

In the carbs: For weight loss, what you eat may be as important as how much

One of the reasons people on low-carbohydrate diets may lose weight is that they reduce their intake of fructose, a type of sugar that can be made into body fat quickly, according to a researcher at UT Southwestern Medical Center.

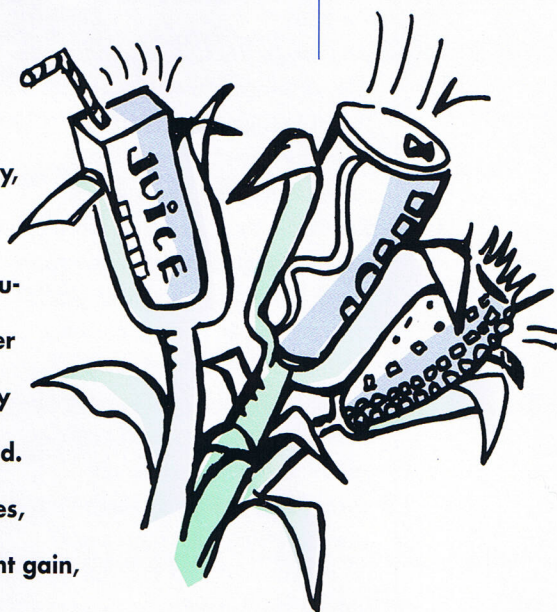
Dr. Elizabeth Parks, associate professor of clinical nutrition and lead author of a study that recently appeared in the *Journal of Nutrition*, said her team's findings suggest that the type of carbohydrates a person eats may be just as important in weight control as the number of calories consumed.

Current health guidelines suggest that limiting processed carbohydrates, many of which contain high-fructose corn syrup, may help prevent weight gain, and the new data on fructose clearly support this recommendation.

"Our study shows for the first time the surprising speed with which humans make body fat from fructose," Dr. Parks said. Fructose, glucose and sucrose, which is a mixture of fructose and glucose, are all forms of sugar but are metabolized differently.

"All three can be made into triglycerides, a form of body fat; however, once you start the process of fat synthesis from fructose, it's hard to slow it down," she said.

In humans, triglycerides are predominantly formed in the liver, which acts like a traffic cop to coordinate the use of dietary sugars. It is the liver's job, when it encounters glucose, to decide whether the body needs to store the glucose as glycogen, burn it for energy or turn the glucose into triglycerides. When there's a lot of glucose to process, it is put aside to process later.



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CARBOHYDRATES

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FRUCTOSE, ON THE OTHER hand, enters this metabolic pathway downstream, bypassing the traffic cop and flooding the metabolic pathway.

"It's a less-controlled movement of fructose through these pathways that causes it to contribute to greater triglyceride synthesis," Dr. Parks said. "The bottom line of this study is that fructose very quickly gets made into fat in the body."

Though fructose, a monosaccharide, or simple sugar, is naturally found in high levels in fruit, it is also added to many processed foods. Fructose is perhaps best known for its presence in the sweetener called high-fructose corn syrup, which is typically 55 percent fructose and 45 percent glucose, similar to the mix that can be found in fruits. It is the preferred sweetener for many food manufacturers because it is generally cheaper, sweeter and easier to blend into beverages than table sugar.

For the study, six healthy individuals performed three different

Dr. Parks said that people trying to lose weight shouldn't eliminate fruit from their diets but that **limiting processed foods** containing the **sugar** may help.

tests in which they had to consume a fruit drink formulation. In one test, the breakfast drink was 100 percent glucose, similar to the liquid doctors give patients to test for diabetes – the oral glucose tolerance test. In the second test, they drank half glucose and half fructose, and in the third, they drank 25 percent glucose and 75 percent fructose. The tests were random and blinded, and the subjects ate a regular lunch about four hours later.

The researchers found that lipogenesis, the process by which sugars are turned into body fat, increased significantly when as little as half the glucose was replaced with fructose. Fructose given at

breakfast also changed the way the body handled the food eaten at lunch. After fructose consumption, the liver increased the storage of lunch fats that might have been used for other purposes.

"The message from this study is powerful because body fat synthesis was measured immediately after the sweet drinks were consumed," Dr. Parks said. "The carbohydrates came into the body as sugars; the liver took the molecules apart like Tinkertoys and put them back together to build fats. All this happened within four hours after the fructose drink. As a result, when the next meal was eaten, the lunch fat was more likely to be stored than burned.

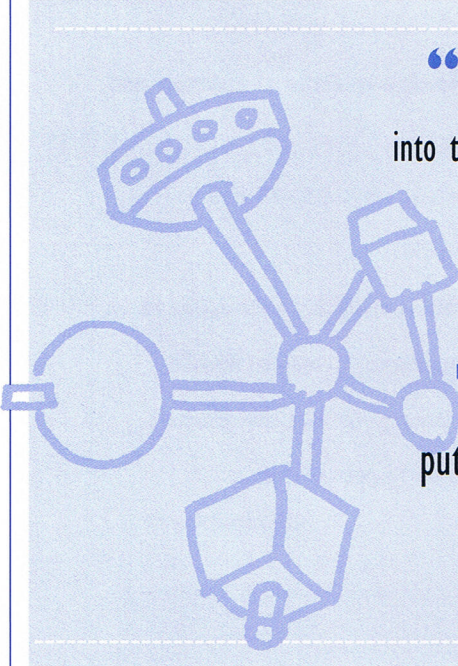
"This is an underestimate of the effect of fructose because these individuals consumed the drinks while fasting and because the subjects were healthy, lean and could presumably process the fructose pretty quickly. Fat synthesis from sugars may be worse in people who are overweight or obese because this process may be already revved up."

Dr. Parks said that people trying to lose weight shouldn't eliminate fruit from their diets but that limiting processed foods containing the sugar may help.

"There are lots of people out there who want to demonize fructose as the cause of the obesity epidemic," she said. "I think it may be a contributor, but it's not the only problem. Americans are eating too many calories for their activity level. We're overeating fat; we're overeating protein; and we're overeating all sugars."

Some data were collected at the University of Minnesota, where Dr. Parks worked before joining the UT Southwestern faculty in 2006.

The work was supported by the National Institutes of Health, the Cargill Higher Education Fund and the Sugar Association. ❧



“The carbohydrates came into the body as **sugars; the liver took the molecules apart **like Tinkertoys** and put them back together to build **fats**.”**

— Dr. Elizabeth Parks

Fish school: Health benefits of seafood outweigh risk

EATING FISH CAN BE A DOUBLE-EDGED SWORD FOR YOUR HEALTH.

On one hand, fish are rich in a type of fat that aids heart health and promotes vision and brain development in babies whose mothers eat fish during pregnancy. On the other hand, eating fish could expose people to harmful contaminants, such as mercury or man-made chemicals, if the fish came from polluted waters.

Well, seafood lovers, take heart.

The nutritional benefits of eating fish generally outweigh the risk of eating contaminated fish, according to registered dietitians at UT Southwestern Medical Center.

"Fish should be a part of your diet," said Dr. Jo Ann Carson, professor of clinical nutrition and a nutrition scholar in the Center for Human Nutrition. "Fish is the best source of omega-3 fat, which has been shown to reduce the inflammation that fosters the build-up of plaque in arteries."

Finding the right type and amount of fish is key, because some fish are more at risk of contamination than others, Dr. Carson said.

Common fish contaminants are methylmercury and polychlorinated biphenyls, man-made compounds commonly known as PCBs. Mercury, which can be found naturally or in industrial pollutants, usually collects in bodies of water as it falls from the air. In the water it becomes methylmercury, and fish in polluted waters absorb mercury into their bodies.

Farmed fish also can contain mercury or polychlorinated biphenyls. The amount depends on farm practices, type of fish food used and farm location.

In any case, children and some women should avoid eating fish with methylmercury, said Lona Sandon,

Go Fish	Cut Bait
These species are low in mercury	Children, pregnant women and nursing mothers should limit their intake of these fish:
Salmon	Shark
Tilapia	Tilefish
Tuna (canned light)	Swordfish
Shrimp	King mackerel
Pollock	Tuna (albacore or white)
Catfish	

don, assistant professor of clinical nutrition.

"It can affect normal brain development of a child or fetus," she said. "Children, pregnant women and nursing mothers thus could be harmed."

Federal agencies recommend that people in those groups limit their intake of fish known to have high levels of mercury, Ms. Sandon said. The list includes large species, such as shark, tilefish, swordfish and king mackerel; oversized fish are more at risk for contamination because they live longer and have more time to accumulate contaminants. Albacore or white tuna also may contain high levels of mercury.

Ms. Sandon suggests that people focus on seafood considered to be low in mercury – salmon, tilapia, canned light tuna, shrimp, pollock and catfish.

"According to Environmental Protection Agency guidelines, it is safe to eat up to two meals per week – 12 ounces total – of fish containing low mercury levels," she said. "If you choose to eat a fish with high mercury, limit it to a 6-ounce serving one time per week, and don't

eat any other fish that week."

People also can get the beneficial nutrients of fish from other products.

Food manufacturers have been creating new products containing omega-3 fats, including eggs, fortified orange juice, fortified margarines and fortified pastas. Flax seeds, flax seed oil and walnuts contain the healthy fats naturally, Ms. Sandon said.

Omega-3 supplements are another option, but the contamination risk still exists in supplements made with fish oil. And supplements do not make up for poor dietary choices.

"The body can more easily absorb this beneficial fat from fish than from plant sources," Ms. Sandon said.

In the big picture, it's not a bad idea to incorporate fish into your diet because it has other benefits, Dr. Carson said.

"Replacing a large steak or fast-food fried chicken with grilled salmon can help lower your cholesterol," she said. "You've lowered the saturated or trans fat in your diet by not eating steak or fried chicken." ❦

Shedding pounds may help type 2 diabetics more than insulin

WEIGHT LOSS AND MAJOR LIFESTYLE CHANGES may be more effective than intensive insulin therapy for overweight patients with poorly controlled, insulin-resistant type 2 diabetes, according to a diabetes researcher at UT Southwestern Medical Center.

The National Heart, Lung and Blood Institute of the National Institutes of Health recently halted part of an ongoing clinical trial on diabetes and heart disease after more than 250 people died while receiving intense treatment to drive their blood glucose levels below current clinical guidelines.

When levels of the hormone insulin are high, certain tissues are overloaded with fatty molecules, which leads to insulin resistance. And, yet, the high blood glucose levels of many obese patients with insulin-resistant type 2 diabetes are being treated with increasing amounts of insulin in an attempt to overpower that resistance. While high doses of insulin may lower glucose levels, they also increase the fatty molecules and may cause organ damage.

In a commentary in the March 12 issue of *The Journal of the American Medical Association*, Dr. Roger Unger, professor of internal medicine, wrote about the recent findings of his own and other labs that link insulin resistance to excess accumulation of fatty molecules in liver and muscle.

Dr. Unger, who has investigated diabetes, obesity and insulin resistance for more than 50 years, said intensive insulin therapy is contraindicated for obese patients with insulin-resistant type 2 diabetes because it increases the fatty acids that cause diabetes. Instead, the most rational therapy eliminates excess calories, thereby reducing the amount of insulin in the blood

and the synthesis of the fatty acids stimulated by the high insulin. Giving more insulin simply increases body fat.

“Evolution was unprepared for the change in the American diet to processed fast food and drive-through lanes,” he said. “There’s no way that our genes could evolve to gird themselves against the superabundance of very, very high-calorie foods that have flooded the U.S.”

Before the discovery of insulin, starvation was the only treatment for diabetes, said Dr. Unger, who is a member of the National Academy of Sciences.

“Today there are many treatment options, including bariatric surgery, if necessary, to lower the fat content in the body before you start giving insulin,” he said. “The fat is causing insulin resistance and killing the insulin-producing beta cells in the pancreas – that is what is causing type 2 diabetes.”

Giving more insulin simply channels the glucose into fat production. There is now a spectrum of diabetes therapies that correct insulin resistance by reducing body fat. Insulin treatment would be indicated only if all these fail and for patients with insulin deficiency, Dr. Unger said.

“Giving more insulin to an insulin-resistant patient is akin to raising the blood pressure of a patient with high blood pressure to overcome resistance to blood flow. Instead, you would try to reduce the resistance,” he said.

In the commentary, Dr. Unger said the increase in the number of patients with insulin-resistant type 2 diabetes can be traced to the epidemic of obesity that began in the U.S. after World War II, when food preparation was moved from the family kitchen to factories and

companies that produce high-fat, calorie-dense foods, leading many Americans to consume substantially more calories on a daily basis. In addition, technological advancements such as televisions, computers and automobiles reduced the number of calories burned per day.

Type 2 diabetes occurs when the body is unable to make enough insulin to compensate for insulin resistance. The condition affects between 18 million and 20 million people in the U.S.

Factors that increase the risk of type 2 diabetes include obesity, age and lack of exercise. Over a period of years, high blood sugar damages nerves and blood vessels, leading to complications such as heart disease, stroke, blindness and kidney disease.

Dr. Unger’s research is supported by grants from the National Institute of Diabetes and Digestive and Kidney Diseases, the Department of Veterans Affairs and the Juvenile Diabetes Research Foundation. ❧

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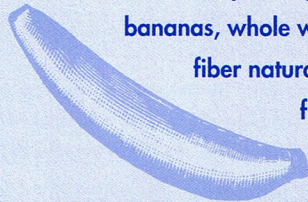
Q: What is the difference between a probiotic and a prebiotic?
Can they improve my health?

A: Probiotics and prebiotics help build up the bacteria that naturally live in your intestines. These bacteria support your immune system, prevent harmful bacteria from growing in your intestines, make vitamin K and other nutrients, and help nourish the gut itself. They may even help reduce symptoms from allergies, lung infections and irritable bowel syndrome.



Probiotics are helpful live bacteria in foods such as yogurt, acidophilus milk and kefir, a fermented milk drink. These bacteria will naturally make their way to the intestines and confer their health benefits. Probiotics also can be used to restore intestinal bacteria after a course of antibiotics.

Prebiotics are special types of fiber that come from foods including artichokes, bananas, whole wheat, soybeans, onions and garlic. Your body cannot digest this type of fiber naturally, but your intestinal bacteria can. Prebiotics promote the growth of helpful bacteria in your intestines, which helps make you healthier overall.



There is a lot of confusion about which products truly count as probiotics and prebiotics. A registered dietitian can tell you whether a product will deliver on its promised health benefits.

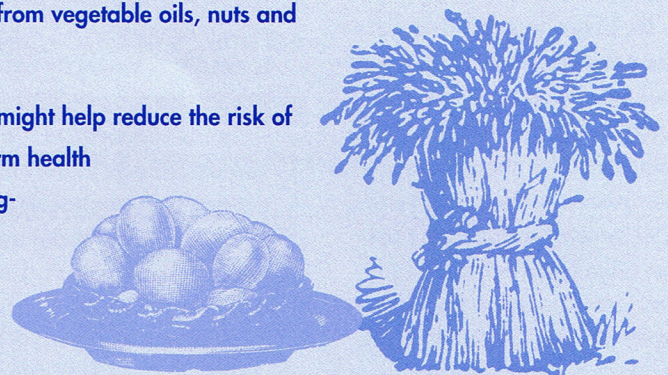
Q: Can any foods help prevent Alzheimer's disease or slow its progression?

A: Although more research is needed, some studies suggest that diets rich in folate and other B vitamins, as well as vitamins C and E, may prevent or slow the progression of Alzheimer's disease.

Folate may protect brain cells from the changes that occur as a result of Alzheimer's disease. The nutrient is found in spinach and other dark leafy greens, oranges, beans and peas. Many breads, grains and cereal products are fortified with folate. Grains and lean meats provide other B vitamins.

Vitamins C and E are antioxidants that may protect brain cells from the free radical damage of pollution and high-fat diets. This protection may slow the progression of Alzheimer's and help maintain memory. Oranges, broccoli, strawberries and green bell peppers are especially good sources of vitamin C. Vitamin E comes from vegetable oils, nuts and dark leafy greens such as spinach.

Although regularly taking a multivitamin might help reduce the risk of Alzheimer's, the wisest approach for long-term health is to eat a well-rounded diet rich in fruits, vegetables and whole grains with good-quality protein from lean meats, low-fat or fat-free dairy foods and egg whites.



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The Center for Human Nutrition Newsletter is published by the Center for Human Nutrition at The University of Texas Southwestern Medical Center at Dallas, 214-648-3404. It is made possible by the generous donations of an anonymous friend of the Center for Human Nutrition.

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