



PATIENT EDUCATION INFORMATION

INSULIN IMBALANCE

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Insulin is secreted by the pancreas. Insulin “unlocks” the cells to allow glucose (sugar) from food to enter and be converted into energy. When too much glucose is present in the body, the pancreas increases the amount of insulin being produced. High insulin as well as high glucose may contribute to multiple symptoms. A number of conditions are associated with insulin and glucose imbalances and regulation problems. These include chronic stress, polycystic ovarian syndrome (PCOS), coronary artery disease, high blood pressure, metabolic syndrome, and diabetes.

What is Insulin?

Insulin is a hormone secreted by the pancreas. It helps the body utilize blood glucose (blood sugar) by binding with receptors on cells like a key would fit into a lock. Once the key, insulin, has unlocked the door, glucose can pass from the blood into the cell. Inside the cell, glucose is either used for energy or stored for future use in the form of glycogen in liver or muscle cells.

What is insulin resistance?

Insulin resistance occurs when the normal amount of insulin secreted by the pancreas is not able to unlock the door to cells. To maintain normal blood glucose, the pancreas secretes additional insulin. In some cases (about 1/3 of the people with insulin resistance), when the body cells resist or do not respond to even high levels of insulin, glucose builds up in the blood resulting in high blood glucose or type 2 diabetes. Even people with diabetes who take oral medication or require insulin injections to control their blood glucose levels can have higher than normal blood insulin levels due to insulin resistance.

Why is insulin resistance in the news?

More and more people in the U.S. are becoming obese, physically inactive, or both. Obesity and physical inactivity aggravate insulin resistance. Also, people who are insulin resistant typically have an imbalance in their blood lipids (blood fat). They have an increased level of triglycerides (blood fat) and a decreased level of HDL (good) cholesterol. Imbalances in triglycerides and HDL cholesterol increase the risk for heart disease. These findings have heightened awareness of insulin resistance and its impact on health.

What is Syndrome X?

Another term heard in the news is Syndrome X. Syndrome X is a cluster of risk factors for heart disease associated with insulin resistance. These risk factors include: hypertriglyceridemia (high blood lipid), low HDL-cholesterol, hyperinsulinemia (high blood insulin), often hyperglycemia (high blood glucose), and hypertension (high blood pressure).

Who has insulin resistance?

Almost all individuals with type 2 diabetes mellitus (diabetes) and many with hypertension, cardiovascular disease, and obesity are insulin resistant. These diseases and conditions are predominantly found in countries with an improved economic status such as the U.S. And in the U.S., these diseases and conditions are among the leading contributors to morbidity and mortality. Also, about 20-25% of the healthy population may be insulin resistant.

What are the symptoms of insulin resistance?

There are no outward physical signs of insulin resistance. A glucose tolerance test, during which insulin and blood glucose are measured, can help determine if someone is insulin resistant. Many people who are insulin resistant produce large enough quantities of insulin to maintain near normal blood glucose levels.

What causes insulin resistance?

No one knows for sure. Some scientists think a defect in specific genes may cause insulin resistance and type II diabetes. Researchers continue to investigate the cause. What we do know is that insulin resistance is aggravated by obesity and physical inactivity both of which are increasing in the U.S.

Do all people with insulin resistance develop diabetes?

No. Science has not yet determined why some people with insulin resistance eventually develop diabetes and others do not. By maintaining an appropriate weight and a physically active lifestyle many individuals are able to reduce their chances of becoming insulin resistant and developing diabetes.

What is the best diet for people with insulin resistance?

Research indicates that low fat diets may aggravate the effect of insulin resistance on blood lipids. Therefore, for individuals who are insulin resistant, a diet low in saturated fat (less than 10 percent of total calories) and more moderate in total fat content (40% of total calories) may be beneficial. This recommendation is different from the low-fat, high-carbohydrate diet that many health organizations recommend to help prevent heart disease. Specifically, they recommend decreasing fat intake to less than 30 percent of calories. Some groups recommend even lower levels of dietary fat. It is also beneficial to maintain an appropriate body weight because obesity can aggravate insulin resistance. To maintain an appropriate weight, regulate caloric intake and maintain a physically active lifestyle. A registered dietitian can assist with developing a proper diet plan for people with insulin resistance, or a family history of type 2 diabetes.

Symptoms of insulin imbalance:

Abnormal blood cholesterol, Fatigue, High blood triglycerides, Increased abdominal fat, Increased hunger and sugar cravings, Low/High blood sugar, Poor circulation to extremities, and Extreme skin changes.