

Clinical Management Series



Natural Medicines in the Clinical Management of Diabetes

Natural medicines and diabetes have something in common: millions of people have diabetes and millions use natural medicines. Not surprisingly, many diabetes patients are users of natural medicines. In fact, some surveys show that about 60% of patients with diabetes use some form of alternative medicine.¹⁷⁴⁶⁴ In some populations, such as southwest Native Americans, use of natural medicines and traditional foods for treating diabetes is even more common.

More often than not, diabetes patients use natural medicines IN ADDITION to their conventional medicines, not INSTEAD of their conventional medicines. This could be beneficial in some cases. But it might also lead to problems such as hypoglycemia. In some cases, conventional drug dose adjustments may be needed.

There are over 170 different natural medicines used for diabetes and thousands of commercially available dietary supplement products are marketed for people with diabetes. However, only a fraction of these products have reliable clinical evidence of effectiveness.

Many of these natural medicines affect blood sugar through a variety of mechanisms. In some cases their effects are similar to conventional medicines.

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Commonly Used Conventional and Natural Medicines for Diabetes*

Hypoglycemic Agents

- **Conventional Medicines**
 - Chlorpropamide (*Diabinese*)
 - Glimepiride (*Amaryl*)
 - Glipizide (*Glucotrol*)
 - Glyburide (*DiaBeta, Glynase, Micronase*)
 - Nateglinide (*Starlix*)
 - Repaglinide (*Prandin*)
 - Tolazamide (*Tolinase*)
 - Tolbutamide (*Orinase*)
- **Natural Medicines**
 - [Banaba](#) (*Lagerstroemia speciosa*)
 - [Bitter melon](#) (*Momordica charantia*)
 - [Fenugreek](#) (*Trigonella foenum-graecum*)
 - [Gymnema](#) (*Gymnema sylvestre*)

Insulin Sensitizers

- **Conventional Medicines**
 - Metformin (*Glucophage, Riomet*)
 - Pioglitazone (*Actos*)
 - Rosiglitazone (*Avandia*)
- **Natural Medicines**
 - [Agaricus mushroom](#) (*Agaricus blazei*)
 - [American ginseng](#) (*Panax quinquefolius*)
 - [Banaba](#) (*Lagerstroemia speciosa*)
 - [Cassia cinnamon](#) (*Cinnamomum aromaticum*)
 - [Chromium](#)
 - [Magnesium](#)
 - [Panax ginseng](#)
 - [Prickly pear cactus](#) (*Opuntia ficus-indica*)
 - [Soy](#) (*Glycine max*)
 - [Vanadium](#)

Carbohydrate Absorption Inhibitors

- **Conventional Medicines**

- Acarbose (*Precose*)
- Miglitol (*Glyset*)
- **Natural Medicines**
 - [Bean pod](#) (*Phaseolus vulgaris*)
 - [Blond psyllium](#) (*Plantago ovata*)
 - [Fenugreek](#) (*Trigonella foenum-graecum*)
 - [Glucomannan](#) (*Amorphophallus konjac*)
 - [Guar gum](#) (*Cyamopsis tetragonoloba*)
 - [Oat bran](#) (*Avena sativa*)
 - [Prickly pear cactus](#) (*Opuntia ficus-indica*)
 - [Soy](#) (*Glycine max*)
 - [White mulberry](#) (*Morus alba*)

Miscellaneous

- **Conventional Medicines**
 - Exenatide (*Byetta*)
 - Pramlintide (*Symlin*)
 - Saxagliptin (*Onglyza*)
 - Sitagliptin (*Januvia*)
- **Natural Medicines**
 - [Alpha-lipoic acid](#)
 - [Chia](#) (*Salvia hispanica*)
 - [Coenzyme Q10](#)
 - [Selenium](#)
 - [Stevia](#) (*Stevia rebaudiana*)

***Note:** Many natural products are tried for diabetes, but very few have reliable evidence that they work. Inclusion in this list does NOT imply that these products are effective for diabetes.

Hypoglycemic Agents

Hypoglycemic agents are often first choice drugs, along with lifestyle modifications, for patients with type 2 diabetes. These include the sulfonylureas...chlorpropamide (*Diabinese*), glipizide (*Glucotrol*), glyburide (*Diabeta*, *Micronase*), glimepiride (*Amaryl*), tolazamide (*Tolinase*), and tolbutamide (*Orinase*). Sulfonylureas work by stimulating beta-cells in the pancreas to produce more insulin.

The hypoglycemic agents also include nateglinide (*Starlix*) and repaglinide (*Prandin*). These drugs increase beta-cell production of insulin, but they do it slightly differently than the sulfonylureas.

These agents are just for type 2 diabetes. The hypoglycemic agents don't work for patients with type 1 diabetes, or patients with type 2 diabetes if they've lost the ability to produce insulin.

Some natural medicines have hypoglycemic effects by stimulating insulin production similar to conventional drugs. Other natural medicines have a hypoglycemic effect due to constituents that have a direct insulin-like action.

[Banaba](#) is the name for a species of crepe myrtle...those beautiful pink, purple, or lavender flowering shrubs. Extracts of the banaba leaves are very popular in the Philippines and Southeast Asia. It is now commonly used by diabetes patients in North America.

Banaba contains two important constituents and has two important effects in people with diabetes. Banaba extracts containing corosolic acid and ellagitannins seem to have an insulin-like effect and also activate insulin receptors.^{11954,11955,11957} Preliminary clinical research shows that type 2 diabetes patients who take a specific banaba extract (*Glucosol*) for 2 weeks have an average of 10% lower blood glucose levels than patients receiving placebo.¹¹⁹⁵⁴

Banaba looks promising. But the evidence is too preliminary...and there isn't much known about long-term safety. Don't recommend it until we know more.

[Bitter melon](#) looks like a light green, pointed cucumber. It is another popular Southeast Asian natural product used for diabetes. Bitter melon, like banaba, also seems to have an insulin-like effect. Bitter melon contains a polypeptide known as "p-insulin," "plant-insulin," or "polypeptide-P." It has similar pharmacokinetics to bovine insulin...onset between 30 and 60 minutes and peak effect at about 4 hours.^{37,38}

Lots of different formulations of bitter melon have been tried in people with type 2 diabetes...bitter melon juice, powder, extracts, and even

View brands containing:	
-	Banaba
-	Bitter melon

fried bitter melon. Some diabetes patients seem to have improved glucose control and decreased HbA1c after using these bitter melon formulations.^{34,35,36,38,12530} But so far, there are no high quality, reliable studies.

Like banaba, don't recommend bitter melon until there is more evidence about its safety and effectiveness.

Practice Pearl

Keep in mind that bitter melon is often a component of traditional Asian and Indian cuisine. There is a report of additive hypoglycemic effects in a diabetes patient who consumed bitter melon curry while taking chlorpropamide (*Diabinese*).⁸¹⁸¹ Advise diabetes patients to eat foods that contain bitter melon cautiously if they are taking other hypoglycemic drugs.

Fenugreek seeds are used as a spice. They taste and smell similar to maple syrup. Preliminary research shows that type 2 diabetes patients who mix 15 grams of ground, powdered fenugreek seeds with a meal have lower postprandial glucose levels compared to controls.^{10283,10284,12534} This might be due to a bulk laxative effect, slowing carbohydrate absorption from the GI tract. But fenugreek also seems to enhance insulin release due to its 4-isoleucine and other constituents.⁸¹¹²

There isn't enough evidence to know how effective eating fenugreek is long-term...or if taking dietary supplement capsules containing fenugreek has any benefit. Explain to patients that there just isn't enough reliable information to rely on fenugreek for diabetes.

Practice Pearl

Watch for patients on antiplatelet or anticoagulant drugs (e.g., aspirin, warfarin, etc) who take fenugreek. Fenugreek contains constituents that might inhibit platelet aggregation. Theoretically, combining fenugreek with these drugs might INCREASE the risk of bruising and bleeding.^{7162,7389}

Tell patients to avoid fenugreek if they are allergic to other plants in the Fabaceae family such as soybeans, peanuts, or green peas. These patients might also be allergic to fenugreek.

Gymnema is an Indian plant referred to as "gurmar" in Hindi, which means "sugar destroying." Gymnema has been tested as a hypoglycemic agent in combination with insulin in a number of preliminary studies. The results are encouraging. Preliminary research shows that taking 200 mg/day of a specific gymnema extract called GS4 seems to cut the required insulin dose in half...and lower HbA1c in both type 1 and type 2 diabetes. When GS4 400 mg is taken with conventional hypoglycemic drugs, such as glyburide or tolbutamide, some people can reduce the dose or even discontinue their conventional hypoglycemic drug.^{45,46}

The gymnema extract GS4 seems to work by increasing endogenous insulin production. Serum C-peptide increases in some people who take GS4 and insulin.⁴⁵ C-peptide is a chain of amino acids that is cleaved from the proinsulin molecule released by the pancreas to form insulin. Therefore, C-peptide is used as a marker for the release of endogenous insulin.

The specific gymnema extract GS4 looks promising and there is some evidence that it can be safely used for up to 20 months.^{45,46} But gymnema is still lacking substantial reliable evidence to back it up. Don't recommend it until there is more evidence.

Despite the lack of strong evidence for these products, many patients are already taking them.

Keep in mind that these natural medicines might INCREASE the risk of hypoglycemia because they increase insulin production, increase insulin release, or contain constituents that work like insulin. Tell diabetes patients to use these products cautiously, especially if they already take insulin or other hypoglycemic drugs.

Insulin Sensitizers ^

Diabetes is a disease of either decreased insulin secretion or

View brands containing:	
-	Fenugreek

Question #1	
Which of the following is TRUE about fenugreek?	
	a. Fenugreek capsules significantly reduce fasting blood glucose.
	b. Fenugreek should be avoided in patients allergic to peanuts.
	c. Fenugreek might DECREASE the effectiveness of warfarin.
	d. Fenugreek works due to its "p-insulin" content.

View brands containing:	
-	Gymnema

decreased insulin effect (i.e., insulin resistance), and often both. Improving the sensitivity of peripheral insulin receptors is the goal of the "glitazones," pioglitazone (*Actos*) and rosiglitazone (*Avandia*).

Metformin (*Glucophage*) is also in this category. It actually works in multiple ways to lower blood glucose. Metformin increases insulin sensitivity, reduces hepatic glucose production, and reduces gastrointestinal absorption of glucose.

Several natural medicines also seem to improve insulin sensitivity.

[Cassia cinnamon](#) started receiving a lot of attention when in a preliminary clinical study from 2004 suggested that taking 1-6 grams (1 teaspoon = 4.75 grams) could lower fasting blood glucose by 18% to 29%.¹¹³⁴⁷ Constituents contained in cassia cinnamon seem to increase insulin receptor sensitivity.^{11247,11248,11249,11973}

But since then the picture has become unclear.

Another clinical trial was published showing benefit. It showed that taking a specific cassia cinnamon product (Cinnamon 500 mg, Puritan's Pride) 1 gram daily for 90 days significantly reduced hemoglobin A1c (HbA1c) by about 0.83%.¹⁷⁰¹¹

But three other clinical studies and a meta-analysis were completed that found no significant effect on blood glucose or HbA1c.^{14344,16010,16010,17011}

These studies are not likely to be the last word on cinnamon for diabetes. It's still a hot area of interest and research.

Keep in mind that there are several different types of cinnamon. So far, studies have examined cassia cinnamon...also known as Chinese cinnamon. *Cinnamomum verum* is the most common type used in the Western world. But cassia cinnamon is not hard to find in Western food stores. For example, *McCormick's Ground Cinnamon* contains cassia cinnamon.

Practice Pearl

There is concern that taking large amounts of cassia cinnamon might not be safe for some people. Cassia cinnamon contains coumarin constituents that have been linked to liver damage when taken in very high doses. For most people this isn't likely to be a problem. Advise people with liver disease to avoid taking cassia cinnamon in large amounts.^{15299,15302}

[Chromium](#) has been used for years for patients with diabetes. Chromium deficiency is associated with some of the features of diabetes such as impaired glucose tolerance, hyperglycemia, glycosuria, a decrease in the number of insulin receptors, poor insulin binding, and neuropathies.^{6858,6869}

Chromium is sometimes referred to as "glucose tolerance factor" or GTF. But this is not entirely correct. GTF is actually a complex of molecules found in the body. It includes chromium bound to single molecules of glycine, cysteine, glutamic acid, and two molecules of nicotinic acid. Chromium by itself is NOT the same as GTF. But chromium is thought to be the active component of the complex. Nonetheless, you'll see chromium supplements on store shelves called [Chromium GTF](#) or other similar names.

Not surprisingly, diabetes patients with chromium deficiency have better glucose control if they correct the deficiency by taking chromium supplements. The big question is whether chromium helps patients WITHOUT a deficiency.

At this point, the answer is not clear. Some clinical research shows that patients who take chromium picolinate have decreased blood glucose levels, insulin levels, and HbA1C.^{1934,6867,7137,12385,12390,15169,14440} But much of this research is from small scale, poor quality trials.

The American Diabetes Association only recommends chromium for patients with documented chromium deficiency. The problem is that documenting chromium deficiency is difficult, and probably not practical for most patients.^{3859,12311}

View brands containing:	
-	Cassia cinnamon

Question #2	
Which of the following is appropriate to tell a patient who wants to try cinnamon?	
	a. Taking 2.5 teaspoons per day is more effective than 1 teaspoon.
	b. There is conflicting evidence about its effectiveness for diabetes.
	c. Cassia cinnamon is ineffective, but other types of cinnamon are beneficial.
	d. Cinnamon is unsafe and shouldn't be taken by anyone.

View brands containing:	
-	Chromium

View brands containing:	
	Chromium

There is not enough evidence to recommend chromium supplements across the board for all diabetes patients. But if type 2 diabetes patients want to try it, a trial run might be worthwhile, especially in patients with a poor diet. Advise these patients to take 100 mcg twice daily up to 500 mcg twice daily.^{6862,6867,7137} Lower doses seem to be just as effective as higher doses, but higher doses might result in a more rapid improvement.^{1934,6867} Explain to patients that if there is no improvement in about 3 months, chromium can be discontinued.

Practice Pearl

Advise diabetes patients with renal problems to avoid chromium supplements. There is some concern that excessive chromium might damage the kidneys and potentially worsen renal disease.^{554,1951,14312}

Magnesium is also being recommended by some practitioners for patients with diabetes. That is because low magnesium levels are associated with diabetes. Hypomagnesemia is more common in people with poorly controlled diabetes and lower serum magnesium levels are associated with a more rapid decline in renal function in patients with type 2 diabetes.^{1172,13372} In people with existing type 2 diabetes, hypomagnesemia occurs in 25% to 38% of patients.

Additionally, higher DIETARY magnesium intake is associated with lower fasting insulin concentrations in adults and obese children and a reduced risk of developing type 2 diabetes.^{6845,11352,13367,13368,13369} According to one analysis, a 100 mg/day increase in dietary magnesium intake is associated with a 15% risk reduction for developing type 2 diabetes. This is equivalent to the magnesium found in 4 slices of whole grain bread, 1 cup of beans, 1/4 cup of nuts, 1/2 cup of cooked spinach, or 3 bananas.¹⁵⁵⁴⁸

The results of clinical studies using magnesium supplements in patients with type 2 diabetes have been mixed. Some research shows that taking magnesium supplements providing 300-600 mg of elemental magnesium can decrease fasting blood glucose and improve insulin sensitivity.^{10664,12582,13376,13377} However, other research shows no effect of magnesium in diabetes patients.^{1171,1172,13378,13379,13380}

Discrepancies in these findings might reflect differences in magnesium salts and doses used, or differences in magnesium status in study subjects. Magnesium supplements might only help for those patients with magnesium deficiency.

Nonetheless, a magnesium supplement may be appropriate to try for those patients who might be deficient.

Vanadium is another trace element used for diabetes. It is thought to enhance the action of insulin by activating insulin receptors. Vanadium is also thought to stimulate hepatic glycogen synthesis and inhibit gluconeogenesis, lipolysis, and intestinal glucose transport. It also seems to increase glucose intake, utilization, and conversion to glycogen within skeletal muscle.^{3012,3013}

Preliminary clinical research shows that type 2 diabetes patients who take vanadium in the form of vanadyl sulfate have improved insulin sensitivity and reduced blood glucose.^{3055,3056,3057} But studies have been very small, enrolling a total of less than 40 people. There is also concern that the high doses needed, about 31 mg of elemental vanadium, might not be safe long-term. Taking vanadium in doses over 1.8 mg/day for long periods of time might increase the risk of renal damage.⁷¹³⁵ Until more is known about long-term safety, advise diabetes patients against using vanadium.

Ginseng is traditionally thought of as a "tonic" for improving energy and vigor. But there has been growing interest in using both **Panax ginseng** and **American ginseng** for diabetes.

One clinical trial shows that taking *Panax ginseng* 200 mg daily lowers blood glucose and HbA1c.⁴²²⁵

More research has been done on American ginseng. Clinical trials show that taking American ginseng 3 grams up to 2 hours before a meal reduces postprandial blood glucose.^{1018,6461} *Panax ginseng* and American ginseng both contain ginsenosides, which are thought to decrease insulin resistance and improve insulin sensitivity.⁸⁶⁰⁵ Some

[Magnesium](#)

View brands containing:	
-	Vanadium

Question #3	
Which of the following is TRUE?	
	a. Vanadium might not be safe long-term.
	b. Cassia cinnamon is unsafe in people with renal disease.
	c. Chromium can be safely used in patients with renal disease.
	d. Vanadium is more effective than chromium.

View brands containing:	
-	Panax ginseng
-	American ginseng

View brands containing:	
-	Agaricus mushroom
-	Prickly pear cactus

Question #4	
Which of the following natural medicines has a mechanism most similar to pioglitazone (Actos)?	
	a. Fenugreek
	b. Psyllium
	c. America

products with low levels of ginsenoside content don't seem to be beneficial for lowering blood glucose.⁹⁷³²

These ginseng products look promising for diabetes, but more evidence is needed about the long-term effectiveness and safety.

[Agaricus mushroom](#) is originally from Brazil, but has now been commercialized in China and Japan as well. Like other mushrooms, it is often used as an immunostimulant. It contains polysaccharides such as beta-glucans that seem to stimulate markers of immune function.

Agaricus mushroom also seems to increase levels of adiponectin, which can reduce insulin resistance. In fact, clinical research shows that type 2 diabetes patients who take agaricus mushroom extract 500 mg three times daily, along with conventional medications, have lower fasting insulin levels compared to patients who don't take the mushroom.¹⁵⁴²¹ This suggests that taking agaricus mushroom reduces insulin resistance.

So far there is no reliable evidence that agaricus mushroom reduces blood glucose or hemoglobin HbA1C levels.

[Prickly pear cactus](#), also known as opuntia, is a cactus found in Mexico and elsewhere. It's prominent in Mexican folk medicine as a treatment for diabetes and is commonly used in Mexican populations and in the Southwestern states of the U.S. The cooked broad leaves of the cactus are called "nopals." In fact, prickly pear cactus is sometimes called "nopal."

Several small, single-dose studies show that eating the broiled stems of one specific prickly pear cactus species, *Opuntia streptacantha*, can reduce blood glucose levels by 17% to 46%.^{5959,5961,5962,5964} But other species don't seem to have this effect.

Some researchers speculate that prickly pear cactus works due to an insulin sensitizing effect. But it might also help by slowing carbohydrate absorption in the gut.⁷⁰²⁸

Consuming whole food prickly pear cactus is safe and might offer some benefit. But tell patients that there is no reliable evidence to support the use of pills containing prickly pear cactus powder or extract.

Carbohydrate Absorption Inhibitors

The conventional drugs acarbose (*Precose*) and miglitol (*Glyset*) work by decreasing or slowing absorption of carbohydrates in the gut. This results in lower blood glucose levels.

"Natural" starch or carbohydrate blockers were marketed in the 1970s for weight loss and diabetes. But they were removed from the market because FDA deemed them unproven drugs. Since the passage of the Dietary Supplement Health and Education Act (DSHEA) in 1994, starch blockers can be marketed as natural products and avoid FDA's scrutiny for efficacy.

These natural starch blockers are made from a protein in white kidney beans, also called [bean pod](#). The supplement purportedly inhibits the alpha-amylase enzyme, preventing the breakdown of starch molecules in the intestine. Undigested starch is said to be passed out in the feces. But there's no credible clinical research to support this claim.

Bean pod has not been evaluated for patients with diabetes. But preliminary evidence shows that a specific bean pod extract called [Phase 2](#) doesn't significantly decrease weight in obese patients.¹²¹⁸⁶ Tell patients not to rely on this product for diabetes or weight loss.

[White mulberry](#) is also gaining popularity as a treatment for type 2 diabetes. White mulberry is a shrub with a white or pinkish fruit that is similar to a blackberry. But it is the leaf of white mulberry that might be beneficial for diabetes, not the fruit.

White mulberry leaf extract inhibits alpha-glucosidase enzymes in the gut, which prevents digestion of carbohydrates, similar to acarbose (*Precose*) and miglitol (*Glyset*). Clinical research shows that taking a white mulberry leaf powder 1 gram three times daily for 4 weeks significantly reduces fasting blood glucose by about 27% in patients

	n ginseng
	d. Bitter melon

View brands containing:	
-	Bean pod
-	White mulberry

with type 2 diabetes.¹⁶⁴⁹⁴

Explain to patients that this is promising, but more evidence is needed about long-term safety and effectiveness.

Lots of other natural medicines also block carbohydrate absorption, but they work through a different mechanism. Most of these fall into the category of fiber.

There are two basic types of fiber...soluble and insoluble. Soluble fibers do what the name implies, they dissolve in water. Insoluble fiber doesn't.

Soluble fibers are usually gummy and gel-like. Insoluble fiber is typically coarse and rough (think "roughage").

Soluble fiber products increase the viscosity of the intestinal contents, slow gastric emptying time, and act as a barrier to diffusion. When these fibrous products are consumed in conjunction with a meal, they can slow the absorption of glucose and reduce postprandial blood glucose levels.

The husks of [blond psyllium](#) seed ([Metamucil](#), [Fiberall](#), [Konsyl](#), others) are a soluble fiber. Several small-scale clinical trials show that consuming blond psyllium lowers postprandial blood glucose concentrations by 14% to 20%. Best results seem to occur when psyllium is taken with a meal. Psyllium has the added benefit of reducing total and low-density lipoprotein (LDL) cholesterol in diabetes patients.^{1405,8058,8064,10091,10099,12552}

[Guar gum](#) is a soluble fiber from the guar plant. Small clinical trials show that it reduces fasting and postprandial blood glucose levels in patients with both type 1 and type 2 diabetes.^{10896,12540,12541,12542,12543,12544,12545}

[Oat bran](#) is high in beta-glucan, which is a soluble fiber. Consuming oat bran as part of the diet can significantly reduce blood glucose levels.^{4980,4982,6266}

[Soy](#) contains both soluble and insoluble fibers. Some researchers believe soy is beneficial for diabetes because of the fiber contained in soy. But there could be other mechanisms, including a direct effect of soy isoflavones. Postmenopausal women with type 2 diabetes who take soy protein 30 grams/day (providing 132 mg isoflavones) seem to have decreased insulin resistance, lower fasting blood glucose, and lower HbA1c.⁸⁵³¹ Other preliminary evidence shows that an extract of a fermented soy product called touchi acts as an alpha-glucosidase inhibitor. It modestly lowers blood glucose, HbA1c, and triglycerides in type 2 diabetes patients.¹¹⁷⁶²

[Glucomannan](#) is an insoluble polysaccharide from the tubers of a plant called konjac. It can also delay glucose absorption.¹¹³⁶¹ Taken daily at doses between 3.6 grams and 7.2 grams for 90 days, it can reduce mean fasting glucose levels by 29% and lead to decreases in the dose of insulin or oral hypoglycemics needed to control blood sugar. Glucomannan can also reduce serum cholesterol and improve glucose tolerance and lipid profiles in people with diabetes.^{183,11357,11359}

Practice Pearl

Psyllium, glucomannan, guar gum, oat bran, and other fibers can decrease absorption of drugs that are taken orally. Tell patients to take medication either one hour before or four hours after taking these fibers. Also, advise patients to take these fiber products with plenty of water.

Miscellaneous

A few new diabetes medications have reached the market in recent years. They work differently than other diabetes drugs. Two of these drugs are the injectables *Symlin* and *Byetta*.

Symlin (pramlintide) is a synthetic version of amylin, which is a hormone secreted by the pancreas to lower glucose levels after eating.

Question #5	
Psyllium works for reducing postprandial glucose levels by	
	a. increasing insulin secretion or insulin-like effects.
	b. decreasing insulin resistance.
	c. slowing glucose absorption from the gut.
	d. All of the above

View brands containing:	
-	Blond psyllium
-	Guar gum
-	Oat bran
-	Soy
-	Glucomannan

Question #6	
Which of the following natural medicines has a mechanism of action most similar to glyburide?	
	a. Vanadium
	b. Glucomannan
	c. Cassia cinnamon
	d. Gymnema

Byetta (exenatide) is an "incretin mimetic." It works similar to incretin hormones, which are secreted by the GI tract after meals. These hormones stimulate insulin secretion, slow stomach emptying, and reduce hunger.

Another relative newcomer is *Januvia* (sitagliptin). It does NOT mimic incretin like *Byetta*, but instead enhances the body's own incretins. It inactivates an enzyme that breaks down incretins, therefore increasing the effects of endogenous incretins.

At present time there are no natural medicines known to work similarly to these medications.

You might get questions from diabetes patients about using [alpha-lipoic acid](#). It's an endogenous coenzyme. It acts as an antioxidant and is thought to regenerate other antioxidants in the body including vitamin E, vitamin C, and glutathione.^{1547,1550,3546,3871}

In people with type 2 diabetes, taking alpha-lipoic acid supplements orally seems to improve insulin sensitivity and glucose disposal, short-term.^{3545,3874,3875,3876} But it does not lower HbA1c.

Alpha-lipoic acid also seems to decrease symptoms of diabetic peripheral neuropathy. It reduces sensations of burning, tingling, and prickling of the feet and legs. But it can take 3-5 weeks before improvement is noticed.^{3540,3541,3557,3868,10148,12106}

Although promising, more evidence is needed about long-term safety of alpha-lipoic acid before it can be recommended for most diabetes patients.

If patients want to try it, explain that doses of 600-1200 mg/day have been used in studies. Lower doses might not help.³⁸⁶⁹

[Coenzyme Q10](#) is produced endogenously and works as an antioxidant and as a cofactor in oxidative respiration. It's best known for its potential role in cardiovascular disease, but there has also been interest in using it for diabetes.

So far clinical research has been contradictory. Some research shows that taking coenzyme Q10 200 mg daily reduces hemoglobin A1c in people with type 2 diabetes.^{9890,11877} However, other research in type 1 and type 2 diabetes using the same dose shows no effect on hemoglobin A1c.^{456,492,2126}

Until more is known, advise diabetes patients not to rely on coenzyme Q10.

You might also get questions from patients about [stevia](#). In folk medicine, the leaf from the stevia plant is used to lower blood sugar. Apparently it acts directly on pancreatic cells, causing them to secrete insulin.⁵⁰³²

There is conflicting evidence about the clinical effects of stevia. Preliminary research suggests that stevioside, a constituent of stevia, 1000 mg daily might reduce postprandial glucose levels by 18% in people with type 2 diabetes.¹¹⁸¹² However, other clinical research suggests that taking 250 mg three times daily does not significantly affect blood glucose levels or glycated hemoglobin (HbA1c) after three months of treatment in patients with type 1 or type 2 diabetes.¹⁶⁷⁰⁵

An extract from the stevia plant is also being used as a "natural" sweetener. Commercial products containing this sweetener are [Truvia](#) and [PureVia](#). These contain a specific extract from the stevia plant called rebaudioside A, also known as Reb A or rebiana. It has no calories and is 200 times sweeter than sugar.

Keep in mind that these food additive sweeteners are different than dietary supplements containing stevia. The sweeteners are more purified than supplements.

Over the years there has been interest in [selenium](#) for treating or preventing diabetes. It's theorized that oxidative stress contributes to insulin resistance and diabetes. Therefore, the antioxidant effects of selenium have been thought to be beneficial for diabetes patients. But population research has linked high serum levels of selenium to an INCREASED risk of developing type 2 diabetes.¹⁵⁴⁵⁸ A recent clinical trial confirms these findings, showing that older people who take a

View brands containing:	
-	Alpha-lipoic acid

Question #7	
Which of the following is TRUE about alpha-lipoic acid?	
	a. It acts as an antioxidant.
	b. Some evidence shows that it improves insulin sensitivity.
	c. It seems to improve symptoms of peripheral neuropathy.
	d. All of the above

View brands containing:	
-	Coenzyme Q10
-	Stevia
-	Selenium

Question #8	
Many patients use selenium for diabetes. What should you tell a patient who is interested in taking selenium?	
	a. Selenium is effective for reducing blood glucose levels.
	b. Selenium might not be effective, but it is safe.
	c. Selenium should not be used because it can increase the risk of diabetes.
	d. Selenium is effective, but can cause liver disease.

View brands containing:	
-	Chia

selenium supplement 200 mcg/day for an average of 7 years have an increased risk of developing type 2 diabetes.¹⁵⁷³³ Advise patients not to take selenium to treat or prevent diabetes.

Chia is now being marketed as the latest "super food." You might remember this plant from the old commercials for "Chia Pets." Chia literally means "oily." The seed contains high concentrations of the omega-3 fatty acid, alpha-linolenic acid. It also contains a significant amount of fiber, protein, calcium, magnesium, iron, and antioxidants.

Due to this nutrient content, chia is now marketed for a variety of conditions, including diabetes.

Preliminary clinical research shows that type 2 diabetes patients who consume bread containing a specific type of chia, called **Salba** (Salba Nutritional Solutions), approximately 37 grams/day for 12 weeks, have significantly reduced cardiovascular risk factors such as systolic blood pressure, C-reactive protein, and von Willebrand factor compared to those consuming bread containing wheat bran. These patients also had a significantly reduced HbA1c compared to baseline, but not compared to wheat bran.¹⁶¹²⁴

Explain to patients that this research pertains to consuming a food produce containing ground chia. There is no reliable evidence that taking chia extract in pill form is beneficial.

Weigh in on what natural medications your patients are asking about at [Colleagues Interact](#). Start your own discussion, or join an ongoing one, like "[Irvincia gabonensis](#)."

The Bottom Line

Lots of natural medicines are tried for diabetes. Many of them have real pharmacological effects that might eventually prove to be beneficial. But so far many of these products lack the high-quality evidence of safety and effectiveness needed to recommend them for long-term use.

A few products are worth considering. Chromium and magnesium might be worth a try short-term for some patients. If they help, it may be due to a chromium or magnesium deficiency. Once the deficiency is corrected, the supplement may be able to be discontinued.

Fibrous foods can be safely recommended. There is not a lot of evidence to support any one specific fiber product (psyllium, oat bran, soy, etc), but most experts agree that a diet consisting of 20-50 grams of fiber daily is beneficial. Most Westerners do not get adequate fiber in their diet. Increasing dietary fiber could have many benefits, one of which is decreased blood glucose levels.

Keep in mind that hypoglycemic natural medicines might be beneficial. But they could also turn out to be harmful if combined with conventional diabetes medicines. Lowering blood glucose too much could push patients into hypoglycemia. The biggest concern is when natural medicines with hypoglycemic activity, due to insulin-like effects, are combined with conventional drugs with hypoglycemic effects. Explain to patients that these natural medicines can have real drug-like effects and to monitor their blood glucose closely if they try any of them.

Print a [Natural Medicines Comprehensive Database recommendation chart](#) as a reference for your practice site.

Question #9	
Which of the following would be considered inappropriate for a type 2 diabetes patient with nephropathy?	
	a. Blond psyllium
	b. Fenugreek
	c. Vanadium
	d. Cassia cinnamon

Question #10	
Which of the following combinations of conventional drugs and natural medicines would make you most concerned about hypoglycemia?	
	a. Glucosamine + rosiglitazone (Avandia)
	b. Bitter melon + acarbose (Precose)
	c. Chromium + glyburide (Diabeta)
	d. Gymnema + glipizide (Glucotrol)