A possible way to prevent Alzheimer's disease: Editing a key gene in human nerve cells

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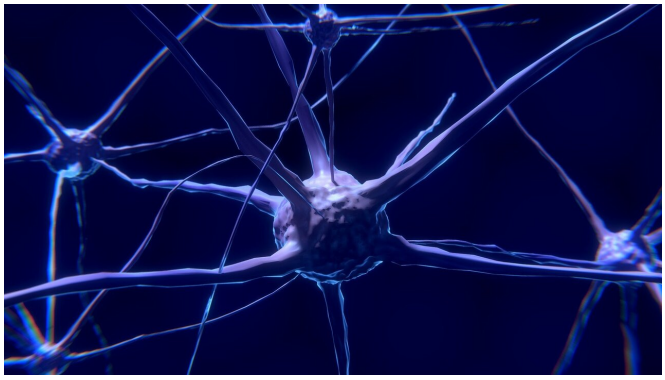

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A team of researchers at Laval University has found evidence that it might be possible to reduce the chances of developing Alzheimer's disease by editing a key gene in nerve cells. In their paper uploaded to the *bioRxiv* preprint server, the group describes experiments they conducted that involved editing genes and what they learned from them.

Prior research has shown that one of the factors involved in the development of Alzheimer's disease is a buildup of beta-amyloid—a type of protein—on brain cells. Prior research has also shown that some people have a gene variant called A673T—those who express it are four times less likely than the general populace to develop Alzheimer's disease. In this new effort, the researchers looked into the possibility of editing human brain cells to give people the gene variant A673T and thereby reduce their chances of developing Alzheimer's disease.

The team noted that the A673T mutation differs from its cognate in those who do not express it by a single DNA letter, suggesting it might be relatively easy to add the mutation. They next tried editing brain cells using a CRISPR technique. And while that attempt proved relatively successful, other aspects of the technique drove the researchers to try another—prime editing. This relatively new technique allows for directly converting one base letter to another. Using this technique, the researchers found that they were able to edit approximately 40% of the brain cells in vitro. They note that such an amount is likely not high enough to prevent buildup of beta-amyloid, and thus not enough to slow the onset of Alzheimer's disease. But more research might lead to better results.

The researchers also note that such editing of brain cells in humans would require early diagnosis because by the time symptoms present, it might be too late to conduct gene editing to prevent the buildup of beta-amyloid. They note that future efforts might instead involve editing the DNA of only those who are deemed at risk of developing the disease while they are still young.

More information: Antoine Guyon et al. Base editing strategy allows insertion of the A673T mutation in APP gene to prevent the development of Alzheimer's disease, *bioRxiv* (2020). DOI: 10.1101/2020.10.27.357830