

Artificial sweetener found to dampen immune response to disease in mice

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Scientists at the Francis Crick Institute have found that high consumption of a common artificial sweetener, sucralose, lowers activation of T-cells, an important component of the immune system, in

mice.

If found to have similar effects in humans, one day it could be used therapeutically to help dampen T-cell responses. For example, in patients with [autoimmune diseases](#) who suffer from uncontrolled T cell activation.

Sucralose is an [artificial sweetener](#), about 600 times sweeter than sugar, that is commonly used in drinks and food. Like many other artificial sweeteners, the effects of sucralose on the body are not yet fully understood, although [recent studies](#) have shown that sucralose can impact [human health](#) by affecting the microbiome.

In the new study, published in *Nature* today (March 15), the researchers tested the impact of sucralose on the immune system in mice.

Mice were fed sucralose at levels equivalent to the acceptable daily intake recommended by the European and American food safety authorities. Importantly, while these doses are achievable, they would not normally be reached by people simply consuming food or drinks containing sweeteners as part of a normal diet.

The mice fed diets containing high doses of sucralose were less able to activate T cells in response to cancer or infection. No effect was seen on other types of immune cells.

By studying T cells in more detail, the researchers found that a high-dose of sucralose impacted intracellular calcium release in response to stimulation, and therefore dampened T -cell function.

This research should not sound alarm bells for those wanting to ensure they have a healthy immune system or recover from disease, as humans consuming normal or even moderately elevated levels of sucralose would

not be exposed to the levels achieved in this study.

Instead, the researchers hope the findings could lead to a new way of using much higher therapeutic doses of sucralose in patients, building on the observation that when mice with T cell mediated autoimmune disease were given a high-dose sucralose diet, this helped to mitigate the [harmful effects](#) of their over active T cells.

Karen Vousden, senior author and principal group leader at the Crick, says, "We're hoping to piece together a bigger picture of the effects of diet on health and disease, so that one day we can advise on diets that are best suited to individual patients, or find elements of our diet that doctors can exploit for treatment.

"More research and studies are needed to see whether these effects of sucralose in mice can be reproduced in humans. If these initial findings hold up in people, they could one day offer a way to limit some of the harmful effects of autoimmune conditions."

Fabio Zani, co-first author and postdoctoral training fellow at the Crick, adds, "We do not want people to take away the message that sucralose is harmful if consumed in the course of a normal balanced diet, as the doses we used in mice would be very hard to achieve without medical intervention.

"The impact on the immune system we observed seems reversible and we believe it may be worth studying if sucralose could be used to ameliorate conditions such as autoimmunity, especially in combinational therapies."

Julianna Blagih, co-first author and former postdoctoral training fellow at the Crick (now Assistant Professor at the Maisonneuve-Rosemont Hospital Research Center, University of Montreal), explains, "We've

shown that a commonly used sweetener, sucralose, is not a completely inert molecule and we have uncovered an unexpected effect on the [immune system](#). We are keen to explore whether there are other cell types or processes that are similarly affected by this sweetener."

Karis Betts, senior health information manager at Cancer Research UK, said, "This study begins to explore how high doses of sucralose could potentially be used in new treatment options for patients, but it's still early days.

"The results of this study don't show harmful effects of sucralose for humans so you don't need to think about changing your [diet](#) to avoid it."

The researchers are continuing this work and are hoping to run trials to test if [sucralose](#) has a similar effect in humans.

More information: Karen Vousden, The dietary sweetener sucralose is a negative modulator of T-cell- mediated responses, *Nature* (2023). [DOI: 10.1038/s41586-023-05801-6](https://doi.org/10.1038/s41586-023-05801-6).
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