

## **Sugary Drinks, Not Fruit Juice, May be Linked to Insulin Resistance**

BOSTON (September 05, 2007) — Steady increases in consumption of sugar-sweetened beverages over the last several decades, as well as rates of Type 2 diabetes mellitus, led nutritional epidemiologists at the Jean Mayer USDA Human Nutrition Research Center on Aging (USDA HNRCA) at Tufts University and colleagues to explore the relationship between sugar-sweetened beverage consumption and insulin resistance, a precursor to Type 2 diabetes. Their findings suggest that higher consumption of sugar-sweetened drinks, but not 100 percent fruit juice, may be associated with insulin resistance, even in otherwise healthy adults.

“Study participants who consumed two or more sugar-sweetened beverages per day had significantly higher fasting blood levels of insulin as compared to participants who did not report consuming any such beverages, regardless of age, sex, weight, smoking status, or other dietary habits,” says senior author Paul Jacques, DSc, director of the Nutritional Epidemiology Program at the USDA HNRCA and professor at the Friedman School of Nutrition Science and Policy at Tufts University. “Higher fasting levels of insulin mean these study participants are more at risk for developing Type 2 diabetes. In contrast,” he says, “consumption of 100 percent fruit juice was not significantly related to any of our measures of insulin resistance.”

Study participants were 2,500 healthy men and women in the Framingham Offspring Study, a community-based study of cardiovascular disease among offspring of people in the original Framingham Heart Study. Participants reported their usual dietary intake for the previous year, which researchers used to determine average intakes of sugar-sweetened drinks (regular and caffeine-free colas and other carbonated beverages containing sugar), diet soft drinks (low-calorie colas with and without caffeine and other low-calorie carbonated beverages), and fruit juice (e.g., apple juice or apple cider, orange juice, and grapefruit juice). One serving of a sugar-sweetened drink or diet soda was considered equivalent to 12 fluid ounces, or a regular-sized can of soda. One serving of fruit juice was considered equivalent to six fluid ounces.

The researchers obtained blood samples from participants who fasted for at least eight hours, and measured the participants’ blood levels of insulin as well as glucose. High fasting glucose levels, like high fasting insulin levels, are a pre-cursor to Type 2 diabetes. “Unlike fasting insulin levels, fasting glucose levels were not significantly different between those who consumed sugar-sweetened drinks and those who did not,” says Jacques, “However, participants consuming two or more daily servings of 100 percent fruit juice had modestly lower fasting glucose levels, compared with those who did not consume fruit juice.” Although this observation might be due to the additional nutrients or other phytochemicals found in the juices, Jacques notes this also may be a consequence of the healthier lifestyle and dietary habits of fruit juice consumers. They were less likely to smoke than non-consumers, and consumed diets relatively lower in saturated fat and higher in total fiber.

Despite these results, Nicola McKeown, PhD, corresponding author and scientist in the Nutritional Epidemiology Program at the USDA HNRCA, does not advise increasing consumption of fruit juice. “While 100 percent fruit juice can be a healthful beverage, too much fruit juice can add excess calories and sugar to the diet. Whole fruit is often a better choice.”

Jacques and McKeown also caution that their results cannot be used to determine cause-and-effect relationships among caloric and non-caloric sugar-sweetened beverage consumption and insulin resistance. “It could be that people who drink sugar-sweetened beverages have other unhealthy behaviors that we did not account for,” says McKeown. “Sugar-sweetened drink consumption may prove to be an important determinant of insulin resistance, but more long-term studies of diverse populations that incorporate the use of more direct measures of insulin resistance are needed.” In the meantime, the researchers suggest that people continue to follow the recommendations in the 2005 Dietary Guidelines for Americans, increasing consumption of water while limiting intake of calorically sweetened, nutrient-poor beverages.

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Yoshida M, McKeown NM, Rogers G, Meigs JB, Saltzman E, D’Agostino R, Jacques PF. *Journal of Nutrition*. 2007 (September); 137:2121-2127. “Surrogate Markers of Insulin Resistance are Associated with Consumption of Sugar-Sweetened Drinks and Fruit Juice in Middle and Older-Aged Adults.”

*The Gerald J. and Dorothy R. Friedman School of Nutrition Science and Policy at Tufts University is the only independent school of nutrition in the United States. The school's eight centers, which focus on questions relating to famine, hunger, poverty, and communications, are renowned for the application of scientific research to national and international policy. For two decades, the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University has studied the relationship between good nutrition and good health in aging populations. Tufts research scientists work with federal agencies to establish the USDA Dietary Guidelines, the Dietary Reference Intakes, and other significant public policies.*

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**If you are a member of the media interested in learning more about this topic, or speaking with a faculty member at the Friedman School of Nutrition Science and Policy at Tufts University, or another Tufts health sciences researcher, please contact Andrea Grossman at 617-636-3728 or Christine Fennelly at 617-636-3707.**