

In Brief

Traditional Chinese medicine (TCM) is a system of healing that is thousands of years old. It has long been utilized in the Chinese culture to treat the complex of symptoms that Western medicine terms diabetes mellitus. This article will outline the key concepts and therapies of TCM that play a role in the evaluation and treatment of diabetic patients.

Traditional Chinese Medicine in the Treatment of Diabetes

Maggie B. Covington, MD

Diabetes is one of the most prevalent chronic diseases in the United States. The morbidity and mortality associated with the disease is significant and derives primarily from complications of persistent hyperglycemia. Longstanding hyperglycemia has been shown to lead to vascular complications involving large and small blood vessels, such as arteriosclerosis, glomerulosclerosis, and retinopathy. Diabetic neuropathy, characterized by pain and paresthesias, is among the most frequent complications of longstanding, poorly controlled diabetes and is often associated with a reduction in physical activity and with sleep disturbances.^{1,2}

Western or conventional therapies for diabetes have been geared toward regulating blood glucose with a combination of diet modification, insulin and/or oral pharmacological agents, weight loss when appropriate, and exercise. Although Western medicine and Traditional Chinese medicine (TCM) share the diabetes treatment goals of reducing symptoms and preventing complications, their approaches to conceptualizing, diagnosing, and treating the disease are very different. This article will outline the key concepts and therapies of TCM that play a role in the evaluation and treatment of diabetic patients.

Traditional Chinese Medicine

TCM is a system of healing that originated thousands of years ago. It has evolved into a well-developed, coher-

ent system of medicine that uses several modalities to treat and prevent illness. The most commonly employed therapeutic methods in TCM include acupuncture/moxibustion, Chinese herbal medicine, diet therapy, mind/body exercises (Qigong and Tai Chi), and Tui Na (Chinese massage).³

TCM views the human body and its functioning in a holistic way. From this perspective, no single body part or symptom can be understood apart from its relation to the whole. Unlike Western medicine, which seeks to uncover a distinct entity or causative factor for a particular illness, TCM looks at patterns of disharmony, which include all presenting signs and symptoms as well as patients' emotional and psychological responses. Humans are viewed both as a reflection of and as an integral part of nature, and health results from maintaining harmony and balance within the body and between the body and nature.³

Two basic TCM theories explain and describe phenomena in nature, including human beings: Yin-Yang Theory and the Five Phases Theory or Five Element Theory.

Yin and Yang are complementary opposites used to describe how things function in relation to each other and to the universe. They are interdependent—one cannot exist without the other, and they have the ability to transform into each other.³ The traditional Yin-Yang symbol (Figure 1)

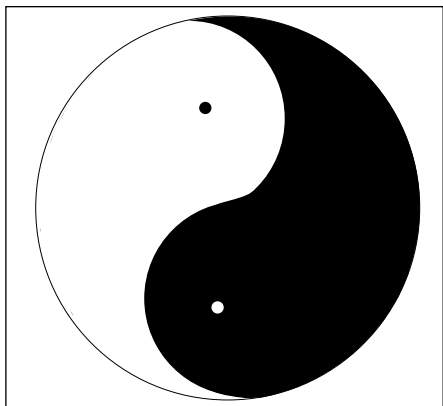


Figure 1. The Yin-Yang symbol

depicts the Yin (the dark side) flowing into the Yang (the light side) and vice versa. The dots within each side symbolize that there is always a bit of Yin within Yang and a bit of Yang within Yin; there are no absolutes. All physiological functions of the body, as well as the signs and symptoms of disease, can be differentiated on the basis of Yin and Yang characteristics.

The Chinese character for Yin originally meant the shady side of a slope. Qualities characteristic of Yin include cold, stillness, darkness, inwardness, passivity, decrease, and downwardness. In contrast, the Chinese character for Yang originally meant the sunny side of the slope, and qualities characteristic of Yang include heat, movement, brightness, outwardness, stimulation, excitement, increase, and upwardness.⁴ Illnesses that are characterized by coldness, weakness, slowness, and underactivity are considered Yin (e.g., hypothyroidism: cold limbs, fatigue, slowed metabolism). Illnesses that manifest strength, forceful movement, heat, and overactivity are Yang (e.g., acute infections with fever and sweating).

The theory of Five Phases, Wu Xing, is a means of classifying phenomena in terms of five basic processes represented by the elements wood, fire, earth, metal, and water. There exists a dynamic balance and relationship among the elements such that if the balance is interrupted or destroyed, pathological changes may occur. The clockwise movement of one element into the next (wood, fire, earth, and so forth) whereby one element generates, acts on, or promotes the following element, is referred to as the Sheng cycle. The Ke cycle represents an element acting on or controlling another element in a different order (Figure 2).³

Within the model of Five Phases, each element is associated with an organ. Wood is associated with the liver, fire with the heart, earth with the spleen-pancreas-stomach, metal with the lungs, and water with the kidneys. In addition, other phenomena, such as seasons, cardinal directions, weather, color, and emotions, are associated with each element. Within the TCM model, diagnostic information is gained by finding out patients' favorite season, color, and predominant emotion(s).

Key Concepts Within TCM

Qi

Qi (pronounced "chi") is translated into English as vital energy. It is defined in terms of function rather than as a discrete substance, and it is what animates us and allows us to move and maintain the activities of life. The origins of Qi include "congenital" (prenatal) Qi—that which is inherited from our parents—and "acquired" Qi—that which is incorporated from food and air.⁴

Two major patterns of disharmony are associated with Qi. Deficient Qi occurs when there is insufficient Qi to perform the functions of life. Deficient Qi may affect one or more organs or the entire body. If the latter occurs, then the patient may experience lethargy, fatigue, and lack of desire to move. Stagnant Qi refers to impairment of the normal movement of Qi through the meridians (see discussion below) and may result in aches and pains in the body.⁴

Meridians

Meridians are the channels or pathways through which Qi is constantly flowing and circulating throughout

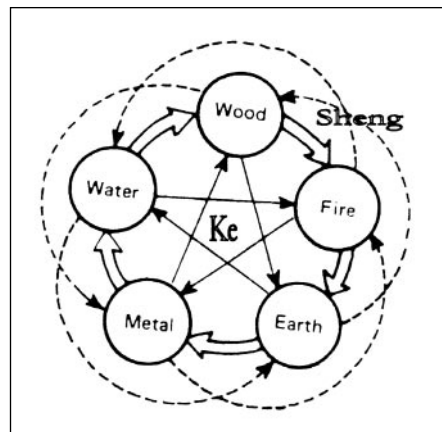


Figure 2. Diagram of The Five Phases, illustrated are the Sheng and Ke cycles

the body. There are 12 regular meridians and 8 extra or "curious" meridians. The 12 main meridians correspond to 12 major functions or "organs" of the body (such as liver, kidney, heart).

The Chinese concept of organs corresponds only loosely to the Western concept. TCM associates specific functions, symptoms, emotions, colors, and tastes with each organ, whereas the Western view is limited primarily to function.

Qi must flow in the correct quantity and quality through the meridians and organs for health to be maintained. Acupuncture, the insertion of thin, solid metal needles, is performed on 1 or more of the 361 acupuncture points distributed along the meridians in order to regulate and promote the proper flow of Qi.⁵ Other techniques may be used to stimulate acupuncture points, such as moxibustion, in which the herb "moxa" (*Artemisia vulgaris*) is used to warm the acupuncture point either above or on the skin. Applied pressure (acupressure), lasers, and magnets also may be used to stimulate acupuncture points.

Jing

Jing, usually translated as "essence," is the substance that is the underpinning of all organic life. Qi is responsible for the ongoing day-to-day movements and function of the body, whereas Jing can be considered an individual's constitutional makeup. According to TCM, Jing is stored in the kidneys.⁴

Shen

Shen is considered to be the psyche or spirit of the individual. Shen is the vitality behind Jing and Qi in the human body. The three elements together—Qi, Jing, and Shen—are referred to collectively in TCM as the "Three Treasures" and are believed to be the essential components of life.⁵

Blood

According to TCM, the major activity of the blood is to circulate through the body, nourishing and moistening the various organs and tissues. Disharmonies of the blood may manifest as "deficient" blood or "congealed" blood. If deficient blood exists and affects the entire body, the patient may present with dry skin, dizziness, and a dull complexion. Congealed blood may manifest as sharp, stabbing pains accompanied by tumors, cysts,

or swelling of the organs (i.e., the liver).⁴ The key organs associated with blood are the heart, liver, and spleen.

Fluids

Fluids are bodily liquids other than blood and include saliva, sweat, urine, tears, and semen. Fluids act to moisten both the exterior (skin and hair) and the internal organs. Disharmonies of fluids may result in dryness and excess heat. The key organs involved in the formation, distribution, and excretion of fluids are the lungs, spleen, and kidneys.³

Diagnosis in TCM

When evaluating patients with a chronic illness such as diabetes, TCM practitioners take a detailed, multi-system case history and supplement this information with observations that give information about the state of the patient's health. These observations include the shape, color, and coating of the tongue; the color and expression of the face; the odor of the breath and body; and the strength, rhythm, and quality of the pulse. Many practitioners will palpate along meridians to detect points of tenderness that may indicate a blockage in the flow of Qi at that point.⁶

One of the most common ways of differentiating symptoms and syndromes in TCM is according to the Eight Principles—four pairs of polar opposites: Yin and Yang, Interior and Exterior, Cold and Heat, and Deficiency and Excess. Characteristics of the Eight Principles are summarized in Tables 1 and 2.⁴

TCM Classification of Diabetes

The Chinese language includes two terms for diabetes. The traditional name, Xiao-ke, correlates closely with diabetes in most instances. Xiao-ke syndrome means “wasting and thirsting.” The more modern term, Tang-niao-bing, means “sugar urine illness.” Reference to diabetes by the traditional term appears in the earliest texts, including the first medical text in Chinese history, *Huang Di Nei Jing*, or *The Yellow Emperor's Inner Classic*.

Diabetes is classically divided into three types: upper, middle, and lower Xiao-ke. Each has characteristic symptoms. The upper type is characterized by excessive thirst, the middle by excessive hunger, and the lower by excessive urination. These types are closely associated with the lungs, stomach, and kidneys, respectively,

and all three are associated with Yin deficiency. At some point during the course of their illness, most people with diabetes manifest symptoms of all three types.

According to TCM, Xiao-ke is attributed to three main factors: improper diet (consuming large quantities of sweets, fatty or greasy foods, alcohol, and hot drinks such as hot coffee or tea), emotional disturbances (stress, anxiety, depression,) and a constitutional Yin deficiency (fatigue, weakness, lethargy, pale complexion).⁷ To the Western ear, TCM diagnoses sound esoteric, even poetic. In the case of a person with diabetes presenting with symptoms of excessive thirst, the diagnosis can be described as kidney

Yin deficiency along with lung Yin deficiency and “internal heat that consumes fluids, thus bringing on wasting and thirsting.”⁷

TCM Therapies

Unlike Western medicine, TCM is not concerned with measuring and monitoring blood glucose levels in diabetic patients. Treatment is individualized and geared toward assessing and treating the symptoms that compose patterns of deficiency and disharmony.

Acupuncture/moxibustion

Acupuncture and moxibustion traditionally have been used in the treatment of diabetes to reduce blood glucose levels and normalize endocrine

Table 1. Summary of TCM Main Excess/Deficiency and Heat/Cold Signs

General Signs	Tongue	Pulse
Excess pattern Ponderous, heavy movement; heavy, coarse respiration; pressure and touch increase discomfort	thick moss	strong
Deficiency patterns Frail, weak movement; tiredness; shortness of breath; pressure relieves discomfort; inactive; passive appearance; low voice; dizziness; little appetite	pale material; thin moss	weak
Heat patterns Red face; high fever; dislike of heat; cold reduces discomfort; rapid movement; outgoing manner; thirst or desire for cold drinks; dark urine; constipation	red material; yellow moss	rapid
Cold patterns Pale, white face; limbs cold; fear of cold; heat reduces discomfort; slow movement; withdrawn manner; no thirst, or a desire for hot drinks; clear urine; watery stool	pale material; white moss	slow

Table 2. Signs of Yin and Yang Patterns⁴

Examination	Yin Signs	Yang Signs
Looking	quiet; withdrawn; slow, frail manner; patient is tired and weak, likes to lie down curled up; no spirit; excretions and secretions are watery and thin; tongue material is pale, puffy and moist; tongue moss is thin and white	agitated, restless, active manner; rapid, forceful movement; red face; patient likes to stretch when lying down; tongue material is red or scarlet, and dry; tongue moss is yellow and thick
Listening and Smelling	voice is low and without strength; few words; respiration is shallow and weak; shortness of breath; acrid odor	voice is coarse, rough, and strong; patient is talkative; respiration is full and deep; putrid odor
Asking	feels cold; reduced appetite; no taste in mouth; desires warmth and touch; copious and clear urine; pressure relieves discomfort; scanty pale menses	patient feels hot; dislikes heat or touch; constipation; scanty, dark urine; dry mouth; thirst
Touching	frail, minute, thin, empty, or otherwise weak pulse	full, rapid, slippery, wiry, floating, or otherwise strong pulse

function. Clinical and experimental studies have demonstrated that acupuncture has a beneficial effect on lowering serum glucose levels.^{8,9}

A typical acupuncture treatment involves needling 4–12 points and allowing the needles to remain in place for ~10–30 min. Needles may be stimulated manually or by using a small electrical current. In addition, the practitioner may warm the points with moxibustion.

The number of treatments for chronic conditions such as diabetes ranges from 6 to 14 sessions. This may be followed by “tune up” sessions every 2–6 months.⁶ The cost for the initial session is about \$75–\$150, with the follow-up visits costing \$65–100 each. Third-party payment for complementary and alternative therapies varies from state to state. Some insurers, such as Blue Cross Blue Shield, cover certain therapies for specific diagnoses only, i.e., acupuncture for pain-related diagnoses. For an additional cost, a few insurance companies offer a separate complementary medicine package that allows the insured to see complementary medicine practitioners at a discounted rate.

Auricular acupuncture (inserting needles into specific points on the ear) may be used alone or in conjunction with body acupuncture. According to TCM, the entire body is represented on the ear. Examination of the ears often reveals surface irregularities, such as superficial capillaries, scars, pitting, pimples, flaking, discoloration, or swelling. Upon probing the auricle of the ear with a rounded, blunt instrument the practitioner may discover tender areas that may correspond to the area of the patient’s pain or disturbance.¹⁰ A sample auricular treatment for diabetes might include needling a master point, for example, Shen Men (a good point for almost all disorders), along with the endocrine point, lung point (for thirst), stomach point (for hunger), kidney and bladder points (for frequent urination), and pancreas point (for increasing insulin secretion).⁷

Peripheral neuropathy, one of the most common complications of type 2 diabetes, occurs most often in the distal extremities and typically affects the sensory, motor, and autonomic systems. Acupuncture has been demonstrated to exert a beneficial effect on neuropathic pain.² The effects of acupuncture, particularly on

pain, are mediated in part by the release of endogenous opioids from the spinal cord, brainstem, and hypothalamus. In addition, it has been demonstrated that neurotransmitters, such as serotonin and substance P, are released during acupuncture treatments. Increases in local blood flow and vasodilation and increased levels of cortisol have also been demonstrated.¹⁰ A 300% increase in plethysmographic recordings of blood flow has been demonstrated in the digits of limbs stimulated with electroacupuncture.¹⁰

A recent study of 46 patients with painful peripheral neuropathy evaluated acupuncture analgesia to determine its short- and long-term efficacy. Using TCM acupuncture points, 34 patients (77%) experienced significant improvement in their symptoms. After a follow-up period of 18–52 weeks, 67% were able to stop or significantly reduce their pain medications. Only 8 (24%) required additional acupuncture treatment; 7 (21%) stated that their symptoms had cleared completely.¹¹

A randomized, sham-controlled, crossover study of 50 adults with type 2 diabetes evaluated the effectiveness of Percutaneous Nerve Stimulation (PENS) therapy in the treatment of neuropathic pain. PENS is a modern adaptation of acupuncture that uses percutaneously placed acupuncture needles to stimulate peripheral sensory and motor nerves innervating the region of neuropathic pain. The results showed that active PENS treatment improved neuropathic pain symptoms in all patients. In addition to reducing pain, the treatment improved physical activity levels, sense of well-being, and quality of sleep and reduced oral non-opioid analgesic medication requirements.²

Because of poor peripheral circulation and slowed healing of skin infections and ulcerations, needling of the lower extremities in diabetic patients should be performed with extreme caution and sterile technique. In general, however, acupuncture appears to be a relatively safe form of treatment. An extensive worldwide literature search identified only 193 adverse events (including relatively minor events, such as bruising and dizziness) over a 15-year period. There have been approximately 86 reported cases of hepatitis B and 1 case of HIV transmission. In all of these cases, nondisposable needles were used.⁶

Herbal medicine

Herbal medicine has been an integral part of TCM for more than 2,000 years. Many herbal formulations have been developed and are used in the treatment of diabetes. The *Huang Di Nei Jing (Yellow Emperor’s Inner Classic)*, which dates from the Han Dynasty 206 B.C.–220 A.D., listed 13 herbal formulations, 9 of which were patent medicines including pills, powders, plasters, and tinctures.¹² The sources of Chinese remedies are varied and include plants, minerals, and animal parts.³

Chinese herbs have specific functions (i.e., warming, heat-clearing, eliminating dampness, and cooling) and can be classified according to those functions. They are also classified according to four natures (cool, cold, warm, and hot) and five tastes (sweet, pungent, bitter, sour, and salty).⁴ Herbs may be prescribed individually or as part of a formula.

Formulas promote the effective use of herbs.³ A typical formula has four components, including:

1. The Chief (principal) ingredient, which treats the principal pattern of disease,
2. The Deputy (associate) ingredient, which assists the Chief ingredient in treating the major syndrome or serves as the main ingredient against a coexisting syndrome,
3. The Assistant (adjutant) ingredient, which enhances the effect of the Chief ingredient, moderates or eliminates the toxicity of the Chief or Deputy ingredients, or can have the opposite function of the Chief ingredient to produce supplementing effects, and
4. The Envoy (guide) ingredient, which focuses the actions of the formula on a certain meridian or area of the body or harmonizes and integrates the actions of the other ingredients.³

Herbal prescriptions for diabetes are formulated or prescribed based on the patient’s predominant symptoms. For instance, a patient presenting primarily with excessive thirst (lung Yin deficiency) might be given a single herb, such as *radix panacis quinquefolii*; or a combination of herbs in a patent formulation such as *yu chuan wan*, which is used in general to treat diabetes of mild to moderate severity and specifically to treat excessive thirst due to Yin deficiency,¹² and *ba wei di huang tang* (“eight-ingredient

pill with rehmannia”), which was originally used to treat people exhibiting weakness, fatigue, and copious urine soon after drinking water.¹³

Some of the most commonly used herbal substances for diabetes in TCM include:

1. *Panax ginseng* (Korean ginseng), which has a long history of use as a hypoglycemic agent. At least five constituents of this herb have been shown to exert hypoglycemic effects. In one study, treatment with ginseng lowered blood glucose levels and improved mood and psychological performance as compared with placebo. Recommended dosage is 100–200 mg/day.¹⁴
2. *Momodica charantia* (balsam pear), which is dried, powdered, and made into pills. A dosage of 18 g/day has been shown to reduce blood glucose.¹⁵
3. *Lagenaria siceraria* (bottle gourd), given as a decoction or pills. The recommended dose is 3 g/day. This, too, has been shown to reduce blood glucose levels.¹⁵
4. *Psidium gnajava*, taken in the form of fresh leaves or as an infusion and drunk as a tea. The dosage is 9 g/day. It acts to reduce blood glucose levels.¹⁵

The above herbs do not appear to increase insulin levels, but rather enhance carbohydrate utilization.¹⁵ Patients should have their type of diabetes and any other diagnoses confirmed before initiating any herbal treatment. In addition, one should first ascertain the credibility of the herbal therapist by inquiring about where and for how long the person received training and about membership in herbal associations such as the American Herbalists Guild. To become members, herbalists must submit three letters of reference from other professional herbalists, a description of their training, and an account of at least 4 years of experience working with medicinal herbs. As part of their training, TCM practitioners learn about the proper use of herbals.

Many Chinese herbs and formulations have been used safely for centuries in the hands of trained TCM practitioners. It is important to recognize, however, that data on drug-herb interactions are scarce, and there are clear contraindications to the use of specific herbs in certain populations, such as pregnant women.¹³

Discontinuing conventional medications in favor of herbal formulations may lead to serious complications such as significant hyperglycemia, and combining conventional hypoglycemic agents with herbal preparations without proper monitoring could lead to hypoglycemia.

The Food and Drug Administration (FDA) does not regulate herbs, minerals, animal products, and patent formulas that come into the United States from China. Herbal products are considered dietary supplements according to the Dietary Supplement and Health Education Act (DSHEA) of 1994; therefore, the manufacturers do not need FDA approval or evaluation for safety, purity, and efficacy before bringing their products to market. There have been reports of some formulas imported from China containing heavy metals such as lead and mercury and of others being deliberately adulterated with conventional Western pharmaceuticals, such as corticosteroids, anti-inflammatory agents, and benzodiazepines.¹⁶

Diet therapy

According to TCM, diet plays an important role in maintaining health and treating disease. In the TCM paradigm, foods are valued and prescribed for their energetic and therapeutic properties rather than solely for their chemical makeup. Attention is paid to the quantity, quality, method of preparation, and time of food intake, as well as to the patient's body type, age, vitality; geographic location; and seasonal influences.

Because TCM defines diabetes as a disease characterized by Yin deficiency and excess internal heat, an example of a dietary prescription would be to consume spinach, which is cooling, “strengthens all the organs, lubricates the intestines, and promotes urination.”⁷ A recommendation might be to boil tea from spinach and drink 1 cup three times/day. Other foods considered to be cooling and beneficial for diabetes include vegetables and grains, such as celery, pumpkin, soybeans (i.e., tofu, soymilk), string beans, sweet potato/yam, turnips, tomato, wheat bran, and millet. Fruit remedies, which act in specific therapeutic ways, include crab apple, guava, plum, strawberry, and mulberry.⁷ It is generally recommended that patients eat a wide variety of seasonal foods and avoid or minimize consumption of sweets and fruits. Meals

should be smaller, eaten more frequently, and eaten at regular times each day.

Qigong

Qigong (pronounced “chi gong”) is literally translated as “function of Qi.” It emphasizes the connection between the mind and body. It is a meditative method that consists of breathing techniques that can be combined with body movements in order to regulate, harness, and enhance Qi. Qigong is used as a means of promoting health, healing, spiritual growth, and overall well-being. While Qigong is not typically used as a major treatment modality for diabetes, it has been found to be a valuable adjunctive therapy for this condition. There are specific Qigong exercises for diabetes.¹⁵

Tui Na

Tui Na is a traditional form of Chinese massage that uses hand manipulations, such as pulling, kneading, pushing, and grasping to stimulate acupuncture points and other parts of the body to create balance and harmony in the system. It can be used effectively in lieu of acupuncture in patients who have an aversion to needles, particularly pediatric patients.¹³

Conclusion

TCM does not offer a cure for diabetes, but instead aims to optimize the body's ability to function normally. There is still a great need for more and better research on the efficacy and safety of both Chinese herbals, which are being used along with or in lieu of Western pharmaceuticals, and acupuncture in the care of diabetic patients. Patients, TCM practitioners, and physicians who choose to integrate the two forms of care must all recognize the importance of careful monitoring of blood glucose levels, as well as monitoring for potential side effects such as drug-herb interactions.

As always, in seeking to integrate different traditions and forms of healing, we are seeking to offer patients the safest, most effective care possible. Remaining open to alternative forms of care and educating ourselves about the safety and efficacy of these modalities can benefit us all.

References

- ¹Berman BM, Kaczmarczyk J, Swyers JP: Complementary and alternative medicine herbal therapies for diabetes. *J Assoc Acad Minor Phys* 10:10–14, 1999

²Hamza MA, White PF, Craig WF, Ghonome EA, Ahmed HE, Proctor TJ, Noe CE, Vakharia AS, Gajraj N: Percutaneous electrical nerve stimulation: a novel analgesic therapy for diabetic neuropathic pain. *Diabetes Care* 23:365–370, 2000

³Lao L: Traditional Chinese Medicine. In *Essentials of Complementary and Alternative Medicine*. Jonas WB, Levin JS, Eds. Baltimore, Md., Lippincott Williams and Wilkins, 1999, p. 216–232

⁴Kaptchuk TJ: *The Web That Has No Weaver: Understanding Chinese Medicine*. Chicago, Congdon & Weed, 1983

⁵Parker MJ: Traditional Chinese Medicine. In *Clinician's Complete Reference to Complementary & Alternative Medicine*. Novey DW, Ed. St. Louis, Mo., Mosby, 2000, p. 203–218

⁶Vickers AZ, Zollman C: <http://www.ahealthyme.com> (accessed March 2001) "Acupuncture"

⁷Choate C: <http://www.acupuncture.com/Acup/Diabetes2.htm> (accessed March 2001) "Diabetes mellitus from Western and TCM perspectives."

⁸Chen DC, Gong DQ, Zhai Y: Diabetes acupuncture research. *J Trad Chinese Med* 14:163–166, 1994

⁹Mao-liang Q: The treatment of diabetes by acupuncture. *J Chinese Med* 15:3–5, 1984

¹⁰Helms JM: *Acupuncture Energetics: A Clinical Approach for Physicians*. Berkeley, Calif., Medical Acupuncture, 1995

¹¹Abuaisha BB, Boulton AJ, Costanzi JB: Acupuncture for the treatment of chronic painful peripheral diabetic neuropathy: a long-term study. *Diab Res Clin Prac* 39:115–121, 1998

¹²Naeser MA: *Outline Guide to Chinese Herbal Patent Medicines in Pill Form*. Boston, Boston Chinese Medicine, 1990

¹³Choate C: <http://alternativediabetes.com/html/chinesemedicine3.shtml> (accessed March 2001) "Diabetes: modern medicine and traditional

Chinese medicine (Part Three)."

¹⁴Choate C: <http://www.jcm.co.uk/SampleArticles/DIA-BETES1.html> (accessed March 2001) "Diabetes: modern medicine and traditional Chinese medicine (Part One)."

¹⁵Keji C: Understanding and treatment of diabetes mellitus by Traditional Chinese Medicine. *Am J Chinese Med* 9:93–94, 1981

¹⁶DeSmet AGM: The safety of herbal products. In *Essentials of Complementary and Alternative Medicine*. Jonas WB, Levin JS, Eds. Baltimore, Md., Lippincott Williams and Wilkins, 1999, p. 108–147

Maggie B. Covington, MD, is director of education for the Complementary Medicine Program and an assistant professor of family medicine at the University of Maryland School of Medicine in Baltimore.