- Brain / Eating customs / Holidays

Over-eating on holiday can lead to ‘obese brain’, scientists find

The Daily Telegraph · 3 Mar 2025 · 14 · By Joe Pinkstone Science correspondent

IF YOU struggle to get back to a healthy eating routine after returning home from a holiday, it could be because your week of indulgence has given you “obese brain”, scientists say.

A study has found that while people may commonly bemoan putting on a few pounds from a week or two of all-inclusive food and drink, the real damage is done between the ears.

Short-term overconsumption of sugar and fat triggers rapid changes in the brain of a healthy person and makes it behave like that of an obese person, scientists found. They add that the changes in the brain last longer and are slower to return to normal than any impact the food has on the body itself.

Prof Stephanie Kullmann of the University of Tubingen in Germany, who led the study, said: “The changes in the brain outlasted the timeframe of the consumption.

“Behaviorally, we see that participants show changes in reward behavior: Reduced reward sensitivity, this could lead to greater food intake. Our data indicate that the brain and behaviour response resemble that of a person with obesity and changes in the brain seem to occur prior to weight gain.”

Scientists gave 18 young and healthy men a high-calorie diet filled with sugary and fatty foods for five days, including chocolate bars, brownies, biscuits, salami and crisps.

The aim was to increase caloric intake by 1,500 calories above normal, but the participants could only manage 1,200 extra.

The men put on no weight, the study found, but there was a substantial change in their brain which is thought to have been caused by the diet. Five days of extra sugar and fat was enough to make their brains behave like those of an obese person, the scientists found.

Brain tests were done before, immediately after and a week after ending the five-day high-calorie diet and showed changes after eating a poorer diet.

The brains of these men had higher levels of resistance to insulin for up to a week after the fatty diet ended than the 11 men in a control arm of the trial, data show. Insulin is produced in response to food and sugars in the body because it helps turn the food into energy and some of the insulin goes to the brain to suppress appetite.

Resistance to the hormone in the brain occurs in response to high levels of sugar exposure and can lead to persistent hunger, lack of satiety, and makes it easier to put on weight.

Data from the study showed that the changes caused by diet were longer lasting in the brain than they were in the rest of the body.

While the change in diet altered some biological pathways, they returned to normal quickly, the scientists found, whereas the impact of insulin resistance in the brain was still present a week after finishing the fatty diet.

The scientists write in the study: “The current study demonstrates that brain insulin responsiveness adapts to short-term dietary changes after overconsumption of broadly available sweet and fatty ultra-processed snacks in addition to their regular diet, in healthy weight men, in the absence of changes in body weight, peripheral insulin sensitivity and food craving.”

The study is published in Nature Metabolism.