Researchers discover an epigenetic lesion in the hippocampus of Alzheimer's

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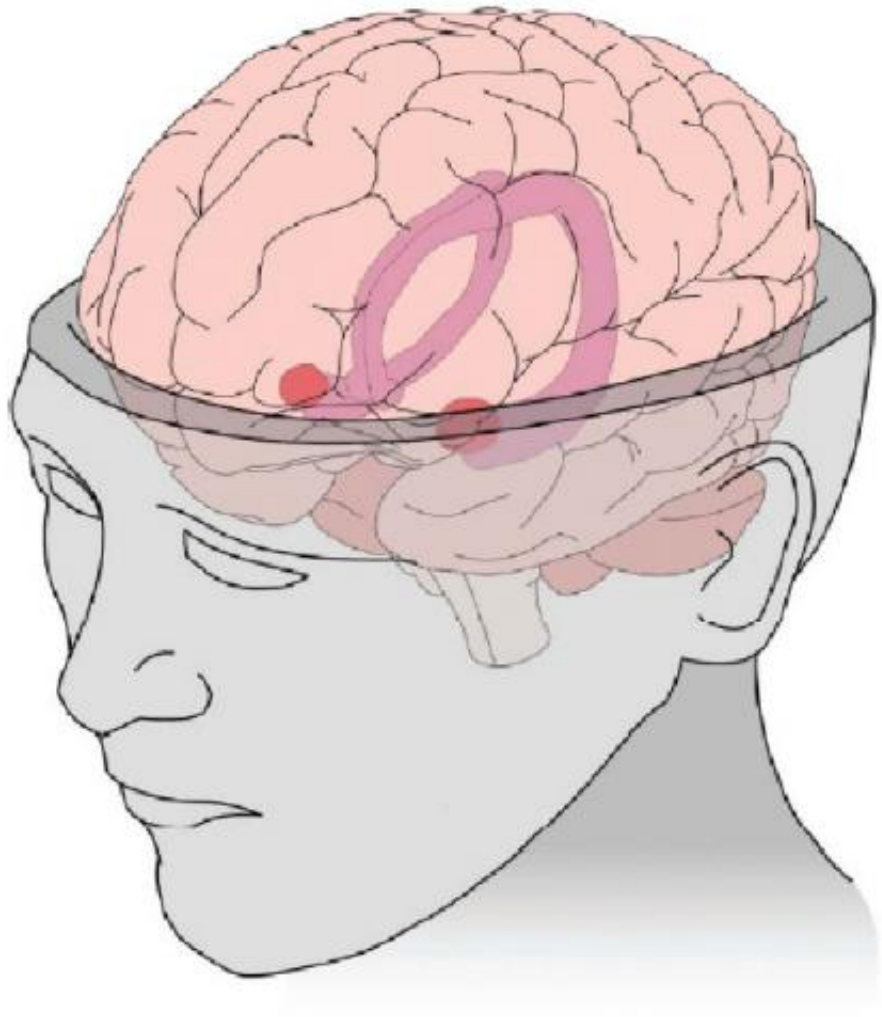

In pink is the location and structure of the brain hippocampus, the region where the epigenetic lesion was found in Alzheimer's patients. Credit: IDIBELL

Alzheimer's disease can reach epidemic range in the coming decades, by the increasing average age of society. There are two key issues for Alzheimer's disease: there is currently no effective treatment and it has been described very few associated genetic changes (mutations) which reduces the number of targets for future therapies.

Alzheimer's disease

Pathologically, Alzheimer 's disease is characterized by the accumulation of protein deposits in the brain of patients. These deposits are formed by plates of a protein called amyloid-beta and rolled tangles of tau protein . The root cause of these lesions in most cases is unknown, but specific alterations in regulating genes expression might be involved.

Today , the prestigious international journal in neurology *Hippocampus* publishes an article led by Manel Esteller, Director of Epigenetics and Cancer Biology , Institute of Biomedical Research of Bellvitge (IDIBEL) , ICREA researcher and Professor of Genetics at the University of Barcelona,with the collaboration of the Institute of Neuropathology IDIBELL led by Isidre Ferrer, demonstrating for the first time the existence of an epigenetic lesion in the hippocampus of the brain of patients with Alzheimer.

Switches in the hippocampus

" We first started studying 30,000 molecular switches that turn on and off genes in the hippocampal region in the brains of Alzheimer patients in different stages of disease and compared with that of healthy patients of the same age. We note that dusp22 gene switch off (methylated) as the disease advances" explained Manel Esteller, director of the study.

"But more importantly" continues "was the discovery that this gene

regulates tau protein. Perhaps therefore the accumulation of tau protein produced in the brain of patients with Alzheimer results from dusp22 epigenetic inactivation " .

According Esteller " the finding is relevant not only to determine the causes of the disease, but also to test potential treatments in the future to act on these epigenetic molecular switches " .

More information: Sanchez-Mut JV, Aso E, Heyn H, Matsuda T, Bock C, Ferrer I, Esteller M. Promoter hypermethylation of the phosphatase DUSP22 mediates PKA-dependent TAU phosphorylation and CREB activation in Alzheimer's disease. *Hippocampus*, DOI: 10.1002/hipo.22245, 2014.

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