# Your Brain's Hunger and Reward Circuits Rewired by Eating Ultra-Processed Foods

A team of researchers at McGill University and the University of Helsinki analyzed the UK Biobank data and found that high ultra-processed food intake is associated with adverse metabolic and adiposity profiles and changes in the microstructure of feeding-related brain regions.

## Study

The researchers analyzed data from 33,654 participants in the UK Biobank, a large-scale database and research resource containing genetic, lifestyle, and health data and biological samples from more than 500,000 individuals.

## Results

The analysis of metabolic parameters revealed that ultra-processed food intake can significantly reduce blood levels of high-density lipoprotein (HDL) and increase blood levels of C-reactive protein (CRP; a marker of inflammation), triglyceride, and glycated hemoglobin (a measure of glycemic control).

Regarding cardiac and obesity markers, the analysis revealed that ultra-processed food intake can significantly reduce blood pressure and increase body mass index (BMI), waist-to-hip ratio, and visceral adipose tissue.

The nutrient profile analysis revealed that these food products are associated with increased consumption of total sugar, sodium, and saturated fatty acids.

These observations collectively highlight the association of ultra-processed food intake with a range of cardiometabolic, anthropometric, and dietary measures.

## Conclusion

The study links high ultra-processed food intake to altered metabolic markers, increased obesity, and changes in brain regions involved in feeding behavior via adiposity-related pathways and independent mechanisms. For example, hypothalamic changes were mediated by BMI, whereas changes in the nucleus accumbens and pallidum occurred independently of adiposity and were partly linked to inflammation and dyslipidemia.

The study also suggests that the observed changes in brain structures might be driven by dyslipidemia, inflammation, or adiposity caused by these food products. However, the paper notes these effects were small in magnitude.

The study also acknowledges that food additives in ultra-processed foods may alter gut microbiota composition, contributing to immune dysregulation and systemic inflammation.

The study's observations on brain structural alterations suggest a reduction in the number of cell bodies and an increase in the volume of extracellular space, which are characteristic features of a neurodegenerative process that can lead to neuroinflammation.

Researchers have mentioned that neuroinflammation is likely to play a role in ultra-processed food-induced changes in eating behavior. They also mention the possibility of a bidirectional relationship wherein ultra-processed food intake increases the desire to eat more such foods by influencing the brain's reward center (nucleus accumbens) through inflammation, independent of BMI.

Researchers have also highlighted the involvement of the pallidum, another brain region associated with reward processing and motivation, in this bidirectional relationship, which they believe can guide food-related decisions.

The study's compelling findings include structural changes in the amygdala and thalamus related to ultra-processed food intake. The amygdala plays a pivotal role in regulating feeding behavior related to reward, and the thalamus is associated with emotional and motivated behaviors, such as fear and reward-seeking.

Most studies investigating the health effects of ultra-processed foods highlight the contribution of nutritional factors, such as low dietary fiber content and high saturated fat, sugar, and sodium content.

The current study included specific nutrients (total sugar, saturated fat, and sodium) in the primary analysis as confounding factors that are commonly linked with disease prevalence and can influence eating behaviors. The primary analysis was also controlled for a large number of other confounding factors that might influence eating behavior.

Therefore, the study findings are interpreted to be independent of nutrient content, socioeconomic status, physical activity, and smoking and alcohol consumption. However, the causal association between ultra-processed food intake and brain structural alterations cannot be established because of the observational study design.

**Source:**

https://www.news-medical.net/news/20250409/Eating-ultra-processed-foods-may-rewire-your-braine28099s-hunger-and-reward-circuits.aspx