



## COMBATING FAT & LOWERING DISEASE RISK: GLYCEMIC INDEX & GLYCEMIC LOAD

The stats are in: Nearly 70% of the U.S. population is now overweight. The problem isn't the severe, circus type of obesity, but the 25 to 40 pounds put on gradually over the years—the creeping obesity common among middle-aged Americans.

Modern-day nutritional habits are to blame, centered on high-calorie, high-fat, high-sugar, refined foods. They put us in real danger and higher risk for weight gain, obesity, insulin resistance and Type -2 (adult onset) diabetes. Ultimately, that hurls us toward even more potential health issues, such as certain cancers (breast, endometrial, colorectal, prostate, pancreatic, esophageal cancer risks rise with excess body fat), nonalcoholic fatty liver disease (NAFLD), high blood pressure, high cholesterol, stroke, heart attack, congestive heart failure, gallstones, gout, osteoarthritis, sleep apnea, among others.

The singular hormonal effects of a diet rich in refined, easily digestible carbohydrates are triggering this excess weight and obesity. It's the "quality" of the calories consumed that regulates weight—and the "quantity" (more calories consumed than expended) that is a secondary phenomenon.

### **Carbohydrates & the glycemic index.**

A wealth of epidemiological studies—Schweitzer (Africa), Hutton (Eskimos), Fouche (South America), Hardlick (Indians), Williams (Fiji), Cleve & Campbell (South America)—demonstrated that when populations were exposed to Western diets

(sugar, molasses, white flour, white rice), they experienced an increase in diseases of civilization—obesity, diabetes mellitus, coronary artery disease, hypertension, CVA, cancer, diverticulitis, gallstones, appendicitis, varicose veins, hemorrhoids. This was all due to an increase of easily digestible carbohydrates.

The link between refined carbohydrates and disease was obscured over the years, thanks to our ignoring the correlation between carbohydrate foods in the natural state and the unnatural refined carbohydrates. As a result, we treated sugars and white flour as equivalent to raw fruits, vegetables and whole meal flour. Our rise in sugar consumption says it all: We went from 15 pounds per year/per person in the 1820s to 100 pounds per year/per person in the 1920s and to over 160 pounds per year/per person in 2008.

Back in the 1960s, Robert Stout (Queens University, Belfast) suggested that ingesting large quantities of refined carbohydrates leads to hyperinsulinemia and insulin resistance—and then to atherosclerosis and heart disease. In certain individuals, insulin secretion after eating carbohydrates is disproportionately large, with carbohydrates being disposed of in fat tissues, liver and arterial walls. That produces obesity. Stout also related that insulin stimulates the smooth muscle lining the interior of arteries, a step in the production of hypertension and atherosclerosis.

In the mid-1970s, longtime researcher and distinguished Stanford University endocrinologist Dr. Gerald Reaven initiated the study of glycemic index to test the difference between simple and complex carbohydrates. Reaven coined Syndrome X in the 1980s, the metabolic syndrome that fingers sugar, flour and easily digestible carbohydrates as the inadvertent culprits to insulin resistance, diabetes, obesity and cardiovascular disease:

- Increased triglycerides
- Increased blood pressure
- Increased fibrinogen
- Increased insulin
- Increased fat
- Increased sugar
- Increased small LDL particles
- Decreased HDL
- Increased waist
- Increased uric acid
- Increased fat
- Increased CRP

Continued on page 2

## Fructose Facts



Researchers tested different foods and found that some simple sugars like fructose entered the bloodstream slowly—whereas, some complex carbohydrates (such as potatoes) entered the bloodstream faster than table sugar.

Table sugar is made up of glucose and fructose. Glucose enters the bloodstream, but fructose is only metabolized in the liver and has little effect on blood sugar levels.

Insulin is the primary regulator of fat, cholesterol and protein metabolism. Species need time to adapt fully to changes in the environment—the introduction of diets high in sugar and refined, easily digestible carbohydrates was the most dramatic change to the body over the past two million years. It is probable that refined carbohydrates and sugar created such a disturbance in blood sugar and insulin that they lead to disturbances of homeostatic regulation and growth throughout the entire body.

Jenkins and Wolever tested 62 foods in 1981. Different individuals responded differently and variations from day to day were tremendous. The more refined the carbohydrate, the greater the blood sugar and insulin response. Anything that increases the speed of digestion (e.g., polishing rice, refining wheat, mashing potatoes, juicing fruit) increases the glycemic response.

Every complex carbohydrate must be broken down into simple sugars and will eventually enter the bloodstream as glucose, which in turn will stimulate insulin. Fiber (both soluble and insoluble) cannot be broken down into simple sugars and thus will have no effect on insulin.

If a carbohydrate source (for example, pasta, which has little fiber) is tested, we see a high insulin response as compared with broccoli (which is rich in fiber), where the insulin response is minimal. That is why starches and grains are considered high-density carbohydrates, fruits are medium density and vegetables are low density.

It is difficult to consume 50 grams of carbohydrates when testing broccoli (+/- 16 cups), so most glycemic index work has been done with grains, starches and some fruits.

**The glycemic index (GI) measures the entry rates of various carbohydrate sources into the bloodstream.** The faster their rate of entry, the greater the effect on insulin secretion. There are at least three factors affecting the glycemic index of a particular carbohydrate.

1. Amount of fiber—especially soluble fiber
2. Amount of fat
3. Composition of the complex carbohydrate—the more glucose, the higher the glycemic index

**The glycemic load (GL) is even more important than the glycemic index in determining the insulin output of a meal.** The glycemic load is the actual amount of insulin-stimulating carbohydrates consumed, multiplied by its glycemic index.

Source	Volume	GI	GL
Pasta	1 cup	59	3,068
Apple	1	54	972
Broccoli	1 cup	50	150

*Composition of different glycemic loads*

Even though the GI of each of these carbohydrates is about the same, one cup of pasta generates **20 times** the insulin response as one cup of broccoli. Consuming most of your carbohydrates from quality vegetables is key to maintaining low insulin levels.

Continued on page 3

- In 1978, HFCS-55 (high fructose corn syrup) was introduced into the market—55% fructose/45% glucose—identical with sucrose.
- By 1985, ½ of all sugar consumed in the U.S. was from corn sweeteners; 2/3 of this was from HFCS. Perceived as healthy because it didn't increase blood sugar (had a low glycemic index), HFCs demonstrated a huge increase in triglycerides by the liver and an increased storage of fat (fructose-induced lipogenesis).
- Fructose is the most lipogenic (fat-producing) carbohydrate.
- Fructose increases blood pressure much more than sucrose.
- Fructose produces 10 times more X-linking of proteins and thus increases AGEs (glycation end products causing cell damage, tissue inflammation, chronic diseases).
- Fructose also increases the oxidation of LDL.

**Bottom line:** HFCS results in the worst of both worlds—glucose increases insulin and fructose increases triglycerides.

Remember, the more processed a food, the higher the GL. The recent epidemiological data suggests a high dietary glycemic load from refined carbohydrates increases the risk of coronary heart disease independent of any known coronary risk factors. Similarly, the excessive consumption of these refined carbohydrates leads to obesity and diabetes. Over 1 million new cases of diabetes mellitus will be diagnosed this year, costing the U.S. \$174 billion in 2008.

When investigators tested the efficiency of high-fat, carbohydrate-restricted diets, the results were remarkably constant. Every investigator reported weight loss between 1-5 pounds per week. None suffered symptoms of semi-starvation or food deprivation, excessive fatigue, irritability, mental depression or extreme hunger.

**Cenegenics & the low-glycemic solution.** Cenegenics offers patients a proven approach to optimized health with customized programs, created from an intensive evaluation process and centered on four components: low-glycemic nutrition, exercise, nutraceuticals and hormone optimization (when clinically indicated).

In fact, it's the science behind age management medicine that helps us identify and meet criteria, which places you in the lowest possible risk category for disease—particularly metabolic syndrome, diabetes, heart disease, cancer, stroke and Alzheimer's disease—and thereby extending your health span.

We start with sound nutrition: A low-glycemic diet is high in nutrient-dense foods (fruits, vegetables, lean meats and essential fats) and low in refined, overly processed foods, fats and simple carbohydrates—and a vital component to keep insulin levels in control.

Our synergistic protocols are based on solid science and help you manage your aging process—from reducing body fat and having leaner muscle mass to improving libido, having sharper thinking and a stronger immune system, regaining youthful vitality and handling stress better.



**Regain your health now.  
Learn more about personalized Cenegenics programs and  
the science behind age management medicine.  
Call 1.866.953.1510.**