Diabetes

Information on diabetes is found in three parts:

Part 1: Introduction

Part 2: Dietary and Lifestyle Changes

Part 3: Dietary Supplements and Herbs

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**Nutritional supplements that may be helpful:** People with low blood levels of vitamin E are more likely to develop NIDDM.1 Double blind studies show that vitamin E improves glucose tolerance in people with NIDDM in most,2 3 4 but not all studies.5 Vitamin E has also improved glucose tolerance in elderly non-diabetics.6 7 Three months or more of supplementation may be required for benefits to become apparent.

The most common amount used is 900 IU of vitamin E per day. In one of the few trials to not find vitamin E helpful with glucose intolerance in people with NIDDM, damage to nerves caused by the diabetes was nonetheless partially reversed by supplementing with vitamin E for six months.8
Vitamin E prevents blood from clotting too fast and has other actions that protect diabetics’ blood vessels from damage. Vitamin E has protected animals from diabetic cataracts.

Higher blood levels of vitamin E—a reflection of dietary intake—have been associated with a dramatically reduced risk of being diagnosed with IDDM. The possibility that vitamin E supplementation might be protective has not yet been directly explored by researchers. The way vitamin E is thought to protect against IDDM (by reducing oxidative damage in the pancreas) appears unrelated to the possible protective roles vitamin E appears to play in NIDDM.

Glycosylation is an important index of diabetes. It refers to how much sugar attaches abnormally to proteins. Vitamin E reduces this problem in some, although not all studies.

People with IDDM appear to have low vitamin C levels. As with vitamin E, vitamin C may reduce glycosylation. Vitamin C also lowers sorbitol in diabetics; sorbitol is a sugar that can accumulate and damage the eyes, nerves, and kidneys of diabetics. Vitamin C may improve glucose tolerance in NIDDM, although not every study confirms this benefit. Many doctors of natural medicine suggest that diabetics supplement with 1–3 grams per day of vitamin C.

One study compared antioxidant supplement intake, including both vitamins E and C, with diabetic retinopathy
(damage to the eyes caused by diabetes).22 Surprisingly, several correlations were found between extensive retinopathy and greater likelihood of taking vitamin C and vitamin E supplements. The outcome of this trail, however, does not fit with most other published data and might simply reflect the fact that sicker people are more likely to take supplements in hopes of getting better. For the present, most nutritionally oriented doctors remain relatively unconcerned about the unexpected outcome of this isolated report.

Many diabetics have low blood levels of vitamin B6.23 24 Levels are even lower in diabetics with nerve damage.25 Vitamin B6 supplements improve glucose tolerance in women with diabetes caused by pregnancy.26 27 Vitamin B6 is also effective for glucose intolerance induced by the birth control pill.28 For other people with diabetes, 1,800 mg per day of a special form of vitamin B6—pyridoxine alpha-ketoglutarate—has improved glucose tolerance dramatically in some research.29 Standard vitamin B6 has helped in some,30 but not all studies.31

Vitamin B12 is needed for normal functioning of nerve cells. Vitamin B12 taken orally, intravenously, or by injection has reduced nerve damage caused by diabetes in most people studied.32 Oral vitamin B12 up to 500 mcg three times per day has been used.

Biotin is a B vitamin needed to process glucose. When people with IDDM were given 16 mg of biotin per day for one week, their fasting glucose levels dropped by 50%.33
Similar results have been reported using 9 mg per day for two months in people with NIDDM. Biotin may also reduce pain from diabetic nerve damage. Some doctors of natural medicine try 16 mg of biotin for a few weeks to see if blood sugar levels will fall.

High levels—several grams per day—of niacin, a form of vitamin B3, impair glucose tolerance and should not be taken by people with diabetes. Smaller amounts (500–750 mg per day for one month followed by 250 mg per day) may help some people with NIDDM, though this research remains preliminary.

Preliminary studies have suggested that niacinamide, the other form of vitamin B3, might be useful in the very early stages of IDDM, though most research does not support this claim. Some research suggests that healthy children at high risk for IDDM may be protected by supplementing niacinamide. Parents of children with IDDM may discuss the possibility of protecting their other children through niacinamide supplementation with a nutritionally oriented doctor.

Years ago, blood levels of vitamin B1 were reported to be low in people with IDDM. Long before that, a trial using 10 mg of vitamin B1 per day for four weeks reported reduced blood sugar levels in six of eleven diabetics. Recently, supplementation with both vitamins B1 (25 mg per day) and B6 (50 mg per day) to a group of people with diabetic neuropathy led to significant improvement in only four weeks. However, this was a study conducted in a
vitamin B1-deficient third world country. Therefore, these improvements might not occur in other diabetics. A recent German study also found that combining vitamin B1 (in a special fat soluble form) and vitamin B6 plus vitamin B12 in high but variable amounts led to improvement in some aspects of diabetic neuropathy in twelve weeks. As a result, some doctors of natural medicine recommend that people with diabetic neuropathies supplement vitamin B1, though the optimal level of intake remains unknown.

Vitamin D is needed for adequate blood levels of insulin. Vitamin D receptors have been found in the pancreas where insulin is made and preliminary evidence suggests that supplementation can increase insulin secretion for some people with NIDDM; prolonged supplementation might also help reduce blood sugar levels. Not enough is known about optimal amounts of vitamin D for diabetics, and high levels of vitamin D can be toxic. Therefore, people with diabetes considering vitamin D supplementation should talk with and have vitamin D status assessed by a nutritionally oriented doctor.

Animal studies show that chromium improves glucose tolerance. Medical reports dating back to 1853 as well as modern research indicate that chromium-containing brewer’s yeast can be useful in treating diabetes. Double blind research shows that chromium supplements improve glucose tolerance in people with both NIDDM and IDDM, apparently by increasing sensitivity to insulin. Chromium improves the processing of glucose in people with prediabetic glucose intolerance and in
women with diabetes associated with pregnancy. Chromium even helps healthy people, although one such report found chromium useful only when accompanied by 100 mg of niacin. Chromium may also lower triglycerides (a risk factor in heart disease) in diabetics. The typical amount of chromium used in research trials is 200 mcg per day. Some doctors of natural medicine recommend up to 1,000 mcg per day for diabetics.

Diabetes patients tend to have low magnesium levels. Double blind research indicates that supplementing with magnesium overcomes this problem. Magnesium has led to improved insulin production in elderly people with NIDDM. Elders without diabetes can also produce more insulin as a result of magnesium supplements, according to some, but not all studies. Insulin requirements are lower in people with IDDM who supplement with magnesium in some trials. However, in people with adult-onset diabetes who nonetheless do require insulin, Dutch researchers have reported no improvement in blood sugar levels.

Diabetes-induced damage to the eyes is more likely to occur to magnesium-deficient people with IDDM. In magnesium-deficient pregnant women with IDDM, the lack of magnesium may even account for the high rate of spontaneous abortion and birth defects associated with IDDM.

The American Diabetes Association admits “strong associations...between magnesium deficiency and insulin...
resistance” but will not say magnesium deficiency is a risk factor. Many doctors of natural medicine, however, recommend that diabetics with normal kidney function supplement with 300–400 mg of magnesium per day.

People with IDDM tend to be zinc deficient, which may impair immune function. Zinc supplements have lowered blood sugar levels in people with IDDM, though some evidence indicates that zinc supplementation in people with NIDDM does not improve their ability to process sugar. Nonetheless, people with NIDDM also have low zinc levels, caused by excess loss of zinc in their urine. Many doctors of natural medicine recommend that people with NIDDM supplement with moderate amounts of zinc (15–25 mg per day) as a way to correct for the deficit.

Some doctors are concerned about having people with IDDM supplement with zinc because of a report that zinc supplementation increased glycosylation, generally a sign of deterioration of the condition. This study is hard to evaluate because zinc increases the life of blood cells and such an effect artificially increases the lab test results for glycosylation. Until this issue is resolved, those with IDDM should consult a nutritionally oriented doctor before considering supplementation with zinc.

People with diabetes cannot adequately process carbohydrates. Coenzyme Q10 (CoQ10) is needed for normal carbohydrate metabolism. Animals with diabetes have been reported to be CoQ10 deficient. In one trial, blood sugar levels fell substantially in 31% of people with
diabetes after they supplemented with 120 mg of coenzyme Q per day.78 In people with IDDM, however, supplementation with 100 mg of coenzyme Q10 per day for three months did not improve glucose control nor reduce the need for insulin.79 Currently, suggesting that diabetics supplement with CoQ10 appears premature.

Inositol is needed for normal nerve function. Diabetes can cause nerve damage, or diabetic neuropathy. Some of these abnormalities have been reversed by inositol supplementation in preliminary research (500 mg taken twice per day).80

Alpha-lipoic acid is a powerful natural antioxidant. It has been used to improve diabetic neuropathies (at an intake of 600 mg per day) and has reduced pain in several studies.81

Carnitine is a substance needed for the body to properly use fat for energy. When diabetics were given carnitine (1 mg per 2.2 pounds of body weight), high blood levels of fats—both cholesterol and triglycerides—dropped 25–39% in just ten days in one trial.82 In higher amounts (1 gram per day by injection), carnitine has been reported to reduce pain from diabetic nerve damage as well.83

Taurine is an amino acid found in protein-rich food. People with IDDM have been reported to have low taurine levels, which leads to “thickened” blood—a condition that increases the risk of heart disease. Supplementing taurine (1.5 grams per day) has restored taurine levels to normal
and corrected the problem of blood viscosity within three months.84

Glucose tolerance improves in healthy people taking omega-3 fish oil supplements.85 Some studies find that omega-3 fish oil improves glucose tolerance,86 87 high triglycerides,88 and cholesterol levels in diabetics.89 However, others report that cholesterol increases90 and diabetes worsens with fish oil supplements.91 92 93

Until this issue is resolved, diabetics should feel free to increase their fish intake, but they should consult a nutritionally oriented doctor before taking omega-3 fish oil supplements. Sometimes, such supplementation may be considered. In one trial, people with diabetic neuropathy and diabetic nephropathy (kidney damage) experienced significant improvement when given 600 mg three times per day of purified EPA—one of the two major omega-3 fatty acids found in fish oil supplements—for forty-eight weeks.94

Supplementing with 4 grams of evening primrose oil per day for six months has been found to reverse the cause of diabetic nerve damage and improve this painful condition. In double blind research, 6 grams per day helped reduce nerve damage in people with both IDDM and NIDDM.95

Nutritionally oriented doctors have suggested that quercetin might help people with diabetes because of its ability to reduce levels of sorbitol—a sugar that accumulates in nerve cells, kidney cells, and cells within the eyes of diabetics
and has been linked to damage to those organs. Human trials have yet to explore whether quercetin actually protects people with diabetes from neuropathy, nephropathy, or retinopathy.

Vanadyl sulfate, a form of vanadium, may improve glucose control in individuals with NIDDM, though it may not help people with IDDM. The long-term safety of the large amounts of vanadium needed to help people with NIDDM (typically 100 mg per day) remains unknown. Many doctors of natural medicine expect that amounts this high may prove to be unsafe.

**Are there any side effects or interactions?** Refer to the individual supplement for information about any side effects or interactions.

**Herbs that may be helpful:** Gymnema may assist the pancreas in the production of insulin in people with NIDDM. Gymnema also improves the ability of insulin to lower blood sugar in people with both IDDM and NIDDM. So far no double blind studies have confirmed the benefit of gymnema for people with any type of diabetes. One uncontrolled study found that 400 mg daily of a gymnema extract could reduce or eliminate the need for oral blood sugar-lowering drugs in some people with NIDDM. Another uncontrolled study suggested the same amount of the extract could allow for use of less insulin in people with IDDM. Gymnema is not a substitute for insulin.
Asian ginseng is commonly used in traditional Chinese medicine to treat diabetes. It has been shown to enhance the release of insulin from the pancreas and to increase the number of insulin receptors. It also has a direct blood sugar-lowering effect. A recent double blind study found that 200 mg of ginseng extract per day improved blood sugar control, as well as energy levels in NIDDM.

Bilberry may lower the risk of some diabetic complications, such as diabetic cataracts and retinopathy. One uncontrolled study found that a standardized extract of bilberry could improve signs of retinal damage in some people with diabetic retinopathy. Ginkgo biloba extract may prove useful for prevention and treatment of early-stage diabetic neuropathy though research is at best very preliminary in this area. Other herbs that may help are fenugreek seeds (discussed as a source of fiber in Part 2: Dietary and Lifestyle Changes) and eleuthero (Siberian ginseng).

Two single blind studies have found that aloe vera juice helps lower blood sugar levels in people with NIDDM. One study found that 1 tablespoon twice daily notably improved the efficacy of the oral blood sugar-lowering drug glibenclamide. The other study found that the juice by itself was effective.

Preliminary studies have found that the whole, fried slices, water extracts, and juice of bitter melon may improve blood sugar control in people with NIDDM.
Double blind studies are needed to confirm this potential benefit.

Topical application of creams containing capsaicin (the main active compound in cayenne) can help relieve symptoms of diabetic neuropathy according to double blind studies. Four or more applications per day may be required to relieve severe pain.

Are there any side effects or interactions? Refer to the individual herb for information about any side effects or interactions.

Checklist for Diabetes
Ranking
  Nutritional Supplements
  Herbs
Primary
  Alpha-lipoic acid

Brewer’s yeast

Chromium

Evening primrose oil

Fiber

Magnesium
Vitamin E
Asian ginseng

Cayenne (topical for neuropathy)

Fenugreek (seeds)

Psyllium
**Secondary**
   Biotin

Carnitine

Coenzyme Q10

Thiamine

Vitamin B6 (gestational diabetes only)

Vitamin C
   Aloe vera

Bilberry

Bitter melon

Gymnema
**Other**
   Fish oil (EPA/DHA)

Inositol
Quercetin

Taurine

Vanadium (for NIDDM)

Vitamin B3 (niacinamide)

Vitamin B12

Vitamin D

Eleuthero

Ginkgo biloba

Within *The Natural Pharmacy: Complete Home Reference to Natural Medicine*, information about the effects of a particular supplement or herb on a particular condition has been qualified in terms of the methodology or source of supporting data (for example: clinical, double blind, meta-analysis, or traditional use). For the convenience of the reader, the information in the table listing the supplements for particular conditions is also categorized. The criteria for the categorizations are: “Primary” indicates there are reliable and relatively consistent scientific data showing a health benefit. “Secondary” indicates there are conflicting, insufficient, or only preliminary studies suggesting a health benefit or that the health benefit is minimal. “Other” indicates that an herb is primarily supported by traditional use or that the herb or supplement has little scientific support and/or minimal proven health benefit.

References:


