
Review article

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Complementary/alternative medicine in the treatment of asthma

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Objective: This review will familiarize clinical allergists/immunologists with the common forms of complementary/alternative medicine (CAM) that are being used frequently by their patients. It reviews reasons that patients seek alternative health care therapies and the most common illnesses that are treated with this form of medicine. Cultural differences in CAM are also reviewed. The article focuses on specific therapies used to treat asthma and reviews the efficacy of these therapies based on the available scientific literature. The reader will also learn about views of other physicians on CAM and how this topic is being addressed in US medical schools.

Data sources: Computer-assisted MEDLINE searches for articles on “complementary/alternative medicine” or “herbal therapy” and “asthma” or “atopy.”

Study selection: Pertinent abstracts and articles in the above areas were selected. Articles selected for detailed review included review articles of the subjects along with randomized, double-blind placebo-controlled studies in animals and humans.

Results: Complementary/alternative medicine is commonly used by patients with chronic conditions including asthma. One-third of the US population has tried CAM. The literature supporting the efficacy of these therapies is lacking. Some reports elucidate the mechanism of action of certain herbal therapies that could possibly be helpful in the treatment of allergic diseases. There are, however, few well-controlled studies that support the efficacy of CAM in the treatment and clinical improvement of human subjects with asthma or atopic disorders.

Conclusion: Available scientific evidence does not support a role for CAM in the treatment of asthma. The studies in the literature often have significant design flaws that weaken the conclusions such as insufficient numbers of patients, lack of proper controls, and inadequate blinding. Further studies are needed to prove or disprove the efficacy of CAM. Physicians often find CAM intimidating because they are unaware of the clinical evidence and feel uncomfortable advising their patients on its efficacy. There is definitely a need for more education among physicians in this area. It is also important that physicians inquire and discuss the use of CAM with their patients since the majority of patients are using some form of CAM.

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INTRODUCTION

Complementary/alternative medicine (CAM) is increasing in popularity among patients, especially in the United States. According to analysis of

the Robert Wood Johnson² Foundation National Access to Care Survey, 10% of Americans saw an alternative medicine provider in 1994.¹ One-third of the US population has tried CAM. In the

Australian population this number is 50%² whereas it is 25% in the United Kingdom.³ In 1990, 425 million visits were made to practitioners of unconventional medicine. This number exceeded the 388 million visits made to primary care physicians. Most of the visits were made by non-African-Americans aged 25 to 49 years who had relatively higher income and education. Approximately \$13.7 billion was spent on CAM in 1990. Insurance providers did not reimburse 75% of this money.⁴

Patients report several common reasons for seeking alternative health care. These include word-of-mouth (32%), fear of side effects from traditional medications (21%), presence of chronic medical problems (19%), dissatisfaction with conventional medicine (14%), and desire for more personalized treatment (9%).⁵ Eisenberg and colleagues in 1993 indicated that approximately one-third of Americans used at least one form of alternative therapy. Only three of ten people in this study actually informed their primary care givers of their alternative therapy use. Most of these patients using CAM were affluent and well educated.⁴

Complementary/alternative medicine refers to a large range of therapies outside the domain of orthodox Western medicine (Table 1). Therapies included in this domain range from 1000-year-old systems of medicine, such as traditional Chinese medicine (TCM) and Ayurvedic medicine, to homeopathy, acupuncture, biofeedback, chiropractic manipulation, herbal medicine, high-dose antioxidant vitamins and minerals, hypnosis, imagery,

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Table 1. Therapies used in Complementary/Alternative Medicine (CAM)

List of CAM Therapies
Traditional Chinese medicine
Homeopathy
Biofeedback
Herbal medicine
Hypnosis
Lifestyle and diet changes
Osteopathy
Relaxation
Self-help groups
Aromatherapy
Ayurvedic medicine
Acupuncture
Chiropractic manipulation
Antioxidant vitamins and minerals
Imagery
Massage therapy
Prayer healing
Yoga
Reflexology
Breathing techniques

lifestyle and diet, massage therapy, osteopathy, prayer healing, relaxation, yoga, and self-help groups. Sikand and colleagues assessed the attitudes, training and practices regarding CAM among fellows of the Michigan chapter of the American Academy of Pediatrics. Results indicated that 83.5% of these pediatricians believe some of their patients use some form of CAM. The topic of CAM is usually initiated by patients rather than physicians (84.7%). Half of these physicians would consider referring patients to other practitioners for CAM therapies. The most common types of CAM referrals made included biofeedback, self-help groups, relax-

ation, and hypnosis. Less than 10% refer for chiropractic manipulation, osteopathic manipulation, homeopathy, herbal medicine, and prayer healing. The majority (54%) of these pediatricians are interested in CME courses in CAM.⁶ Medical conditions commonly treated with CAM include chronic problems (headaches, backaches, pain management, and seizures), problems for which traditional therapies have failed, behavioral problems, psychiatric disorders (anxiety and depression), and neurologic diseases listed below.

Chronic condition
Back pain
Headaches
Pain management
Seizures
Behavioral problems
Nightmares
ADHD
Psychiatric disorders
Depression
Anxiety
Neurologic diseases (eg, demyelinating)

The primary chronic condition for which individuals seek alternative therapies is lower back pain, followed by allergies.⁷

Complementary/alternative medicine is used mostly for benign chronic conditions for which mainstream medicine cannot offer a reliable cure. Asthma sufferers are prime candidates for CAM. Ernst surveyed members of the United Kingdom National Asthma Campaign in order to generate data on the prevalence of CAM use among asthmatics. The majority of the re-

sponders (60%) used CAM in a variety of forms. The most commonly used therapies included breathing techniques (44%), homeopathy (17%), and herbalism (15%). Most of the patients found out about CAM by friends and relatives (27%), media (16%), and the general practitioner (13%). The majority of respondents found that CAM had improved their symptoms "to some extent" or "to a slight extent."⁷

The use of CAM in regard to general beliefs and philosophies, specific herbs, and therapies varies between cultures (Table 2). Traditional Chinese medicine (TCM) relies on maintaining harmony and balance between two forces (yin and yang), and among five elements (fire, earth, metal, water, and wood). "Fire gives rise to bitterness, earth to sweetness, metal to acidity, water to saltiness, and wood to sourness." Each taste has a specific action: bitter dries and drains, sweet tonifies and reduces pain, acid disperses, salty nourishes kidneys, sour nourishes yin, astringe prevents unwanted loss of body fluids, and bland is diuretic. Therapy for asthma and allergies is based mostly on *ma huang* (*Ephedra* bush). Observations made in Chinese medicine point to a link between asthma and water imbalance or kidney deficiency. So herbs felt to produce kidney reinforcement or contain tonifying blends are used in asthma therapy.⁸

In Japan, the Kampo medical system is based on TCM. Combination products are recommended. In India, asthma therapy involves Ayurvedic medicine, yoga, meditation, breathing exercises, and homeopathy. Ayurvedic medicine rec-

Table 2. Cultural Differences Regarding CAM

China (traditional Chinese medicine)	Stresses harmony between yin and yang and balance among five elements (fire, earth, metal, water, and wood)
Japan (Kampo medical system)	Based on TCM; combination products commonly used
India (Ayurvedic medicine)	Recognizes five elements (fire, ether, water, air and earth); used in combination with yoga, meditation, and homeopathy
Latin America/Puerto Rico	Believes cold is the main cause of bronchial asthma so therapies are based on "hot" remedies such as oral infusions and syrups
Hawaii	Feel illness is due to loss in energy or balance so therapy aimed at restoring balance; use religious ceremonies, seances, massage, and herbs
Industrialized countries	Utilize a variety of CAM therapies: acupuncture, chiropractic manipulation, herbal therapy, etc.

Abbreviations: CAM = complementary/alternative medicine and TCM = traditional Chinese medicine.

ognizes five elements (fire, ether, water, air, and earth), which manifest in the body as form (tridosha) or humors: pitta (fire or bile), vata (air or wind), and kapha (water or phlegm). As with TCM, taste indicates an herb's properties: sweet, sour, salty, pungent, bitter, or astringent.⁸

Medicine in Latin America/Puerto Rico believes that cold is the main cause of bronchial asthma; therefore, therapy results in "hot remedies." Treatment consists of oral infusions and syrups, camphor rub, Vicks VapoRub, prayer, and the use of talismans.⁹ In Hawaiian medicine, illness is believed to be due to a loss in energy and balance. Treatment is used to return this energy and balance back to normal. Methods include religious ceremonies, seances, massage, and herbs.¹⁰

Industrialized countries utilize a wide variety of CAM therapies including acupuncture, acupressure, homeopathy, chiropractic manipulation, osteopathy, herbs, hypnotherapy, massage, reflexology, iridology, and magnetic therapy. In the United States, any of the above therapies are used, along with vitamins, magnesium, selenium, acetylcysteine, omega-3 fatty acids, ginkgolides, and herbs. Western cultures use herbal products from local plants along with herbs from eastern cultures.¹¹

SPECIFIC THERAPY IN ASTHMA

Chiropractic Manipulation

Chiropractic care claims that most diseases can be managed by the manipulation of subluxations in the vertebral column. Classic chiropractic theory claims that subluxations block the flow of "innate intelligence," which affects the ribs and organs. Practitioners rely on vigorous manipulation techniques, such as high-velocity, low-amplitude thrusts using their hands or devices to readjust vertebral subluxations and to help patients maintain more healthy postures.¹² Randomized, controlled trials have shown that spinal manipulation relieves back pain and other musculoskeletal conditions.^{13,14} Many

chiropractors report benefit in patients with asthma, as well.^{15,16} The theoretical basis for expecting benefit from spinal manipulation in persons with asthma assumes that correction of subluxation restores normal mechanical and nerve function and aids in the resolution of asthma.^{17,18} A recent randomized controlled trial of chiropractic spinal manipulation for children with mild or moderate asthma was conducted. This study looked at two groups of children that received either active or simulated manipulation over a 4-month period while participants continued their routine asthma medications. The primary outcome measure was the change from baseline in the peak expiratory flow, measured in the morning, before the use of a bronchodilator. Eighty children had data that could be evaluated. The results showed small increases (7 to 12 L/min) in peak expiratory flow in the morning and evening in both groups. There were also decreased symptoms and beta agonist use and increased quality of life in both groups. There was no significant difference between the two groups. In conclusion, any benefit was nonspecific and was attributable to a placebo effect or to being involved in an active study (the hawthorne effect).¹⁹ Other controlled studies also suggest chiropractic manipulation offers no corrective benefit in asthma.²⁰ Previous trials in which there had been evidence of benefit of chiropractic treatment of asthma were inadequately controlled.^{16,21}

ACUPUNCTURE

Acupuncture has been used in asthma with varying success. This Chinese practice involves insertion of thin needles into specific points on the body in order to restore the balance of yin and yang energies, which is believed to be abnormal in illness. The mechanism of action of acupuncture is not clear. One suggested mechanism is through the stimulation of adrenocorticotrophic hormone, vasoactive intestinal peptide (VIP), or endorphins, which leads to increased secretion of adrenocorticoids and increased steroid production. Va-

soactive intestinal peptide is a potent vasodilator and bronchodilator. The effects of acupuncture are most evident at one-half hour after stimulation of specific acupuncture loci on the thoracic wall and along the "lung-channel." These immediate effects include decreased airway resistance, decrease in sputum viscosity, analgesia, and improved sleep patterns.²²

Kleijnen et al reviewed 13 studies on acupuncture in the treatment of asthma considered to have adequate methodologic criteria. The eight superior studies of these 13 were of only mediocre quality and the claims of efficacy were not supported by actual findings.²³ Lane and Lane reported that acute benefits were discernible in some of the studies they examined.²⁴ The efficacy of acupuncture for the treatment of asthma remains uncertain, and its superiority over conventional medical therapy has never been demonstrated. It is relatively safe but is not without risks. There has been a report of an outbreak of hepatitis B from use of unsterile needles and a report of a pneumothorax following placement of needles into points on the chest wall.²⁵

HERBAL THERAPY

Herbs are plants or plant parts used to flavor food, make medicine, and produce fragrance. Herbal products exist in various forms including capsules, teas, extracts, essential oils, and ointments. As many as 250,000 to 500,000 plants exist worldwide, but only 5,000 have been studied in regard to their medicinal properties. Herbs contain "naturally occurring chemicals that have biological activity."⁸ Herbalists claim that certain constituents have anti-allergic, antihistaminic, anti-asthmatic, and anti-inflammatory properties (Table 3).

MA HUANG

Ma Huang is one of the most important anti-asthma herbs used in traditional Chinese medicine (TCM). It is derived from the stem of the Chinese plant *Ephedra sinica*. The active ingredients include L-ephedrine (80% to 90%), L-Methylephedrine, L-norephed-

Table 3. Herbs Commonly Used in the Treatment of Asthma

Common Name	Botanical Name	Possible Therapeutic Properties
Ephedra (<i>Ma-Huang</i>)	<i>Ephedra sinica</i>	Main ingredient, ephedrine, acts as adrenergic agonist on both α - & β -receptors leading to vasoconstriction, mydriasis, and bronchial relaxation
Deadly nightshade	<i>Atropa belladonna</i>	Primary ingredient, atropine, is anticholinergic
Ginkgo	<i>Ginkgo biloba</i>	Primary ingredients, ginkgolides, act as platelet activating factor antagonists
Licorice	<i>Glycyrrhiza uvale</i>	Antitussive and mucokinetic; glycyrrhetic acid inhibits 11- α -dehydrogenase and blocks conversion of cortisol to cortisone hence prolonging the action of cortisol
<i>Saiboku-to</i>	(combination of 10 herbs)	Contains glycyrrhizin and magnol which are inhibitors of 11- α -dehydrogenase leading to increased cortisol levels
Tylophora	<i>Tylophora indica</i>	Bronchodilator
Coleus	<i>Coleus forskohlii</i>	Primary ingredient, forskolin, enters cells and stimulates adenylate cyclase to produce 3',5'-adenosine monophosphate leading to bronchodilation

rine, D-pseudoephedrine, D-N-methylpseudoephedrine, D-pseudoephedrine, L-norephedrine, and alkaloid.²⁶ Ephedrine acts as an adrenergic agonist on both α - and β -receptors leading to vasoconstriction, mydriasis, and bronchial relaxation. Oral ephedrine was once used to treat asthma in conventional Western medicine, before the appearance of inhaled β_2 -agonists, such as albuterol.²⁵ This herb is the most well studied herb in TCM and is also used in the treatment of hay fever, nasal congestion, tracheitis, cough, hemorrhage, and shock.²⁷ The usual treatment regimen for asthma includes doses of 15, 25, or 30-mg tablets tid or a 30 mg/ampoule subcutaneously or intramuscularly.²⁶ Rhinitis is treated with a 1% nasal spray. *Ma Huang* is used either alone or in combination with other herbs such as Minor Blue Dragon, cough formulas, and cold formulas. Ephedrine is also a popular dietary supplement promoted to treat obesity and fatigue in larger amounts that may exceed 100 mg per dose. It is thought to be relatively safe in the amounts used to treat asthma but is more dangerous at the larger doses.²⁸ Adverse effects can include hypertension, tachycardia, palpitations, nervousness, headache, insomnia, dizziness, euphoria, nephrolithiasis, seizure, stroke, and fatal myocardial infarction.

ATROPA BELLADONNA

The second most important herb in the treatment of asthma is *Atropa belladonna* (deadly nightshade). Its active

ingredient is atropine. Atropine is found along with other anticholinergic agents in all solanaceous plants such as jimsonweed (*Datura stramonium*) and henbane (*Hyoscyamus niger*). Atropine has anticholinergic and bronchodilating properties. The bronchodilating atropinic drugs are liberated by burning the leaves of these plants. These plants were once burned in cigarettes and referred to as "asthma cigarettes."²⁸ These primitive "inhalers" were a popular treatment for asthma and other respiratory conditions in Europe and North America in the early part of the 20th century.²⁹

GINKGO BILOBA

Ginkgo biloba is used around the world for a variety of illnesses. Some of the diseases it is promoted to treat include coronary artery disease, angina, hypercholesterolemia, and Parkinson's disease.²⁶ It is used throughout Europe for asthma and circulatory disorders. Traditional Chinese medicine claims that it is useful in expelling phlegm and controlling wheezing. It is used for cough and wheezing in combination with *Ephedra sinica*, apricot seed, and *Morus alba* root.³⁰ The main ingredients are termed ginkgolides and include kaemferol-3-rhamnoglucoside, ginkgetin, isoginkgetine, and bilobetin, which vasodilates, lowers plasma cholesterol, and relaxes smooth muscle.²⁶ There are studies that indicate that ginkgolides act as platelet activating factor (PAF) antagonists. In a recent paper regarding herbal treatment of

asthma, Bielory and Lupoli reviewed several controlled trials in animals that resulted in ginkgolides inhibiting PAF-induced bronchoconstriction.³¹ Guinot and colleagues performed a randomized, double-blind, crossover study in eight atopic asthmatics who received 3 days of a ginkgolide or placebo with subsequent allergen exposure that resulted in inhibition of early bronchoconstriction and residual bronchial hyperactivity in the treatment group. These results indicate that PAF-antagonists are efficacious in allergen-induced reactions in asthmatic humans.³² Side effects include nausea, vomiting, diarrhea, salivation, anorexia, headache, dizziness, tinnitus, and hypersensitivity reactions.

LICORICE

Licorice is a root that is used as an antitussive and mucokinetic in cough, bronchitis, and asthma. Traditional Chinese medicine describes it as an herb that stops coughing and wheezing while it moistens the lungs. Active ingredients include glycyrrhizin, a glycone glycyrrhetic acid, 2- β -glucuronosyl glucuronic acid, isoliquiritigenin-4-glucoside, licorice, tannic acids and several others. Glycyrrhetic acid activity inhibits 11- β -dehydrogenase and blocks conversion of cortisol to cortisone hence prolonging the action of cortisol.³³ Licorice has also been reported to inhibit histamine-induced increased permeability of capillaries and inhibit PAF.³¹ Licorice also has chemicals that are antitussive including

18-beta-glycyrrhetic acid and terpenoids.²⁶ Some derivatives of licorice have been shown to be as potent as codeine in suppressing cough.³⁴ There have been no controlled trials with licorice in asthmatic humans.

SAIBOKU-TO

Saiboku-to is the most popular and well-studied anti-asthmatic herbal treatment used in the Kampo medical system in Japan. In China, it is called *chaipu-tang* (CPT). Uses include steroid-dependent asthma where it is claimed to be steroid-sparing. It is a combination of two preparations of herbs, *sho-saiko-to* and *hange-koboku-to* and contains the 10 following herbs: *Glycyrrhiza glabra*, *Perillae frutescens*, *Magnolia officinalis*, *Zizyphus vulgaris*, *Scutellaria baicalensis*, *Bupleurum falcatum*, *Poria cocos*, *Pinellia ternata*, *Zingiber officinale*, and *Panax ginseng*.³⁵ Both glycyrrhizin and magnol, a component of *Magnolia officinalis*, are inhibitors of 11-beta-dehydrogenase leading to increased cortisol levels. This activity may account for the claimed steroid-sparing effect of *Saiboku-to*. There have been two controlled studies in adult steroid-dependent asthmatics that have resulted in reduced steroid dose. Egashira et al studied 64 steroid-dependent asthmatics in a randomized, controlled trial using *saiboku-to* and placebo. *Saiboku-to* allowed some patients to withdraw from steroids and was helpful in alleviating symptoms as shown by decreased asthma scores. Two patients were able to stop steroids and eleven reduced their dose by 50%.³⁶ Nakajima et al studied 40 steroid-dependent asthmatics treated with *saiboku-to* for 6 to 24 months: 11% stopped using steroids and 34% decreased their steroid dose. *Saiboku-to* also spared the down-regulation of glucocorticoid receptors and beta-2-receptors by beta-2-agonists.³⁷ Other studies have shown suppression of allergen-induced bronchial hyperactivity and tracheal accumulation of eosinophils in guinea pigs.³⁸

TYLOPHORA INDICA

Tylophora indica is an herb claimed to be mucokinetic used commonly in the

Ayurvedic system of medicine, which is practiced in India. It is used in India to treat asthma and other respiratory disorders such as bronchitis and the common cold along with dysentery and rheumatism. It is recognized as a bronchodilator.³⁹ The active ingredient is tylophorine, an alkaloid. Gopalakrishnan et al showed that tylophorine inhibited anaphylaxis and immunocyto-adherence in guinea pigs.⁴⁰ Bielory and Lupoli recently reviewed studies on the effects of *Tylophora indica* in asthmatics. There have been three double-blind, placebo-controlled studies in asthmatics that showed a decrease in asthma symptoms in patients receiving tylophora. One study also showed an increase in peak expiratory flow rate after treatment with this Indian herb.³¹ A trial conducted by Gupta et al, however, showed no statistically significant change between treated asthmatics and the placebo group in regard to asthma signs and symptoms, drug use, forced expiratory volume in one second, and peak expiratory flow rate.⁴¹ Side effects, which are more prominent when the leaves of this plant are chewed rather than alcohol extracts ingested, include nausea, vomiting, and sore mouth.³¹

COLEUS FORSKOHLII

Coleus forskohlii is another Indian herb used in the treatment of asthma. It contains forskolin (also called colforsin), and has bronchodilator effects. It is claimed to enter cells and directly stimulate adenylate cyclase to produce cyclic 3', 5'-adenosine monophosphate. This could offer an advantage by bypassing beta-surface receptors and overcoming tachyphylaxis.²⁷ Two groups of investigators compared forskolin with fenoterol and placebo in asthmatic subjects in double-blind, controlled, crossover studies. Bauer et al found relevant bronchodilation in the forskolin-treated group that lasted more than one-half hour but a greater dose was required than when fenoterol was used.⁴² Kaik and Witte found that colforsin capsules increased specific airway conductance.⁴³ Both groups found fewer side effects in

the forskolin groups in regard to degree of tremor and hypokalemia.

TRADITIONAL CHINESE MEDICINE

The efficacy of several traditional Chinese medicines in asthma was investigated in a two-part multicenter, double-blind, placebo-controlled study by Hsieh et al. Three herbal-based interventions were explored: group A, Liu-Wei-Di-Huang Wan; group B, Shen-Ling-Bai-Shu-San; and group C, Jia-Wei-Si-Jun-Zi-Tang. Each intervention consisted of a combination of herbal products.

Three hundred and three asthmatic children were evaluated in the first part of the study in regard to symptom score, medication score, peak expiratory flow (PEF), and changes in immunoregulatory function. Improvements were found in both the placebo and treatment groups by symptom and medication scores. Groups A and C showed significant increases in PEF values. In vitro studies in the second part of the study showed a decrease in histamine release and enhanced prostaglandin E2 production. In vivo studies, then performed in guinea pigs, showed decreased leukotriene C4 production and enhanced PGE2 production. Hsieh concluded that herbal-based TCM showed some efficacy in asthma treatment, although there was also a significant placebo effect present.⁴⁴

RISKS OF HERBAL THERAPY

Many herbal agents can be safe when used appropriately, but known and potential risks of such compounds do exist. There is a misconception that herbs are safe because they come from plants. The chemical makeup of flowering plants is sophisticated and many are toxic. Much of their risk is related to the unknown. Contamination with metals such as lead and mercury has occurred. Adulteration with drugs to improve their activity has been reported. Common adulterants that have been found include steroids and NSAIDs. Other factors related to the unknown include inconsistent dosing,

drug interactions, and worsening of serious medical conditions.⁴⁵

There is no licensing body for the practice of herbal medicine in the United States. Most herbs are marketed as dietary supplements and are not regulated by the FDA. There is no guarantee of quality. Physicians and patients should realize the risks involved in using these herbal remedies.⁴⁶

VITAMIN THERAPY AND ASTHMA

There has been a great deal of interest in vitamin therapy in the treatment of asthma. Bielory and Gandhi reviewed studies pertaining to vitamin C in asthma and allergy. They found a number of studies that support the use of vitamin C in asthma and allergy. Significant results included positive effects on pulmonary function tests and bronchoprovocation challenges with methacholine or histamine or allergen. There were also several studies that showed no improvement in these measures.⁴⁷

Vitamin C has been shown to attenuate exercise-induced bronchospasm in at least some patients. Cohen et al evaluated 20 asthmatics with exercise-induced asthma (EIA) and found that over half of these patients had a documented protective effect on exercise-induced hyperreactive airways after receiving ascorbic acid.⁴⁸ These findings agree with the observations of Schachter and Schlesinger⁴⁹ and Miric and Hakhiu.⁵⁰ Vitamin C is the major antioxidant substance present in the airway surface liquid of the lung, where it could be important in protecting against both endogenous and exogenous oxidants.

Soutar et al evaluated the relationship between dietary levels of antioxidants and bronchial reactivity in a group of asthmatics in rural Sweden using a validated dietary questionnaire and methacholine challenge. The results indicated that the lowest intakes of vitamin C, manganese, and magnesium were associated with a greater risk of hyperreactivity.⁵¹

EDUCATION OF US MEDICAL STUDENTS

In surveys of physicians, many are interested in continuing medical education opportunities regarding complementary/alternative medicine. Medical schools are having to face the challenge of teaching their students about these therapies. Wetzel and colleagues surveyed the 125 US medical schools to document the courses offered to medical students. Replies were received from 117 (94%) of the schools. Of the schools that replied, 64% offer elective courses or include topics in required courses. The number of courses reported was 123. Most of the courses (68%) are stand-alone electives. One-third are part of required courses and one course is part of an elective. The Family Medicine Department teaches 31% of the courses and the Internal Medicine department offers 11%. Formats include lectures, practitioner lectures/demonstrations and patient presentations. Common topics consist of chiropractic manipulation, acupuncture, homeopathy, herbal therapies, and mind-body techniques. The experience of doctors-in-training in regard to complementary/alternative medicine is diverse and heterogeneous.⁵²

CONCLUSION

Available scientific evidence does not support a role for CAM in the treatment of asthma. The studies in the literature often have significant design flaws that weaken the conclusions such as insufficient numbers of patients, lack of proper controls, and inadequate blinding. Subject groups are often not well characterized in regard to asthma severity and use of conventional medications. Further studies are needed to prove or disprove the efficacy of CAM. More investigation into promising herbal treatments is not only important because of their increased usage, but could possibly lead to development of new medications that would be beneficial in the treatment of asthma and allergy.

Physicians often find CAM intimidating because they are unaware of the clinical evidence and feel uncomfort-

able advising their patients on its efficacy. There is definitely a need for more education among physicians. It is important to realize that the majority of patients are using some form of CAM. Physicians should inquire and discuss this issue in order to promote more successful treatment of their patients.

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CME Examination

No 002–012

Questions 1–20. DM Graham and MS Blaiss. *Ann Allergy Asthma Immunol* 2000;85:438–449.

CME Test Questions

- What proportion of the U.S. population has tried some form of CAM?
 - One fourth
 - One half
 - One third
 - One tenth
 - One eighth
- Common reasons for seeking alternative health care include all of the following **except**:
 - Word of mouth
 - Presence of chronic medical problems
 - Dissatisfaction with conventional medicine
 - Fear of side effects from traditional medications
 - Desire for less personalized treatment
- According to this review, the most common types of CAM referrals from pediatricians surveyed included all of the following **except**:
 - biofeedback
 - self-help groups
 - chiropractic manipulation
 - relaxation
 - hypnosis
- The most common conditions treated with CAM include all of the following **except**:
 - headaches
 - skin infections
 - pain management
 - seizures
 - backaches
- The primary condition for which individuals seek alternative therapies is:
 - seizures
 - heart disease
 - allergies
 - back pain
 - pain management
- Members of the National Asthma Campaign using CAM most commonly used the following therapy:
 - Chiropractic manipulation
 - Herbalism
 - Magnetic therapy
 - Homeopathy
 - Breathing techniques
- The following statement is not true in regard to chiropractic manipulation in patients with chronic diseases:
 - Classic chiropractic therapy claims that subluxations block the flow of “innate intelligence” which affects the ribs and organs.
 - Randomized, controlled trials have shown that spinal manipulation relieves back pain and other musculoskeletal conditions.
 - Theoretically, spinal manipulation in asthmatics corrects subluxation and restores normal mechanical and nerve function and aids in resolution of asthma.
 - Chiropractic manipulation shows increases in peak expiratory flow and decreased symptoms in a group of asthmatic children compared to a control group.
 - Benefit from chiropractic manipulation in asthma is nonspecific and attributable to a placebo effect.
- Possible mechanisms of action for acupuncture include all of the following **except**:
 - Blocking of the “lung channel”
 - Stimulation of steroid production
 - Stimulation of vasoactive intestinal peptide
 - Stimulation of endorphins
 - Stimulation of adrenocorticotrophic hormone
- According to this review, the most important anti-asthma herb used in Traditional Chinese medicine (TCM) is which of the following:
 - Atropa belladonna
 - Ma Huang
 - Ginkgo biloba
 - Licorice
 - Saiboku-tu
- According to this review, the mechanism of action of *Ginkgo biloba* is which of the following:
 - anticholinergic and bronchodilating
 - platelet activating factor antagonist
 - adrenergic agonist on alpha- and beta-receptors
 - inhibition of 11-beta-dehydrogenase
 - stimulation of adenylate cyclase
- According to this review, the mechanism of action of *Ma Huang* is which of the following:
 - Anticholinergic and bronchodilating
 - platelet activating factor antagonist

-
- C. adrenergic agonist on alpha- and beta-receptors
D. inhibition of 11-beta-dehydrogenase
E. stimulation of adenylate cyclase
12. According to this review, the mechanism of action of *Coleus forskohlii* is which of the following:
A. anticholinergic and bronchodilating
B. platelet activating factor antagonist
C. adrenergic agonist on alpha- and beta-receptors
D. inhibition of 11-beta-dehydrogenase
E. stimulation of adenylate cyclase
13. According to this review, the mechanism of action of licorice is which of the following:
A. Anticholinergic and bronchodilating
B. platelet activating factor antagonist
C. adrenergic agonist on alpha- and beta-receptors
D. inhibition of 11-beta-dehydrogenase
E. stimulation of adenylate cyclase
14. According to this review, the mechanism of action of *Atropa belladonna* is which of the following:
A. anticholinergic and bronchodilating
B. platelet activating factor antagonist
C. adrenergic agonist on alpha- and beta-receptors
D. inhibition of 11-beta-dehydrogenase
E. stimulation of adenylate cyclase
15. According to this review, *Saiboku-to* contains glycyrrhizin which has the following activity:
A. Anticholinergic and bronchodilating
B. platelet activating factor antagonist
C. adrenergic agonist on alpha- and beta-receptors
D. inhibition of 11-beta-dehydrogenase
E. stimulation of adenylate cyclase
16. According to this review, **low** dietary levels of all of the following were associated with increased bronchial reactivity **except**:
A. Vitamin C
B. Manganese
C. Magnesium
D. Vitamin E
17. According to this review, the following statements are true about herbal therapy **except**:
A. Most herbs are marketed as dietary supplements.
B. Adulterants such as steroids and NSAIDS are common.
C. Contamination with metals such as lead and mercury has occurred.
D. Herbal therapy is associated with inconsistent dosing, drug interactions, and worsening of serious medical conditions.
E. There is a licensing body for the practice of herbal medicine in the United States.
18. According to this review, vitamin C has been shown to be associated with all of the following **except**:
A. Improvement in nocturnal cough related to asthma
B. Improvement in pulmonary function tests
C. Positive effects on bronchoprovocation challenges with methacholine
D. Positive effects on bronchoprovocation challenges with histamine and allergen
E. Attenuation of exercise induced bronchospasm
19. According to this review, most of the courses offered to US medical students regarding CAM are in the form of which of the following formats:
A. Required courses
B. Stand-alone electives
C. Included as topic within an elective
D. Standardized topics across the US
E. Interactive courses
20. According to this review, the following statements regarding CAM studies in the literature are true **except**:
A. Most studies have inadequate numbers of patients.
B. Most studies lack proper controls.
C. Most studies have inadequate blinding.
D. Study groups are not well characterized in regard to asthma severity.
E. Study groups are usually well characterized in regard to use of conventional medications.
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Use a No. 2 or soft lead pencil for marking the answer sheet. You may

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Answers to CME examination—Annals of Allergy, Asthma & Immunology (Identification No. 2000-011) Thompson A K: Quality of Life in patients with allergic rhinitis. *Ann Allergy Asthma Immunol* 2000;85:338–348.

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| 1. c | 6. b | 11. e | 16. d |
| 2. e | 7. e | 12. a | 17. b |
| 3. e | 8. e | 13. e | 18. a |
| 4. b | 9. c | 14. b | 19. e |
| 5. a | 10. c | 15. d | 20. a, b, c |