Bitter receptor involved in anti-inflammatory effect of resveratrol?

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Resveratrol is a plant compound found primarily in red grapes and Japanese knotweed. Its synthetic variant has been approved as a food ingredient in the EU since 2016. At least in cell-based test systems, the substance has anti-inflammatory properties. A recent collaborative study by the Leibniz Institute for Food Systems Biology at the Technical University of Munich and the Institute of Physiological Chemistry at the University of Vienna has now shown that the bitter receptor TAS2R50 is involved in this effect. The team of scientists led by Veronika Somoza published its results in the Journal of Agricultural and Food Chemistry.

Gum cells as a test system

To investigate this question, the team led by Veronika Somoza carried out experiments with a human cell line derived from a gum biopsy. The cells of this cell line are a suitable test system for investigating interactions between bitter substances, bitter receptors and the release of inflammatory markers. As the team shows for the first time, these cells have active bitter receptor genes and are also immunocompetent. That is, when the cells are treated with surface antigens from bacteria that trigger gingival inflammation, they release quantifiable amounts of the inflammatory marker interleukin-6.

Resveratrol reduces inflammatory markers

In the current study, resveratrol reduced the amount of inflammatory marker released by about 80 percent. Additional administration of the bitter-masking substance homoeriodictyol reduced this anti-inflammatory effect by about 17 percent. "This is remarkable because homoeriodictyol is a natural substance that has been shown to reduce the bitterness of food ingredients mediated via certain bitter receptors. These receptors include the bitter receptor TAS2R50, which is also expressed by the cells of our test system," explains Veronika Somoza, deputy director of the Institute of Physiological Chemistry in Vienna and director of the Leibniz Institute in Freising. Additional knock-down experiments performed by the researchers as well as computer-assisted structure-function analyses support this finding. "Therefore, it is reasonable to conclude that this receptor type is involved in mediating the anti-inflammatory resveratrol effect," Somoza says.

She adds: "Of course, there is still a great deal of research to be done. Nevertheless, the study results already provided new insights to help elucidate the molecular interactions between bitter-tasting food ingredients, bitter receptors and immune responses. In the future, it will also be exciting to find out whether bitter substances and..."
bitter receptors could play a role with regard to inflammatory gum diseases such as periodontitis."


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