

## INSULIN RESISTANCE / METABOLIC SYNDROME

To have a lifetime of excellent health requires the achievement and maintenance of proper blood sugar metabolism. Prolonged unhealthy blood sugar metabolism can significantly affect the health of one's nerves, eyes, blood vessels, kidneys and pancreas, as well as weight, body shape, energy level, blood pressure, cholesterol, triglycerides, and overall cardiovascular health. Over 60 million Americans have "insulin resistance" or "metabolic syndrome," a form of unhealthy blood sugar metabolism that frequently goes unrecognized, but can often progress to the point where signs of significant health deterioration appear.

To maintain health one needs to eat a nutrient-rich diet containing unrefined carbohydrates from whole foods. Through normal, healthy digestion, unrefined carbohydrates are progressively broken down to smaller sugars, which are then absorbed through the intestine into the blood. This sugar absorption stimulates the pancreas to secrete an appropriate quantity of insulin into the blood, which facilitates the delivery of sugar into cells throughout the body.

Insulin acts like a key that allows the sugar to be transported across the cell membrane to be used by the mitochondria (the energy factories of the cell). If this does not occur because the cell is unresponsive to the insulin, the body stores the sugar for future use, most often in adipose tissue (body fat). The response of the cell to the insulin is critical to healthy blood sugar metabolism.

Obesity, lack of exercise and an unhealthy diet are considered major contributors to developing poor blood sugar metabolism. When a person consumes excess sweets and refined or processed foods, the simple sugars they contain are absorbed very quickly and can cause a rapid and dramatic increase in our blood sugar levels. Carbohydrates that cause such an increase are said to have a high glycemic index (GI): the higher the GI of a food, the higher it's potential for elevating blood sugar.

With a high concentration of sugar in the blood, the pancreas responds by producing a proportionally high surge of insulin in an effort to help the sugar gain entrance to the cell. In unhealthy blood sugar metabolism, the cell may be unresponsive or insulin resistant and sugar delivery into the cell can be reduced. The pancreas then tries to compensate by producing even more insulin. Over time, these high levels of insulin can lead to a variety of problems, including increased triglyceride levels, decreased HDL ("good") cholesterol

levels, high blood pressure, other cardiovascular manifestations and hormone disruption. Insulin resistance is often a precursor to Type 2 diabetes. It has been estimated that the metabolic conditions leading to eventual development of Type 2 diabetes occur up to 15 years before the overt manifestation of the condition itself.

In addition to Type 2 diabetes, there are several other conditions related to insulin resistance, such as cardiovascular disease, hypertension, hyperlipidemia, polycystic ovary syndrome, obesity, cancer (colon, breast prostate), sarcopenia (loss of muscle mass), accelerated aging, sleep apnea, Alzheimer's disease. The long term results of diabetes can include cardiovascular disease, blindness, kidney failure, and amputation.

There are many indicators that insulin resistance is occurring. Red flags might include dietary history of high refined carbohydrate intake; increased appetite, usually after a carbohydrate meal; fatigue after a carbohydrate meal; sleepiness after a meal; insomnia relieved by snacking; mental fuzziness, sugar cravings and carbohydrate addiction; pattern of nighttime eating. Other indicators include resistant weight loss, hirsutism (abnormal hair growth pattern on body), acne, acanthosis nigricans (velvety, mossy hyperpigmented skin often found in the nape of the neck, axillae, and beneath the breasts), hypoglycemia, or menstrual irregularities. Insulin resistance should be suspected when there is apple shaped obesity, family history of type 2 diabetes, history of gestational diabetes, hypertension, dyslipidemia, left ventricular hypertrophy, or polycystic ovaries.

Incorporating lifestyle changes that focus on effective weight control, a program of regular exercise and specific dietary guidelines are very important to promoting healthy blood sugar metabolism. The dietary guidelines should focus on two primary goals: 1) choosing foods that have a moderate effect on raising blood sugar, referred to as low-GI foods, and 2) choosing foods that improve the body's ability to support the effect of insulin, functionally reducing insulin resistance. Portion sizes and eating frequency are also important variables. Not skipping meals and eating 3 small meals and 2 – 3 snacks daily (each preferably including protein) is important to maintain stable blood sugar and insulin levels.

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1. Michael Kaplan, DC, Kaplan Health and Wellness, Golden Valley, MN.
2. "The Importance of Healthy Sugar Metabolism" by Advanced Nutrition Publications, Inc, 2001, Rev 5/04.