

DIABETES CONTROL MATTERS

WHAT IS INSULIN RESISTANCE?

Type 2 diabetes comprises 90-95% of the population with diabetes. Early in their disease, type 2 diabetes patients may have normal, or even excessive levels of insulin in the blood stream, but the insulin present is not effective in controlling blood glucose.



Description of Insulin Resistance

Insulin is produced from the pancreas and released into the blood, where it attaches to cells by binding to the cells' "insulin receptors". It is estimated that there are as many as 20,000 insulin receptors found on the surface of each cell. Inside the insulin receptor is an enzyme which is activated when insulin attaches to the cell's insulin receptors. This leads to a series of events that open channels through which glucose can enter the cell and be used for energy. When the cells are insulin resistant, the channels do not open and the glucose fails to gain entry into the cells.

Glucose then builds up in the blood stream, signaling the pancreas to produce more insulin. The body is capable of making up to 10 times the amount of insulin necessary, so it is usually able to overcome the insulin resistance by making extra insulin. This may work indefinitely or, as is the case with 25% of the insulin-resistant population, the pancreas eventually loses the ability to keep up. When the pancreas can no longer overcome the insulin resistance, the person develops type 2 diabetes.

Insulin resistance often has no obvious symptoms. Those who are insulin resistant and don't get diabetes may never be aware that they have the condition. It is estimated that one-fourth of the population is just as insulin resistant as those with diabetes, but their pancreases are able to compensate and overcome the resistance.

Although we don't know why, it is clear that the muscle cells (where most of the sugar breakdown occurs) of obese people and those who get little exercise are far less responsive to insulin than are the muscle cells of thinner people who exercise regularly.

It is believed that all people with insulin resistance are much more likely to develop high blood pressure, abnormal blood lipids, and coronary heart disease (Syndrome X). Therefore, these are considered top priorities in addition to treating high blood sugar aggressively.

What We Know About Insulin Resistance

- ◆ Obesity is linked to insulin resistance.
- ◆ Sedentary lifestyle is linked to insulin resistance.
- ◆ Smoking is linked to insulin resistance.
- ◆ It can be corrected by diet, exercise, oral medications, insulin, or a combination of all of these.
- ◆ **We don't know why cells become resistant to insulin.**

Problems Which Could Explain Insulin Resistance

- ◆ Decreased number of insulin receptors on the cell membrane,
- ◆ The way in which the receptors function,
- ◆ A defect in the receptors after they are activated,
- ◆ A combination of some or all of these.

Therapies Which Enhance Sensitivity to Insulin:

- ◆ **Weight loss in the obese patient**
- ◆ **Regular Physical exercise**
- ◆ **Medication Management using Metformin or one of the Glitazones**

AMERICAN DIABETES ASSOCIATION GOALS FOR BLOOD GLUCOSE

	GOALS	ACTION SUGGESTED
Pre meals	80-120 mg/dl	<80 or >140 mg/dl
Bedtime	100-140 mg/dl	<100 or >160 mg/dl
Hemoglobin A1c	<7%	>8%