

## NUTRITION

# Sugar caned

David Katz finds much to chew on in a polemic on the risk of consuming too much high-fructose corn syrup.

Excess sugar deserves to be in the spotlight that Robert Lustig shines on it. And *Fat Chance*, at its best, is genuinely illuminating.

Lustig, a medical doctor and endocrinologist, has provided obesity treatment to children and adolescents for 16 years — during which time the condition has overtaken nearly 20% of that age group in the United States. In 2009, his YouTube video *Sugar: The Bitter Truth* went viral. Now, in *Fat Chance*, he lays out the case that sugar — and fructose in particular — is the leading cause of obesity and metabolic diseases in both young people and adults. He also touches on the importance of other dietary factors, such as fibre.

The book is, ostensibly, Lustig's opportunity to explain in detail why fructose — present in many foods in syrup derived from heavily subsidized maize (corn) and other sources — is the one thing really wrong with our diets and health. But it is also an opportunity to acknowledge that there is more to the story. He manages the reconciliation of these two conflicting agendas with variable success.

Some solid science underlies *Fat Chance*. Lustig has published dozens of articles laying out his case against sugar in general, and fructose in particular. He participated in the development of an official position on the role of sugar in cardiovascular health for the American Heart Association. His book is at its best when telling us why fructose is bad.

Dietary sugars trigger a release of the hormone insulin, which facilitates both the uptake of glucose by our cells for immediate use as fuel and the conversion of excess calories into fat, for storage. Lustig makes the case that fructose is preferentially stored as fat, and preferentially taken up by the liver, where fat accumulation is most harmful. Fructose, Lustig notes, shares metabolic pathways with ethanol, and its consumption is linked to a range of adverse conditions. One is hepatic insulin resistance, in which insulin receptors in liver cells become desensitized to the actions of insulin, leading to a demand for higher levels of the hormone and the risk of pancreatic stress and diabetes. Another, metabolic syndrome, is a constellation of factors associated with insulin resistance, including abdominal obesity and high blood pressure.

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**Fat Chance:**  
Beating the Odds  
Against Sugar,  
Processed Food,  
Obesity, and  
Disease

ROBERT H. LUSTIG  
*Hudson Street: 2012.*  
336 pp. \$25.95

against 'nanny state' intrusions are entertaining and enlightening. The examples — notably one in which a sweetened yogurt is shown to be a dairy product acting as delivery vehicle for a soft drink — can be quite stunning.

But there are inconsistencies. Lustig says that fructose is a particularly bad actor because it does not trigger an insulin release. That lack of insulin, he says, means that levels of the hormone leptin — which influences appetite and fat accumulation — do not rise, leading to persistent hunger and overeating. But elsewhere in the book, Lustig writes that the insulin resistance caused by fructose consumption leads to elevated levels of insulin in the bloodstream, interfering with leptin signalling, and leading to overeating. Can a lack of insulin release and excessive insulin release be the same problem?

And what about glucose? This is a component of most sugars we consume, from sucrose (table sugar) to high-fructose corn syrup to the lactose in milk (which contains equal amounts of glucose and galactose). Glucose does trigger an insulin release, so if high levels of insulin are among the perils of excess sugar intake, the argument that fructose is uniquely bad is suspect. This is compounded by the fact that fruit is the one common source of pure fructose in our diets

— yet even Lustig identifies fresh fruit as part of the solution. The problem is surely eating too much sugar per se, and the consumption of sources such as syrups and juices that contain little or no fibre, for instance.

There are few overt errors in *Fat Chance* — but the assertion that “burning a pound of fat liberates 2,500 calories” is one. The figure is 4,086 calories (454 grams in a pound, and 9 calories per gram of fat). Lustig then goes on to develop a whole argument against the relevance of calories and the role of exercise in weight control based on the error. However, the best data source we have for sustained weight loss, the US National Weight Control Registry, indicates that routine exercise is an almost universal feature in such success.

Fructose, writes Lustig, is Darth Vader. That presumably makes Lustig Luke Skywalker. There is much more to the universe of our dietary concerns than this one encounter, such as unwanted chemicals in food, refined starch and trans fats. But we would surely benefit from eating less sugar, and Lustig is on a mission to make it happen. May the force be with him. ■

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