

Nutrition and Diabetes

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Diabetes – Facts

Diabetes is a chronic disorder of carbohydrate, fat and protein metabolism characterized by fasting elevations of blood sugar (glucose) levels. Diabetes can occur when the pancreas does not secrete enough insulin or if the cells of the body become resistant to insulin. Hence the blood sugar cannot get into the cells, which then leads to serious complications. Obesity is a major contributing factor to this loss of insulin sensitivity; approximately 90% of individuals with type II diabetes are obese. Type 1 – Diabetes or Insulin-Dependent Diabetes occurs most often in children and adolescents. It is associated with complete destruction of the beta cells of the pancreas, which manufacture the hormone insulin. IDDM require lifelong insulin for control of blood sugar levels. It is caused by antibodies attacking the pancreas. In newly diagnosed Type 1 diabetics - Niacinamide supplementation can in some cases cause a complete reversal of type 1 diabetes. Type 2 can also result from using corticosteroids or glucocorticoids. Because these drugs counteract insulin - the steroids cause urinary chromium loss.

Diabetes is at epidemic proportions in this country. It is estimated that 17 million Americans have either type 1 or type 2 diabetes and almost 6 million people have the disease but have not been diagnosed. Approximately 8.6 % of the adult population is diabetic. Slightly more women than men have it. The economic cost is 132 Billion a year.

The rise in type 2 diabetes cases in young people has led experts to label the disease an emerging epidemic. 20 years ago about 2% of all cases of new onset diabetes type 2 were in people between 9 and 19 years old. Not it's about 30-50%. Over the next 25 years the number of Americans with diabetes will rise to 50 million from the current 16 million. The cost of treating people with diabetes will amount to \$1 trillion annually; with patients with type 2 accounting for the bulk of these costs. *Reuters Health, Sept 8, 2000*

Syndrome X is defined as impaired glucose tolerance with elevated insulin levels, excessive abdominal fat, high blood pressure and high cholesterol "deadly quartet". It occurs because of cellular insensitivity to insulin activity. The ADA estimates that at least 16 million Americans have this condition. Many of them will develop into type 2 if their metabolic syndrome is not corrected.

Long-term consequences of diabetes include:

- 1 – Arteriosclerosis
- 2 – Heart Disease
- 3 – Nephropathy (kidney disease)
- 4 – Retinopathy (damage to the retina of the eye)
- 5 – Cataracts.

These problems are more likely to develop if blood-sugar levels remain chronically elevated than if they are kept in a tight range – as close to normal as possible.

Reducing the insulin requirement is a desirable objective, since excessive insulin levels may be one of the factors contributing to the development of heart and blood vessel disease.

In type 2 diabetes, insulin levels are often too high and go up much more rapidly in response to sugar and carbohydrate intake. When the body's insulin can't get the sugar into the cells properly it often produces even more which causes a cascade of other problems, including high blood pressure and cholesterol abnormalities specifically, lower levels of good HDL cholesterol and higher levels of the LDL. In type 2 diabetes some of the weight problems are due to the excess insulin response to sugar and carbohydrate intake. 90% of NIDDM (non insulin dependent diabetes mellitus) are obese. Even in normal individuals significant weight gain results in carbohydrate intolerance, higher insulin levels, and insulin insensitivity in fat and muscle tissue. The progressive development of insulin insensitivity is believed to be the underlying factor in the development of NIDDM. Weight loss alone can correct all of these abnormalities and either significantly improve diabetes or totally resolve it

Smoked or Cured Meats – Streptozotocin is a compound that is used to induce diabetes in studies with animals. It works by destroying the beta cells. It is similar in structure and function to the N-nitroso-compounds (nitrites, nitrates) found in smoked and/or cured meats. In fact, a diet high in bacon, ham, smoked salmon and similar products has been linked to IDDM (insulin dependent). Many other chemicals in foods and the environment have also been implicated in beta-cell damage.

Insulin Insensitivity – The typical patient with NIDDM has high levels of insulin in the bloodstream. There is plenty of insulin, but it is just not performing its function because cells have become unresponsive. While healthy individuals secrete approximately 31 units of insulin daily, the obese Type II diabetic secretes an average of 114 units daily. This amount is nearly 4X the normal amount. Measures to restore insulin sensitivity such as dietary changes and or weight loss usually relieve NIDDM

Dietary Fat – Saturated fats have been shown to be associated with NIDDM as well as to predict the conversion from impaired glucose tolerance to NIDDM. Partially hydrogenated fats are particularly harmful. Omega 3 fatty acids such as found in cold water fish may help restore membrane permeability of the cell wall.

Refined Sugars and Refined Carbohydrates

It is widely accepted that refined carbohydrates are among the most important contributing factors to diabetes and reactive hypoglycemia (as well as obesity). Refined sugars are quickly absorbed into the bloodstream, causing a rapid rise in blood sugar. The body's response is to greatly increase the secretion of insulin by the pancreas. The excessive secretion of insulin drives the blood sugar down and often causes the symptoms of hypoglycemia to appear. In response to the rapid fall in blood glucose levels, the adrenal glands secrete epinephrine (adrenaline), which causes a rapid increase in the blood glucose level. In time the adrenal glands become exhausted by the repeated stress and cannot mount an appropriate response. If blood sugar control mechanisms are further stressed, the body will eventually become insensitive to insulin or the pancreas will become exhausted, and hypoglycemia will turn into diabetes.

Glycosylated hemoglobin (HgbA-1) – Often proteins that have glucose molecules attached to them (glycosylated peptides) are elevated several fold in diabetics. Since the average life span of a red blood cell is 120 days, the **HgbA-1** measurement represents the average values for blood glucose over the preceding 2 to 4 months. This is an important and useful test for diabetic control. Measurement – every 3 months for poorly controlled diabetics and annually in well-controlled cases is a prudent idea.

Diabetes; Preventing Complications:

Even tight control of blood sugar levels does not completely eliminate the risk of organ damage that can result from diabetes. Other biochemical changes occur in diabetes that are only partly related to blood-glucose levels. Addressing these abnormalities may greatly increase the likelihood that a diabetic will live a normal life.

Often diabetics can have digestive problems also and doing a test for hydrochloric acid and pancreatic enzyme tests can be helpful.

In diabetes there is a gradual thickening of the substance surrounding the smallest blood cells, called the “basement membrane”. As it thickens, it's harder and harder for nutrients to move from the bloodstream into the cells, and for waste products and metabolites to move from cells back into the bloodstream. This is particularly a problem in diabetic nephropathy-diabetic kidney disease. Bilberry flavanoids have the ability to protect against this. Also 1,000mg of Vit C – 3X a day.

Atherosclerosis – The diabetic has a 2 – 3X risk of dying prematurely of arteriosclerosis than a nondiabetic individual. To help with cardiovascular problems. Use anti-platelet aggregators –Fish Oil or Flax Oil, GLA along with vit E & C, garlic and ginkgo biloba are good also. GLA 120mg a day from Black Currant, or Borage or Evening Primrose Oil. GLA can help prevent. The amino acid Taurine – helps prevent retinal and heart problems and likely to help with gallbladder function.

Sorbitol Damages Cells – Sorbitol is produced through the action of the enzyme aldose reductase it is a byproduct of glucose metabolism. Sorbitol accumulates in certain tissues of the diabetic – when glucose levels become elevated inside the cells, sorbitol is produced faster than it can be broken down. Since it

cannot cross the cell membrane, it builds up inside the cells. This accumulated sorbitol draws water in by the process known as osmosis. Sorbitol-induced osmotic swelling is believed to be one of the main causes of tissue damage in diabetics. Elevations of sorbitol levels are a major problem in the lens of the eye, the nerve cell of the peripheral nerve, the pancreas, and the cells of the retinal blood vessels. In another study treating diabetics with 2,000 mg of Vit C reduced the average sorbitol concentration in red blood cells by 45%. It should be noted that Diabetics have a higher than normal requirement for Vit C. because glucose competes with the vitamin for entry into the cells.

Glycosylation: The “Browning” Reaction –

Glycosylation is the other reaction that is thought to cause organ damage in diabetics. The sugar molecule binds irreversibly to a protein molecule – cross linking (tanning of one’s inner hide). One example, glycosylated cholesterol carrying LDL molecules (found in high levels in diabetics) do not bind to LDL-receptors or shut off the liver’s manufacture of cholesterol so the liver continues to manufacture more cholesterol. Excessive glycosylation has many adverse effects: inactivation of enzymes, inhibition of regulatory molecule binding, and disruption of many cell functions. This process takes place in all humans but it takes place at a faster rate in people who have elevated blood-sugar levels. Vitamins B6, E & C are all capable of inhibiting glycosylation. The effective dose of B6 is 50mg 3X a day. Vit E at 600iu to 1,200iu’s a day. Vit C at 1,000mg a day. B6 also helps break down homocysteine levels in the blood stream.

Flavonoids – Bilberry in particular – in one study, the tissue abnormalities seen in diabetics were largely reversed by treatment with an extract of bilberry. Bilberry extract given to diabetics with eye disease also reduced the tendency of their retinal tissue to bleed.

Cataracts – Extra vitamin C can slow the progression of cataracts - also use natural mixed carotenes including lutein. Taurine 500-1000mg a day and Curcumin 500mg 3x a day, B-2, selenium, E and zinc all help in cataract prevention. Please add some Bilberry 80mg 2X a day (standardized to 25% anthocyanosides).

Diabetic Neuropathy – Diabetic neuropathies are among the most frequent complications of long-term diabetes. Loss of peripheral nerve function, tingling sensations, numbness, loss of function, pain and muscle weakness may occur as a result of diabetic neuropathies. There is substantial evidence that diabetic neuropathy is also due to sorbitol accumulation. GLA from primrose oil at 240mg a day or black currant oil. B6 – 50 mg 3x a day, B-12 – 1,000mcgs in the sublingual form (methylcobalamin), & biotin 5 mg a day. Alpha Lipoic Acid 300mg. 2x a day was judged the best dose improving patients symptoms - 25% better than placebo.

Retinopathy – Is a serious eye disease that can result in blindness. Diabetic retinopathy is still the leading cause of blindness in the US. Diabetics are often deficient in magnesium and the deficiency is most severe in those with retinopathy and microangiopathy (a disease of the small blood vessels in the back of the eye). Taurine may also help prevent the decline in visual function that is associated with diabetes. 500mg 3x a day. Use methylcobalamin B-12 - 1,000mcgs daily. Bilberry extracts – standardized berry divided into doses of 80-160mg 3x a day. Rutin & Butchers Broom are also helpful supplements.

Nephropathy (Kidney Disease) – Is a common complication and a leading cause of death in diabetes. Good glucose control goes a long way in reducing the risk of diabetic nephropathy.

Diabetic Foot Ulcers – Lack of blood supply and peripheral neuropathy are the key factors in the development of diabetic foot ulcers. The incidence of gangrene of the feet in diabetes is much higher than normal individuals; supplements that support neuropathy and circulation are the best nutritional approaches to preventing problems.

Dietary factors are important depending on the individuals insulin response either

- 1) A) High Fiber – high complex carbohydrate diet or B) Atkins style – high protein low carbohydrate diet.(The book Sugar Busters has a very good program incorporating 100% whole grains but limiting the glycemic response). Consider a modified (Paleolithic) “caveman diet” places an emphasis on fresh fruits and vegetables more raw than cooked with fresh meat and fish

and a low emphasis on grains, beans and dairy products. Paleocarbs, mainly fruits and vegetables not neocarbs, grain and legume based, refined carbohydrates. Today in America we eat less than 1/3 of our carbohydrates come from these foods. The ubiquitous foods – foods that we eat continuously - are wheat, corn, dairy products and soybeans. Food allergies, autoimmune diseases and a lack of variation nutritionally can be caused by an over consumption of these foods. Gluten intolerance can create major health problems caused by eating gluten-containing grains – wheat, oats, rye, and barley.

- 3) Avoiding refined sugars and caffeine
- 4) Blood Pressure can be controlled through to a large extent by consuming more foods that contain complex carbohydrates and fiber, such as 100% whole grains, fruits, vegetables, legumes, nuts and seeds. Legumes (beans) are especially important for diabetics. Studies have shown that ingesting a bean dish helps prevent the blood-sugar elevations not only at that meal, but at the following meal as well. Dr. Gaby has his patients eat beans at breakfast (British way of doing things) and supper. Not everyone responds to the carbohydrates – some do better on the Atkins style program. Sometimes the best test is trial and error.

Diet for Diabetes

The importance of dietary fiber – Population studies, as well as clinical and experimental research, show diabetes to be one of the diseases most clearly related to inadequate dietary fiber intake. The intake of complex carbohydrate sources that are rich in fiber should be increased. The type of fiber that exerts the most beneficial effects on blood sugar control are the water-soluble forms. Include in this class are hemicelluloses, mucilage, gums. And pectin substances. These types of fiber are capable of: slowing down the digestion and absorption of carbohydrates, thereby preventing rapid rises in blood sugar, increasing the sensitivity of tissues to insulin, thereby preventing the excessive secretion of insulin; and improving uptake of glucose by the liver and other tissues, thereby preventing a sustained elevation of blood sugar level. Particularly good sources of water-soluble fiber are legumes (beans), oat bran, nuts, seeds, psyllium seed husks, pears, apples, and most vegetables. The optimal diet for diabetics includes a large amount of plant foods to ensure adequate levels of dietary fiber. A daily intake of 50 grams is a reasonable goal. Frequent consumption of legumes is particularly important since a high-carbohydrate, legume-rich, high-fiber diet has been shown to improve all aspects of diabetic control.

Glycemic Index of foods –

www.rickmendoza.com or go to google and type in Glycemic Index Lists

The glycemic index list can be somewhat useful to give you a general guide to how fast foods release sugar into the blood stream. It must be kept into perspective fresh fruits and vegetables are about 90% water, they produce a very dilute amount of pure carbohydrate compared to dried beans, flour, and sugar – if you want to get 25 grams of carbohydrate from carrots you would have to eat 1.5 lbs of them.

Sweeteners

LoHan Kuo, an extract of a Chinese herb is non-glycemic and 200X as sweet as sugar and has no calories.

Stevia is a non-caloric, non-glycemic and available in loose powder, or liquid form.

Glycine – The simplest amino acid has a flavor just like a high quality sugar but it's a protein.

Agave – Sweetener made from the “tequila cactus” naturally high in fructose has a low number on the glycemic index and a wonderful flavor like honey.

Exercise and Weight Loss

Maintaining ideal body weight - in many cases 20 – 50 lbs is all the weight it takes to lose to significantly improve diabetes. Especially in overweight people over 40 years old. Obesity interferes with normal glucose metabolism and decreases insulin sensitivity. The insulin receptors on the cells that store fat don't seem to work as well when the cells are “stuffed” with storage fat. Chronically elevated levels of insulin can make fat loss more difficult and may increase appetite. People with diabetes are often very sedentary, rarely if ever exercising strenuously. Skeletal muscles are by far the biggest users of glucose in the body. The more muscles you have the more you use them the lower the risk of developing diabetes.

Exercising regularly – Include weight bearing exercises (weight lifting)

- 1- increases the metabolic rate, and with his increase, insulin receptors on the muscle cells are activated. Glucose uptake is greatly enhanced over sedentary levels.
- 2- With regular exercise training the body uses insulin more efficiently.
- 3- Regular exercise can increase insulin binding and insulin receptor number, thus improving the uptake of glucose.
- 4- Helps us lose body fat, and helps prevent us from gaining it back. Strength training can significantly increase the lean to fat body mass ratio.
- 5- Can lower total and LDL cholesterol levels, decrease blood pressure, and improve circulation, all of which help reverse or control diabetes and diabetic complications.

Alternate weightlifting with moderate aerobic exercise if you can, but if you have to choose only one, or limit exercise due to time or health constraints, a few hours a week spent lifting weights are far better than a few hours spent on aerobics in terms of body fat loss. A study in Colorado found that running elevates the metabolism and burns body fat for 1 hour after exercise, but weightlifting elevates the metabolism for 15 hours after exercise. The latest research shows that weight training is the single most important thing that the elderly can do to prevent loss of balance, coordination, strength, and mobility. **Super Slow training** – a single set, usually 10 seconds positive motion (lifting weights up) and 10 seconds negative motion (lowering the weights down) – The training pushes muscles beyond failure, which results in large strength and lean body mass gains for little investment in time.

Nutritional Supplements:

Patients who are taking medication for diabetes should never make dietary changes or take nutritional supplements without medical supervision. If the diet and supplements work - the dosage of medications could change. In addition, the kidneys of individuals with advanced diabetes may be too weak to process the large amount of potassium that is contained in a high-complex carbohydrate diet. Potassium on rare occasions can build up to very high levels.

Vitamin C – A primary function of vitamin C is the manufacture of collagen, the main protein substance in the human body. Collagen is an important protein in connective tissue; vitamin C is vital for wound repair, healthy gums, and the prevention of excessive bruising. Vitamin C is critical to immune function, the manufacture of certain nerve-transmitting substances and hormones, and the absorption and utilization of other nutritional factors.

Since the transport of vitamin C into the cells is facilitated by insulin, many diabetics do not have enough intracellular vitamin C. Therefore; a relative vitamin C deficiency exists in many diabetics despite adequate dietary consumption. Vitamin C at high doses (2,000 mg per day) has been shown to reduce the accumulation of sorbitol in the red blood cells of diabetics and to inhibit the glycosylation of proteins. Supplementation with a minimum of 2 grams of vitamin C daily in diabetics appears warranted due to its other important effects. Good dietary sources of vitamin C are broccoli, peppers, potatoes, Brussels sprouts, and citrus fruits.

Note: If you have renal complications from diabetes or related kidney dysfunction, consult your physician before supplementing more than 1,000mg of C - 3X a day.

Niacin – Like chromium, niacin is an essential component of the glucose tolerance factor, making it a key nutrient for treating hypoglycemia and diabetes. It appears that a small amount of niacin (such as 20 to 100mg per day) should be included in any supplement program designed to regulate blood sugar. Niacin has also been used to lower elevated cholesterol levels. A safer form of niacin is inositol hexaniacinate, composed of one molecule of inositol and 6 molecules of niacin. This form completely eliminates the flush found in taking straight niacin. Inositol hexaniacinate can be used in both Type I and Type II diabetes to lower elevated blood lipid levels. In cases of elevated cholesterol levels, a dosage of 600 to 1000 mg. 3X a day is usually sufficient to produce an 18% reduction in total cholesterol, a 26% reduction in triglycerides and increase of 30% in HDL

B-6 – Vitamin B6 supplementation appears to offer significant protection against the development of diabetic nerve disease (neuropathy). Individuals with long-standing diabetes, or who are developing signs of peripheral nerve abnormalities, should definitely be supplemented with B6. B6 inhibits glycosylation of proteins. Dr Alan Gaby MD recommends 50mg. 3x a day.

B-12 – Supplementation has been used with some success in treating diabetic neuropathy. It is not clear if this is due to the correcting of a deficiency state or to the normalization of the deranged vitamin B12 metabolism seen in diabetics. Oral

Supplementation of 1,000mcgs sublingual (methylcobalamin) daily.

Biotin – Supplementation has been shown to enhance insulin sensitivity and increase the activity of glucokinase, the enzyme responsible for the first step in the utilization of glucose by the liver. Glucokinase concentrations in diabetics are very low. In a study of 18 diabetics who were given 9mg of biotin for a month average blood-glucose level fell 45% in the group.

Vitamin E – Diabetics appear to have an increased requirement for vitamin E. High doses of vitamin E (800 to 1,200 IU) not only improves the action of insulin, but also exerts a number of beneficial effects that may aid in preventing the long-term complications of diabetes. Oral vit E supplements may reduce oxidative stress, thus improving cell membrane physical characteristics and related activities in glucose transport. Vit E also appears to play a significant role in the prevention of diabetes - a low vitamin-E concentration in the blood was associated with a 3.9X greater risk of developing diabetes.

Chromium – Chromium is one of the most important nutrients for the type 2 diabetes. Chromium helps to restore the cell-membrane response to insulin. It serves as a critical component to the GTF (glucose tolerance factor) and functions as a cofactor in all insulin-regulating activities. Supplementing the diet with chromium has been shown to significantly improve insulin's efficiency, decreasing fasting glucose, cholesterol and triglyceride levels and increasing HDL-cholesterol. One dietary study showed that 90% of American Diets contained less than the minimum daily intake for chromium. The typical western diet is dominated by refined sugar, which some researchers suggest depletes the body's chromium stores. Good food sources are eggs and whole grains. And Brewer's Yeast – Lewis Labs imported yeast is the richest food source of chromium. Dr Wright and Gaby prefer the picolinate form, which is the best-studied form. The optimum intake varies from person to person. For most individuals 200 to 500 mcgs per day is adequate; however, in their experience some patients appear to need 1,000mcgs per day or more. A Chinese study with 180 diabetics taken for 4 months used 500mcgs of Chromium Picolinate 2x a day lowered fasting and post-meal blood glucose and nearly normalized glycated hemoglobin (a test used to measure the extent of diabetes). Total cholesterol and insulin levels also dropped. If you are taking any medication to control your blood sugar, start with 200mcg per day for a week and monitor your glucose closely. Increase the dosage by 200mcg per week until you reach 1,000mcg and then have medication adjusted accordingly. Toxicity studies in animals have shown that chromium is remarkably safe; it has one of the lowest toxicity profiles of all the essential trace minerals. Chromium is not, however, a panacea for NIDDM.

For type 1 use the same approach. Add chromium in 100-200mcg increments per week. Monitor glucose closely, because you should experience a decrease in your insulin requirements. If you have trouble adjusting the insulin dose you take just before going to bed, do not take chromium supplements within 3 hours of retiring. Work up to the level of chromium that allows you to consistently reduce your daytime insulin and stabilize your requirements. Then work on the night dosage.

Magnesium – Magnesium deficiency is common in diabetics, and magnesium may prevent some of the complications of diabetes, such as retinopathy and heart disease. Magnesium levels are lowest in diabetics who have severe retinopathy. The RDA is between 300 – 350mg per day. The diabetic may need 2x as much. Best dietary sources are nuts, tofu, legumes, whole grains and green leafy vegetables. Diabetics should take at least 50mg of B6 with magnesium. The level of intracellular B6 appears to be intricately linked to the magnesium content of the cell. In other words, without B6 magnesium will not get inside the cell.

Manganese – Is a cofactor in many enzyme systems involved in blood sugar control, energy metabolism and thyroid hormone function. Diabetics have been shown to have only _ the manganese of normal individuals. A good daily dose of manganese for a diabetic is 30mg.

Zinc – Is involved in virtually all aspects of insulin metabolism: synthesis, secretion, and utilization. Zinc also has a protective effect against beta-cell destruction. Diabetics typically excrete excessive amounts of zinc in the urine and therefore require supplementation, which has been shown to improve insulin levels in

both Type 1 and Type 2 diabetes. In addition, zinc helps improve the poor wound healing observed in diabetics. The recommended level of supplementation for diabetics is at least 30 mg. of zinc per day.

Quercetin and Flavonoids – Quercetin promotes insulin secretion and is a potent inhibitor of sorbitol accumulation. Flavonoids such as found in eating berries (especially blueberries) help increase intracellular vitamin C levels and decrease in the leakiness and breakage of small blood vessels and prevent easy bruising.

Essential Fatty Acids - Both omega-6 and omega-3 fatty acids have shown benefit in treating various aspects of diabetes. GLA (gamma-linolenic acid) has been shown to offer significant protection against the development of diabetic neuropathy, while the omega-3 oils offer significant protection against hardening of the arteries and enhance insulin secretion in NIDDM. Diabetes is associated with a substantial disturbance in essential fatty acid metabolism. One of the key disturbances is the impairment in the process of converting linoleic acid to GLA. In a study with 111 patients with mild diabetic neuropathy taking 480mg of GLA per day – 16 parameters were assessed, after 1 year all 16 parameters improved 13 of them to a statistical degree.

Fish consumption of about 1oz a day was associated with a significantly lower incidence of glucose intolerance. In addition the mortality was lower in fish consumers 20.6/1000 vs. 31.2/1000 person years. This amount works out to roughly 2 – 3 _ oz servings per week.

Vitamin D - especially in the elderly may affect blood sugar levels – lack of D has been linked to glucose intolerance in the elderly.

Carnitine – supplementation has resulted in significantly decreased total serum lipid and increased HDL cholesterol levels in diabetic patients. L-Carnitine helps insulin work better, and helps control the hyperinsulinemia often symptomatic of Type 2, it also helps the body oxidize stored fat and improves overall lipid metabolism. Diabetics appear to have a greater need for L-Carnitine, yet excrete it at a greater rate than nondiabetic persons.

CoQ10 and Diabetes – Alan Gaby MD

39 Diabetics received 120mg and day of CoQ7 for 2 – 18 weeks. Fasting blood sugar levels fell by at least 30% in 31% of the patients (12 patients) and the concentration of ketone bodies declined by at least 30% in 59% of the patients (22 Patients) tldp 7/99

ALA alpha lipoic acid is widely accepted in Germany as a treatment for diabetic peripheral neuropathy. However most of the evidence of its effectiveness for this condition is limited to studies that used IV form of lipoic acid. A randomized, double blind, placebo controlled study of 503 individuals suffering from diabetic neuropathy found that IV ALA reduced symptoms over a 3 week period, but long-term oral supplementation was not effective. Another German study followed 73 diabetics who had symptoms of cardiac autonomic neuropathy for 4 months. Treatment with 800 mg a day of oral ALA showed significant improvement compared to placebo. Combining ALA with GLA may have a synergistic effect.

Keep Iron out of supplements – a small proportion of diabetics have a genetic disorder that causes them to accumulate iron in their tissues. Since Iron overload can aggravate or even cause diabetes, diabetics should have their iron status checked. Use an iron free multi-vit if possible. Unless this genetic disorder has been ruled out.

Botanical Medicines

Onions and Garlic – have demonstrated blood-sugar-lowering action in several studies. The active principles are believed to be sulfur containing compounds APDS although other constituents such as flavonoids may play a role as well. Clinical evidence suggests that APDS lowers glucose levels by competing with insulin for insulin-inactivating sites in the liver. This results in an increase of free insulin. A diet with 1 to 7 oz of onion was shown to reduce blood sugar levels in a dose dependent manner – the higher the intake of onion extract, the lower the level of glucose during oral or intravenous glucose tolerance tests. The cardiovascular effect of garlic and onions also substantiates the value of liberal intake of garlic and onions by the diabetic patient.

Bitter Melon – contains an insulin-like polypeptide - polypeptide-P. Oral administration of bitter melon preparations has shown good results in clinical trials in patients with Type 2 Diabetes.

Fenugreek Seeds – have demonstrated significant anti-diabetic effects in experimental and clinical studies. In NIDDM supplementation with 15 grams of powdered fenugreek seed soaked in water significantly reduced after meal glucose levels during the meal tolerance test.

Ginkgo biloba – GBE (ginkgo biloba extract) has been shown to improve the blood flow to peripheral tissues in the arms, legs, fingers and toes. This is an important effect, as peripheral vascular insufficiency is common in diabetics. Ginkgo extract has also been shown to prevent diabetic retinopathy in diabetic rats, suggesting that it may have a protective effect in human diabetics.

Gymnema Sylvestre – A study with experimental animals made diabetic by administering a pancreas-damaging chemical, treatment with *Gymnema sylvestre* promoted repair and regeneration of the insulin-producing cells of the pancreas. Type 1 given an extract of this herb for 6 to 8 months experienced, on average experienced a 23% reduction in fasting blood glucose and a 25% decrease in insulin requirement. Type 2 given the same extract for 18 to 20 months also showed a significant reduction in blood-sugar levels, 5 of 22 patients were able to discontinue their blood sugar lowering medication and all the others (except one) were able to reduce the dosage. Not all practitioners have had these same results. A clinical trial recently conducted in the US further support for the use of this herb in the management of type 1 and type 2 diabetes. Of 65 patients tested over the 90 day trial *Gymnema* tablets reduced mean fasting glucose levels by 11%. Improved glucose control with *Gymnema* enabled 16% of the participants to decrease their prescription medication usage. The tablets used in the trial contained 400mg of *Gymnema* extract standardized to 25% gymnemic acids. The dose was 2 tablets a day. (Equivalent to 4 g of leaf). This latest study confirms previous studies. (Note: there still hasn't been a placebo controlled study done on *Gymnema*) – all the previous studies have been done comparing the persons taking insulin.

Cinnamon, cloves – Cinnamon contains a phytochemical called chalcone polymers that increase glucose metabolism in the cells 20x or more. To make a cinnamon tea use 3 rounded Tbs. of ground cinnamon and 1/2 teaspoon of baking soda in a 1 Qt jar. Fill the jar with boiling water and let steep at room temperature until cool – strain the liquid and refrigerate. Drink 1 cup – 4x a day after 1-3 weeks drop to 1-2 cups a day. Add cinnamon to your diet in cooking and adding to things like yogurt, coffee, put on fresh fruit.

Glucosol is an herbal formulation is made with *Lagerstroemia speciosa* L, a raw material that serves as a glucose transport stimulator – it has high levels of the active ingredient, colosolic acid that exerts a hypoglycemic effect. This acid activates glucose transport from blood to tissues, resulting in lower blood sugar level. 2 previous independent studies in which glucosol decreased blood glucose and average of 16% in 30 days treatment of type 2 diabetics. Glucosol significantly improved glucose transport from the blood into cells after a 650-calorie meal compared to a control study. . Type 2 patients experienced improved blood glucose regulation with 48 mg of glucosol per day.

Nopal (Prickly Pear Cactus) – to use nopal purchase the fresh cactus from a grocery with a Latin American produce section and eat a cup cooked or raw every day. In Mexico it has been found to lower fasting glucose 22-25% 3 hours after eating it.

Websites of interest:

Diabetes Education Program www.ndep.nih.gov

National Diabetes info clearinghouse www.niddk.nih.gov

NIH – National center for complementary and alternative medicine. www.nccam.nih.gov

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Townsend Letter for Doctors and Patients

Issues between 1999 & 2003

