The Natural Approach to Healthy Blood-Sugar Metabolism
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Part I: The Importance of Healthy Sugar Metabolism

Achieving and maintaining proper blood sugar metabolism is essential for a lifetime of excellent health. Prolonged unhealthy blood sugar metabolism can significantly affect the health of your eyes, blood vessels, kidneys, and pancreas. It can impact your weight, body shape, energy levels, blood pressure, cholesterol, triglycerides, overall cardiovascular health, and more. Over 60 million Americans have "insulin resistance", a form of unhealthy blood sugar metabolism that frequently goes unrecognized, but can often progress to the point where signs of significant health deterioration appear. Don't let this happen to you! It's never too early or too late to learn how you can achieve and maintain healthy blood sugar metabolism and experience the benefits of sustained good health[1].

Insulin Resistance and Syndrome X

Insulin is a hormone secreted by the pancreas. It helps the body utilize blood glucose (blood sugar) by binding with receptors on cells, like a key would fit into a lock. Once the key (insulin) has unlocked the door, the glucose enters the cell. Glucose is either used for energy, or stored for future use in the form of glycogen in liver, or muscle cells.

Insulin resistance occurs when the normal amount of insulin secreted by the pancreas is not able to unlock the door to cells. To maintain normal blood glucose, the pancreas secretes additional insulin. In some cases (about 1/3 of the people with insulin resistance) when the body cells resist or do not respond to even high levels of insulin, glucose builds up in the blood resulting in high blood glucose or type-2 diabetes.

Another term heard in the news is (metabolic) Syndrome X. It affects 22% of adults today, with 33% affected between ages 50 – 59 and 43.5% ages 60 – 69. Syndrome X is a cluster of risk factors for heart disease associated with insulin resistance. If you have 3 out of 5 risk factors listed on the chart below, you will be classified with Syndrome X.

ATP-III Metabolic Syndrome

Risk Factor	Defining Level
Abdominal Obesity Men Women	Waist Circumference > 40 in. > 35 in.
Triglycerides	≥ 150 mg/dL
HDL Cholesterol Men Women	< 40 mg/dL < 50 mg/dL
Blood pressure	< 120/80 mm/hg
Fasting glucose	> 100 mg/dL

Blood Sugar Metabolism Adversely Affects Cholesterol Levels

People who are insulin resistant typically have an imbalance in their blood lipids (blood fat). They have an increased level of triglycerides (blood fat) and a decreased level of HDL (good) cholesterol. The triglycerides are elevated because "whenever a greater quantity of carbohydrates enter the body that can be used, the excess is rapidly converted into triglycerides"[2]. Triglycerides can ultimately convert into LDL (bad) cholesterol. Excess insulin can convert HDL to VLDL (precursor to LDL)[3].

Some scientists think a defect in specific genes may cause insulin resistance and type-2 diabetes. Researchers continue to investigate the cause. What we do know is that obesity (1/3 of Americans are classified as) and physical inactivity are increasing in the US. Additionally, unhealthy diet consumption with excess sweets and refined and processed foods also contribute to blood-sugar disorders.

Lab Tests - What They Reveal

Blood glucose – high blood glucose may be a sign that your body does not have enough insulin or does not use it well. However, a fasting measurement or oral glucose tolerance test provides more of precise information.

Insulin – an insulin measurement helps determine that a high blood glucose reading is the result of insufficient insulin or poor use of insulin.

Fasting glucose – your blood glucose level should be lower after several hours without eating. After an overnight fast, the normal level is below 100 mg/dL. If it is in the 100 – 125 mg/dL range, you have impaired glucose or pre-diabetes. A result of 126 mg/dL or higher, if confirmed on a repeat test indicates diabetes.

Glucose tolerance – your blood glucose level will be higher after drinking a sugar solution, but it should still be below 140 mg/dL 2 hours after the drink. If it is higher than normal (in the 140 – 149 range) 2 hours after drinking the sugar solution, you have IGT or pre-diabetes. A level of 200 or higher, if confirmed, means diabetes is already present.

Hemoglobin A1c – is a simple lab test that shows the average amount of sugar (glucose) in a person's blood over the last 3 months. It is now considered one of the best testing for blood-sugar control.

Fructosamine – measures short-term control of blood sugar for the past 1 – 3 weeks.

VAP Cholesterol Test – the most comprehensive lipid panel available. This panel identifies the size of LDLs and the prominence of non-HDL cholesterol, both of which are better predicators of heart disease risk than LDL alone.

Blood Sugar in the News

The Lancet, Nov. 11, 2006 reported that *High Blood Sugar is a Global Killer*. A Harvard study shows that 3.16 million deaths occur per year due to high blood sugar. High blood sugar is among the world's top five killers and is one sign that a person is on the road to diabetes. All good reasons to pay attention to your diet and lifestyle which will be discussed in next month's edition of this newsletter.

"Those who think they have no time for healthy eating will sooner or later have time for illness". *Edward Stanley*

Sources:
[1] Metagenics.com. Blood Sugar Management Programs
[2] Medical Physiology, Guyton, 7th Edition, p. 819
[3] Swenson, FL. Diabetes Metabolism Review 1991; 7: p. 139-153

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