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Infections damage our ability to form spatial memories

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Increased inflammation following an infection impairs the brain's ability to form spatial memories – according to new research. The impairment results from a decrease in glucose metabolism in the brain's memory centre, disrupting the neural circuits involved in learning and memory.

Inflammation has long been linked to disorders of memory like Alzheimer's disease. Severe infections can also impair cognitive function in healthy elderly individuals. The new findings published in the journal *Biological Psychiatry* help explain why inflammation impairs memory and could spur the development of new drugs targeting the immune system to treat dementia.

In the first trial to image how inflammation impairs human memory, the team at Brighton and Sussex Medical School scanned 20 participants before and after either a benign salty water injection or typhoid vaccination, used to induce inflammation. Positron emission tomography (PET) was used to measure the effects of inflammation on the consumption of glucose in the brain and after each scan participants tested their spatial memory by performing a series of tasks in a virtual reality.

A reduction in glucose metabolism within the brain's memory centre, known as the Medial Temporal Lobe (MTL), was seen following inflammation. Participants also performed less well in spatial memory tasks, an effect that appeared to be directly mediated by the change in MTL metabolism.

"We have known for some time that severe infections can lead to long-term cognitive impairment in the elderly. Infections are also a common trigger for acute decline in function in patients with dementia and Alzheimer's disease," explains Dr Neil Harrison, a Wellcome Trust Intermediate Clinical Fellow at BSMS who led the study. "This study suggests that catching a cold or the flu, which leads to inflammation in the brain, could impair our memory."

Infections are unlikely to cause long-term detrimental impact in the young and healthy but the findings are of great significance in the elderly. The team now plan to investigate the role of inflammation in dementia, including insight into how acute infections such as influenza influence the rate of progression and decline.

"Our findings suggest that the brain's memory circuits are particularly sensitive to inflammation and help clarify the association between inflammation and decline in dementia," says Dr Harrison. "If we can control levels of inflammation, we may be able to reduce the rate of decline in patients' cognition."

More information: Paper: www.biologicalpsychiatryjourna … (14)00019-5/abstract

Provided by Wellcome Trust

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