

Insulin

What is insulin?

Insulin is a hormone that allows blood sugar to be utilized by muscle, liver and fat cells throughout the body. It is produced by specialized cells called β -cells in the in the pancreas and secreted in response to elevated blood sugar levels. Its main function is to regulate plasma glucose levels within a narrow range. Insulin binds to cellular insulin receptors, which signals glucose to be taken up into various types of cells (such as skeletal muscle or liver tissue) thus removing it the bloodstream. Ingested carbohydrates stimulate insulin production as well as some stimulatory hormones such as adrenaline.

Why measure insulin?

Insulin levels tell a lot about the efficiency with which a person can metabolize carbohydrates. Fasting insulin levels are inversely correlated to insulin sensitivity. That is, the higher the insulin level, the less sensitive a person is to the glucose- clearing effect of insulin. Especially in persons without diabetes, elevated fasting insulin can facilitate diagnosis of insulin resistance, which predisposes a person to cardiovascular disease. Insulin resistance is also linked to higher rates of stroke.

When a diagnosis of metabolic syndrome is made, clinicians will often look at the possibility of insulin resistance. Of the metabolic syndrome clinical factors, elevated fasting blood sugar (a possible indicator of insulin resistance) is often thought to be the most dangerous factor. (Three of five warrant diagnosis of metabolic syndrome – (1) obesity, (2) low HDL, (3) high triglycerides, (4) hypertension or (5) elevated fasting blood glucose).

Why are high levels of insulin harmful?

Insulin levels can be elevated for two reasons: the body is de-sensitized to the action of insulin (insulin resistance), or blood sugar levels are high enough to warrant excess release of insulin in order process the glucose in the bloodstream. Since elevated blood sugar levels can act as an arterial abrasive and contribute significantly to atherosclerosis, high levels of insulin generally mean excess blood sugar is present.

How is high insulin treated?

In the absence of full-blown diabetes, to which high insulin is a precursor, the primary line of therapy is lifestyle changes – specifically weight loss, when visceral adiposity (fat in the midsection) is present, and exercise. Even modest amounts of weight loss can reverse or retard some of the effects of insulin resistance, thus altering metabolism in such a way that promotes efficient energy production over fat storage. Moderate exercise also helps to lower insulin levels, even in the absence of weight loss.

References

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Additional references at <http://www.spectracell.com/online-library-mnt-insulinresistance-abstracts>