Sugar is a chronic toxin

Posted on 21 July 2011 by **cjf**

After some 30 years of waning, my interest in the assertion that the effects of sugar are poisonous was rekindled in April by reading a piece entitled "Is Sugar Toxic?" by Gary Taubes in the New York Times. When Taubes wrote admiringly of John Yudkin (1910–1995) (whose short 1972 book "*Sweet and Dangerous*" profoundly influenced me when I read it in the early 80s), the effect was electrifying: maybe he was right … vindicated after all these years! To sober myself up, I began researching our current understanding of the biochemistry and physiology of sugar metabolism. My research supported an interesting three hour discussion at the 10 July 2011 meetup of the Ben Franklin Thinking Society in Philadelphia.

Although the case against sugar is stronger now than it was in the 1970s, there is still no ironclad proof of its toxicity (more on that below). Sentiment against sweeteners with fructose in them (table sugar is one-half fructose) is growing because it has been implicated in several biochemical pathways associated with the so called **metabolic syndrome**. Metabolic syndrome is a complex of several (usually at least three) of the following factors: abnormal blood fat, high blood pressure, fatty liver, insulin resistance, and new fat deposition. Metabolic syndrome is very important because physicians now realize it is a more accurate predictor for diabetes, heart disease and cancer than any of the symptoms considered separately. The impact of this new perspective and the research that has ensued is starting to challenge conventional wisdom about the dietary factors involved in these diseases.

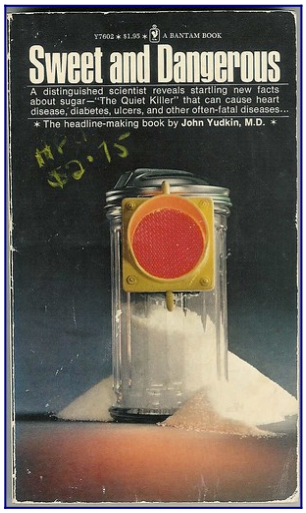
Taubes' New York Times article starts by referring to the powerful, "viral", 90-minute, YouTube video presentation by Dr. Robert Lustig indicting sugar. Lustig and Taubes convincingly lay out the case that fructose is a chronic toxin that causes metabolic syndrome. Therefore, it should be implicated as a causal factor in the obesity, diabetes, and cardiovascular disease pandemics. Taubes ends his article ominously by quoting prominent oncologists (cancer physicians) worrying that cancer could be caused in part by fructose & sugar as well (a claim Lustig did not make).

The Robert Lustig Video: Sugar: The Bitter Truth

Dr. Robert Lustig argues that the "fat is bad craze" has failed us: we reduced our fat intake, but the obesity and diabetes epidemics grew much more intense in the 1990s and 2000s. He observes that the fastest growing epidemic in obesity is among six month old babies! So the disparaging view that gluttony and sloth are the key factors in obesity appears absurd: babies don't choose gluttony nor sloth — indeed, no one does! Could excess fat be a physiological problem and not a simple issue of "won't power" (a phrase my grandfather used)? Perhaps our conventional wisdom is wrong? Lustig argues convincingly that a calorie is NOT just a calorie: some have worse physiological effects than others.

Lustig's main thesis is that fructose acts in the body as a chronic toxin of the liver very much like alcohol. He observes that fructose is implicated in eight of the 12 chronic symptoms attributed to ethanol: high blood pressure, heart attack, abnormal blood fat, inflamation of the pancreas, obesity, liver dysfunction, insulin resistance, and habituation. In his not too difficult (but also not too easy) biochemistry lesson, Lustig points out that fructose and alcohol metabolism are nearly identical. Both hit the liver hard and both share many similar metabolic pathways. He concludes that "hepatic [liver-based] fructose metabolism leads to all of the manifestations of metabolic syndrome".

John Yudkin's Book "Sweet and Dangerous"



John Yudkin was a distinguished nutritionist and MD. He performed experimental studies and analyses of epidemiological data. As early as the 1960s, he concluded that sugar has no nutritional value beyond its calories and that if its effects were present in any other substance, it would be banned. This led to a heated debate with another distinguished nutritionist Ancel Keys who first proposed the link between dietary fat and heart disease. In his famous Seven Countries Study, Keys concluded that increased cholesterol and the western diet with its heavy load of saturated fats led to increases in heart disease and stroke. Keys effectively started the *fat is bad craze* that led to the US government's recommendation that we reduce fat consumption from 40% to 30% of calories. Lustig argues that Keys may have done his statistical analysis incorrectly. Could the last 30 years of nutritional guidance be based on a statistics mistake?

On re-reading Yudkin's book, I was impressed by his penetrating discussion of the techniques to prove causes of disease (a subject known as *etiology*). Yudkin observes that "absolute" proof requires pairing subjects into two groups who are as alike as possible with the exception of an experimental intervention. This "gold standard" in medical research is known as a clinical trial. Yudkin explains that the ethical and practical complications of such studies are enormous. Therefore, most nutritional and medical data comes from less reliable and more circumstantial evidence. Yudkin explains in basic terms the nature of epidemiological and experimental evidence and its limitations. Yudkin's book is a great non-technical introduction to medical research.

I wish that more non-technical nutrition and health writing would advise us of the complications in applying insights from new medical research given the inherent limitations especially since so few of us understand reasoning with uncertainty. Health sciences writers would do well to "take a page" from Yudkin's book.

Gary Taubes' Video "Big Fat Lies"

On 6 February 2008, Gary Taubes spoke at the Stevens Institute of Technology about *Big Fat Lies*. In it he convincingly explains the problems with the conventional wisdom that obesity is caused by excess calorie consumption and physical inactivity. Lustig's treatment of this subject is also good, but despite watching both videos I had difficulty explaining it at the meetup (or maybe the idea so conflicts with our current cultural biases that it is rejected without thinking?). Perhaps this will clarify the situation: the body may choose to deposit a calorie as fat even if it is starving and malnourished (Taubes cites many examples of obese malnourished people). Likewise, the body may choose to "spend" its calories despite an excess from a large meal (there are thin people who can eat anything without gaining weight). There are profound physiological phenomena that affect the impact of a calorie. It is not as simple as "calorie in; calorie out"! Taubes concludes that "obesity is not a disorder of overeating, it is a disorder of excess fat" which he calls the **lipophilia hypothesis**. Apparently, it was widely accepted before world war II. He effectively "proves" (at least he convinced me) that fat deposition requires carbohydrates such as sugar through the mediation of insulin.

Dr. Richard Johnson on Obesity

In this video set, Dr. Richard Johnson argues that fructose increases uric acid (a fact corroborated by Luc Tappy as I mention below) which he claims mediates hypertension and cardiovascular disease. What I liked about his presentation is the rich history and stories about the twists and turns in the development of medical research.

Dr. Rutledge says Artificial Sweeteners are Bad

If sugar is bad, are artificial sweeteners any better? I have not thoroughly researched this issue, but in this video Dr. Rutledge's argument seems basically sound. Namely, there do not seem to be any reports that "diet" foods are *proven* to help people lose weight. Rutledge points out that makers of such foods would advertise the fact if it were true. We can infer that artificial sweeteners do not lead to weight loss and better health. Moreover, Rutledge cites a study at Purdue that links Artificial Sweeteners To Weight Gain. So one should be wary of artificial sweeteners too.

Reaching a Conclusion and Avoiding Conjunction & Confirmation Bias

After reading Yudkin's book and watching all these videos indicting sugar, I realized that I put myself in danger of suffering from conjunction bias (over-valuing arguments that are juxtaposed) and confirmation bias (seeking out only evidence that supports the sugar is toxic thesis). Most of us fall victim to these biases in our research … especially Internet research where our search engine can exacerbate the problem by "helpfully" finding related (read that as similarly biased) content. To avoid these biases and to aspire to a more comprehensively valid *truth* it is important to actively seek out alternative ideas to challenge and test our theories. Exerting some effort to disprove one's working hypothesis can be very helpful. So I spent some time searching for articles that praise sugar's benefits. Of course, I learned that the sugar industry strongly argues that sugar is healthy. And from time-to-time some nutritionists also argue that sugar is not dangerous (see, for example, this report). Most articles I reviewed advise that sugar consumption should be reduced with the possible exception of athletes, marathoners, and mountain climbers (who can benefit from carb loading). But very few accept the conclusions of Yudkin, Lustig, and Taubes. The sugar is toxic thesis is still at the frontier of scientific discussion.

Taubes addressed the bias concern in his New York Times article by citing Luc Tappy's research. Tappy is regarded as one of the foremost authorities on fructose biochemistry. Tappy and Kim-Anne Lê wrote a very technical article on the "Metabolic Effects of Fructose" which carefully and quite conservatively reviews the known effects of fructose. The article asserts that fructose increases fat (triglycerides) and uric acid in the blood. But the other effects that Taubes and Lustig refer to are, according to Tappy and Lê, less conclusively demonstrated. However, in some cases they cite substantial *indirect* evidence for these deleterious effects.

Although the hypothesis that sugar is a chronic toxin is not proven "beyond a shadow of doubt", the case has strengthened considerably since I first read Yudkin's book about 30 years ago. As with all hypotheses, it is wise to remain skeptical. Truth requires the sustained accumulation of more and more corroboratory data. Nonetheless, it would be wise to reduce one's fructose and sugar consumption in case more of the allegations are confirmed.

Tags: Ancel Keys, cancer, diabetes, fructose, Gary Taubes, heart disease, John Yudkin, Luc Tappy, obesity, Richard Johnson, Robert Lustig, Science, sugar

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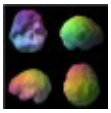
8 Responses to “Sugar is a chronic toxin”

1. **Joshua Pang** on 21 July 2011 at 6:59 pm

   Hi CJ

   Just a quick one–

   I was with Dr. Lad today and he discussed sugar!

   He said ‘processed white sugar is bad’ but ‘natural rock sugar is ok’

   Just putting it out there.

   Will try and reconsider

   -Josh

   Reply

2. **Deena Stryker** on 21 July 2011 at 8:25 pm

   All around great job, CJ, research, writing!

   Do you guys have an e-reader? If so, check out my illustrated memoir, Lunch with Fellini, Dinner with Fidel at Amazon.

   Deena

   Reply

3. **Michael Riversong** on 22 July 2011 at 11:47 am

   Good research! Actually i’m living proof of the toxicity of sugar and artificial sweeteners. As a long-term diabetes case, i’ve been successful with completely eliminating sugar, and failed miserably when i started to compromise on that in 2000. Lost a lot of weight, to an unhealthy status, and eventually started manifesting serious neuropathy. That became a springboard for chronic foot infections, resulting in a partial amputation and a lot more fighting. Definitely fructose is worse than any other form!

   As for artificial sweeteners, i used to do a lot of asparatme. Had some terrible eye

problems which cleared up after i stopped using it. That substance has destroyed many good careers, especially for pilots.

Reply

4. **Todd Walton** on 22 July 2011 at 3:10 pm

Thanks for this. I note you did not reference “Sugar Blues” which hugely impacted the hippie/organic gardening/vegetarian scene in California in the 1970’s. Reading that little book changed my eating habits immediately and permanently. I found the following about the book on Wikipedia. “Sugar Blues is a book by William Dufty that was released in 1975 and became a commercial success. According to the publishers, over 1.6 million copies have been printed. In the book, Dufty makes the case that sugar is an addictive drug, that it is extremely harmful to the human body, and that the sugar industry conspires to keep Americans addicted to sugar.” Through my own investigations and dietary adventures, I am sure that the craving for sugar is largely the craving for good fat, as opposed to bad fat which often rides shotgun in the foods loaded with sugar.

Reply

5. **Joe Lindley** on 25 July 2011 at 10:49 am

CJ, Sorry this is so long but I wanted to do this justice…

Thanks for this perceptive analysis of the current status of clinical findings on the toxicity of sugar. I don’t often run into this kind of balanced scrutiny on sugar toxicity, so it is refreshing. I am a low carb (anti-sugar) advocate, so don’t like to have to say this, but you are correct in your findings. I’ve believed the same thing, but didn’t want to shout it to the rooftops!

That being said, I agree with the Gary Taubes interpretation of what has happened with the scientific dialogue and clinical trial results related to the impact of sugar and refined carbohydrates on our increasingly difficult battle with obesity and its negative impact on health. He provided this interpretation in his book, Good Calories Bad Calories, and maybe in the shorter follow-up book, Why We Get Fat. First of all, he asserts that clinical dietary studies are by nature difficult and expensive to conduct and also easily misinterpreted because there are so many variables (patient demographics, health, age, etc.) that can invalidate findings. We’ve come to rely, therefore on the experts who conduct these studies to be scrupulously balanced (which you’ve done) in interpreting their results. Unfortunately some scientists weren’t so scrupulous in the 70s and managed to label dietary fats as the cause for our obesity and heart disease problems. That has been, for the last several decades, a commonly held, but uproven, belief. It led to a decrease in dietary fat and a compensating increase in carbohydrates in our diet, because we had to get the calories from someplace. Along with that relative increase in carbohydrates our obesity rates rose, almost precisely in sync. So now, when the low carb and anti-sugar advocates push for decreasing carbs in our diet, the status quo officialdom (the American Heart Association and the American Diabetes Association for example) push back by simply saying that the “dietary fat causes obesity” view is the null hypothesis and to prove otherwise we have to provide long-term statistical evidence to reject that null hypothesis. As you are

seeing, that's difficult to do. So, in short, bad science put us in a bad spot.

In terms of proof for why sugar and carbs are the problem behind obesity I would suggest reading Good Calories Bad Calories. The evidence Gary Taubes presents is anecdotal, but the cumulative weight of one study after another over hundreds of years and including populations and differing socio-economic groups from all over the world is inescapable. As an example of one type of study included in the book, every time sugar and refined carbohydrates have been introduced to native populations for the first time, obesity and health problems have surged.

As a personal note, I'm on a low card diet. I have seen my metabolism change and improve, my weight drop, and my blood test results improve, just as Taubes and Lustig predicted. It is also the easiest diet I've ever used. I remain an unabashed low carb zealot.

Reply

6. **Roger Tobie** on 25 July 2011 at 4:52 pm

In this discussion of refined sugar I am reminded of the old maxim "The dose makes the poison." That goes back to Paracelsus in the 1500's. Seems to me that this is true about "white refined sugar", etc. A little bit once in a while won't hurt you, but given the substantial amounts of sugar that most of us consume on a daily basis over prolonged periods of time, it is both toxic and addictive and it is biologically disruptive.

Personally, I have been a low sugar and low refined flour intake "zealot" since I was a kid of 9 or 10 back in 1943/44. That was World War II when sugar was rationed. I saw no reason to change after the war was over. I follow this regimen as best I can to this day, though it is very hard to follow if you eat much junk food. So, I avoid junk food, period. Everybody loves to eat sugar, salt, and saturated fat somewhat in that order.

Reply

7. **Kirstin** on 17 August 2011 at 5:36 pm

Great ideas, CJ, I hope you follow it further. I've been looking at diet for a while, as I grew up morbidly obese. I worked on my diet to severest extremes at times in my life, from Kushian Macrobiotics to high protein, sometimes no fructose, often with natural fructose… Now that I am a parent and have watched hundreds of kids eat more and worse than I ever did growing up, I know there's much more to it. I tend more towards believing there are numerous factors influencing epidemic obesity, diet being one of the last factors. Activity being the first.

I started reading the Weight Watcher's books at ten, OA by 13, Kushi by 16… and the first things I noticed at any meeting was not the type of diet people succumbed to but their personal type and neuroses. There are personality types that match fat types. Several of them I feel are related to boundaries issues, fat becoming an exo-boundary, esp in victims of molestation, physical or psychological. Some aspects are not personal or identity-based at all, like thyroid and hormonal influences. How many times have you heard that thyroid is a fat people excuse for their bad behavior? Yet thyroid testing commonly done is totally inadequate to determine if

the system is working.

I think the topic deserves a volume of books at this time in the world, so I had better let the writing go now, or else my behind shall look like the seat of my chair. And I think the point with all this sugar effects analysis is to avoid that.

Nicely written, CJ, carry on.

Reply

8. **Margaret** on 13 March 2012 at 2:51 am

CJ, I think you're right in your research. I have read lot's of article about the negative effects of fructose. here's a another great explanation from Dr. Mercola why fructose is bad for our health.
http://articles.mercola.com/sites/articles/archive/2010/01/02/highfructose-corn-syrup-alters-human-metabolism.aspx

Reply

9.