

# Inflammation attacks brain's reward center

2 February 2016



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A new study by Neil Harrison and colleagues published in *Biological Psychiatry* suggests that a brain reward center, the striatum, may be directly affected by inflammation and that striatal change is related to the emergence of illness behaviors.

Inflammation increases the risk for [depression](#).

More specifically, inflammation induces behavioral changes similar to depression that are often associated with illness, including [fatigue](#), difficulty concentrating, lack of motivation, and reduced experience of pleasure.

The authors recruited 23 patients with hepatitis C who were beginning treatment with interferon-alpha (INF- $\alpha$ ). This treatment provokes an immediate inflammatory response, confirmed by measuring cytokines in the blood.

Four hours after INF- $\alpha$  administration, a specialized type of imaging, called magnetization

transfer imaging, was performed that showed evidence of microstructural changes in the [striatum](#) when compared to scans conducted prior to INF- $\alpha$  administration. This suggests that the striatum is highly sensitive to INF- $\alpha$ .

INF- $\alpha$  also induced fatigue and depression in the patients, particularly over weeks 4 through 12 of treatment. Interestingly, the early striatal structural change predicted the later emergence of fatigue, but not depression, in the study participants.

Changes in the striatum were heterogeneous with some changes associated with the risk for fatigue, while other changes seemed to be protective against developing fatigue.

"Inflammation-related fatigue and depression are big clinical problems," said Dr. John Krystal, Editor of *Biological Psychiatry*. "This study highlights that the brain regions central to reward and motivation are directly altered by inflammation in ways that that appear to predispose or protect against developing fatigue but not depression. The heterogeneous striatal response may suggest that fatigue and mood are supported by different microcircuits within the striatum."

"These findings are important as they show that a relatively simple MRI technique can be used to measure effects of inflammation on the brain," Harrison commented. "Inflammation is increasingly implicated in the cause of common mental illnesses, particularly depression. This technique could be a powerful way to identify patients who are most sensitive to effects of [inflammation](#) on the brain. It could also be used to monitor response to novel anti-inflammatory therapies that are now being tested in depression."

**More information:** Nicholas G. Dowell et al. Acute Changes in Striatal Microstructure Predict the Development of Interferon-Alpha Induced Fatigue, *Biological Psychiatry* (2016). DOI: [10.1016/j.biopsych.2015.05.015](https://doi.org/10.1016/j.biopsych.2015.05.015)

Provided by Elsevier

APA citation: Inflammation attacks brain's reward center (2016, February 2) retrieved 19 April 2021 from <https://medicalxpress.com/news/2016-02-inflammation-brain-reward-center.html>

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