COMPLETE GLUCO-D

Ingredients: Each Table Supplies: Vitamin B-1 15 mg, Vitamin B-6 15mg, Vitamin B-12 (methylcobalamin) 100mcg, Niacin 10 mg, Pantothenic Acid (as d-calcium pantothenate) 30 mg, Biotin 30 mcg, Folic Acid 100 mcg, Chromium (as chelate) 50 mcg, Selenium (as chelate) 20 mcg, Zinc (as chelate) 1.5 mg, Magnesuim (as malate) 1.6 mg, Manganese (as chelate) 500 mcg, Potassium (as chelate) 3 mg, Benfotiamine (lipid soluble derivative of Vitamin B-1) 35 mg, Alpha Lipoic Acid 2.5 mg, Quercetin 5 mg, Inositol 25 mg, Niacinamide 20 mg, Co-Enzyme Q-10 2.5 mg, Protease (vegetable) 5 mg, Lipase (vegetable) 5 mg, Amylase (vegetable) 5 mg, Vanadyl Sulfate (vanadium 50 mcg) 160 mcg, Acetyl L-Carnitine 10 mg, L-Taurine 30mg, L-Glutamine 30 mg, Bitter Mellon (fruit) 25 mg, Gymneme Sylvestre (leaf) 60 mg, Panax Ginseng (root) 20 mg, Fenugreek (seed) 15 mg, Eleuthero (root) 30 mg.

Supportive Function: Use as part of the diet to help maintain healthy blood sugar levels, normal nerve growth and maintenance.

When is Complete Gluco-D helpful? High blood-sugar problems; insulin insensitivity; tissue damage (especially kidney, nerve, eye etc. due to high blood glucose levels); provides antioxidant/cell protection.

Clinical Applications and Research:

Benfotiamine: Exciting research on a new form of an old nutrient (vitamin B-1) has been putting benfotiamine in the spotlight. There are three major biochemical pathways implicated in the pathogenesis of hyperglycemia induced vascular damage: 1. The advanced glycation end product (AGE) formation pathway; 2. The hexosamine pathway and 3. The diacylglycerol (DAG)-protein kinase C (PKC) pathway. They are all activated by increased availability of sugar metabolites. Researchers have discovered that, "the **lipid-soluble thiamine derivative benfotiamine can inhibit these three pathways** by activating the pentose phosphate pathway enzyme transketolase. In retinas of diabetic animals, benfotiamine treatment inhibited these three pathways and also **prevented experimental diabetic retinopathy**."[1]

Accumulation of sugar by-products called triosephosphates resulting from high glucose concentrations is a trigger for biochemical dysfunction leading to the development of diabetic nephropathy - a common complication of diabetes associated with a high risk of cardiovascular disease and mortality. By stimulating the pentosephosphate pathway with benfotiamine, the accumulation of triosephosphates was countered, and development of nephropathy was inhibited. This inhibition "was associated with decreased activation of protein kinase C and decreased protein glycation and oxidative stress - **three major pathways of biochemical dysfunction in hyperglycemia.** Benfotiamine also inhibited diabetes-induced hyperfiltration… **benfotiamine therapy is a potential novel strategy for the prevention of clinical diabetic nephropathy."**[2]

Why is it important to think of benfotiamine and not just thiamine? In a rat study, nerve conduction velocity was nearly normalized after six months of benfotiamine application but not with thiamine. "Furthermore, benfotiamine induced a major inhibition of neural imidazole-type AGE formation and **completely prevented diabetes induced glycoxidation products ... Unlike treatment with water-soluble thiamine, timely administration of liposoluble benfotiamine was effective in the prevention of functional damage and of AGE formation in nerves of diabetic rats."**[3]

Bitter Melon: People in tropical regions have utilized bitter melon for nutritional support of diabetes for many years[4], and beneficial results have been reported in some clinical trials.[5]

At least three sets of constituents in bitter melon have been reported to have potential benefit. These include steroidal saponins known as charantin, insulin-like peptides, and alkaloids. Researchers report that, "**Components of bitter melon extract appear to have structural similarities to animal insulin. Antiviral and antineoplastic activities have also been reported** in vitro. Four clinical trials found bitter melon juice, fruit, and dried powder to have a moderate hypoglycemic effect."[6]

Fenugreek: Fenugreek seeds contain alkaloids (mainly trigonelline) and protein (it is high in lysine and L-tryptophan.) The steroidal saponins (diosgenin, yamogenin, tigogenin, and neotigogenin) and mucilaginous fiber are believed to account for many of the beneficial effects. The ingredients in fenugreek, especially the soluble fiber, may help lower blood sugar levels.[7] One human study discovered that **fenugreek can help lower cholesterol and blood sugar levels** in people with moderate atherosclerosis and non-insulin-dependent (type 2) diabetes.[8] Preliminary and double-blind trials have found that fenugreek helps improve blood sugar control in both patients with insulin-dependent (type 1) and non-insulin-dependent (type 2) diabetes.[9,10,11] Double-blind trials have shown that fenugreek lowers elevated cholesterol and triglyceride levels in the blood,[12,13] and this has also been found in a controlled clinical trial with diabetic patients exhibiting elevated cholesterol.[13] Additionally, fenugreek does not lower the good cholesterol (HDL).

Siberian ginseng: Siberian ginseng in known as an adaptogen, which means it works to stabilize and bring the body into homeostasis, especially in stress-related incidences. [14] Siberian ginseng is thought to enhance mental acuity.[15] and possibly improve the use of oxygen by the working muscle.[16] Healthy people supplementing with Siberian ginseng have been shown to have increased numbers of immune cells (T4 lymphocytes).[17]

Panax ginseng: Panax ginseng is another "adaptogenic" herb, which is also commonly used for mental and physical vitality. Ginseng is composed of ginsenosides, and also "panaxans", which may help lower blood sugar, and the polysaccharides (complex sugar molecules), which are believed to support immune function.[18,19] A double-blind trial found that Panax ginseng improved blood sugar levels in people with type 2 (non-insulin-dependent) diabetes.[20]

Chromium: Chromium is part of the GTF, or Glucose Tolerance Factor; it helps to regulate insulin utilization and blood sugar levels. Chromium has been shown in studies to improve insulin sensitivity…"Accordingly, ingestion of **chromium and antioxidants which improve insulin sensitivity and/or lessen free radical formation could theoretically ameliorate these basic disorders** and lessen signs and symptoms of chronic age-related disorders."[21]

Acetyl-L-carnitine: Carnitine is known for its ability to bring fats across the mitochondrial membrane to be oxidized for energy. A deficiency in carnitine has been associated with impaired ability to utilize these fats, and may even result in accumulation of fatty acids, which is detrimental to nerve health. Acetyl-L-carnitine has been researched for potential neuroprotective characteristics. [22] "In the prevention study, the nerve-conduction defect was 73% prevented and structural abnormalities attenuated. Intervention with **acetyl-L-carnitine resulted in 76% recovery of the conduction defect and corrected neuropathologic changes** characteristic of 4 mo. diabetic rats. Acetyl-L-carnitine treatment promoted nerve fiber regeneration, which was increased two-fold, compared to nontreated diabetic rats. These results demonstrate that **acetyl-L-carnitine has a preventive effect** on the acute Na+/K+-ATPase defect and a **preventive and corrective effect** on PGE1".[23] Treatment with acetyl-L-carnitine **"reduces the functional, structural, and biochemical changes associated with hyperglycemia that occur in the myelin sheath."**[24]

The acetyl group that is part of acetyl-L-carnitine contributes to the production of the nerve transmitter acetylcholine, which is required for mental function. Several double blind clinical trials suggest that acetyl-L-carnitine delays the progression of Alzheimer's disease. [25,26] One double-blind trial[27] has found that acetyl-L-carnitine may be helpful for people with degenerative cerebellar ataxia, a loss of muscular coordination affecting the hind part of the brain that controls muscle tone and balance.

Gymnema sylvestre: Gymnema sylvestre is native to the Indian tropical forests. Studies on Type 2 diabetics indicate that gymnema sylvestre "significantly reduced blood glucose, glycosylated hemoglobin, and glycosylated proteins. These data suggest that the beta cells (that produce insulin in the pancreas) may be regenerated/repaired in Type 2 diabetic patients on supplementation"[28] Animal studies indicate that gymnema sylvestre may also stimulate insulin production in type I diabetics.[28]

Co-enzyme-Q-10: Co-Q-10 stimulates insulin production. It has been shown to reduce fasting blood sugar levels and ketone bodies by 30%.[29]

Vitamin B-6: The B vitamins are involved in all aspects of glucose metabolism. Vitamin B-6 in particular prevents the glycation process. Solomon and co-workers determined that administration of high dose B-6 for six weeks decreased levels of hemoglobin 1Ac and that, "B-6 supplementation has a beneficial role for persons with diabetes".[30]

Manganese, magnesium, and potassium: These minerals can be depleted in diabetes. Manganese is an important cofactor in key enzymes of glucose metabolism.[31] A deficiency has resulted in diabetes in animals, and many human diabetics have ½ the manganese levels of non-diabetics.

Zinc is involved in all aspects of insulin metabolism - synthesis, secretion, and utilization. "Zinc can help prevent diabetes complications through its intracellular activation of the enzyme sorbitol dehydrogenase (SDH)".[32] ***References available on request.***

Testimonials/Tidbits: "Complete-Gluco-D is my favorite; I use it exclusively and it is the only one I have to use for my diabetic patients. It really works well" (Dr. Holm DC, Ac, Denver, CO.)

Suggested Dosage: 1-2 tabs, 2-3 times daily

Size: 90

Vegetarian: Yes

Contraindications: Contraindicated in hypoglycemia (low blood sugar) and pregnancy. Use caution with other diabetic drugs (i.e. glipizide); monitor for hypoglycemia. Fenugreek and ginseng are used synergistically in small amounts to enhance this formula.