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WELLNESS INSTITUTE

GLUCOSE BALANCE

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INTRODUCTION

Blood sugar irregularities and the diseases associated with it have become epidemic among the American population. The most common blood sugar irregularity is commonly referred to as metabolic syndrome or insulin resistance.

The CDC reports that 86 million Americans are living with pre-diabetes or insulin resistance. That is one out of every three Americans. Ninety percent of those with pre-diabetes do not even know that they are suffering with the condition. The diabetic population numbers 29.1 million and at least 8 million of these are not diagnosed.

Blood sugar irregularities tend to increase with age. By the age of 65 half the population is insulin resistant and 26 of the population are diabetics.

The CDC tells us that 72 million Americans are obese. Obesity is just one of the complications which results from insulin resistance.

The American Heart Association criteria for diagnosis of metabolic syndrome involves the presence of three of the following five conditions even if they are successfully being treated with medication:

A **waist circumference** of men greater than or equal to 40 inches (for Asian men it is 35.5 inches) and for women a waist size greater than or

equal to 35 inches (31.5 inches for Asian women).

Fasting triglycerides equal to or greater than 150 mg/dl.

An **HDL** less than 40 for men and 50 for women.

A **blood pressure** equal to or greater than 130/85.

A **fasting blood glucose** equal to or greater than 100 mg/dl.

ASSOCIATED PROBLEMS

Metabolic syndrome was originally identified as Syndrome X by Dr. Gerald Reaven. He linked insulin resistance to heart disease risk. Subsequent research confirmed this finding and found that insulin resistance increases oxidative damage and inflam-

matory activity in the body.

Recent research has associated insulin resistance with diabetes, bad blood fats, high blood pressure, cancer, and infertility.

Research has also begun to focus on the association between psychiatric illness and metabolic syndrome. The primary fuel for brain cells is glucose. If brain cells become resistance to insulin, an individual may become more susceptible to depression, bipolar disorder, dementia, and other conditions. Depressed individuals are four times more likely to suffer with insulin resistance than the average person and one out of three individuals with bipolar disorder meet the criteria for insulin resistance. Six out of ten schizophrenics suffer with the condition.

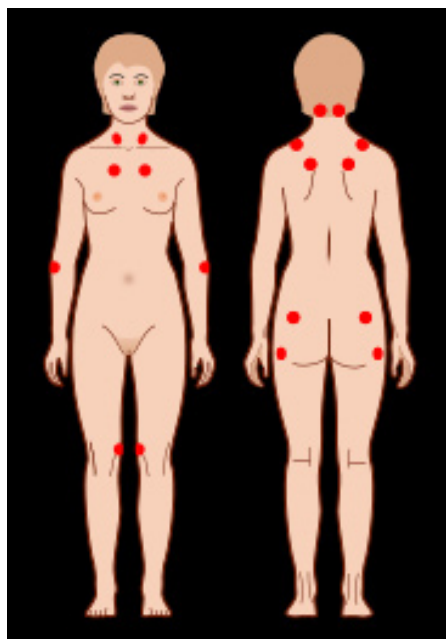
Insulin resistance is associated with fibromyalgia--a condition where the body aches in 18 specific locations. Women with fibromyalgia are six times more likely to suffer with metabolic syndrome than women without the condition.

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GLUCOSE BALANCE

Control of blood sugar levels involves keeping blood glucose levels as constant as possible, supporting production of insulin, and allowing insulin to function as effectively as possible. After considerable research NeoLife has introduced Glucose Balance. The product is carefully designed to avoid some of the common problems associated with supplements designed to help balance blood sugar.

Glucose is not designed to drive blood sugar lower at any cost. This can contribute to hypoglycemia and erratic blood sugars. The product looks for a long term benefit of keeping blood sugar and insulin levels as stable as possible and reducing the inflammatory and oxidative damage associated with metabolic syndrome. The ingredients include cassia cinnamon, curcumin, tumeric, GTF chromium, and lipoic acid. We shall look at each of these ingredients separately.

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Ghirlanda, D., et al., Evidence of plasma CoQ10-lowering effect by HMG-CoA reductase inhibitors: A double-blind, placebo-controlled study, *Clinical Pharmacology*, March 1993; 33(3):226-229.

GTF CHROMIUM

Glucose tolerance factor (GTF) chromium is a natural form of chromium found in yeast. Dr. Walter Mertz was the first to recognize the insulin enhancing activity of chromium in 1959.

The following is a quote from the *British Journal of Nutrition* reviewing research on GTF chromium in both test tube and live animal studies: “GTF exerts remarkable insulin-mimetic and insulin-potentiating effects, both in vivo and in vitro. It produces an insulin-like effect by acting on cellular signals downstream of the insulin receptor. These results demonstrate a potential source for a novel oral medication for diabetes.”

Unfortunately, the most common form of chromium supplementation has been chromium picolinate. Hepburn points out that this form of chromium causes free radical production when given to rats and causes DNA damage in fruit flies that leads to lethal mutations. The damage was caused by the picolinate portion of the molecule since other forms of chromium did not cause this damage.

In another study Hepburn found that rats fed chromium picolinate at low doses developed DNA damage and oxidized fats. Chromium picolinate was “found to raise urinary and cellular 8-OHdG levels in a time dependent fashion.” This particular measurement is used to evaluate damage to DNA and high levels are associated with increased risk of cancer.

The exact structure of natural glucose tolerance factor is not known but it appears to be a combination of chromium with nicotinic acid and cysteine. Many experts recommend the natural glucose tolerance factor in preference to chromium picolinate.

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Mirsky, Nitsa, et al., Glucose tolerance factor extracted from yeast: oral insulin-mimetic and insulin-potentiating agent: in vivo and in vitro studies, *British Journal of Nutrition*, September 14, 2012; 108(5):875-882.

Hepburn, Dion D. D., et al., Nutritional supplement chromium picolinate causes sterility and lethal mutations in *Drosophilamelanogaster*, *PNAS*, April 1, 2003; 100(7):3766-3771.

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ALPHA-LIPOIC ACID

Alpha-lipoic acid or ALA is a natural food component found most abundantly in organ meats and at lower levels in some plants such as spinach and potatoes. Many experts consider internal synthesis of the molecule barely adequate. Lipoic acid is a sulfur-containing molecule that is both fat and water soluble.

Lipoic acid is a cofactor in the activity of two enzymes involved in glucose metabolism in the mitochondria or energy factories of the cells. These enzymes assume a central role in general energy production.

A different lipoic acid containing enzyme complex is involved in deriving energy from branched chain amino acids.

Finally, lipoic acid appears to play a role in transportation of glucose or blood sugar into the cell.

Lipoic acid has powerful antioxidant activity. It can regenerate vitamins C and E. Because it is both fat and water soluble it can work about anywhere in the body. Particularly significant, is the ability of lipoic acid to prevent oxidative damage in the pancreas where insulin is produced. Because lipoic acid contains sulfur it can suppress the formation of free radicals by copper and iron.

Lipoic acid works in a variety of ways to enhance the functioning of insulin and reducing insulin resistance. Lipoic acid prevents the development of diabetes in mice by blocking the accumulation of fat in muscle. One





research paper wrote, “These results suggest that ALA-induced improvement of insulin sensitivity is mediated by activation of AMPK which stimulates uptake of glucose by skeletal muscle and reduced triglyceride (or fat) accumulation in skeletal muscle.”

Lipoic acid has long been a standard treatment in Europe for diabetic neuropathy. A 3-week double-blind, placebo-controlled trial in 1995 substantiated the benefit of lipoic acid for diabetic nerve damage.

Lipoic acid competes with biotin and vitamin B5 for uptake into cells. Supplementation with a source of the B complex vitamins should accompany use of higher doses of lipoic acid.

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Lee, Woo Je, et al., α -Lipoic acid increases insulin sensitivity by activating AMPK in skeletal muscle, *Biochemical and Biophysical Research Communications*, July 8, 2005; 332(3):885-891.

Ziegler, D., et al., Treatment of symptomatic diabetic peripheral neuropathy with the anti-oxidant lipoic acid, *Diabetologia*, 1995; 38:1425-1433.

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CASSIA CINNAMON

Cinnamon is one of the most effective herbs in promoting proper insulin functioning and fat metabolism. One study concluded the following: “After 40 days, all three levels of cinnamon (1, 3, or 6 g/day) reduced the mean fasting serum glucose (18–29%), triglyceride (23–30%), LDL cholesterol (7–27%), and total cholesterol (12–26%) levels; no significant changes were noted in the placebo groups.”

One of the nice aspects of cinnamon is that it tends to produce the

greatest benefits among those with the most serious glucose problems. Mang wrote, “The decrease in plasma glucose correlated significantly with the baseline concentrations, indicating that subjects with a higher initial plasma glucose level may benefit more from cinnamon intake.”

In other words, even small doses of cinnamon can have powerful beneficial effects on blood sugar, but the most powerful effects are seen among those with the greatest abnormalities in blood sugar. Cinnamon does not tend to lower blood sugar to unhealthy levels.

A review article by Qin notes that cinnamon has been demonstrated to improve insulin resistance, elevated blood sugars and blood fats, inflammation and antioxidant activity. It also has beneficial effects on weight gain and the glycation of proteins, a process in which sugars bond with proteins in the body and damage them.

Cinnamon has also been shown to alleviate factors associated with Alzheimer’s disease by blocking and reversing tau formation. Tau proteins are one of the two major markers for Alzheimer’s disease.

There are two types of strokes: thrombotic and ischemic or hemorrhagic stroke. Thrombotic strokes are associated with blood clots. Most strokes (87%) are hemorrhagic. Blood vessels become inflamed and high blood pressure bursts blood vessels. Qin suggests that cinnamon can alleviate the cell swelling associated with ischemic stroke reducing stroke risk.

Qin also notes that components of cinnamon also control angiogenesis which is associated with the proliferation of cancer cells.

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TUMERIC AND CURCUMIN

Tumeric is an herb which forms rhizomes similar to ginger and belonging to the ginger family. Curcumin is an extract from tumeric.

Kuroda writes, “These results indicate that turmeric is a promising ingredient of functional food for the prevention and/or amelioration of type 2 diabetes...”

Weisberg suggests that curcumin offers potential as an adjunctive therapy for adult onset diabetes, “We therefore conclude that orally ingested curcumin reverses many of the inflammatory and metabolic derangements associated with obesity and improves glycemic control in mouse models of type 2 diabetes. This or related compounds warrant further investigation as novel adjunctive therapies for type 2 diabetes in man.”

Wickenberg demonstrated that tumeric improved insulin production in healthy people. Tumeric improves the functioning of the beta cells which produce insulin.

Chuengsamarn and associates conducted a 9-month intervention with curcumin in a prediabetic population and significantly reduced the number who eventually developed Type 2 diabetes. The researchers noted that the curcumin also appeared to improve the overall function of the beta cells in the pancreas that produce insulin with very minor adverse effects.

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SUMMARY

Glucose Balance and the ingredients in the supplement accomplish several important activities for establishing glucose balance and the energy flow that results from efficient utilization of blood sugar. Efficient energy production is dependent upon the following:

Managing glucose uptake: The body suffers when digestion and absorption of glucose is either too fast or too slow. Similarly, a consistent delivery of glucose within cells is vital for long term physical and mental health. Brain cells in particular are much more easily damaged if glucose is not readily available.

Insulin production: Failure of insulin production leads to diabetes. Due to poor diets and excessive sugar intake the pancreas and its insulin production are often compromised in modern men and women.

Insulin sensitivity: There are three main areas where sensitivity to insulin is important, peripheral tissues like muscle and fat, the liver, and the pancreas. Exercise and weight reduction are the most powerful means of improving insulin sensitivity

Insulin receptor function: The end of the journey of insulin is its receptor. Failure here blocks glucose utilization.

The nutrients and herbs discussed in this paper work to enhance every aspect of glucose utilization. They provide an excellent complement to other measures taken to improve blood sugars such as weight loss, exercise, and the NeoLife Shake.

The NeoLife Shake is rich in natural leucine which plays a role in the production and release of leptin, the satiety hormone that makes us feel full, satisfied, and happy. Deficient leucine in the diet of rats reduces leptin levels by 40% promoting binge eating. Obesity is characterized by

low leptin levels or decreased sensitivity to leptin.

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