

Excessive Sugar Consumption Can Ruin Your Body

By Nancy Appleton, Ph.D.

In 1912, a Frenchman by the name of Louis Maillard found out that the reason that some foods discolored and toughened when they were cooked was due to a chemical attachment of the sugar (glucose) in the food to protein.

The Maillard Reaction

This reaction causes toast to turn brown and steak to toughen during cooking. It takes a high temperature to bind these glucose and protein molecules. He found out that this attachment changed the structure of the protein, and it could be a problem for this new structured food to digest, assimilate and metabolize in the body.

Besides barbecuing and frying, most processed foods are heated to high temperatures, and the Maillard Reaction is a problem for any food heated to a high temperature. Since 1912, more research has come out on the Maillard Reaction, or the browning reaction, because cancer has been linked with this process.

Food scientists are continually trying to find a method to slow or stop this reaction in processed food. To me, it seems better to not eat foods that are processed using high temperatures rather than looking for a magic potion to stop the reaction, which might cause its own problems, or looking for a pill to give someone who has eaten over-processed foods to stop the reaction, which again might have its own side effects.

Recently, new research has shown that this same reaction, of sugar binding with protein in an abnormal way, can go on in the body when our blood glucose becomes, and stays, elevated.

In 2002, the consumption of sugar is approximately 170 pounds per person per year in the United States. This glut of sugar can cause some to have elevated blood glucose -- much more elevated than in the past when we ate less sugar. When our blood and our blood cells become awash with this sugar continually, the sugar can become bound nonenzymatically with protein.

That might not sound so harmful but it is. There is a normal process where sugar binds enzymatically to protein in our body and forms glycoproteins that are essential to the working of our body. All of these chemical reactions in living tissues are under strict enzymatic control and conform to a tightly regulated metabolic program. When enzymes attach glucose to proteins, they do so at a specific site, on a specific molecule, for a specific purpose.

Sugar and protein are not supposed to bind nonenzymatically. When they do, the product that is formed is called glycated protein or Advanced Glycated End Product (AGE). This process can permanently alter the molecular structure of the protein and, as a result, alter the way these AGE function in the body. The

protein becomes toxic to the body.

Toxicity causes cells to not function optimally, causes damage to the body, and results in an exhausted immune system. Degeneration takes place over time. These changes can start as minor disturbances or disabilities and later continue on to become specific illnesses.

This damage to the proteins takes place in two stages. The first product that is formed by glucose attacking the protein is called a Schiff's base, which stays in the body for a few days. The Schiff's base is unstable and will undergo a slow chemical rearrangement that will last several weeks until it forms a more stable union, the Amadori products.

These products have more reactions until they form AGE, which irreversible. AGE are characterized as brown or fluorescent pigments and seem to promote many age related complications, such as atherosclerosis, hypertension, cataracts, macular degeneration, joint stiffness, rheumatoid arthritis, Alzheimer's disease and diabetes.

Glycation of blood proteins takes place when the levels of glucose shoot up and stay high. Anyone who drinks just one soft drink, eats a candy bar or a donut on an empty stomach will find that the levels of glucose in their blood shoot up. The average person living in the United States today drinks over 576 12-ounce servings of soft drinks per year, or 1.6 12-ounce cans per day. The average teenaged boy drinks 868 soft drinks per year.

Each soft drink has 10 teaspoons of sugar, so each person is getting about one-quarter cup of sugar each day from soft drinks alone. The average person consumes over one-half cup of total sugar a day. This excess can make the blood awash with sugar much of the time, leading to ramifications such as the immune system being suppressed.

A recent study presented at the annual meeting of the Diabetes Association in San Francisco shows that eating browned foods may cause heart attacks, strokes and nerve damage.

Scientists have known for many years that cooking proteins with sugars in the absence of water forms AGEs that can damage tissues in the body. Diabetics suffer a very high incidence of nerve, artery and kidney damage because high blood sugar levels in their bodies markedly accelerate the chemical reactions that form advanced glycation products.

The frightening news is that eating foods with these AGE raises blood and tissue levels and increases nerve damage. Cooking with water prevents sugars from binding to proteins to form these poisonous chemicals.

Cooking without water causes sugars to combine with proteins to form AGE. So, baking, roasting and broiling cause the poisonous advanced glycation products to form, while boiling and steaming prevent them. According to these new findings, brown foods, such as brown cookies, brown bread crust, brown

basted meats, brown beans, and even brown coffee beans may increase nerve damage, particularly in diabetics who are unusually susceptible to nerve damage.

On the other hand, since steamed and boiled vegetables, whole grains, beans and fruits are made with water, they do not contain significant amounts of advanced glycation products. This is certainly another reason to remove as much sugar from your diet as possible, as soon as possible, and eat much of your food raw or steamed.

Nancy Appleton is the author of Lick the Sugar Habit, Lick the Sugar Habit Sugar Counter, The Curse of Louis Pasteur, Heal Yourself with Natural Foods, and Healthy Bones.

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