

assessed the participants' plasma lipoproteins, fatty acid profile, fasting glucose, and insulin at the end of four weeks. Then, they randomly assigned each group to eat a different test fat for another four weeks.

Both the trans-fat and the interesterified fat significantly raised LDL/HDL ratios and fasting blood glucose compared to the natural saturated fat. Interesterified fat had a greater effect on glucose levels than the trans-fat. In addition, the interesterified fat lowered fasting insulin even more than the trans-fat did: "Fasting 4 wk insulin was 10% lower after [partially hydrogenated soybean oil] ($p > 0.05$) and 22% lower after [interesterified fat] at ($p < 0.001$) compared to [palm olein]." This study is preliminary – not conclusive. "Whether this reflects the amount of test fat consumed, underlying genetics of the specific population examined, or some unknown factor requires further study because the apparent adverse impact on insulin metabolism is a troubling finding," says Hayes. He and colleagues hope that their study will spur research by others, leading to more conclusive data.

The study was partially funded by the Malaysian Palm Oil Board, and all three researchers have ties to the organization. "It's obviously a conflict of interest; I realize that and I'm not trying to disguise or hide that," Hayes said. "But I also think I know more about different kinds of fats, including palm oil, than most people in the world. I see where it's good and where it's weak, and my main goal is to try to get a better fat in the public's hands, in the public's mouth, in the public's bodies." His own preference is for mixing natural fats instead of trying to "trick nature."

New fat, same old problem with an added twist? Replacement for trans fat raises blood sugar in humans [adapted from Brandeis University press release].

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Osteocalcin, Leptin, and Diabetes

Recently, Gerard Karsenty, MD, PhD, and colleagues at Columbia University Medical Center discovered that osteoblasts (bone-forming cells) secrete a hormone that regulates insulin production and enhances insulin sensitivity. This hormone, called osteocalcin, tells beta cells in the pancreas to produce more insulin. Osteocalcin also instructs fat cells to release adiponectin, a hormone that increases insulin sensitivity.

Leptin, a hormone secreted by fat cells, inactivates osteocalcin via the sympathetic nervous system, according to research by E. Hinoi et al. Leptin is the brake that keeps osteocalcin and circulating insulin levels from becoming too high. Obese individuals with diabetes often exhibit high blood levels of both leptin and insulin. Researchers are trying to understand the interaction among leptin, osteocalcin, and beta cells in the hope of developing new treatments for diabetes.

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Low-Glycemic Diet Found More Effective

For years, weight-loss advice has focused on low-fat diets and calorie restriction – a dreary prospect that is difficult to maintain over a long period. Recent studies have found that eating low-glycemic carbohydrates is a better tactic for losing weight and controlling blood sugar than restrictive-calorie diets. Weight loss is a high priority for people with diabetes, coronary artery disease, and metabolic syndrome, and for people who wish to avoid such disorders. Metabolic syndrome comprises several conditions linked to coronary artery disease and type 2 diabetes, including obesity, high blood pressure, elevated triglycerides, elevated LDL cholesterol, and low HDL cholesterol. High-glycemic foods cause a high, quick rise in blood glucose and corresponding increase in insulin, the hormone in charge of glucose use and storage. Chronically high insulin levels produce inflammation and, eventually, cells begin to resist insulin. Insulin resistance is the hallmark of metabolic syndrome.

A 2007 Cochrane review of six randomized, controlled trials ($n = 202$) reports that a low-glycemic diet is more effective for losing weight than a conventional weight-loss diet with restrictive intake. A 2009 Cochrane review of 11 randomized controlled studies, involving 402 people with type 1 and type 2 diabetes, finds significantly better control of blood glucose among participants who follow a low-glycemic diet. "The current available scientific literature shows that low glycaemic-index diets acutely induce a number of favorable effects, such as a rapid weight loss, decrease of fasting glucose and insulin levels, reduction of circulating triglyceride levels and improvement of blood pressure," state Gabriela Radulian and colleagues in their article for *Nutrition Journal* (2009).

All carbohydrates cause a rise in blood-sugar levels. This rise is quantified by the glycemic index (GI). The more quickly the body digests a carbohydrate and releases sugar into the bloodstream, the higher the glycemic index. Sweets and white bread, which are quickly digested, have a higher GI than fruits and whole grains. Glycemic load (GL), however, is more useful for assessing the body's response to eaten foods, according to a University of Wisconsin patient handout (www.fammed.wisc.edu). Glycemic load takes into account how much of the sugar-producing carbohydrate is in one serving of a particular food. Watermelon, for example, has a high GI (72 out of 100), but most of its content is water. Consequently, the glycemic load is just 4. (A GL of 20 or more is considered

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