

## DO I HAVE INSULIN RESISTANCE?

What is insulin resistance? This means that the cells of your body have become resistant to the effect of the hormone insulin. When your body detects high levels of glucose or blood sugar in the blood, your pancreas secretes the hormone insulin which triggers the cells in your body to absorb sugar in order to reduce the amount of sugar in the blood.

In the early stages of insulin resistance the body is able to lower the blood sugar levels to the normal range and blood sugar tests will not indicate any pre-diabetes or diabetes. At some point, as the insulin resistance increases, the body may not be able to reduce the blood sugar levels to the normal range. This is when blood tests will start to indicate diabetic tendencies.

But even before it shows up in the diabetic range, the higher levels of insulin in the blood cause many inflammatory conditions throughout the body: heart disease, autoimmune disease, epilepsy, Alzheimer's, allergies, obesity, chronic fatigue, polycystic ovaries, and cancer. Eating a low carb, high fat ketogenic diet will reduce the amount of insulin in the blood and reduce inflammation throughout the body.

There are several ways to determine if you have insulin resistance:

1. **Skin tags:** These little "tags" of skin have a 100% correlation with insulin resistance.
2. **High Triglyceride HDL ratio:** Look at your most recent blood work. Take the level of your Triglycerides and divide this number by the level of your HDL. If this number is greater than 3.0, then you are insulin resistant. For example: Triglyceride: 210, HDL: 45,  $210/45 = 4.6$  which is over 3.0
3. **High fasting insulin:** Have your MD order a fasting insulin test. If your fasting insulin is greater than 5, you are insulin resistant. The report may say that above 5 is still in the normal range, but that is because many MDs don't accept the concept of insulin resistance until it gets very serious. Dr. Adam Nally, D.O. who has been working with this condition for the last ten years, feels that anything over 5 indicates some level of significant insulin resistance.
4. **High Triglyceride levels:** If your triglyceride level is over 250, then you are insulin resistant.
5. **NMR Lipoprofile with insulin markers:** The best test for cardiovascular risk and insulin resistance is offered by Labcorp and measures the size and number of lipoprotein particles in the blood. This test takes a little explanation, but will increase your understanding of what is happening in your blood.

Cholesterol does not flow independently through your blood vessels. Your blood is primarily water and cholesterol is a lipid or fat. As you know, water and oil do not mix. That is why the cholesterol in your blood is combined with other molecules to form particles that are able to mix with blood. At first, the only way to measure cholesterol was to break up all of these particles and measure the amount of cholesterol. Over the past 10 years the science has gotten much more sophisticated and now the actual size and number of these particles can be measured. Recent research shows that the total cholesterol and LDL values are much less important than the number of total and very small particles in determining the risk of heart disease. This test measures these values and shows your relative cardiovascular risk.

Research also shows that increased levels of insulin changes the size and quantity of these particles. This test will not only show whether you have insulin resistance, but also how advanced. By retesting this on a regular basis, you will see how your ketogenic diet is healing your lipid profile.

**To review:** If you have skin tags, you are insulin resistant. Look at any recent blood work that you have had done and check your triglycerides and HDL values. If you don't have recent blood test results, have your MD request a standard lipid profile and a fasting insulin test. And if you want to go a little deeper, also request the Labcorp NMR Lipoprofile with insulin markers. I can also order these lab tests through my office, but they will not be covered by insurance.