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# Fructose may quietly supercharge your inflammation

## A new study shows that fructose can quickly change how immune cells react to bacterial toxins.

*Date:* November 30, 2025

*Source:* University of Vienna

*Summary:* Researchers found that fructose can prime immune cells to overreact to bacterial toxins. In healthy adults, fructose-sweetened drinks increased receptors that trigger inflammation. This heightened sensitivity may contribute to greater infection risk. The effects could be even more dangerous in people with metabolic diseases.

**FULL STORY**

Fructose boosts inflammatory receptors on immune cells, making them more sensitive to bacterial toxins. Even short-term consumption may raise infection risk, especially for those with metabolic conditions. Credit: Shutterstock

Despite major progress in medicine, infections caused by viruses and bacteria continue to rank among the leading causes of death worldwide. This has raised new scientific interest in understanding whether certain nutrients might influence the body's defense system. A team led by Ina Bergheim from the Department of Nutritional Sciences at the University of Vienna has shown

for the first time that monocytes, a group of important immune cells found in the bloodstream, react more intensely to bacterial toxins after people consume fructose -- and this reaction is harmful rather than protective. The researchers found that levels of receptors that recognize bacterial toxins rose, making the body more prone to inflammation. The results were published in *Redox Biology*.

To investigate this effect, the researchers carried out two randomized studies involving healthy adults. They compared the immune response after drinking beverages sweetened with fructose to the response after drinking glucose-sweetened beverages. The team also examined isolated monocytes and used cell culture tests to explore the underlying biological mechanisms in greater detail.

**Fructose Increases Toxin-Sensing Receptors in Immune Cells**

Their findings showed that fructose intake, unlike glucose, led to higher concentrations of Toll-like receptor 2 in monocytes. Toll-like receptor 2 plays a key role in controlling how the immune system reacts. The rise in this receptor was linked to greater sensitivity to lipoteichoic acid, a bacterial toxin. "The concentration of receptors for such toxins in the body increased, which means that the inflammatory response increased," explains study leader Ina Bergheim from the University of Vienna. The researchers also reported increased release of pro-inflammatory messengers, including interleukin-6, interleukin-1β and tumor necrosis factor-alpha.

"These findings make an important contribution to understanding how individual food components and fructose in particular can influence the immune system," says Bergheim. "They indicate that even short-term, high fructose consumption in healthy people can influence the immune system and increase inflammation."

**Broader Health Implications of High Fructose Intake**

According to the researchers, future work should examine how long-term, elevated fructose consumption may affect immune function and infection risk, especially in people who already face health challenges such as type II diabetes mellitus or fatty liver disease, which is associated with metabolic dysfunction. "Sugar, especially the fructose in sugary drinks and sweets, has long been suspected of increasing the risk of developing metabolic diseases -- this needs to be investigated," says Bergheim.

**Story Source:**

Materials provided by **University of Vienna**. *Note: Content may be edited for style and length.*

**Journal Reference**:

1. Raphaela Staltner, Katja Csarmann, Amelie Geyer, Anika Nier, Anja Baumann, Ina Bergheim. **Fructose intake enhances lipoteichoic acid-mediated immune response in monocytes of healthy humans**. *Redox Biology*, 2025; 85: 103729 DOI: 10.1016/j.redox.2025.103729

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