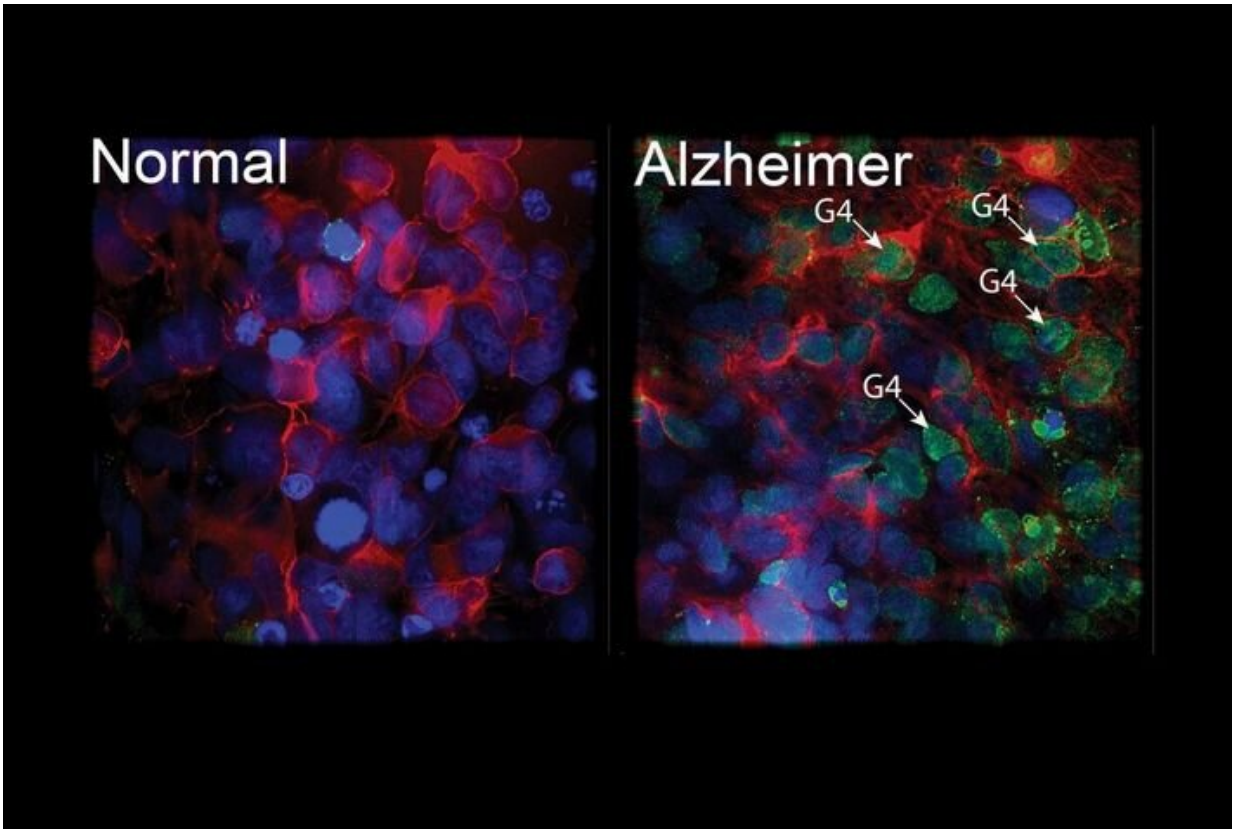
BMI1, a promising gene to protect against Alzheimer's disease

March 23 2021, by Julie Gazaille



Healthy neurons (left) and Alzheimer's disease neurons (right): in green, accumulation of G4 structures in Alzheimer's neurons. Credit: University of Montreal

Another step towards understanding Alzheimer's disease has been taken

at the Maisonneuve-Rosemont Hospital Research Centre. Molecular biologist Gilbert Bernier, and professor of neurosciences at Université de Montréal, has discovered a new function for the BMI1 gene, which is known to inhibit brain aging. The results of his work have just been published in *Nature Communications.*

In his laboratory, Bernier was able to establish that BMI1 was required to prevent the DNA of neurons from disorganizing in a particular way called G4 structures. This phenomenon occurs in the brains of people with Alzheimer's disease, but not in healthy elderly people. Thus, BMI1 would protect against Alzheimer's by preventing, among other things, the excessive formation of G4s that disrupt the functioning of neurons.

"This discovery adds to our knowledge of the fundamental mechanisms leading to Alzheimer's," said Bernier. "There is still no cure for this disease, which now affects nearly one million Canadians. Any advance in the field brings hope to all these people and their families."

In previous articles published in the journals *Cell Reports* and *Scientific Reports*, Bernier demonstrated that the expression of the BMI1 gene is specifically reduced in the brains of people with Alzheimer's disease. He also showed that inactivation of BMI1 in cultured human neurons or in mice was sufficient to recapitulate all the pathological markers associated with Alzheimer's disease.

More information: Barabino, A. et al. G-quadruplexes originating from evolutionary conserved L1 elements interfere with neuronal gene expression in Alzheimer's disease. Nat Commun 12, 1828 (2021). doi.org/10.1038/s41467-021-22129-9

Provided by University of Montreal