Weighing In April 2017

Insulin Resistance ….. Cause and Effects

Recently, we have seen more patients with labs reflecting insulin resistance. So, this month we will discuss and explain insulin resistance in detail. A newsletter in 2015 also addressed this, but there are sometime new developments I wanted to share.

Insulin resistance is a pathological condition in which the cells of the body fail to respond normally to the hormone insulin. The body produces insulin when glucose (sugar) starts to be released into the bloodstream from the digestion of carbohydrates in the diet. This normal insulin response triggers glucose (sugar) to be taken in the cells to be used for energy and inhibits the body from using fat for energy. The concentration of glucose in the body and the bloodstream decreases as a result, staying within the normal range even when large amounts of carbohydrates are consumed.

When the body produces insulin under conditions of insulin resistance however, the cells are resistant to the insulin and don't' respond to it. This leads to a high blood sugar. Beta cells in your pancreas then will respond by increasing the production of insulin, further contributing to a high blood insulin level. Unfortunately, there are few symptoms associated with this and it often remains undetected.

Undetected insulin resistance can contribute to the development of type II diabetes or latent autoimmune diabetes in adults. Although this type of chronic insulin resistance is harmful, during the acute illness, it is a well involved protective mechanism. Recent investigations by multiple universities have revealed that insulin resistance helps to conserve the blood glucose supply by preventing muscle from taking up excessive glucose. Insulin resistance may also be present under harsh metabolic conditions such as pregnancy, during which the expanding fetal brain that may require more insulin.

New research published in the Diabetologist Journal shows insulin resistance which is one of the hallmarks of type II diabetes is also associated with language problems. Researchers found that lack of verbal fluency in women and men is a sign of cognitive decline associated with dementia and may be linked to insulin resistance. Type II diabetes and Alzheimer's disease are both common diseases, in fact; Alzheimer's has been coined "Type III diabetes". Research shows that some patients who suffer from these conditions also have worsening insulin resistance. Insulin resistance that occurs during midlife may increase the risk of cognitive decline later in life. In addition, type II diabetes is an independent risk factor for cognitive decline in Alzheimer's disease.
Given this research, investigators hypothesized that insulin resistance is related to poor cognitive performance. To test their theory, they went to Finland which has an adult population ranging from 30 to 97 years. Random sampling was used and subjects were given the standard test for verbal fluency to help evaluate language and also semantic memory verbal fluency. As measured by a simple test, in this case, the precipitants were asked to name as many animals as they could in 60 seconds then total the score they received on the test. The fewer number of animals that were mentioned, the higher insulin resistance the subject had showing a possible association with reduced verbal fluency and insulin resistance. There was a slight difference in women than in men. Women were considered to be factored greater than men; reasoning was not entirely understood.

Furthermore, the inclusion of young and middle-aged adults in this study suggest an association of insulin resistance with poor cognition is already present years before the onset of severe cognitive decline. In the future, longitudinal studies will be needed to conduct and explore casual relationships between insulin resistance and cognition.

Acute insulin resistance may also develop in people who have undergone abdominal or bariatric procedures. This acute form of insulin resistance may result in postoperative trends to increase over short-term with the sensitivity to insulin typically returning to the patient in about five days. People diagnosed with insulin resistance have some of these following characteristics:

- **Increase hunger**
- **Lethargy**
- **Brain fogginess and inability to focus**.
- **Weight gain**: Resulting in fat storage and difficulty losing weight for most people. The fat accumulation seen in insulin resistance is usually stored in and around abdominal organs. This is seen in both males and females and it is suspected that hormones produced in the fat are precipitating the cause of insulin resistance. This is why it's important from a health standpoint to lose fat around your belly.

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- **Increased blood cholesterol**
- **Increasing blood pressure**: Many people with hypertension are either diabetic or have pre-diabetes and they have elevated insulin levels due to insulin resistance.

Insulin resistance implies that the body cells primarily in the muscle lose sensitivity to the hormone insulin that we know is secreted by the pancreas. To promote glucose utilization at the molecular level, a cell senses insulin through the insulin receptors, with the signal spreading through a cascade of molecules collectively. Known as the signaling pathway, this pathway sensitivity to insulin may be shorted by many factors such as free fatty acids causing insulin resistance. The following are known to play a role in developing insulin resistance:

- **Pregnancy**: As previously mentioned, due to the proponent change in metabolic conditions under which the mother has reduced her muscle insulin sensitivity despite more glucose for the brain and the child in utero.

- **Simple Sugars**: Several authors have suggested that the intake of simple sugars, particularly that of fructose, is also a contributing factor to insulin resistance. Fructose is metabolized by the liver into triglycerides which tend to raise their level in the bloodstream; therefore, it may contribute to insulin resistance by the same mechanism as dietary fat. Just like fat, high levels of fructose and sucrose induce insulin resistance found in laboratory rats.

- **Leptin resistance**: This is another cause-and-effect relationship. Leptin is a hormone that regulates long-term energy balance. An important role of Leptin is long-term inhibition of appetite in response to the formation of body fat. This mechanism is known to be in many obese people: even though their leptin levels are commonly elevated this does not result in a reduction in appetite or caloric intake. Leptin resistance has also been triggered in rats by access to unlimited and highly dense palpable foods over several days. Once leptin signaling is disrupted, the individual becomes prone to further overeating, weight gain and insulin resistance.

- **Lack of Physical Activity**: Studies now have shown the likelihood of developing insulin resistance in those who do not exercise. Just the difference of walking has lowered the risk of diabetes by 9% every two years.

- **Vitamin D deficiency**: Also associated with insulin resistance, this is one of the reasons we've increased our lab assessment for vitamin D.

- **Fast Food**: Another new study shows the consumption of fast food has a fundamental factor behind metabolic syndrome epidemic. In all its constituents studies show that high levels of cortisol within the bloodstream from digested animal protein may contribute to insulin resistance.

- **Uric Acid**: several studies note high uric acid levels apart from contributing factors may also have a significant role in insulin resistance.

The most common type of insulin resistance is associated with overweight and obesity in a condition known as metabolic syndrome. Insulin resistance often progresses to full type II diabetes mellitus or the latent phase of autoimmune diabetes in adults. This is often seen when hyperglycemia (high blood sugar) develops after a meal when the pancreatic beta cells are unable to produce sufficient amounts of insulin to maintain normal blood sugar levels in the face of insulin resistance. The inability of the beta cells to produce sufficient insulin is a condition of hyperglycemia characterized by the transition of insulin resistance to type II diabetes.

Proper management of insulin resistance requires proper diet, exercise, weight loss and sometimes pharmaceutical assistance. Research shows that a low-carbohydrate diet may have a significant reduction in insulin resistance. The medication Metformin has been shown to decrease insulin resistance. Proper labs should also be ordered. Since insulin resistance is associated with abnormalities lipids unusually high blood triglycerides and low high-density lipoprotein so it is important to screen for these abnormalities as well.

Understanding insulin resistance and how carbohydrates and sugars affect your longevity are extremely important. If you have any questions about insulin resistant, don't hesitate to ask.

Blessings,

Chuck Shaffer MD

The hidden reasons behind your plateau…

You have been coming for weeks and have been doing well. All of a sudden, you hit a frustrating plateau! The staff has asked you questions about your food, exercise, constipation, etc and it's still a bit of a mystery as to why your weight is stalled. More often than not, it could be a hidden ingredient in a food, drink or even sweetener that is keeping your weight from moving!

Food labels are a great way to learn about calories and total carbs, but don't tell you the whole story. If you look a little farther down under the label you will see a list of ingredients. This is where your focus should be!

Unfortunately, often times these seemingly foreign words are difficult to understand and interpret. Thankfully, there are a few tips that can make reading your ingredients much easier.

To begin, note that ingredients are always listed by weight. This means that the first ingredient makes up the majority of the product, where the ingredients following make up less and less. So if it's salsa you're looking at the first ingredient may be tomatoes followed by other ingredients like salt, spices, etc. The more ingredients, the more processed the product typically is. It's always a good sign to see only one or two ingredients that you can actually read versus 20 ingredients that all appear Greek in nature.

The second rule you should look for are the endings on ingredients that are hard to identify. Words such as dextrose, maltose, sucrose and galactose are all sugar! Notice they also all end in –ose. Of course there are exceptions, take for example Sucralose, this is the chemical name for Splenda, a sugar substitute. You might also see "sugar" listed as the fourth ingredient and think it's not so bad. Keep in mind though that sugar can also be listed as high-fructose corn syrup or corn syrup, agave nectar, barley malt syrup or dehydrated cane juice, just to name a few.

The other common culprits are sugar alcohols, these are partially absorbed carbohydrates. While one gram of carbohydrate normally has four calories, one gram of sugar alcohol equates to two calories. The other two calories pass through unabsorbed. Large quantities of sugar alcohols can still add up in your carbohydrate allotment for the day and also cause nasty side effects like gas, bloating and diarrhea. We cannot urge you enough to read your ingredient labels. Drinks, sweeteners (including Stevia), dressings and processed meats are more than likely the most common products that could potentially hinder your success.

Keep in mind that all brands vary when it comes to ingredients too. If you do have a questions, take a picture of the ingredient list and send it to me. I'm always happy to walk you through what you need to know regarding labels. You can email me directly at: tfoley@weighstation.net

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