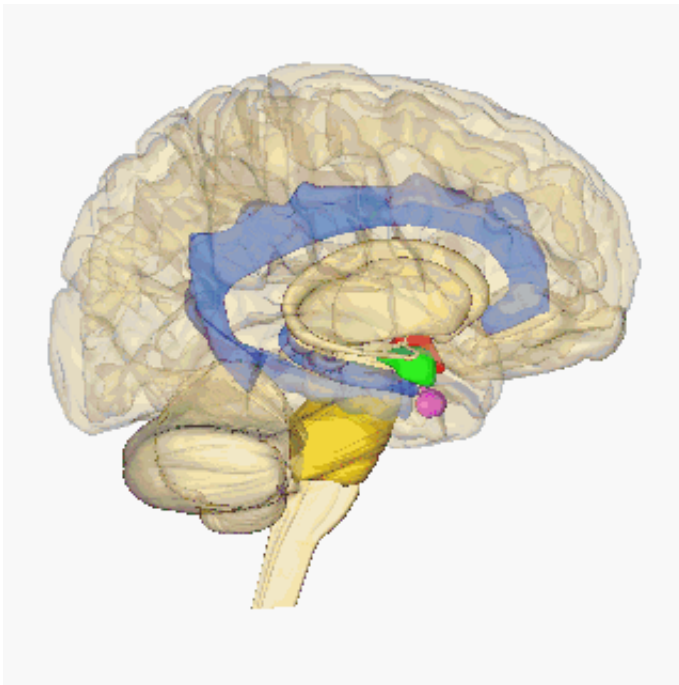


How chronic pain disrupts short term memory

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Human brain (hypothalamus=red, amygdala=green, hippocampus/fornix=blue, pons=gold, pituitary gland=pink. Credit: BrianMSweis

A group of Portuguese researchers from IBMC and FMUP at the University of Porto has found the reason why patients with chronic pain often suffer from impaired short –term memory. The study, to be published in the *Journal of Neuroscience*, shows how persistent pain disrupts the flow of information between two brain regions crucial to retain temporary memories.

Chronic pain sufferers often complain of [short term memory](#)'s problems. The [neural mechanisms](#) why this occurs are however not understood. Recent studies in animals showed that pain can disturb several cognitive processes as well as change the brain pathways for how we think and feel. Of the many cognitive disturbances observed the most important include problems in [spatial memory](#), [recognition memory](#), attention and even emotional and non-emotional decisions.

In the new article the team of researchers from the University of Porto led by Vasco Gallardo describes in a rat model of neuropathic pain how a neuronal circuit crucial for the processing of short-term memory is affected by pain. The circuit, established between the [prefrontal cortex](#) and the hippocampus, is essential for encoding and retaining temporary memories on spatial information. The researchers used multi-electrodes implanted in the brain to record neuronal activity during a behaviour dependent of spatial memory - the animals were trained in a maze where they had to choose between two alternative paths and then asked to recall their chosen path.

The results show that after a painful injury there is a significant reduction in the amount of information that passes through the circuit. This could mean a loss of ability to process information on spatial localization memory, or that those regions critical to memory are now "overwhelmed" by the [painful stimuli](#) disrupting the flow of information for memory.

According to Vasco Gallardo, the team " has already demonstrated that peripheral nerve injury induces an instability in the spatial coding capacity of hippocampus neurons ", where is seen "a clear reduction in their capacity to encode information on the location of the animal."

So to the author "this new work contributes to the demonstration that chronic pain induces alterations in the function of brain circuits that are

not directly connected to tactile or painful processes". So as a result of chronic pain it is seen that "are also affected neuronal circuits linked to the processing of memories and emotions, what might mean a need for larger and more integrative strategies in the treatment of painful pathologies", says the researcher.

More information: Cardoso-Cruz, H., Lima, D. and Galhardo, V. (2012). Impaired spatial memory performance in a rat model of neuropathic pain is associated with reduced hippocampal-prefrontal cortex connectivity. *Journal of Neurosciences*.

Provided by University of Porto

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