

Insulin Resistance: A Weighty Matter

Insulin is a hormone involved in the metabolic processes that convert the food we eat into the fuel our bodies need to survive. As the master fuel-supply hormone, insulin's main functions are to regulate the amount of blood sugar (glucose) that flows into the body's cells to create energy, and to communicate the need to refuel (that is, to eat or stop eating).

In about 10 percent of the population, cells start to "resist" the influences of the insulin hormone, thereby reducing its effectiveness and causing it to build up in the blood, eventually resulting in a condition known as *insulin resistance*. Warning signs of insulin resistance include:

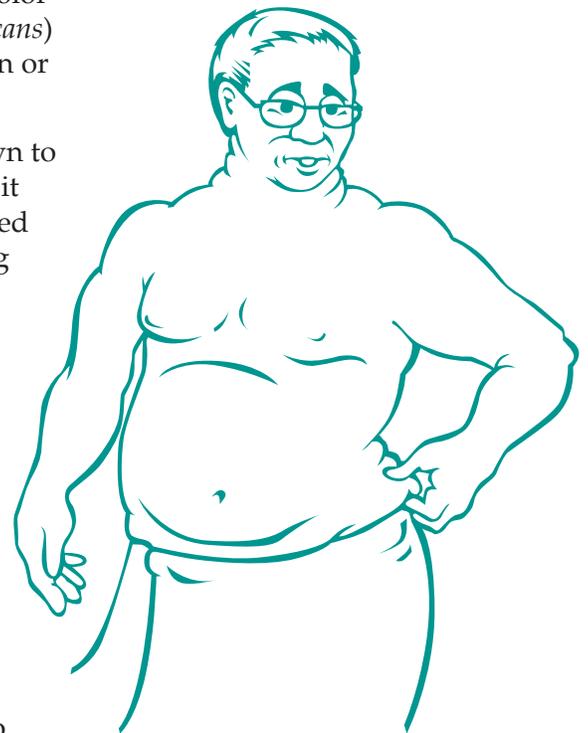
- frequent thirst
- frequent urination
- excessive hunger
- gaining a few pounds and having difficulty losing them
- unexplained drowsiness or feeling tired most of the time, especially after eating
- inability to concentrate
- inflammation

- decreased endurance during physical exertion and exercise
- high blood pressure
- low high-density lipoprotein (HDL, the "good" cholesterol)
- high triglyceride levels
- high fasting glucose levels
- skin tags or dark discoloration (*acanthosis nigricans*) around the neck, groin or armpits.

Insulin resistance is known to be genetically coded, but it also appears to be activated by behavior. Contributing factors, such as excess weight and a sedentary lifestyle, can trigger the condition at any age, even pre-teen.

Abdominal obesity is widely considered a hallmark of insulin resistance, but the relationship is not a simple, straightforward cause and effect. Excess insulin puts the body into fat-making mode and keeps it there, making it harder to lose the extra pounds. To make

matters worse, people who are overweight typically find exercise difficult so they often avoid it; this tendency toward inactivity further compromises effective metabolism, thereby promoting additional weight gain. This helps explain why obesity is now considered to be an epidemic in the United States.



Abdominal obesity is widely considered a hallmark of insulin resistance.

“Refined carbohydrates not only raise glucose and insulin to unhealthy levels, but also fail to provide the many vitamins, minerals and vitamin-like nutrients our body needs to properly utilize these foods.”

However, even people who are not obese may develop insulin resistance, particularly if they consume a diet that is high in refined carbohydrates.

In addition to abdominal fat, insulin resistance is often accompanied by hypertension, high triglyceride levels, and/or low HDL levels (the “good” cholesterol). This clustering of symptoms is also known as *Metabolic Syndrome* or *Syndrome X*. While each of the associated conditions increases the chance of a heart attack, stroke or diabetes, in combination they put individuals at very high risk because they tend to aggravate each other and create a vicious cycle of poor health that can be hard to overcome. Men and women are equally at risk, and those having clusters of these symptoms are more than three times as likely to die of a heart-related problem, and five times as likely to develop Type 2 diabetes.

Physicians first noticed a tendency for several of these

conditions (in various configurations) to cluster together as cardiovascular risk factors as early as the 1920s. While the term *Metabolic Syndrome* dates to the 1950s, it became widely accepted as a syndrome in 1988 when endocrinologist Gerald M. Reaven proposed insulin resistance as the underlying factor for the “constellation of abnormalities” he named *Syndrome X*.

People with insulin resistance also have an increased risk for:

- obstructive sleep apnea
- liver damage
- gestational diabetes and preeclampsia
- polycystic ovary syndrome
- hypogonadism in men (low testosterone)
- gout (uric acid deposits in the joints)
- gallbladder disease
- psychiatric problems, especially depression and anxiety
- dementia
- cancer.

How did we get to this point? Many believe that the farther we stray from our natural food path, the more likely we are to develop insulin resistance.

How Did We Go Astray?

The human diet has changed significantly since the Stone Age nearly 15,000 years ago when people survived by foraging for wild, edible plants and occasionally hunting game. Early people obtained about half of their daily calories from carbohydrates, roughly the same percentage nutritionists recommend today. But their carbohydrates bear little resemblance to the kind most of us eat today.

Stone Age people rarely ate grains (and did not cultivate them), and never consumed dairy products, domesticated meats, or any sweet foods (except perhaps honey). Carbohydrates largely derived from vegetables and a few small

Continued on Page 3

fruits when in season. These plants contained less sugar content, and about five times as much fiber content, as their modern descendants.

About 10,000 years ago, humans began eating foods higher in carbohydrates, such as whole grains and legumes, to compensate for meat shortages. Grinding stones were introduced 2,000 years ago to make whole-grain flours. The advent of the steel roller mill in the late 1800s made milling of both wheat and sugar cane so affordable and readily available that white sugar and white flour became dietary staples. During that time, the average person consumed about 12 pounds of sugar each year; by the year 2000, that consumption had increased to over 150 pounds per year!

Unfortunately, we continue to stray further away from the nutrient-rich foods we were meant to eat. Few of us eat enough “complex” carbohydrates, such as fresh fruits and vegetables, which contain complex sugars, starches, and fibers. Instead, our daily carbohydrates are more processed than ever, and more likely to raise blood sugar and insulin levels. As Jack Challem, Dr. Burton Berkson, and Melissa Diane Smith explain in their book *Syndrome X*: “Refined carbohydrates not only raise glucose and insulin to unhealthy levels, but also fail to provide the many vitamins, minerals and vitamin-like nutrients our body needs to properly utilize these foods.”

The balance between fats and protein in our diets has also tipped negatively. Because domesticated animals are now fed corn and soybeans instead of grass, their meat is much higher in fat. In addition, we get far less protein from lean animal sources such as fish, shellfish, and game, and far more protein from higher fat beef, pork, and chicken. Diets deficient in proteins and essential fatty acids also lead to insulin resistance.

How Do We Become Insulin Resistant?

As everyone knows, food provides the fuel that powers our every action. During digestion, food is broken down into several parts, including simple sugar (glucose), amino acids (which form proteins), and dietary fats (fatty acids). Glucose is the primary fuel produced by all living cells when converting nutrients into energy.

A complex symphony of organs, glands, and hormones keeps the process humming along by controlling how fast or slow the entire process works, where the nutrients are stored, and how the fuel is to be used.

Keeping blood sugar levels in balance is primarily dependent on two hormones produced by the pancreas, *glucagon* and *insulin*. When blood sugar is low, glucagon signals the liver to convert glycogen into glucose and release it into the bloodstream; when blood sugar is high, insulin helps carry glucose to cells and instructs them to take it in, thereby removing excess glucose from the blood.

Other organs involved in this complex process are the thyroid and the adrenal glands. The thyroid gland produces thyroid hormone, which plays a key role in determining how fast or slow this chemical process occurs. People with a thyroid

People with a thyroid deficiency typically have a slower metabolism, high cholesterol levels, and livers that are “sluggish” in handling excess glucose.

Continued on Page 4

deficiency typically have a slower metabolism, high cholesterol levels, and livers that are “sluggish” in handling excess glucose. Restoring healthy thyroid levels allows the liver to properly store and release glucose.

Cortisol, which is produced by the adrenal glands, reduces insulin’s ability to carry glucose into cells. Stress raises cortisol levels, triggering the release of stored sugar as part of the “fight or flight” response. Chronically high levels of cortisol contribute to insulin resistance and may also explain why some insulin-resistant people report unexplained feelings of alarm or anxiety.

Low testosterone and progesterone levels may also lead to insulin resistance in both men and women. Michael E. Platt, MD, author of *The Miracle of Bio-identical Hormones* maintains that the major cause of hyperinsulinemia (too much insulin) is too little progesterone. “Low progesterone levels,” he writes, “cause over-production of insulin, leading to hypoglycemia and an outpouring of adrenaline to bring sugar levels up.” According to Dr. Platt, natural progesterone reduces insulin and regulates blood sugar levels.

Given the complexity of metabolism and the various contributors to that process, the slightest imbalance among any of the organs, glands, or hormones involved can create a chronic

insulin-glucose imbalance that becomes increasingly difficult to correct. When the body uses insulin effectively, insulin and glucose ebb and flow like an elegantly choreographed dance. In insulin-resistant people, the body has lost its ability to use insulin effectively and both glucose and insulin get further and further out of step.

Cigarette smoking is also known to increase insulin resistance, as are hormone fluctuations resulting from pregnancy, infection, or illness, all of which can affect insulin production and/or blood sugar levels. Thus, even thin people, particularly those with a family history of diabetes, can be at risk.

How Do We Prevent or Overcome Insulin Resistance?

There is good news, but anyone wishing to prevent or reverse insulin resistance should expect to work hard. Our modern lifestyle is overstuffed with tasty, empty calories and lean on opportunities to work them off. Anyone who has struggled with unwanted pounds knows that changing diet and exercise habits is far from easy—you must “go against the grain” to challenge sedentary habits and modern food processing methods. Such changes require extra time and attention not easily found in our fast-paced lives.

Increasing our physical activity levels and improving eating habits are both difficult, but the benefits are many and significant. Weight loss and balanced nutrition are the keys to preventing or reversing insulin resistance, and even modest drops in weight can also improve blood pressure, cholesterol and triglyceride levels, and decrease inflammation, according to Drs. Vagnini and Isaacs, the authors of *Overcoming Metabolic Syndrome*.

Improve Your Diet

The authors of *Syndrome X* note that “nutrition has become the ‘missing link’ in modern medicine ... Although it has a fundamental influence on our health, it has also been routinely ignored and undervalued for many years.”

One of the earliest proponents of the “whole foods” movement was the health writer and syndicated radio host Carlton Fredericks. In the 1950s and 1960s, Fredericks revealed the ironic nature of modern food processing, where vitamins and nutrients are removed from food to lengthen shelf life, only to be added back as “improvements.” He railed against foods high in sugar and over-processed carbohydrates—advice still largely ignored, despite America’s long obsession with dieting. In his 1972 book on low blood sugar, Fredericks related an anecdote from a medical nutritionist who said

Continued on Page 5

“Exercise helps the body to use insulin more efficiently...[it] promotes blood flow to the muscles, helping your body use glucose more readily. ”

Americans “give themselves little sugar-tolerance tests every morning” by eating a typical breakfast of orange juice, muffin or donut, and coffee with sugar.

Eliminating highly processed foods and refined sugars from your diet is the first step toward preventing or reversing insulin resistance. Each additional small step back toward a more natural diet helps moderate the glucose-insulin response even further. Shifting from more processed foods (like apple drinks) to their whole forms (an apple) also adds more fiber to the diet, takes longer to eat, and creates a feeling of fullness.

The timing and overall composition of meals can also affect blood sugar levels. Eating several small meals (instead of three large ones) reduces spikes of blood sugar, while eating some protein along with carbohydrates helps the body make better use of both.

For many people, adding a broad-spectrum mineral supplement also really helps. Avoiding caffeine (which triggers the liver to release sugar) and alcohol (which raises triglycerides) are also recommended.

Get More Exercise

Moderate activity such as brisk walking for 30 minutes, at least five days per week, is recommended for both losing weight and increasing “good” cholesterol levels. “Exercise helps the body to use insulin more efficiently,” writes Drs. Isaacs and Vagnini. “Even if you don’t lose weight, exercise promotes blood flow to the muscles, helping your body use glucose more readily.”

Maintain Hormone Balance

As discussed previously, even a slight hormone imbalance can have a significant effect on the complex chemical processes involved in

metabolism. A complete hormone checkup will provide valuable information regarding potential reasons for insulin resistance. In particular, the thyroid hormones, cortisol, estrogen, progesterone, and testosterone—in both men and women—all play significant roles in keeping insulin and glucose in check.

Evidence suggests that restoring hormone balance—particularly with regards to fat-storage hormones such as estrogen—can sometimes be a key factor in losing excess weight and keeping it off, especially as we age because hormones naturally decline with age.

The Stickler: Sticking To It!

Low cost, over-the-counter hemoglobin A1C home test kits are now readily available at pharmacies. These test kits can identify if the hemoglobin in blood has been subjected to higher

Continued on Page 6

than normal glucose levels. Hemoglobin A1C is a good measure of average blood glucose levels over time, rather than a single glucose test sample.

While normally used by diabetics or those concerned they are pre-diabetic, anyone concerned about blood sugar abnormalities can now perform this simple test at home. Some kits even provide immediate results. However, to assure accuracy and that the kit is working properly, it is best to validate home test results with professional lab results from time to time.

Many people find that the immediate feedback provided by a home test kit helps them stick to their goals by seeing the correlation between their diet and exercise habits and their blood sugar levels. It also helps to enlist the support of family and friends.

Always consult with your healthcare practitioner before initiating a new diet or exercise program. Ask for a referral to a nutritionist for assistance in designing a diet that matches your physical needs and includes your favorite foods. Together, these professionals will help you develop a reasonable plan—*one that you can live with for life.*

References

- *Syndrome X: The Complete Nutritional Program to Prevent and Reverse Insulin Resistance* by Jack Challem, Burton Berkson, MD, and Melissa Diane Smith; John Wiley & Sons, Inc.; New York, NY; 2000.
- “Glucose Levels and Risk of Dementia” by P.K. Crane, MD, et al.; *New England Journal of Medicine*; August 2013.
- *The Miracle of Bio-Identical Hormones* by Michael E. Platt, MD; Clancy Lane Publishing; Rancho Mirage, CA; 2007.
- *Overcoming Metabolic Syndrome* by Scott Isaacs, MD, and Fred Vagnini, MD; Addicus Books Inc.; Omaha, NE; 2006.
- *Low Blood Sugar and You* by Carlton Fredericks, PhD, and Herman Goodman, MD; Constellation International; New York, NY; 1972.
- “Understanding the Metabolic Syndrome” by Dana Brown, PharmD; *Pharmacy Times*; November 2007.

Connections is a publication of **Women’s International Pharmacy**, which is dedicated to the education and management of PMS, menopause, infertility, postpartum depression, and other hormone-related conditions and therapies.

This publication is distributed with the understanding that it does not constitute medical advice for individual problems. Although material is intended to be accurate, please seek proper medical advice from a competent healthcare professional.

Publisher: Constance Kindschi Hegerfeld, Executive VP, Women’s International Pharmacy

Co-Editors: Julie Johnson and Carol Petersen, RPh, CNP; Women’s International Pharmacy

Writer: Kathleen McCormick, McCormick Communications **Illustrator:** Amelia Janes, Midwest Educational Graphics

Copyright © October 2013, Women’s International Pharmacy. *This newsletter may not be reproduced or distributed without the permission of Women’s International Pharmacy.*



For more information, please visit www.womensinternational.com or call (800) 279-5708.

Women’s International Pharmacy | Madison, WI 53718 | Youngtown, AZ 85363