

Insulin Resistance And Syndrome X

Diabetes was originally thought to be due to a deficiency in the production of insulin. This is what happens in Type 1 diabetes when the insulin producing cells in the pancreas have been attacked and destroyed by the immune system. Type 1 diabetes tends to be inherited, usually surfaces during childhood and requires daily injections of insulin. Insulin resistance was initially arbitrarily defined as requiring more than 200 units of insulin daily to control elevated blood sugar and prevent ketosis. Some patients required several times this amount because they developed antibodies to insulin that blocked its effects.

Insulin resistance as it is currently used is quite different and often occurs in the absence of diabetes. It is a metabolic disorder in which the normal ability of insulin to promote glucose uptake and utilization in cells is inhibited. Insulin resistance is closely linked to Metabolic Syndrome but all the connections are not clear. One factor appears to be an overloading of the tissues with lipids. Patients with insulin resistance usually have high levels of free fatty acids and when these enter muscle cells lipid overload occurs that induces insulin resistance. The body compensates by producing more insulin so that blood insulin levels are high. This helps to drive more glucose into the cells and also to prevent blood sugar levels from becoming too elevated. High blood insulin levels also suppress the release of fatty acids from adipose tissue.

As we get older our ability to produce insulin declines although there is a great deal of individual variation. When the production of insulin is no longer able to overcome insulin resistance blood glucose levels become permanently elevated. The diagnosis of Type 2 diabetes signifies that fasting levels exceed 126 mg/100 cc. While there are many hormones that cause an increase in blood sugar, insulin is the only one that lowers it. Insulin also has other important metabolic activities. It promotes glycogen, fatty acid and protein synthesis and inhibits the release of fatty acids from adipose tissue and suppresses the production of apolipoproteins and other lipid factors.

The link between insulin resistance and compensatory hyperinsulinemia with hypertension, high triglycerides, low HDL and other risk factors for coronary heart disease was first noted in 1988 by Gerald Reaven. He suggested the term "Syndrome X" to emphasize the unknown nature of these relationships and their consequences. It is often called Metabolic Syndrome X to distinguish it from another Syndrome X used in 1973 to describe patients with angina-like chest pain and positive stress tests but no evidence of coronary artery disease on angiography. Quite by coincidence, many of these chest pain Syndrome X patients also show evidence of insulin resistance.

Metabolic Syndrome X is important because it has become increasingly prevalent in the U.S and Western society and is associated with an extremely high incidence of cardiovascular disease and premature death that can be prevented or significantly reduced with prompt and proper treatment. Unfortunately it is often unrecognized by patients as well as their physicians until complications occur. Since Reaven's original description, the list of coronary risk factors linked to Syndrome X has grown to include very low density lipoproteins like apolipoprotein b, slower clearing of blood fats after meals and a decreased ability to break up clots or inhibit clot formation.

Insulin resistance is present in almost all patients with Type 2 diabetes and has likely existed for years before the onset of any signs or symptoms of diabetes. Studies show that microvascular complications of diabetes like retinopathy and neuropathy as well as accelerated atherosclerotic deposits in coronary and other arteries often begin many years prior to any diagnosis or suspicion of diabetes. While it is important to keep blood sugars within normal limits many authorities now believe that the long term complications of diabetes are related more to the degree and duration of insulin resistance than poor blood sugar control. The scary thing is that insulin resistance can be demonstrated in about a third of the U.S. population, the vast majority of whom are completely unaware that they may be headed for Syndrome X troubles.