MedicalXpress

Researchers find that eating high levels of fructose impairs memory in rats

July 16 2009

Researchers at Georgia State University have found that diets high in fructose -- a type of sugar found in most processed foods and beverages -- impaired the spatial memory of adult rats.

Amy Ross, a graduate student in the lab of Marise Parent, associate professor at Georgia State's Neuroscience Institute and Department of Psychology, fed a group of Sprague-Dawley rats a diet where fructose represented 60 percent of calories ingested during the day.

She placed the rats in a pool of water to test their ability to learn to find a submerged platform, which allowed them to get out of the water. She then returned them to the pool two days later with no platform present to see if the rats could remember to swim to the platform's location.

"What we discovered is that the fructose diet doesn't affect their ability to learn," Parent said. "But they can't seem to remember as well where the platform was when you take it away. They swam more randomly than rats fed a control diet."

Fructose, unlike another sugar, glucose, is processed almost solely by the liver, and produces an excessive amount of triglycerides — fat which get into the bloodstream. Triglycerides can interfere with insulin signaling in the brain, which plays a major role in brain cell survival and plasticity, or the ability for the brain to change based on new experiences.

Results were similar in adolescent rats, but it is unclear whether the

effects of high fructose consumption are permanent, she said.

Parent's lab works with Timothy Bartness, Regents' Professor of Biology, and John Mielke of the University of Waterloo in Waterloo, Ontario, Canada to examine how diet influences brain function.

Although humans do not eat fructose in levels as high as rats in the experiments, the consumption of foods sweetened with fructose — which includes both common table sugar, fruit juice concentrates, as well as the much-maligned high fructose corn syrup — has been increasing steadily. High intake of fructose is associated with numerous health problems, including insulin insensitivity, type II diabetes, obesity and cardiovascular disease.

"The bottom line is that we were meant to have an apple a day as our source of fructose," Parent said. "And now, we have fructose in almost everything." Moderation is key, as well as exercise, she said.

Exercise is a next step in ongoing research, and Parent's team will investigate whether exercise might mitigate the memory effects of high fructose intake. Her lab is also researching whether the intake of fish oil can prevent the increase of triglycerides and memory deficits. Results from that research will be presented by her graduate student Emily Bruggeman at the 2009 Society for Neuroscience meeting in Chicago this fall.

Source: Georgia State University (news : web)