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Insulin – Friend or Foe? By
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Your Health *The Examiner*
May 29, 2003

It is commonly thought that insulin is only important if you are diabetic. And, insulin is a very important part of diabetic care. In Type 1 Diabetes, the pancreas is not able to produce insulin and without insulin being injected into the body daily, the person will die. In Type II Diabetes, the cells of the body are resistant to insulin and while the person typically will not die, he/she will become ill and develop many health problems.

However, insulin levels and insulin resistance are very important to all of us whether diabetic or not. Energy metabolism is a fascinating part of medical science and the role insulin plays in that metabolism is important for everyone to understand.

Blood Sugar

When your body notices that the sugar in your blood is elevated, it is a sign that you've got more than you need, so it is accumulating in your blood. As a result, insulin will be released to take that sugar and store it. The body stores sugar in the form of glycogen, but the body can store very little glycogen. All the glycogen stored in your liver and all the glycogen stored in your muscle, if you had an active day, wouldn't last you the day. Once you fill up your glycogen stores, additional sugar excess is stored as fat.

Immediately, we can draw a conclusion about a high complex-carbohydrate, low saturated-fat diet. Those high complex carbohydrate diets are nothing but a high glucose diet, or a high sugar diet. And, if you are not active enough, either through your life-style, or through exercise, to burn that sugar, and because of the effect of insulin, your body is just going to store the excess carbohydrate – the excess sugar -
- as saturated fat.

Insulin doesn't just store carbohydrates. Insulin is an anabolic hormone, which means that it builds the body. Unwisely, body builders are using insulin now because it is legal, so they are injecting themselves with insulin because it builds muscle, and it stores protein too.

Insulin Resistance and magnesium

Insulin also stimulates the storing of magnesium. If your cells become resistant to insulin, you can't store magnesium so you lose it into the urine. One of magnesium's major roles is to relax muscles. If you lose magnesium and your blood vessels constrict, theoretically this increases blood pressure, and reduces energy since intracellular magnesium is required for all energy producing reactions that take place in the cell.

Magnesium is also necessary for the action of and the manufacture of insulin. Here's the viscous cycle. Due to insulin resistance, your body raises your insulin level, this causes you to lose magnesium, and the cells become even more insulin resistant.
Then your blood vessels constrict, glucose and insulin can't get to the tissues, which make them more insulin resistant, so the insulin levels go up and you lose more magnesium. This cycle goes on even before you were born.

What else does insulin do?

Insulin also causes the retention of sodium, which results in the retention of fluid. Fluid retention contributes to high blood pressure and both fluid retention and high blood pressure contribute to the development of congestive heart failure.

One of the strongest stimulants of the sympathetic nervous system is high levels of insulin. Heart attacks are two to three times more likely to happen after a high carbohydrate meal, NOT after a high fat meal. One of the immediate effects of raising your blood sugar from a high carbohydrate meal is to raise insulin and that immediately triggers the sympathetic nervous system which will cause arterialspasm
-- constriction of the arteries. If you take anybody prone to a heart attack, constrict their arteries and decrease the blood flow to the heart, you are going to get an increased number of heart attacks.

Insulin mediates blood lipids.

Just as insulin makes the cell "open up" to put sugar into the cell and decrease the circulating excess sugar, insulin also makes the cell permeable to lipids or fat. When the Framingham Study was done, HDL (High Density Lipoproteins) was used as a principle risk factor for both heart disease and stroke risk. Now we know that LDL (Low Density Lipoproteins) is the real culprit. LDL cholesterol comes in several fractions, and it is the small, dense LDL that plays the largest role in initiating plaque
– narrowing of the arteries. The small, dense fraction of the LDL is the most able to actually fit through the small cracks in the lining of the arteries. The LDL fraction is the one insulin resistance actually raises the most.

Insulin Resistance Produced by Insulin

Cells become insulin resistant because they are trying to protect themselves from the toxic effects of high insulin. If your cells are exposed to insulin at all they get a little bit more resistant to it, so the pancreas just puts out more insulin. Insulin resistance is associated with the chronic elevation of circulating insulin in the blood (Hyperinsulinism) that contributes to all of the chronic diseases of aging. As far as we know, hyperinsulinism is a major cause of aging in virtually all life. Controlling insulin sensitivity is extremely important.

If all of the cells were to become resistant to insulin we wouldn't have that much of a problem. The problem is that all of the cells don't become resistant. Some cells are incapable of becoming very resistant. The liver becomes resistant first, then the muscle tissue, then the fat.

When the liver becomes resistant, the effect is to suppress the production of sugar.

The sugar floating around in your body at any one time is the result of two things:

1. The sugar that you have eaten and

2. How much sugar your liver has made.

When you wake up in the morning your sugar level is more of a reflection of how much sugar your liver has made. If your liver is listening to insulin properly, it won't make much sugar in the middle of the night. If your liver is resistant, those brakes are lifted and your liver starts making a bunch of sugar, so you wake up with an elevated blood sugar.

The next tissue to become resistant is the muscle tissue. Insulin allows your muscles to burn sugar. If your muscles become resistant to insulin, they can't burn that sugar that was just manufactured by the liver. In insulin resistance, the liver is producing too much sugar, the muscles can't burn it, and this raises your blood sugar.

It takes longer for the fat cells to become resistant. For a while, your fat cells retain their sensitivity. Remember, the liver is producing too much sugar and the muscles can’t use it, so the fat cells store it. As people become more and more insulin resistant, they get fat and their weight goes up. But eventually they plateau. They might plateau at three hundred pounds, two hundred and twenty pounds, one hundred and fifty pounds, but they will eventually plateau, as the fat cells protect themselves and become insulin resistant.

Hyperinsulinemic

As all these major tissues become resistant to insulin, your pancreas is putting out more insulin to compensate, so you are hyperinsulinemic (elevated insulin levels in your blood) and you've got insulin floating around all the time. But there are certain tissues that aren't becoming resistant such as your endothelium -- the lining of the arteries. So all that insulin is affecting the lining of your arteries.

Insulin floating around in the blood causes:

1. Plaque build up in the arteries.

2. The blood to clot too readily.

3. The conversion of macrophages into foam cells, which are the cells that accumulate the fatty deposits.

Insulin resistance and insulin accumulation contribute to and cause cardiovascular disease. The effects of insulin fills the artery with plaque and because of its affect on the sympathetic nervous system, it constricts the arteries. Insulin also increases platelet adhesiveness and therefore increases the clotting of the blood.

Carbohydrates, Insulin Resistance and Hyperinsulinism

The concept of simple and complex carbohydrates is irrelevant. What we must address are carbohydrates which are fiber or non-fiber. Fiber is good for you, and a non-fiber carbohydrate is bad for you. If you have a carbohydrate that is not a fiber, it is going to be immediately turned into a sugar.

Fibrous carbohydrates, like vegetables and broccoli, are great. Potatoes on the other hand are just a big lump of sugar, particularly once they are cooked. A slice of bread is just a slice of sugar. What is the minimum daily requirement for carbohydrates? ZERO.

Two Essential Reasons for Eating

We eat for energy and we eat to gather the building blocks by which the body repairs and maintains itself. The building blocks are proteins and fatty acids. No need for carbohydrates for building. What about fuel? That's the other reason we eat. There are two kinds of fuel that your body can use with minor exceptions:

1. Sugar and

2. Fat.

But what happens if you eat sugar. Your body's main way of getting rid of it, because it is toxic, is to burn it. That which your body can't burn your body will get rid of by storing it as glycogen and when that gets filled up your body stores it as fat. If you eat sugar, your body will burn it and you stop burning fat.

Fat is your best fuel by far and the fuel that your body wants to use. To gather the building blocks for maintenance and repair, the body needs protein and fat. No carbohydrate needed is needed. Without question, fat is the most efficient fuel and the fuel that your body desires the most. So where do carbohydrates come in? They don't. There is no essential need for carbohydrates.

This doesn’t mean you can’t have any carbohydrates. Vegetables are great. The practical aspect of it is that you are going to get carbohydrates, but there is no essential need for them. The traditional Eskimo diet for most of the year subsists on almost no vegetables at all, but they get their vitamins from organ meats and things like eyeballs which are a delicacy.

Vegetables are good for you and you should eat them. Fruit, on the other hand, is a mixed blessing. Fruit should be chosen on the basis of its glycemic index which we have discussed previously.

Next week, we will continue our discussion of insulin. As you learn and as you change your diet and your activities, remember, it is your life and it is your health.