

**“Is fructose bad for you?” From Harvard Health Publications, MSN Health & Fitness, May 20, 2006.**

Editor, Harvard Health Letter

RE: “Is fructose bad for you?”, posted on MSN.com Health & Fitness

To the Editor:

We are writing in response to an article authored by Harvard Health Letter appearing on the MSN.com Health & Fitness website entitled, “Is fructose bad for you?” The article was last updated on 05/2007.

The article makes a cursory attempt to be objective, admitting that the data on fructose and HFCS is not conclusive. However, there are several errors of fact that, coupled with the incorporation of recent published data, would substantially change the tone and conclusions of the article. I draw your attention to the following specific points:

- “Levels of leptin, the satiety hormone that gives us a full feeling, go up when insulin surges, and levels of ghrelin, the “hunger hormone,” go down. There’s fairly good evidence that fructose has just the opposite effect, reducing leptin, so we don’t necessarily feel full after a fructose-filled meal, and not lowering ghrelin as much as glucose does, so we stay hungry. For this reason, some experts see high-fructose diets as contributing to overeating.”
- The article relies on old data that compares fructose, at excessively high levels, with glucose. Many metabolic anomalies are observed under such conditions, but they are of no nutritional significance since our diet never consists of fructose as the only simple sugar and we seldom eat glucose alone. When fructose is present in a meal, there is commonly an equivalent or greater amount of glucose as well.
- A far better experiment would compare [fructose + glucose] monosaccharides with disaccharide sucrose, since HFCS and crystalline fructose displaced half of the sucrose in foods and beverages over the past 30 years. Rippe’s group performed this comparison and found no difference in such metabolic markers as serum glucose and insulin, leptin and ghrelin, triglycerides and uric acid, and subjective descriptors of appetite and satiety (1-3).

- “Oversupply the metabolic pathway for fructose with the sugar, and the liver ends up churning out triglycerides – fat that circulates in the blood. The same is true of glucose and its metabolic pathway, but it takes larger amounts.”
- Metabolic pathways are like assembly lines: they are designed to handle a certain number of parts (substrate) and still run smoothly. If the capacity of the pathway is exceeded, however, something must be done with the excess substrate. In the case of fructose, excess substrate can be interchanged with glucose at several intersections of their pathways. It is only when these pathways are saturated as well that fructose is converted into energy-dense molecules (triglycerides) for storage and later use.
- In the human diet where fructose normally constitutes 8-9% of calories (4), these pathways are not typically saturated. In extreme experiments where the pathways are absolutely flooded with 30-60% of calories as fructose, however, it should come as no surprise that the body finds other uses for the surplus. Triglycerides are a common product in such circumstances. Triglycerides are also produced when glucose pathways are saturated. McDevitt demonstrated that similar levels of fat deposition take place whether overfeeding derives from glucose, sucrose, fructose or triglycerides (5).
- It should be explicitly acknowledged in your article that such extreme diets are never encountered in humans. Dietary fructose is always accompanied by glucose from a variety of sources, including cereal grains; fruits and vegetables; food starches, maltodextrins and corn syrups; and nutritive sweeteners like sucrose, glucose, honey, fruit juice concentrates and HFCS.
- “Sally Squires, the Washington Post nutrition columnist, has called [HFCS] ‘the floozy of the sugar world: sweeter and cheaper than sucrose, but viewed with distrust by some consumers.’”
- HFCS-55 was specifically developed to have the same sweetness as sucrose; HFCS-42 has about 92% of the sweetness of sucrose (6).
- HFCS is viewed with distrust by consumers only because of scientific hyperbole that exaggerates its prevalence in the food supply and mischaracterizes its composition and metabolic effects.

- “Is high-fructose corn syrup especially harmful? Hard to say. At this point, the case against soft drinks sweetened with the stuff is pretty persuasive, although even that might be just a matter of the added calories.”
  - The case against soft drinks is becoming less persuasive. Rippe’s group compared soft drinks sweetened with HFCS-55 vs. sucrose and found no difference in a variety of metabolic markers (see above) (1-3). And new research by Sun & Empie (7) and Forshee et al (8) finds little correlation between soft drink or HFCS consumption and obesity; fat consumption shows a far higher correlation.

HFCS is a caloric ingredient — like fats, protein, alcohol and other nutritive sweeteners and carbohydrates. No untoward metabolic consequences have been reported at typical use levels. It should surprise no one that overconsumption of any caloric ingredient without compensating energy expenditure will result in weight gain.

I encourage you to rewrite the article, correcting errors of fact, putting the literature into proper physiological context and incorporating the most recent research.