

Aspartame sweetener reduces body fat, but could harm heart and brain

A study on mice has found that even at low doses prolonged intake of sweeteners may have a detrimental impact on the function of these organs

The results obtained by CIC biomaGUNE and the Biogipuzkoa Health Research Institute suggest that current consumption guidelines need to be reviewed

Donostia, 18 December, 2025. A study by CIC biomaGUNE and Biogipuzkoa HRI conducted on mice has found that the prolonged intake of sweeteners may exert harmful effects on the function of various organs. Artificial sweeteners are widely used to reduce the intake of sugar and control body weight. Although these substances were initially thought to be beneficial to health, in recent years there has been growing concern that they may have adverse effects on the metabolism of cells and organs in the long term.

One of the most ubiquitous sweeteners, aspartame, is widely used in sweets, diet soft drinks, bakery products, chewing gum, etc. It produces a sweet taste 200 times greater than sucrose, so its caloric value is relatively low. Numerous studies have explored the effects of aspartame; however, until now, its long-term metabolic and behavioural effects have not been known.

A study conducted by the researcher Irati Aiestaran-Zelaia, supervised by the Ikerbasque Research Professors Jesús Ruiz-Cabello of CIC biomaGUNE and Ian J. Holt of Biogipuzkoa HRI, has assessed the effects of long-term aspartame consumption in mice, by exposing them for one year to a dose equivalent to one-sixth of the maximum recommended daily intake for humans.

The study concluded that "aspartame does indeed reduce fat deposits (by 20%) in mice, but it does so at the cost of mild cardiac hypertrophy and decreased cognitive performance," the research team confirmed. These findings indicate that "although this sweetener may help achieve weight loss in mice, it is accompanied by pathophysiological changes in the heart and, possibly, in the brain", they added.

Very low doses

The daily dose of aspartame used in the study was 7 mg per kg of body weight in human equivalent units. "This dose is well below the maximum dose recommended by the World Health Organisation, the EMA (European Medicines Agency) and the FDA (Food and Drug Administration, USA), which is 50 mg/kg per day. This highlights the importance of the results obtained in the study," they pointed out. The study demonstrates that prolonged exposure to artificial sweeteners may have a

detrimental impact on organ function, even at low doses, suggesting that current consumption guidelines need to be critically reviewed.

This study, which examined for the first time the effects of aspartame intake over a full year, helps to fill significant gaps in knowledge about the consequences of long-term consumption, and provides crucial information on the chronic effects resulting from intake levels achievable through a normal diet. In fact, as the CIC biomaGUNE and Biogipuzkoa HRI researchers pointed out in the study, “we observed effects that have not been described until now, most likely due to the difficulty and duration of the study”.

It should be noted that these results are supported by "a large quantity of data of all kinds: functional imaging (magnetic resonance imaging), molecular imaging (positron emission tomography), brain and liver spectroscopy, cognitive tests, temperature, amount of food and drink, etc. They have helped to explain the effects aspartame has on mice and will serve as a basis for reinforcing and expanding the conclusions of this study".

The study is part of a series of studies in which "we are observing how nutrient modulation impacts organ function in sickness and in health, and in this case, we set out to determine the physiological impacts aspartame exerts on the hearts and brains of mice, as well as its effect on fat levels and body weight, in order to compare them with other types of sugars and sweeteners", they concluded.

Bibliographic reference

Irati Aiestaran-Zelaia, María Jesús Sánchez-Guisado, Marta Beraza, Libe López-Arandia, Sandra Plaza-García, Irene Fernández-Folgueral, Antonio de Molina-Iracheta, Ian J. Holt , Jesus Ruiz-Cabello

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About CIC biomaGUNE

The Center for Cooperative Research in Biomaterials [CIC biomaGUNE](#), member of the Basque Research and Technology Alliance ([BRTA](#)), is a not-for-profit research centre located in Donostia that conducts state-of-the-art research at the interface between Chemistry, Biology and Physics, devoting particular attention to studying the properties of biological nanostructures at the molecular scale, and their biomedical applications. It was recognised in 2018 as a “María de Maeztu” Unit of Excellence for

meeting requirements of excellence, which are characterised by a high impact and degree of competitiveness in its field of activity on the global scientific stage.

About Biogipuzkoa HRI

[Biogipuzkoa HRI](#) is the leading health research and innovation centre for the province of Gipuzkoa [Basque Autonomous Community]. Its mission focuses on generating knowledge and results in the field of translational research in a way that impacts and adds value to the care provided to patients and society in general. For more than 15 years, it has been promoting basic, epidemiological, clinical and translational research, as well as innovation, in areas such as neuroscience, oncology and ageing. Its entire activity is underpinned by over 400 researchers attached to 32 research groups together with 19 Support Units and Platforms. The Institute is part of the main cooperative health research networks and platforms at a national and international level.