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Fructose: Short, Sweet, and Deadly

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As is often the case, something that may be obvious to many of us in the alternative health world is still largely unknown or ignored by the mass culture. I am referring to the role of sugars - fructose in particular - as a leading cause of declining health. There is recognition of this fact in some of the leading "people's diets." The Atkins diet, South Beach diet, Maker's diet, Mercola's diet, Paleolithic diet, Nourishing Traditions, and many more, all have one major theme in common: limiting simple carbohydrates. Sugars and their close cousins, simple carbohydrates, are significant factors in the failure of the modern diet.

The wisdom of limiting simple carbohydrates can be seen when we take an evolutionary view. We have been humans for about a million years. Agriculture came about roughly 10,000 to 40,000 years ago in China and the "Fertile Crescent" region.

Imagine what happens when, after 960,000 years of eating nuts, seeds, roots, tubers, grubs, wild fruits, berries, and any animal we could get our hands on, we "suddenly" encounter grains. Fast forward to the last 50 years and look at the unprecedented increase in simple-carbohydrate foods - foods based on sugars and flour products, namely baked goods, breads, pastas and sweetened beverages. What we see is an exponential leap in sugar intake, which puts a powerful strain on insulin-dependent glucose metabolism. As the levels of glucose introduced into the blood have increased, so has the demand for insulin. Insulin gets less efficient over time, and more is needed to compensate, which leads to a condition called insulin resistance.

In a 1995 paper entitled "Pathophysiology of Insulin Resistance in Human Disease," Gerald Reaven coined the term "Syndrome X," which many now refer to as "metabolic syndrome." Reaven described the links of insulin resistance to the myriad chronic health problems we experience in our modern culture; diabetes, obesity, hypertension, increased triglycerides, decreased HDL, increased LDL, uric acid increase, and coronary heart disease.

Dr. Weston Price, a dentist in the early part of the 20th century, traveled and visited native cultures still living on their traditional diets. He was curious to discover why dental caries and overcrowding of teeth were so prevalent among his American patients and suspected that it had something to do with the modern diet. He carefully documented primarily dental conditions among the native peoples he visited. What he found in abundance were wide jaws with beautiful, straight white teeth. Dental caries and crowding were rare. He also observed generally good health among native peoples from the arctic to tropical regions. Over time he revisited many of these peoples and found that those who had been introduced to the "trading post" diet had experienced, within one generation, narrowing of the jaw, crooked and crowded teeth, with a proliferation of dental caries. He also noted a marked decline in overall health. His findings are sadly corroborated by the skyrocketing rates of alcoholism, obesity and diabetes among Native Americans and aboriginals. There are many factors that contribute to the poor

health of native peoples who were displaced and uprooted from their traditional way of life, but sugar has to be one of the leading dietary culprits.

Recently, a study from Louisiana State University looked at a particularly bad actor, fructose, in the form of high fructose corn syrup (HFCS). Here are some of their findings:

- Obesity among U.S. adults in the last 10 years has risen from 23 percent to 30 percent.
- The average body weight of Americans has slowly risen from the early 1900s to the late 1980s. After the late 1980s, the rise spiked significantly.
- Consumption of HFCS increased more than 1,000 percent between 1970 and 1990.

HFCS is a human-made mixture of about 80 percent fructose and 20 percent glucose derived from corn, most likely genetically modified. Most fruit has a 50/50 ratio of fructose to glucose. In 1980, the average American ate 39 pounds of fructose and 84 pounds of sucrose. In 1994, the average consumption was 83 pounds of fructose and 66 pounds of sucrose, providing 19 percent of total caloric energy intake. Today 25 percent of the average total caloric energy consumption for Americans comes from sugars, and fructose has the largest fraction from that intake. If you realize that sucrose is a disaccharide composed of 50 percent glucose and 50 percent fructose, these numbers become alarming regarding fructose intake.

HFCS is everywhere, from bread and pasta sauces to protein bars and "natural" sodas. It is also the main sweeter in soft drinks. Annual soft drink consumption increased from 22 gallons to 41 gallons per person between 1970 and 1997! Now school children can buy it in their schools from vending machines!

A USDA study fed rats a diet deficient in copper, with sucrose as the main carbohydrate. The result was that the rats developed liver, heart and testes hypertrophy, pancreatic atrophy, and premature death. It was shown that fructose (half the sucrose composition) interfered with copper-dependent enzymes that form collagen and elastin and necessary ingredients for healthy tissue formation.

A review in the *American Journal of Clinical Nutrition* looked at the relationship between insulin resistance and fructose consumption. It found that fructose, compared to glucose, more preferentially converts to lipid in the liver. It increases insulin resistance and hyperinsulinemia, induces impaired glucose tolerance, and creates hypertension in animal models. This is essentially the model of syndrome X.

If this were not bad enough, one must also add in the Maillard reaction, also known as the browning reaction. Sugars can combine with amino acids, peptides and proteins to form compounds that increase oxidative stress and inflammation in the body. It is thought that the browning reaction is a significant factor in the decline of health in diabetics. Unfortunately, you don't have to be diabetic to experience the detriment of the browning reaction; it happens anywhere sugars and amino acids meet. Sometimes too much of a good thing is, well, a bad thing.

Getting back to the model of our evolutionary heritage, the amount of fructose and other simple sugars humans consumed was fairly stable, and came from whole, wild foods for about 99.999 percent of our cellular history. Our pancreas was designed to deal with a certain range of glucose in the blood. We are simply not ready for prime-time simple carbohydrate consumption on the order of magnitude that exists in our modern diet.

You don't have to go into ketosis, *a la* the Atkins diet, to eat healthy amounts of the right foods. Just stick with the types of foods that didn't exist more than 100 years ago for starters. Reduce bread and pasta intake, and drink water to quench your thirst. Avoid fruit juices unless you make them yourself from whole organic fruit. You won't consume that much, because it is really expensive! Fruit, which has fiber, enzymes, vitamins and minerals, slows the absorption of the sugars. By eating whole fruit, one can only consume so much at a time. Drinking fruit juice, on the other hand, enables one to consume many more sugars in a sitting. No soda! No "fruit-sweetened" anything; fruit-sweetened is a code name for fructose. Just taking these steps will take care of a huge amount of hidden sugars.

For the sophisticated purveyors of health foods, forget the manufactured products that tout being "natural." Even organic honey-sweetened juices are too sweet. Dilute them with water if you can't resist them, and be conscious of how much sugar you are actually taking in by reading the label and getting the calories from sugar per serving. Energy bars, even the organic ones, are another form of a quick sugar fix.

Remember: When in doubt about a food, follow the principle of eating as far back in your ancestral history as possible, and you'll be better off.

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