Medical Xpress

Avoiding sweets may spell a longer life, study in worms suggests

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A new study in the October issue of *Cell Metabolism* reveals that worms live to an older age when they are unable to process the simple sugar glucose. Glucose is a primary source of energy for the body and can be found in all major dietary carbohydrates as a component of starches and other forms of sugar, including sucrose (table sugar) and lactose.

“In the US and Europe, added sugar accounts for 15 to 20 percent of daily calories, and the breakdown of that sugar always generates glucose,” said Michael Ristow of the University of Jena in Germany and the German Institute of Human Nutrition Potsdam-Rehbrücke. If the findings in worms hold for humans, it “suggests that, in healthy people, glucose may have negative effects on life span.” The findings may also cast some doubt on the prevailing treatments for type 2 diabetes, all of which are aimed at lowering blood levels of glucose by increasing the amount of sugar taken up by body tissues, Ristow said.

What’s more, Ristow’s group further demonstrated in their report that antioxidants and vitamins given to the worms erased the life-extending benefits of sugar deprivation, raising questions about the widespread use of antioxidant supplements, according to the researchers.

In westernized countries, glucose represents a key dietary component since the most commonly ingested sugar, sucrose, contains equal amounts of glucose and fructose, the researchers noted. Nevertheless, it is a matter of debate whether glucose and other carbohydrates have a relevant effect on disease burden and mortality in humans, they said.

To begin to address the issue in the current study, the researchers exposed the nematode Caenorhabditis elegans to a chemical that blocked the worms' ability to process glucose, producing a metabolic state the researchers said resembles that of dietary glucose restriction. That treatment extended the worms' life span up to 20 percent, Ristow reported, noting that the observed gain extrapolated to humans would mean an additional 15 years of life.

Unable to depend on glucose for energy, the long-lived worms ramped up the activity of cellular powerhouses known as mitochondria to fuel their bodies, Ristow said. That mitochondrial activity led to the increased production of reactive oxygen species, sometimes referred to as free radicals. In turn, the worms' defenses against "oxidative stress" increased, the researchers found.

Free radicals are usually considered harmful, Ristow said, and scientists have generally thought that exposure to them would shorten life span. The new findings suggest that, at least in some cases, the opposite may be true.

Indeed, even when the researchers returned the worms to their normal environment, allowing them to again use glucose for energy, the worms' increased defenses and longevity persisted, Ristow said. In contrast, treatment with antioxidant vitamins prevented the oxidative stress and the defenses against it, eliminating the life-boosting effects. Ristow called the result "scary" because it means that, rather than being protective, antioxidant pills may actually leave the body more vulnerable by thwarting those natural defenses.

Ristow doesn't recommend that people toss out their multivitamins just yet, however, cautioning that his findings were made in worms. He also noted that antioxidant-rich foods, including fruits and vegetables, contain thousands of substances—many of which have yet to be identified.

While scientists don't yet know what all those ingredients do, it's clear that such natural foods support "healthy pathways," Ristow said.

Source: Cell Press