

When Barack Obama was elected US president four years ago, his wife Michelle soon set out her plans to combat weight problems among children. In one of her first speeches on the topic she focussed on the effects of high fructose corn syrup (HFCS)*. HFCS is made from corn and, as a result of processing, is as much as 20% sweeter than normal sugar. It is also the cheapest sweetener available to manufacturers.

At the time it was still unclear how our bodies processed HFCS. Fructose is also found in fruits and vegetables, and nobody has ever gotten fat or sick from eating them. Nevertheless, the American Medical Association expressed its doubts that the cheapest sweetener on the market could feed an enormous rise in Americans' body weight. In the US food industry, ordinary sugar has mostly been replaced by HFCS. It's found in most processed food, from bread and cereal through ketchup and mayonnaise to desserts and meat products. A particularly large dose is provided by the soft drinks Americans are so fond of.

Michelle Obama's speech led to a media uproar: the first lady discovered first-hand what it meant to criticise the most profitable business in the land and to square off against its wealthiest industrialists. The argument among food industry lobbyists was that sugar is sugar and calories are calories – that there's no difference, whatever the source. Exaggeration is never a positive thing in any case, but the state simply cannot start regulating how much people eat or drink.

Over the last 40 years, however, America has reached the point of a true 'fat crisis', which is why scientists have started to seriously tackle the metabolic problems of processed additives. This has revealed the most bitter truth of all things sweet: yes, large quantities of sugar damage our health, cause us to become overweight and pave the way for 'lifestyle illnesses' at younger and younger ages. In other words, calories aren't all calories, and the body doesn't process all sugars in the same way. This has brought the modified sweetener into sharp focus among nutritional researchers and medical specialists around the world.

So how is HFCS different from ordinary sugar i.e. sucrose? Sucrose is made up of an equal number of interconnected molecules of glucose and fructose. In HFCS, this balance is shifted to make it sweeter – in its most common form HFCS is 55% fructose and 42% glucose. The fructose molecules are not connected, so as soon as they enter our bodies they're ready for use. While glucose is used mainly for energy and its residue is stored as glycogen in the liver and muscles, fructose is thought to operate differently: its metabolic residue takes the form of fatty acids, including 'bad' cholesterol (LDL) and triglycerides, which are stored as droplets of fat in the liver and muscles when large amounts of fructose are consumed. 'Large' here means

more than 50 mg of fructose a day – which Americans consume from a single, large sweet drink. Since the burden of processing fructose is borne entirely by the liver (as opposed to glucose, of which it processes just 20%), this enables scientists to claim that soft drinks sweetened with HFCS, as an example, are as damaging to children's livers as alcohol would be. Whereas less than 1 cal of 120 calories of consumed glucose is stored as fat, the same amount with fructose is as much as 40. So it's very much a case of calories not all being calories.

This spring, scientists from the Institute of Neuroscience at one of the most prestigious universities in the United States, Princeton, published an extensive study into the metabolism of HFCS (www.princeton.edu/main/news). The influence of both fatty foods and foods with HFCS was tested on rats. While some of the rats in the group that were fed fatty foods gained weight and some lost weight over the 6-month period of the study, all of the rats that were given food with HFCS "ballooned". Total body weight increased for all of the rats in this group, but the most drastic increase was in the extent of their stomach fat. Furthermore, the triglyceride content of their blood rose. The rats reached a state during the study which in humans would be described as a 'metabolic syndrome'. This is a pre-requisite for high blood pressure, diabetes and cancer. A number of volunteer groups in America have also allowed the effects of food with high amounts of HFCS to be tested on them – and the results have been exactly the same.

Americans' weight started to rise significantly in the 1970s, when HFCS was introduced in the food industry. Before then the proportion of overweight people in the population was around 15%. Today, with more than a third of the country diagnosed as undergoing fattening, scientists independent of food manufacturer funding have set up their own cooperative body, since everyone is afraid of a catastrophe. There are hundreds of additives in use whose metabolisms need to be studied. A handful are outlawed every year as connections are identified with specific illnesses.

You may be wondering why I'm talking about HFCS in the European Union when our consumption of corn is many times lower than in the United States. The answer is simple: cheap products are popular wherever people are price-sensitive and wherever manufacturers have no shame comprising on their conscience. As little as five years ago I didn't give corn syrup a second thought. Today, it's almost impossible to find ice cream in Estonian stores that's HFCS-free. Some of our cheese curd creams and desserts and confectionery products contain it, too. Looking at other things on our supermarket shelves, I've even found it in meat products, patés and sauces. It hasn't made its way into everything we eat or drink, but children's bodies in particular are delicate, so making informed choices is often the only way of protecting them.

The number of children in Estonia with weight problems is rising all too steadily, too. I know quite a few worried parents who do their best to make healthy choices only to see their kids' waistlines expanding further and further. Cheese curd creams and desserts taste great and are good for you too... or at least that's what we've always thought. But prices are forcing manufacturers to look for cheaper alternatives when it comes to the ingredients they put into the products we love, and this is putting our health in danger. It's also making the most of the lack of awareness (and indeed interest) that exists among consumers. Trans fats snuck their way into our food – will it be the same story with corn syrup? None of my friends had ever heard about it, so my conscience as a doctor has forced me to speak up. This time, though, let's approach the issue without panic!

*High fructose corn syrup, glucose/fructose syrup, corn syrup and fructose/glucose are all names for the same thing