

Preventing chronic pain with stress management

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For chronic pain sufferers, such as people who develop back pain after a car accident, avoiding the harmful effects of stress may be key to managing their condition. This is particularly important for people with a smaller-than-average hippocampus, as these individuals seem to be particularly vulnerable to stress.

These are the findings of a study by Dr. Pierre Rainville, PhD in Neuropsychology, Researcher at the Research Centre of the Institut universitaire de gériatrie de Montréal (IUGM) and Professor in the Faculty of Dentistry at Université de Montréal, along with Étienne Vachon-Preseau, a PhD student in Neuropsychology. The study appeared in *Brain*.

"Cortisol, a hormone produced by the [adrenal glands](#), is sometimes called the 'stress hormone' as it is activated in reaction to stress. Our study shows that a small hippocampal volume is associated with higher [cortisol levels](#), which lead to increased vulnerability to pain and could increase the risk of developing pain chronicity," explained Étienne Vachon-Preseau.

As Dr. Pierre Rainville described, "Our research sheds more light on the [neurobiological mechanisms](#) of this important relationship between stress and pain. Whether the result of an accident, illness or surgery, pain is often associated with high levels of stress. Our findings are useful in that they open up avenues for people who suffer from pain to find treatments that may decrease its impact and perhaps even prevent

chronicity. To complement their medical treatment, pain sufferers can also work on their stress management and fear of pain by getting help from a psychologist and trying relaxation or [meditation techniques](#)."

Research summary

This study included 16 patients with chronic back pain and a control group of 18 healthy subjects. The goal was to analyze the relationships between four factors: 1) cortisol levels, which were determined with [saliva samples](#); 2) the assessment of clinical pain reported by patients prior to their brain scan (self-perception of pain); 3) hippocampal volumes measured with anatomical magnetic resonance imaging (MRI); and 4) brain activations assessed with functional MRI (fMRI) following thermal pain stimulations. The results showed that patients with chronic pain generally have higher cortisol levels than healthy individuals.

Data analysis revealed that patients with a smaller hippocampus have higher cortisol levels and stronger responses to acute pain in a brain region involved in anticipatory anxiety in relation to pain. The response of the brain to the painful procedure during the scan partly reflected the intensity of the patient's current clinical pain condition. These findings support the chronic pain vulnerability model in which people with a smaller hippocampus develop a stronger stress response, which in turn increases their pain and perhaps their risk of suffering from chronic pain. This study also supports stress management interventions as a treatment option for [chronic pain sufferers](#).

More information: Étienne Vachon-Presseau, Mathieu Roy, Marc-Olivier Martel, Etienne Caron, Marie-France Marin, Jeni Chen, Geneviève Albouy, Isabelle Plante, Michael J. Sullivan, Sonia J. Lupien et Pierre Rainville. "The stress model of chronic pain: evidence from basal cortisol and hippocampal structure and function in humans", February 18, 2013.

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