GlucoResolve™

Nutritional Support for Healthy Glucose and Insulin Metabolism

Clinical Applications

- Supports Healthy Glucose and Insulin Levels
- Promotes Healthy Weight Management
- Optimizes Metabolism
- Contains Powerful Antioxidants
- Promotes AMPK Activity

Effective regulation of blood glucose has important implications for health. Mild disruption of glucose homeostasis can result in a plethora of unwanted health issues. The majority of people struggling with weight loss resistance also have blood sugar dysregulation and insulin resistance, a metabolic conundrum that only exacerbates the inability to lose weight. Insulin, also referred to as the "fat fertilizer", is a peptide hormone secreted by the β cells of the pancreatic islets of Langerhans to help maintain normal blood glucose levels by facilitating cellular glucose uptake, regulating carbohydrate, lipid and protein metabolism and promoting cell division and growth.[1]

A person experiencing insulin resistance has a normal or elevated insulin level that produces an attenuated biological response to glucose resulting in impaired glucose metabolism.[2] Metabolic syndrome represents a cluster of abnormalities and is a direct result of dysregulation of insulin metabolism. A signature clinical observation in metabolic syndrome is increased abdominal fat due to an increase in insulin production. This increased abdominal fat correlates strongly to insulin resistance. Not only is less adiponectin produced to help regulate the insulin, the amounts of non-esterified fatty acids, glycerol, hormones, cytokines and other proinflammatory markers – all involved in insulin resistance – are also increased.

Glucose and insulin homeostasis depend on a wide range of micronutrients often lacking in a typical American diet. **GlucoResolve™** provides targeted nutritional support for healthy glucose and insulin metabolism to foster healthy weight management. In addition to key vitamins and minerals, **GlucoResolve™** contains the following nutrients shown to be beneficial for glucose and insulin metabolism.

Pomegranate Seed Extract

Pomegranate extracts are known to possess enormous antioxidant benefits and also support healthy inflammatory pathways and

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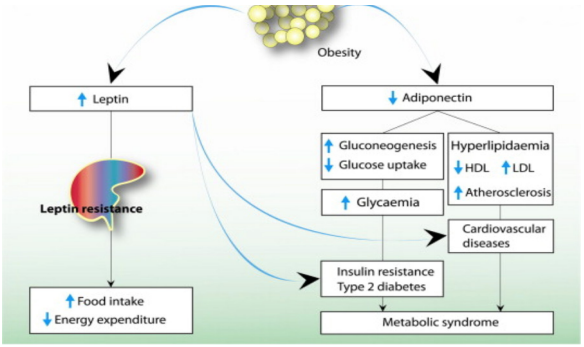
the maintenance of healthy blood sugar levels in vitro and in vivo.[3] High in linoleic acid, linolenic acid, punicic acid, stearic acid, palmitic acid, phytosterols, elostearic acid, catalpic acid, phytosterols, polyphenols and isoflavones, pomegranate seeds are replete with health-promoting benefits. In a number of animal studies, pomegranate seed oil supplementation improved insulin sensitivity in high-fat diet (HFD) fed mice, confirming its ability to ameliorate glucose intolerance.[4] Catalpic acid supplementation resulted in improvements of fasting glucose and insulin concentrations compared to the control. A decrease in the accumulation of abdominal white adipose tissue was also observed as well as increased high-density lipoprotein (HDL) cholesterol and lowered triglyceride levels in plasma.[5] McFarlin et al[6] reported that the consumption of pomegranate seed oil and an HFD resulted in decreases of body weight, leptin, insulin and increased adiponectin compared with controls since decreased body weight is mediated by the leptin-adiponectin pathway.



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Berberine

Berberine has been shown to regulate glucose and lipid metabolism in vitro and in vivo and acts as a potent hypoglycemic agent. In one study, berberine's insulin sensitizing effect was demonstrated by significantly decreasing HbA1c levels in patients with blood sugar dysregulation.[7]

Alpha-Lipoic Acid (ALA)

Alpha-lipoic acid, a potent antioxidant, has been shown in many studies to enhance the body's ability to support healthy blood sugar levels in patients with glucose dysregulation. One study, in particular, examined the effects of ALA supplementation over a period of two months on fasting blood glucose (FBG), insulin resistance (IR) and glutathione peroxidase (GH-Px) activity in patients with insulin resistance and found a significant decrease in FBG, PPG and GH-Px levels compared to the placebo group.[8]

Green Tea Extract

Epigallocatechin gallate (EGCG), the most abundant form of catechin in green tea, has been known to be the main factor of beneficial effects of green tea. EGCG inhibits adipocyte proliferation, increases fat oxidation, and increases expression of GLUT-4 (glucose transporter) in adipose tissue of an animal model. [9],[10],[11] In human studies, increased energy expenditures were documented.[12] Also, Tian et al[13] showed that green tea polyphenols had anti-obesity effect by up-regulating adiponectin levels in

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rats. In addition, polyphenols such as those found in green tea, influence glucose metabolism by inhibiting glucose absorption from the intestine, increasing insulin secretion from the pancreas, improving glucose uptake in muscle cells and adipocytes[14], all critical to maintaining healthy and stable blood sugar levels.

Forskolin

Forskolin is a diterpene derived from the plant Coleus forskohlii, known to activate adenylate cyclase, which increases cellular cAMP (cyclic AMP) levels. AMP-activated protein kinase (AMPK) is an important regulator of cellular energy status. In adipocytes, stimuli that increase intracellular cyclic AMP (cAMP) have also been shown to increase the activity of AMPK.[15] In one study evaluating the effects of forskolin on blood sugar, forskolin was found to predominantly decrease basal glucose in healthy rats and support healthy blood sugars in rats with insulin dysregulation.[16]

Carnitine

Carnitine is involved as part of a vital transport mechanism of fat metabolism in which fat enters energy production pathway. L-carnitine supplementation remodels fatty acid metabolism, insulin action and mitochondrial function and is positively indicated for those with blood sugar dysregulation.

Vanadium

Due to possible insulinotropic effects of vanadium, inadequate amounts of this trace mineral are undesirable in those with blood sugar abnormalities. One study concluded vanadium depressed beta cell death, and by the proliferation of the viable beta cells, increased insulin activity and productivity.[17]

Vitamin E and Selenium

Vitamin E and selenium are essential nutritional factors which act as antioxidants and may be involved in glucose balance.[18],[19] As many complications associated with diabetes may be related to excess free radical activity, adequate selenium and vitamin E should be supplied in the diabetic diet.

Chromium

The effect of chromium on glucose metabolism requires its conversion to glucose tolerance factor (GTF), a low-molecular-weight compound that contains chromium, niacin (nicotinic acid), glycine, glutamic acid, and cysteine. GTF has been shown to potentiate the action of insulin at the cellular level.[20] A systemic review and meta-analysis suggests favorable effects of chromium supplementation on glycemic control in patients with blood sugar dysregulation. Also, there was no increase in the risk of adverse effects compared to the placebo, confirming its safety.[21] Tissue chromium levels were found to decline with age in Americans.[22]

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In other studies, including one by the U.S. Department of Agriculture, more than 50% of people consumed less than the lower level of chromium recommended by the National Academy of Sciences, Nutritional Research Council.[23] Chromium aspartate is a well-utilized form of supplemental chromium being solubilized at a wide range of pH. The amounts of chromium used in most clinical trials (*150 to 200 ug/ day) are apparently inadequate for some patients, even when more efficient chromium compounds are used. Larger amounts of chromium, such as 500 to 1,000 ug/day, have often had a greater benefit.[24]

Biotin

The initial step in glucose utilization by the cell is its phosphorylation, mediated by the biotin-dependent enzyme hepatic glucokinase (GCK). Adequate biotin intake is, therefore, required to initiate intracellular glucose into the cell. Biotin may also play a role in stabilizing blood sugar levels through biotin-dependent enzymes, acetyl CoA carboxylase and pyruvate carboxylase.[25] In a 2015 animal study, biotin improved postprandial glucose levels in subjects with blood sugar dysregulation due to its effect on key enzymes in glucose metabolism such as GCK and phosphoenolpyruvate carboxykinase 1 (PCK1). Thus, biotin deficiency should be avoided in those with blood sugar disorders.[26]

Supplement Facts

Serving Size: 3 Capsules
Servings Per Container: 60

	Amount Per Serving	% Daily Value
Vitamin A (as retinyl acetate)	750 mcg RAE	83%
Vitamin C (as calcium ascorbate and ascorbic acid)	250 mg	278%
Vitamin D (as cholecalciferol)	10 mcg	50%
Vitamin E (as d-alpha tocopheryl acetate and natural mixed tocopherols)	135 mg	900%
Thiamin (as cocarboxylase chloride and thiamin mononitrate)	12.5 mg	1,042%
Riboflavin (as riboflavin-5-phosphate)	10 mg	769%
Niacin (as niacinamide and niacin)	75 mg	469%
Vitamin B6 (as pyridoxal-5-phosphate)	10 mg	588%
Folate (as calcium folinate)	400 mcg DFE	100%
Vitamin B12 (as methylcobalamin)	25 mcg	1,042%
Biotin	1,500 mcg	5,000%
Pantothenic Acid (as d-calcium pantothenate)	50 mg	1,000%
Zinc (as zinc picolinate and zinc citrate)	15 mg	136%
Selenium (as selenomethionine)	55 mcg	100%
Copper (as copper gluconate)	1 mg	111%
Manganese (as manganese citrate)	5 mg	217%
Chromium (as chromium aspartate)	500 mcg	1,429%

	Amount Per Serving	% Daily Value
Potassium (as potassium aspartate)	49.5 mg	<1%
Alpha-Lipoic Acid	125 mg	*
Taurine	100 mg	*
Pomegranate seed extract	100 mg	*
Berberine hydrochloride	50 mg	*
Green Tea (leaf)(extract)(50% EGCG)	50 mg	*
Acetyl-L-Carnitine HCl	25 mg	*
Coenzyme Q10 (emulsified)	25 mg	*
N-Acetyl-L-Cysteine	25 mg	*
Forskohlii (Coleus forskohlii)(rhizome)(extract)	25 mg	*
Baikal Skullcap (Scutellaria baicalensis)(root) (extract)	15 mg	*
Grape Seed (Vitis vinifera)(extract)(95% OPCs)	15 mg	*
Quercetin	12.5 mg	*
Phytolens® (Lens esculenta)(extract)(husk)	1.5 mg	*
Vanadium (as vanadium aspartate)	50 mcg	*

*** Daily Value not established**

KEEP OUT OF REACH OF CHILDREN
Store in a cool, dry area.
Sealed with an imprinted safety seal for your protection.

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Other ingredients: Capsule shell (gelatin and water), cellulose and magnesium stearate.

This product is gluten, dairy and GMO free.

RECOMMENDATION: Three (3) capsules one (1) to two (2) times each day, with meal, as a dietary supplement or as otherwise directed by a healthcare professional.

WARNING: Avoid if pregnant or lactating, have polycystic kidney disease, or taking blood thinners or blood pressure medication.

**** For the list of references, visit www.bioticsresearch.com/glucoresolve***

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