Update on Complementary Therapies in Diabetes

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THIS ACTIVITY IS TAKEN FROM A PRESENTATION BY LAURA SHANE-MCWHORTER, PHARMD, AMERICAN ASSOCIATION OF DIABETES EDUCATORS 32ND MEETING AND EXHIBITION AUGUST 10-13, 2005, WASHINGTON, DC

STATEMENT OF NEED

Health care providers who treat diabetic patients must stay informed of various therapies – including complementary and alternative medicines (CAM) – that their patients might be using. CAM is defined as a group of diverse medical and health care systems, practices and products that are not presently considered to be part of conventional medicine. According to the National Institutes of Health's National Center for Complementary and Alternative Medicine, a government survey found that 36% of US adults aged >18 years use some form of CAM.

TARGET AUDIENCE

This activity is designed for primary care physicians, endocrinologists and other clinicians who treat patients with type 2 diabetes.

LEARNING OBJECTIVES

After successful completion of this program, the participant should be able to:

- list and describe popular CAM therapies that include botanical and nonbotanical products used by patients;
- review the pharmacology of CAM therapies for diabetes, including theorized mechanisms of action, side effects and drug interactions; and
- discuss reliable sources for providers and patients to assess the potential benefits and hazards of CAM therapies.

METHOD OF INSTRUCTION

Participants should read the learning objectives and CME program in their entirety. After reviewing the material, they must complete the self-assessment test, which consists of a series of multiple-choice questions.

Participants have a choice of completing this activity online by visiting www.DiabeticMCToday.com; getting real-time results at www.CMEToday.net; or by using the print forms following this activity.

ACCREDITATION

This activity has been planned and implemented in accordance with the essentials and standards of the ACCME through the joint sponsorship of The Dulaney Foundation and *Diabetic Microvascular Complications Today*.

DISCLOSURE

In accordance with the disclosure policies of The Dulaney Foundation and to conform with ACCME and FDA guidelines, all program faculty are required to disclose to the activity participants: 1) the existence of any financial interest or other relationships with the manufacturers of any commercial products/devices, or providers of commercial services, that relate to the content of their presentation/material or the commercial contributors of this activity; and 2) identification of a commercial product/device that is unlabeled for use or an investigational use of a product/device not yet approved.

FACULTY DISCLOSURE DECLARATIONS

None.

FACULTY CREDENTIALS

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INTRODUCTION

There are over 100 complementary and alternative therapies used as diabetes treatments. It is important for clinicians to find out if their patients are taking any therapies in addition to their traditional diabetic treatments. Patients should always continue to take their traditional treatments, as complications may develop without them.[1]

Physicians also must know what specific products and product lines patients use. Some have been found to contain lead, and there was even a recent case where dietary supplements resulted in hypoglycemia because of glyburide contamination.

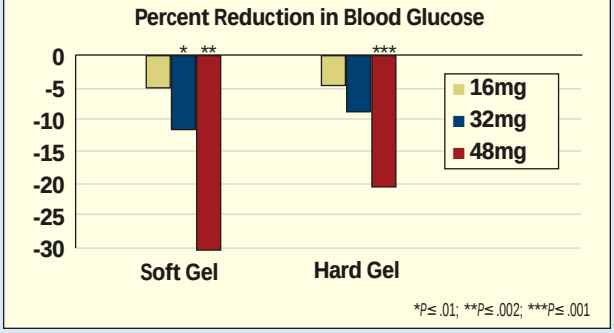
Even though CAM are natural products, they are still considered as pharmaceuticals and can cause side effects and drug interactions.

BOTANICAL PRODUCTS: BANABA

Banaba is a member of the crepe myrtle family and grows in the Phillipines and southeast Asia. The banaba leaf is used as a tea for its hypoglycemia activity. The active ingredients are thought to be corsolic acid, which has been standardized to Glucosol, as well as tannic acid derivatives that may have an insulin mimetic effect. In vitro studies have shown insulin receptor activation, and the leaf has been used for diabetes treatment and weight loss. While no side effects have been seen in short-term studies, theoretically there could be additive effects with hypoglycemic agents and other herbs that decrease blood glucose.

Banaba is one of the more popular herbal products being used for diabetes, despite the fact that there is little evidence for its use. A 15-day randomized controlled trial was performed in 10 type 2 diabetic patients with fasting blood glucose (FBG) levels between 140 and 250 mg/dL, aged 55 to 70 years.[2] Patients were assigned two different formulations (soft or hard gel), they were not taking any diabetes medications for 45 days prior to the trial and they maintained normal diets throughout the study. Five patients in each group received three daily oral doses of 16, 32 or 48 mg for 15 days with a 10-day washout period between doses, and the remaining patients received placebo.

TABLE 1. BANABA



> Banaba is a member of the crepe myrtle family and it grows in the Phillipines and southeast Asia.

Three blood samples were taken per patient and the values were averaged. Patients taking the soft gel formulation had decreases of 11% and 30% for the 32- and 48-mg dose, respectively and the hard gel patients had a 20% drop for the 48-mg dose (Table 1).

Based on this small study the appropriate dose of banaba would be 32 to 48 mg of the soft gel; however there remains insufficient evidence to support its use.

CAIAPO

Caiapo is a white-skinned sweet potato that when eaten raw is a treatment for diabetes, hypertension and anemia. It grows in the mountains of Kagawa Prefecture, Japan. Its active ingredient is unknown, however it may have an acidic glycoprotein component that improves insulin sensitivity and decreases insulin resistance. The known side effects include gastrointestinal (GI) upset and it could have potentially additive effects when combined with hypoglycemic agents.

A randomized, double-blind placebo-controlled trial was performed in 61 type 2 diabetes patients for 3 months.[3] Five patients were on oral agents; all diabetes medications were withdrawn 2 weeks prior to study start. Participants were told to stay on a weight-maintaining diet and continue usual physical activity. Thirty patients were assigned 4 g/day caiapo and the others placebo. FBG, oral glucose tolerance test (OGTT), 2-hour postprandial glucose (PPG), HbA1c, cholesterol and triglycerides were measured and compared to baseline.

Improvements were seen in FBG, PPG, HbA1c, cholesterol and weight after 12 weeks, but benefits were not seen in triglycerides or blood pressure (Table 2).

While there is some evidence for use at 4 g/day, further study is needed on caiapo.

TABLE 2. CAIAPO AND HBA1C

	Caiapo	Placebo
Baseline	7.21%	7.04%
End	6.68%	7.1%

(*P*<.001 vs baseline)

CINNAMON

Cinnamon is a spice that is typically used in gum, toothpaste and mouthwash. It acts on polyphenolic polymers and may enhance insulin action. It has been shown in vitro to increase glucose uptake and glycogen synthesis. It may increase phosphorylation of insulin receptors and aid in triggering insulin cascade system. Cinnamon has been used to treat diabetes and GI upset, although it can cause a topical allergic reaction and it may have additive hypoglycemic activity.

In a 40-day randomized trial, 60 patients with type 2 diabetes were divided into six groups.[4] Groups 1, 2 and 3 were assigned 1, 3 or 6 g three times/day and groups 4, 5 and 6 were assigned placebo. Patients took cinnamon for 40 days and then had a 20-day washout period. FBG was compared to baseline at 40 days and 60 days (Table 3). Cinnamon-treated patients also had decreased total cholesterol, triglycerides and LDL.

An effective dose of cinnamon may be 1 to 6 g/day or 1 tsp ground cinnamon. The long-term effects are not known.

IVY GOURD

Ivy gourd is a climbing vine, the leaves and stems of which are used as food because the leaf and root juice have hypoglycemic action. The plant grows in India, southeast Asia, Australia and Hawaii. Ivy gourd may suppress the activity of glucogenic enzyme and act as an insulin mimetic. It has been used as a vegetable and as a diabetes treatment. No side effects have been seen in short-term studies, but it has the potential to have additive effects when combined with hypoglycemic agents.

A 6-week, randomized, double-blind, placebo-controlled trial of 32 type 2 diabetic patients was performed.[5] Half the patients were assigned ivy gourd in a 300-mg tablet, where three tablets were given twice-daily. The other half received placebo. This small study showed that FBG declined in treated patients and PPG improved (Table 4). The recommended dose is 900 mg twice daily and more study is needed.

GYMNEMA SYLVESTRE

Gymnema Sylvestre (gurmar) is a woody climbing plant that grows in the tropical forests of central and southern India. The leaves are used in herbal medicine preparations, and it is known to block sweetness cravings.

TABLE 3. CINNAMON AND FASTING BLOOD GLUCOSE

FBG baseline to 40 days	
1 g	209 to 157 mg/dL
3 g	205 to 169 mg/dL
6 g	234 to 166 mg/dL
(*P*<.05 from baseline)	
FBG to 60 days (< baseline)	
1 g	175 mg/dL
3 g	178 mg/dL
6 g	205 mg/dL
(*P*<.05 for 1 g only)	

The herb is thought to bind to the intestinal receptors and impair glucose absorption as well as increase the activity of enzymes involved with glucose absportion. It increases cell permeability for insulin and stimulates beta-cell function. It has been used as a diabetic treatment, its side effects include hypoglycemia and it may have additive hypoglycemic effects if combined with other agents (Tables 5 and 6).

In one study 22 patients with type 2 diabetes were assigned gymnema 400 mg/day for 18 to 20 months plus sulfonylurea and then compared to 25 controls. An HbA1c decrease from 11.9% to 8.5% was seen, and FBG dropped from 174 to 124 mg/dL (*P*<.001).[6]

While animal research of gymnema is prolific, human study is less so. There is new information being gathered from a product called Beta Fast GXR (Informulan, 200 to 600 mg/day). This herbal should not be used without medical supervision and other diabetes medications may have to be adjusted.

FENUGREEK

Fenugreek is also known as trigonella foenumgraecum. It is composed of saponin/alkaloids and coumarin/glycosides.

TABLE 4. IVY GOURD AND GLUCOSE

	Ivy gourd	Placebo
FBG	179 vs. 122*	195 vs. 181
1-hr OGTT	268 vs. 225**	261 vs. 268
2-hr OGTT	245 vs. 187*	255 vs. 252

* (*P*<.01)

**(*P*<.05)

(all measures in mg/dL)

TABLE 5. GYMNEMA STUDIES

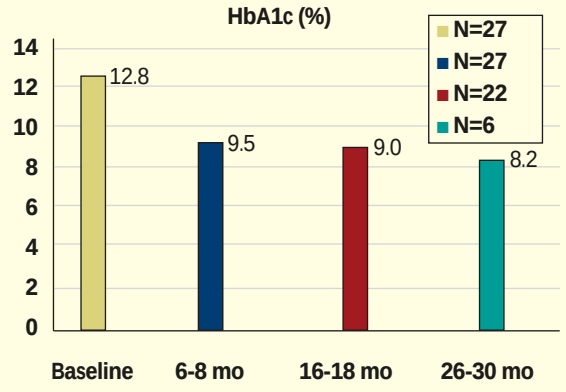
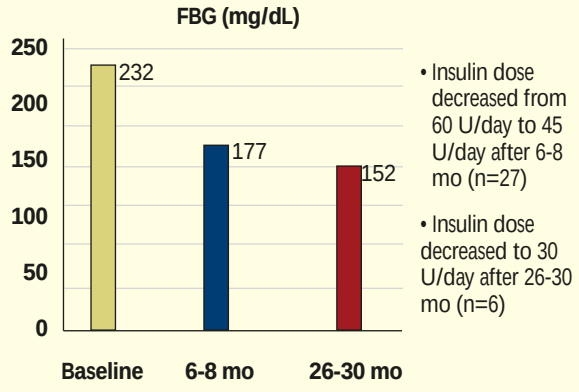


TABLE 6. GYMNEMA STUDIES



It is a member of the legume family that acts by delaying gastric emptying and inhibiting glucose transport. It contains 4-hydroxy isoleucine that stimulates insulin secretion. It has been used to treat diabetes, hyperlipidemia and constipation. Its side effects include GI hypersensitivity, dermatitis, utertonic and sweet urine. It may interact with hypoglycemics, anticoagulants, steroids, hormones and monoamine oxidase inhibitors.

In a study of 60 patients with type 2 diabetes, patients were assigned 25 g/day fenugreek seed powder. Their FBG decreased from 151 mg/dL at baseline to 112 mg/dL after 24 weeks.[7]

In a double-blind placebo-controlled fenugreek study, 25 patients with new type 2 diabetes were studied for 2 months. One group was given 1 g/day of hydroalcoholic extract of fenugreek seeds and one group was given placebo plus diet and exercise.

Area under the curve of FBG and insulin levels were lower for the treatment group ($P<.001$), and triglycerides and HDL improved as well.

Fenugreek is associated with allergies and it should not be used during pregnancy. If taken, the dose should be 10 to 15 g/day in capsule form.

BITTER MELON

Bitter melon has momordin and charantin properties, as well as alkaloid. Its mechanism of action is glucose uptake and glucose mechanism. It has been used in diabetes and its side effects include GI, antifertility, abortifacient, hypoglycemia and favism. The red arils around the seeds are toxic to children. Bitter melon interacts with chlorpropamide and vitamin K depleters.

In a study of bitter melon, 100 patients with type 2 diabetes received an aqueous suspension of the vegetable pulp for two days.[8] Baseline FBG (152 mg/dL) and OGTT were done on day 1, and 2-hr PPG was measured (257 mg/dL). On day 2, FBG was done, bitter melon was given, and 1 hour later glucose was much lower (160 to 131 mg/dL; $P<.001$). Then 75 gm OGTT was performed and 2-hr glucose was decreased from values on previous day without bitter melon (222 vs 257 mg/dL, P=NS).

Five of the 11 patients with type 1 diabetes and six of the eight with type 2 were given injectable bitter melon polypeptide.[9] Glucose values declined for several hours after the injection.

Bitter melon requires more studies and it has been associated with severe side effects. A "dose" would be one small unripe melon per day or 50 mL of fresh juice, taken twice or three times a day with food.

GINSENG

There are three types of ginseng: Asian, Siberian and American. It contains ginsenosides, an ingredient from a family of steroids that have various hormonal and central nervous system effects. It has been used as an adaptogen for its ergogenic effects. Ginseng can have adverse effects, such as "ginseng abuse syndrome," which consists of hypertension, anxiety and insomnia. It also has been associated with estrogenic and metabolic effects.

Ginseng has numerous drug interactions: it decreases INR with warfarin; it can lead to diuretic resistance; it attenuates the effects of antihypertensives; when combined with phenelzine it can cause mania; and it has an additive effect when combined with estrogen. Preliminary evidence shows that ginseng may inhibit CYP 2D6 resulting in a 6% increase in the serum concentration of certain medications such as beta-blockers, antipsychotics, antidepressants and opiates. It has also been associated with erroneous digoxin serum concentrations.

In a randomized, double-blind placebo-controlled trial, 36 patients with type 2 diabetes were given ginseng 100 to 200 mg or placebo daily for 8 weeks.[10] The ginseng patients taking

TABLE 7. FENUGREEK AND GLUCOSE (ALL MEASURES IN MG/DL)

	FBG baseline	FBG 2 mo.	PPG baseline	PPG 2 mo.
Group 1	148	120	211	181
Group 2	138	113	220	242

both doses experienced an improvement in mood, vigor and psychomotor performance. Patients taking the 200-mg dose had decreased FBG and HbA1c.

Another study evaluated American ginseng versus placebo in nine patients with and 10 without type 2 diabetes.[11] Patients were given a 25-g OGTT with or without 3 g of ginseng. The ginseng was given 40 minutes before or with glucose challenge. Nondiabetic patients who had ginseng 40 minutes before OGTT had a drop in PPG ($P<.05$), but no drop was seen with ginseng when given with the OGTT. Patients with diabetes who had ginseng with OGTT or 40 minutes prior to OGTT all had a drop in PPG ($P<.05$).

Ginseng studies have been flawed and there are many severe side effects and drug interactions associated with the herb. There are varying potencies of preparations, and patients should take it within 2 hours of a meal to avoid potential hypoglycemia.

ALOE

Aloe is a member of the lily family, and its dried leaves have been used as a laxative in juice form. Its gel is used as a treatment for wounds and diabetes. Its mechanism of action may have to do with its fiber properties, similar to glucomannan/guar. The juice may induce hypokalemia as well as fluid or electrolyte problems. It may also exacerbate GI problems. The juice decreases potassium levels when used in conjunction with steroids or diuretics.

Aloe was studied in 40 patients with newly diagnosed diabetes for 42 days.[12] The patients took either 1 TBSP aloe gel or placebo. Patients taking aloe had a drop in FBG from 250 to 140 mg/dL ($P<.01$). Aloe patients also had a drop in triglyceride levels.

Another study evaluated aloe in 40 patients who were taking 5 mg glibenclamide twice/daily. Half the patients were given 1 TBSP aloe gel daily in addition to glibenclamide. These patients had a FBG drop from 288 to 148 mg/dL ($P=.01$); their triglyceride levels also dropped. Levels in other patients stayed about the same.

When using aloe, patients should no be taking the cathartic form. Its use is common in the Hispanic population; recommended dose is about 50 to 200 mg/day of leaf gel. There is insufficient evidence for its use.

NOPAL

Nopal (prickly pear) is a member of the cactus family. It may contain fiber that decreases glucose absportion and increases glucose sensitivity. It has been used in a cooked or capsule form for diabetes and hyperlipidemia. It is also used to prevent hangovers if taken before drinking alcohol. Side effects of nopal include increased stools and abdominal fullness. Combined with chlorpropamide it can have additive effects on glucose and insulin levels. It also might have an additive hypoglycemic effect when combined with secretagogues.

In a nopal study of dieting patients, 16 patients ate nopal broiled, 10 took water and 6 had broiled zucchini.[12] Patients who ate the nopal had a decrease in PPG from baseline of 222 to 198 mg/mL at 120 min and 183 mg/dL at 180 min.

> There are many side effects associated with ginseng and varying potencies of preparation.

In another nopal study of patients with and without type 2 diabetes, patients were given either water or nopal. After eating nopal, diabetic patients had a significant PPG decrease (41 mg/dL after 180 min) and normal patients had no change.

Nopal is widely used in the southwest United States; benefit is only from immature plants. It is relatively benign and it may have a role in diabetes and hyperlipidemia. The dose would be 500 g/day.

MILK THISTLE

Milk thistle is a member of the aster family; it is also known as silymarin. It inhibits heptoxin binding, it is an antioxidant and it restores malondialdegyde concentrations. It also may benefit patients with insulin resistance secondary to hepatic damage. Milk thistle has been used as a hepaprotectant and to decrease insulin resistance. Side effects include loose stools, sweating and nausea, but it may have beneficial interactions with hepatoxins.

In a 12-month, randomized, open-label trial 60 patients with type 2 diabetes and cirrhosis were assigned silymarin or placebo.[14] Patients in the treatment group had a reduction in FBG from 190 at baseline to 165 mg/dL ($P<.01$) and a reduction in HbA1c from 7.9% to 7.2% ($P<.01$). Patients also had a decrease in their insulin requirements, from 55 U/day to 45 U/day ($P<.01$).

While milk thistle may be used to protect patients against potentially hepatoxic diabetes drugs, its use is very preliminary. Doses vary according to silymarin extract.

NONBOTANICALS: ALPHA-LIPOIC ACID

Alpha-lipoic acid (ALA), or thioctic acid, is a coenzyme in the body. In vivo, it helps to produce adenosine triphosphate. ALA may reduce oxidative disease caused by glucose, and it has been used to increase insulin sensitivity. ALA also has been used in peripheral neuropathy treatment. It has been associated with some GI side effects and it may be associated with hypoglycemia when used with sulfonylureas.

A meta-analysis of ALA trials was done to determine efficacy and safety of 600 mg given over 3 weeks in patients with symptomatic polyneuropathy. Pain, burning, paresthesiae and numbess were evaluated (TSS). The trials included Aladin I, Aladin III, Sydney and Nathan II, with a total of 1,258 patients.

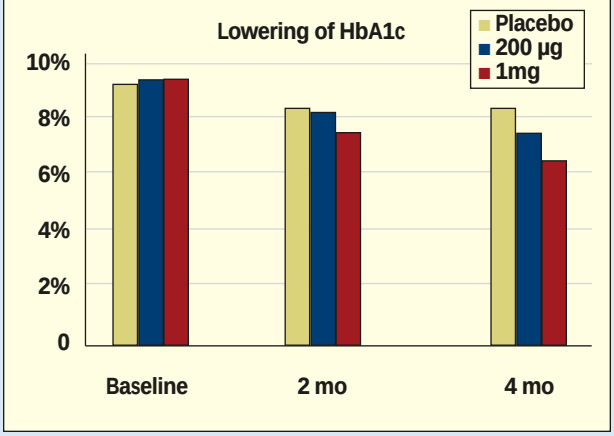
After 3 weeks, the relative difference in favor of treatment compared to placebo was 24.1%; the responder rate (≥50% improvement in TSS) was 52.7% for ALA versus 36.9% for placebo.

While ALA does not have a benefit on HbA1c, it may improve other complications and it warrants closer attention in long-term trials. The American Diabetes Association does not sanction the use of ALA, but the European Association for the Study of Diabetes encourages a diet high in natural antioxidants. A suggested dose would be 600 to 800 mg/day.

CHROMIUM

Chromium, in its trivalent form, may potentiate cellular insulin effects. It increases insulin receptors, insulin sensitivity and it may be more effective when combined with biotin. It has been used for glycemic control, lipid lowering, weight loss and ergogenic effects. There have been cases of renal toxicity, psychiatric problems and rhabodomyolysis associated with very high quantities. Chromium can interact with medications that decrease glucose, and when combined with other chromium containing herbs the risk of toxicity increases (Table 8).

TABLE 8. CHROMIUM IN TYPE 2 DIABETES



> Alpha-lipoic acid warrants closer attention in long-term trials. It may improve diabetic complications such as neuropathy.

Chromium at a dose of 50 to 200 µg is suggested, it may be beneficial only in states of deficiency. It is not effective for bodybuilding and its long-term effects are not known.

VANADIUM

Vanadium is a trace element found in vegetable grains. The appropriate dose is unknown. It may have a function in the insulin signaling pathway and acts as an insulin mimetic. It has been used in diabetes treatment as well as bodybuilding. It can cause serious GI side effects. There are serious safety issues surrounding this substance. It has interactions with anticoagulants, digoxin and can cause hypoglycemia.

Risks of long-term use with vanadium are unknown, but it does accumulate in the bone, kidneys, lungs and liver. Small short-term studies have shown a decline in FBG associated with its use. This element is toxic in high doses and supplementation is not recommended at this time.

For more information, visit: nccam.nih.gov and www.cfsan.fda.gov/~dms/ds-savvy.html. ■

1. Shane-McWhorter L. Complementary therapies in diabetes: An update. Presented at the American Association of Diabetes 32nd Annual Meeting & Exhibition. Aug 10-13, 2005. Washington, DC.
2. Judy WV , Hari SP, Stogsdill WW, et al. Antidiabetic activity of a standardized extract (Glucosol) from Lagerstroemia speciosa leaves in Type II diabetics. A dose-dependence study. *J Ethnopharmacol.* 2003;87:115-117.
3. Ludvik B, Neuffer B, Pacini G. Efficacy of Ipomoea batatas (Caiapo) on diabetes control in type 2 diabetic subjects treated with diet. *Diabetes Care.* 2004;27:436-440.
4. Khan A, Safdar M, Ali Khan MM, et al. Cinnamon improves glucose and lipids of people with type 2 diabetes. *Diabetes Care.* 2003;26:3215-3218.
5. Azad Khan AK, Akhtar S ,Mahtab H. Coccinia indica in the treatment of patients with diabetes mellitus. *Bangladesh Med Res Counc Bull.* 1979;5:60-66.
6. Baskaran K, Kizar Ahamath B, Radha Shanmugasundaram K, Shanmugasundaram ER. Antidiabetic effect of a leaf extract from Gymnema sylvestre in non-insulin-dependent diabetes mellitus patients. *J Ethnopharmacol.* 1990; 30:295-300.
7 Sharma RD, Sarkar A, Hazra DK, et al. Use of fenugreek seed powder in the management of non-insulin dependent diabetes mellitus. *Nutr. Res.* 1996;16:1331-1339.
8. Ahmad N, Hassan MR, Halder H, Bennoor KS. Effect of Momordica charantia (Karolla) extracts on fasting and postprandial serum glucose levels in NIDDM patients. *Bangladesh Med Res Counc Bull.* 1999;1:11-13.
9. Khanna P, Jain SC, Panagariya A, Dixit VP. Hypoglycemic activity of polypeptide-p from a plant source. *J Nat Prod.* 1981;44:648-655.
10. Sotaniemi EA ,Haapakoski E ,Rautio A . Ginseng therapy in non-insulin-dependent diabetic patients. *Diabetes Care.* 1995;18:1373-1375.
11. Vuksan V, Sievenpiper JL ,Koo VY, et al. American ginseng (Panax quinquefolius L) reduces postprandial glycemia in nondiabetic subjects and subjects with type 2 diabetes mellitus. *Arch Intern Med.* 2000;160:1009-1013.
12. Frati-Munari AC, Gordillo BE, Altamirano P, Ariza CR. Hypoglycemic effect of Opuntia streptacantha Lemaire in NIDDM. *Diabetes Care.* 1988;11:63-66.
13. Frati AC ,Gordillo BE ,Altamirano P, et al. Acute hypoglycemic effect of Opuntia streptacantha Lemaire in NIDDM. *Diabetes Care.* 1990;13:455-456.

CME QUESTIONS

Circle the most appropriate answer in the "ANSWER SECTION" on the following page.

1. Which of the following statements is NOT accurate with respect to banaba?
a. it is a member of the crepe myrtle family
b. it may act as an insulin mimetic
c. there is much evidence to support its use
d. it may have an additive effect when combined with hypoglycemic agents

2. In randomized, placebo-controlled trials, caiapo has been associated with:
a. improvements in glucose levels
b. blood pressure lowering
c. triglyceride improvement
d. increased energy

3. Adverse effects of cinnamon include which of the following:
a. severe GI distress
b. headaches
c. sweet urine
d. skin rashes

4. A possible mechanism of action discussed in the activity for Gymnema Sylvestre is:
a. it acts as an insulin mimetic
b. it affects glucose absorption
c. it delays gastric emptying
d. it has ergogenic properties

5. What is another name for fenugreek?
a. trigonella foenumgraecum
b. gurmar
c. prickly pear
d. thiocitic acid

6. Ginseng has been associated with numerous drug interactions. Which of the following was NOT mentioned in the activity:
a. warfarin
b. antihypertensives
c. antipsychotics
d. NSAIDs

7. What statement is NOT associated with aloe?
a. it is a member of the lily family
b. it is commonly used in Hispanic populations
c. the juice can be used for upset stomach
d. it is associated with fasting glucose reductions

8. How is nopal typically ingested?
a. the leaves are brewed in a tea
b. it can be cooked and eaten
c. the gel is rubbed on the body
d. the seeds are ground into a paste

9. What statement is NOT associated with alpha-lipoic acid?
a. it has beneficial effects on HbA1c
b. it may improve symptoms of neuropathy
c. it is a coenzyme
d. it may reduce oxidative stress

10. No known side effects have been reported with chromium use.
a. true
b. false

REGISTRATION/EVALUATION FORM: COMPLEMENTARY THERAPIES IN DIABETES

To obtain AMA/PRA category 1 credit, you must:

- Read the learning objectives and the CME article and complete the self-assessment test.
- Photocopy and complete this registration/evaluation form and record your test answers in the Answer Section below.
- Send the Registration/Evaluation form to **The Dulaney Foundation, PO Box 44408, Phoenix, AZ 85064, or fax to 602-508-4893.**
- Retain a copy of your test answers. Your answer sheet will be graded, and if you achieve a passing score of 70% or better, you will receive a CME credit letter awarding AMA/PRA category 1 credit within 4 weeks. If you do not achieve a passing score, you will be notified and offered the opportunity to complete the activity again.

ANSWER SECTION

Circle the best answer for each question on page 46.

1. A B C D	2. A B C D	3. A B C D	4. A B C D	5. A B C D
6. A B C D	7. A B C D	8. A B C D	9. A B C D	10. A B

REGISTRATION FORM

First name _____ Last name _____ Degree (MD, PhD) _____

Specialty _____

Institution or practice name _____

Address _____

City _____ State _____ Zip Code _____ Country _____

Telephone _____ Fax _____ E-mail address _____

The processing fee has been underwritten by an educational grant from Eli Lilly and Company.

I attest that I have completed this activity as designed and I am claiming ____ (up to 1 credit) AMA/PRA category 1 credit.

Signature _____ Date _____

Credit for this activity is available until Sept. 30, 2006.

The planning and execution of useful and educationally sound continuing education activities are guided in large part by input from participants. Please assist us in evaluating the effectiveness of this activity and make recommendations for future educational offerings by completing this evaluation form. Your response will help ensure that future programs are informative and meet the educational needs of all participants. Please note: CME credit letters and long-term credit retention information will only be issued upon receipt of this completed evaluation. Thank you for your cooperation.

OBJECTIVES

After successful completion of this program, you should be able to:

• list and decribe popular CAM therapies that include botanical and nonbotanical products used by diabetic patients	5	4	3	2	1
• review the pharmacology of CAM therapies for diabetes, including theorized mechanisms of action, side effects and drug interaction	5	4	3	2	1
• discuss reliable sources of information for providers and patients to assess the potential benefits and hazards of CAM therapies	5	4	3	2	1

(Please circle the number that is most accurate; 5 represents strongly agree and 1 represents strongly disagree.)

OVERALL EVALUATION

• The information presented increased my awareness/understanding of the subject.	5	4	3	2	1
• The information presented will influence how I practice.	5	4	3	2	1
• The information presented will help me improve patient care.	5	4	3	2	1
• The faculty demonstrated current knowledge of the subject.	5	4	3	2	1
• The program was educationally sound and scientifically balanced.	5	4	3	2	1
• The program avoided commercial bias or influence.	5	4	3	2	1
• Overall, the program met my expectations.	5	4	3	2	1
• I would recommend this program to my colleagues.	5	4	3	2	1

(Please circle the number that is most accurate; 5 represents strongly agree and 1 represents strongly disagree.)

- If you anticipate changing one or more aspects of your practice as a result of your participation in this activity, please provide a brief description of how you plan to do so: _____
- Please provide any additional comments pertaining to this activity (positive and negative) and suggestions for improvements: _____

_____