The Chi Farm

Acupuncture and Nutritional Counseling Centre

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Nutrition Information Series

Insulin Resistance, Metabolic Syndrome, Type II Diabetes, Oh My!

Humans require three macronutrients for survival: carbohydrates, fats and proteins. This Nutrition Information Tipsheet discusses carbohydrates and why eating them in excess may lead to conditions such as Insulin Resistance, Metabolic Syndrome and Type II Diabetes. Dietary tips on how to avoid these syndromes are provided.

Glucose and Insulin

Carbohydrates are produced by green plants and include sugars, starch and cellulose. Glucose is a simple sugar. In humans, most carbohydrates are converted into glucose and glucose is the only energy source utilized by human cells. If necessary, proteins and fats can also be broken down into glucose.

Hormones are chemical signaling agents in the body. As carbohydrates are converted into glucose and pass into the bloodstream along with glucose eaten in food, the blood glucose concentration rises. This rise in blood glucose signals the pancreas to release the hormone insulin. Insulin then binds with cells and acts like a key, opening specific channels that transport glucose into the cells. Insulin also keeps the body from burning fat for energy because it tells the body there is glucose here to use for fuel. Glucose in excess of the body's need is converted into glycogen, a complex sugar that acts as a form of energy storage. Glycogen is stored in the liver and muscles. Once the glycogen storage capacity of the muscles and liver is reached, the remainder is turned into fat and stored around the body. There is no limit to how much fat the body can store.

Your lifestyle and bad medical advice may be affecting your health

Many Americans were led down a path to insulin resistance, Metabolic Syndrome, and/or Type II Diabetes by faulty medical claims touting cholesterol and saturated fat are bad and that they should eat more carbohydrates. Ingesting excess quantities of carbohydrates results in the pancreas releasing large amounts of insulin. Eventually these constant high insulin levels result in the cells refusing to bind with insulin. This then leads to the pancreas excreting even more insulin in an attempt to force the cells to accept it. This is the beginning of *insulin resistance*: normal amounts of insulin are inadequate to produce a normal insulin response by the cells. Continuing these eating habits along with a sedentary lifestyle may lead to *Type II Diabetes*, wherein the pancreas can no longer produce enough insulin to overcome the resistant cells and blood sugar levels rise to unhealthy levels. *Metabolic Syndrome* occurs when an insulin resistant person develops other maladies including hypertension and autoimmune diseases.

Just how bad is this in America? In 2010, 50% of Americans consumed a half-pound of sugar per day, or 150 – 180 pounds per year. Remembering that excess glucose is converted into fat, the average American is now 23 pounds overweight. Women with waist sizes over 34.5" and men

with waists over 37" most likely have blood sugar issues. Nearly 25% of adolescents are on the verge of developing Type II Diabetes and it is estimate that by 2020, 50% of Americans will be diabetic or pre-diabetic.

For those who do develop diabetes, the statistics are even more alarming. Diabetes is the number one cause of blindness, kidney failure and amputations among American adults. Every 24 hours 230 diabetics have a limb amputated, 55 go blind and 120 progress into kidney failure. Those who develop kidney failure generally require dialysis, causing that procedure to be the most expensive line item in healthcare costs. The US Center for Disease Control and Prevention reports that by age 65, 77% of people are diabetic or pre-diabetic.

Even without developing diabetes, there are numerous signs that indicate a person is having blood sugar handling issues: tired without food; tired in the afternoon; overall fatigue; awaking during the night; getting shaky and/or irritable between meals; difficulty focusing vision; difficulty concentrating; reflux, sour stomach or nausea; and sugar/carb cravings. Eventually the person may begin to exhibit signs of insulin resistance: sleepy after meals; mental fogginess and fatigue; intestinal bloating and gas; increase blood pressure and blood triglyceride levels; expanding waistline; depression; thinning hair in women; and difficulty losing weight.

Fortunately there are steps you can take

The key to reversing the signs of sugar handling issues and insulin resistance is to stop triggering large quantities of insulin being released. To do so requires making some simple lifestyle changes, the most important of which is reduce carbohydrate intake until the sugar cravings and/or fatigue go away. For most people this is about 60 grams of carbohydrates per day excluding those found in green vegetables, beets, carrots, etc. Controlling carbohydrate intake will reduce insulin release and allow the cells to recover from their inability to bind with insulin, while at the same time restoring the body's ability to burn stored body fat for energy.

Additional changes include eating every three hours and never skipping a meal, increase healthy fat intake, and exercise moderately. If sweeteners are required, try stevia or xylitol.

The following list includes the types of carbs to be included in the 60 grams/day:

- Bread; cereal; crackers and chips
- Snack and breakfast bars
- Fruit, fruit juices and smoothies
- Beer and Wine
- Oatmeal
- Baked goods, cakes and pastries
- Pasta, rice, potatoes and yams
- Milk
- Bran
- Beans
- Sodas and energy drinks
- Corn and popcorn

Plus anything containing high fructose corn syrup, cane sugar or agave nectar

Many of the foods considered healthy are actually loaded with carbs and trigger increased insulin release. For example, a small banana (6" – 7") contains 23 grams of carbohydrate, over 1/3 of the daily maximum input. A bowl of steel cut oats (1/4 cup uncooked) contains about 25 grams of carbs, while an 8 ounce glass of orange juice adds in another 26 grams.

There are several free food tracking apps available online to help monitor carbohydrate intake. An excellent reference for all nutritional values is the USDA's Nutritional Database: http://ndb.nal.usda.gov/ndb/search. When looking at food labels, the amount of Dietary Fiber listed can be subtracted from the Total Carbohydrate value; your body does not digest these.

Whole food and mineral supplementation may also be required to restore insulin receptor and pancreatic function. Zinc, magnesium and chromium are generally severely depleted in diabetics and pre-diabetics and levels can often be brought up with high-quality supplements. Repair to the pancreas may or may not be possible depending on the severity of the damage, making carb reduction even more important to reduce the amount of injected or endogenous insulin required.

Please contact The Chi Farm to obtain a list of the scientific references from which these recommendations were developed.