

Complementary and Alternative Medicine and Heart Health

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Definition of CAM

- ❑ According to a 2012 national survey, more than 30 percent of adults and about 12 percent of children in US use complementary and alternative medicine (CAM).
- ❑ Complementary and alternative medicine (CAM) is defined as “a group of diverse medical and health care systems, practices, and products that are not generally considered part of conventional medicine”
- ❑ Complementary Medicine: If a non-mainstream practice is used **together with** conventional medicine, it’s considered “complementary.”
- ❑ Alternative Medicine: If a non-mainstream practice is used **in place of** conventional medicine, it’s considered “alternative.”

Cardiovascular Disease

- ❑ Cardiovascular disease is the leading cause of mortality in the United States for both men and women.
- ❑ Approximately 600,000 people die of heart disease in the United States every year, representing one in every four deaths.
- ❑ Risk factors for CVD include hypertension, high LDL-cholesterol, smoking, diabetes, overweight and obesity, poor diet, physical inactivity, and excessive alcohol use.
- ❑ Despite CAM therapies being widely employed by patients with CVD, many physicians are not familiar with these therapies.

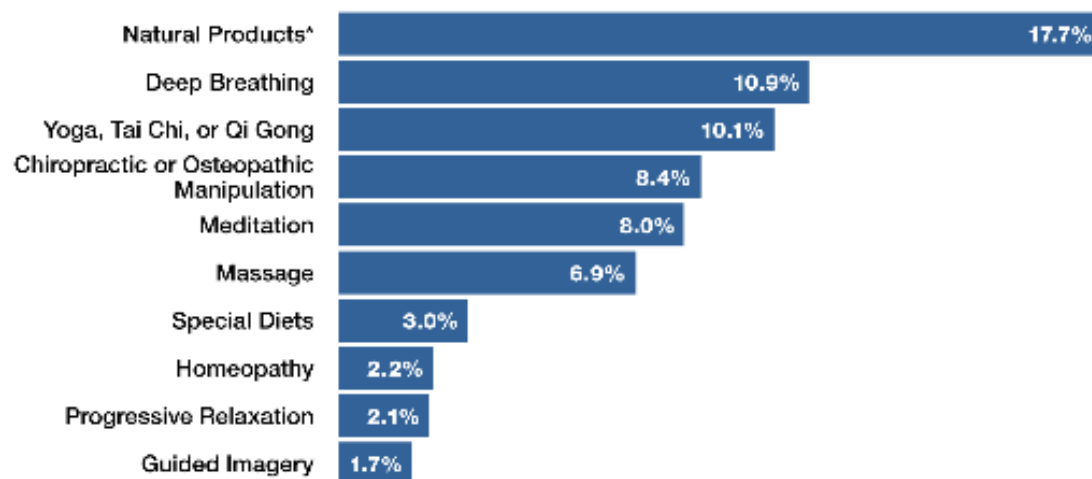
CAM and CAD

- ❑ The most common reason cited by patients for the CAM use is the perception that CAM is harmless.
- ❑ Some other reasons for CAM use are CAM is thought to be of greater benefit than conventional medications, adverse drug reactions to conventional therapy and overall well being and promotion of good health.
- ❑ CAM use is highest in patients include:
 - ✓ Female
 - ✓ Non smokers
 - ✓ Physically active
 - ✓ Having normal BMI
 - ✓ Eating low fat diets with a high fruit and vegetable content
 - ✓ Individuals aged 35 to 54 years with a high level of education

Use of Complementary Health Approaches in the U.S.

National Health Interview Survey (NHIS)

10 most common complementary health approaches among adults—2012



*Dietary supplements other than vitamins and minerals.

Source: Clarke TC, Black LI, Stussman GJ, Barnes PM, Nahri RL. Trends in the use of complementary health approaches among adults: United States, 2002-2012. National health statistics reports; no 79. Hyattsville, MD: National Center for Health Statistics; 2015.

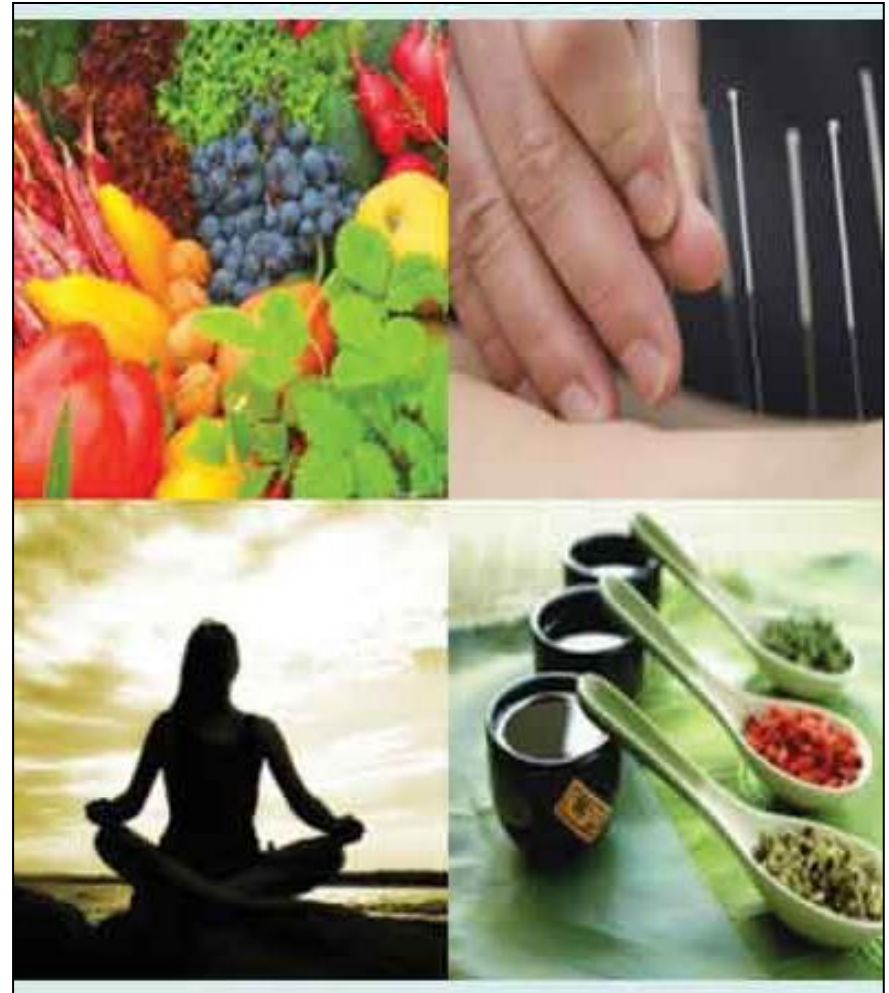
U.S. Department of Health & Human Services • National Institutes of Health



nccih.nih.gov

Categories of CAM

- Biologically based therapies
- Mind body therapies
- Manipulative and body therapies
- Whole medicine systems
- Energy medicine



Biologically Based Therapies

Biologically Based Therapies

- ✓ Diet based Therapy
- ✓ Aromatherapy
- ✓ Chelation therapy
- ✓ Phytotherapy/Herbal Medicine
- ✓ Folk Medicine
- ✓ Iridology



Question

Which of the following statement is True

1. Herbal medications are approved by the FDA before they enter the market
2. Herbal medications are studied in Pregnant women and children
3. FDA monitors the safety of herbal medicines by reviewing serious adverse events
4. Herbal Medications have antidotes for overdose/adverse effects

Garlic (Allium Sativum)

- ❑ Garlic is used as dietary supplement for treatment of Hyperlipidemia, Hypertension and CVD.
- ❑ Garlic may exert an anti atherosclerotic effect and inhibiting lipid deposition in the vessels. It has been shown to reduce both endogenous synthesis and intestinal absorption of cholesterol.
- ❑ To date, there is **no conclusive evidence** on the efficacy of garlic for the treatment of cardiovascular conditions, although some positive data are available.
- ❑ **Safety concern:** Due to the potential antiplatelet activity caused by garlic consumption, it should be taken with extreme caution in individuals treated with antiplatelet or anticoagulant medications.



Ginseng (Panax Ginseng)

- ❑ Asian ginseng is used to support overall health and boost the immune system. It is claimed to improve blood pressure control and lower blood glucose and lipids.
- ❑ Asian ginseng may exert beneficial effects on the cardiovascular system by , reducing platelet adhesion and stimulating secretion of endothelial cell–derived nitric oxide, which inhibits production of reactive oxygen species.
- ❑ Based on studies, there appears to be **insufficient evidence** to suggest a beneficial effect of Asian ginseng for CVD.
- ❑ **Safety Concerns:** Can induce enzyme activity of the cytochrome P450 (CYP450) family and, as a consequence, lower the bioavailability of a number of medications, including warfarin.



Ginkgo Biloba

- ❑ Ginkgo has been largely studied for possibly preventing and treating dementia and CHD.
- ❑ Ginkgo biloba is purported to have cardio protective effects by several studies through its antioxidant, antiplatelet, antithrombotic, vasodilatory, and antihypertensive properties.
- ❑ Large RCT found **no evidence** that, compared with placebo, ginkgo reduced total or cardiovascular disease mortality, or cardiovascular events, including myocardial infarction, angina pectoris, and stroke.
- ❑ **Safety Concerns:** Major bleeding events have been described during concomitant use of ginkgo with antiplatelet and anticoagulant medications.



Hawthorn (Crataegus)



- ❑ Favorable effects have been claimed for hawthorn in cardiovascular conditions, including hypertension, hyperlipidemia, arrhythmia, and congestive heart failure.
- ❑ Biological data have shown antioxidant anti inflammatory effects, positive inotropic and antiarrhythmic effect etc.
- ❑ There is **no robust evidence** to support the use of this herb for the treatment of cardiovascular diseases.
- ❑ **Safety concerns:** There is potential interaction between hawthorn and digoxin, leading to an increase in the effect of digoxin.

Flaxseed

- ❑ Possible beneficial effects on cardiovascular health have been claimed, including lowering blood pressure and lipid levels, reducing the progression of atherosclerosis, and preventing arrhythmias.
- ❑ A meta-analysis determined that, flaxseed supplementation was associated with a decrease in blood total and LDL concentrations but did not significantly affect HDL and triglycerides.
- ❑ **Flaxseed oil did not show these effects.** Flaxseed contains a large amount of fiber, and dietary soluble fiber has been shown to have cholesterol lowering effects.
- ❑ **Safety Concerns:** It may interfere with the intestinal absorption of oral medications, thus leading to decreased efficacy.



Question

The active ingredient in Red Yeast Rice is similar to which cholesterol lowering medication

1. Gemfibrozil
2. Atorvastatin
3. Niacin
4. Lovastatin

Red Yeast Rice

- ❑ Some red yeast rice products contain substantial amounts of monacolin K, which is chemically identical to the active ingredient in the cholesterol-lowering drug Lovastatin.
- ❑ Other red yeast rice products contain little or no monacolin K. It is not known whether these products have any effect on blood cholesterol levels.
- ❑ The FDA has determined that red yeast rice products that contain more than trace amounts of monacolin K are unapproved new drugs and cannot be sold legally as dietary supplements.
- ❑ Some red yeast rice products contain a contaminant called citrinin, which can cause kidney failure.



Soy and L-Carnitine

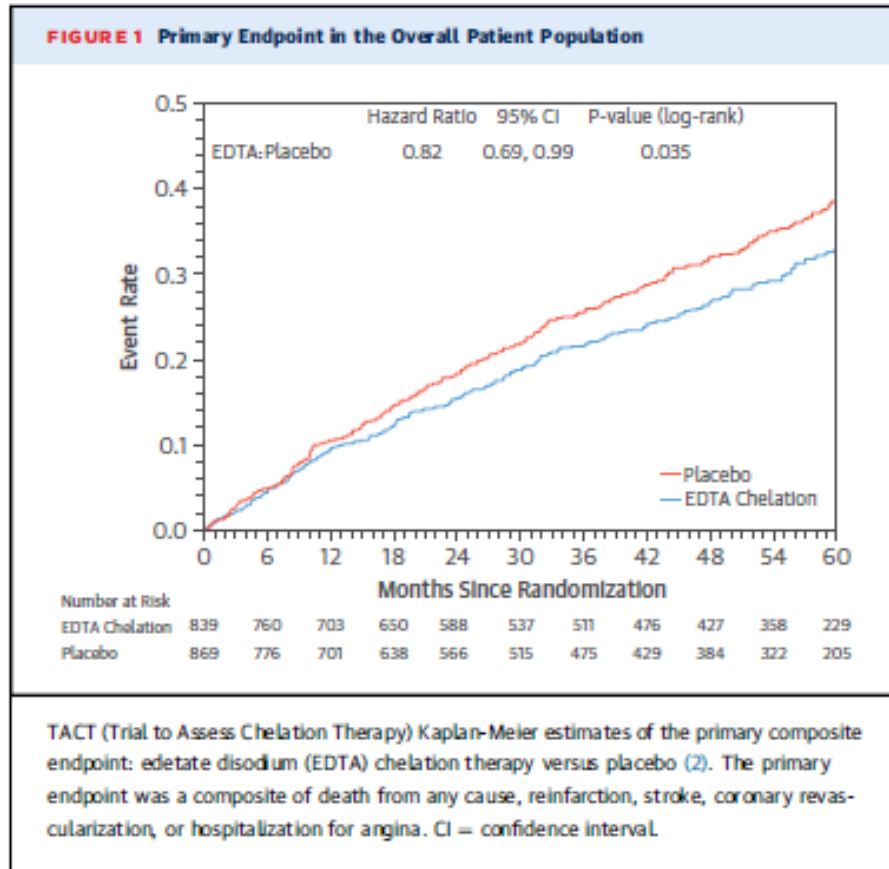


- ❑ Soy: The American Heart Association conclusive advice states that soy dietary products could be beneficial to cardiovascular health because of their high content of polyunsaturated fats, fiber, vitamins, and minerals, and low content of saturated fat.
- ❑ L-Carnitine: It has been reported that the long-term administration of L-carnitine to patients with intermittent claudication did not result in a statistically significant improvement in peak treadmill performance or quality of life as compared with exercise. The clinical effectiveness of L-carnitine in the treatment of other CVD entities is not well established.

Chelation Therapy

- ❑ Chelation is a chemical process in which a substance is used to bind molecules, such as metals or minerals, and hold them tightly. Chelation has been used to rid the body of excess or toxic metals
- ❑ TACT, an NIH-sponsored multicenter, double-blind safety and efficacy study, which took place from 2002- 2012 and was conducted in 134 sites across the United States and Canada.
- ❑ TACT study demonstrated an 18% reduction in recurrent heart events by chelation in participants who already had sustained a heart attack. Recurrent heart events measured in the study were death, heart attack, stroke, heart bypass or stent, and hospitalization for angina.
- ❑ In 633 diabetic participants, there was an even larger benefit with a 41% reduction in recurrent heart events and a 43% reduction in deaths.

Chelation Therapy



- TACT2 study will narrow its focus to the group with the greatest benefit in the original study - diabetics 50- years of age or older who have survived a prior heart attack.

Question

Fish Oil has shown to

1. Reduce LDL and Triglycerides
2. Reduce LDL and increase HDL
3. Reduce Triglycerides
4. Reduce cardiac mortality

Omega 3 Fatty Acids

- ❑ Fish rich in omega-3 polyunsaturated fatty acids are Salmon, Herring, Mackerel.
- ❑ Good plant sources of Omega-3 fatty acids are flaxseed, walnuts, canola oil, Soybeans, Soybean oil.
- ❑ Omega-3 fatty acids may affect CHD outcomes by decreasing triglycerides levels, platelet aggregation, improving arterial compliance and endothelial function.
- ❑ Fish oil is approved by FDA for lowering triglyceride levels.
- ❑ There is no evidence that Omega-3 fatty acids in supplement form protect against heart disease.



Question

Does use of antioxidant supplements (Vitamin A, C and E) help with the prevention of cardiovascular disease and cancer?

1. True
2. False

Vitamin Supplementation

Recommendation Summary

Summary of Recommendations and Evidence

Population	Recommendation
Use of Multivitamins to Prevent Cardiovascular Disease or Cancer	The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of the use of multivitamins for the prevention of cardiovascular disease or cancer.
Single- or Paired-Nutrient Supplements for Prevention of Cardiovascular Disease or Cancer	The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of the use of single- or paired-nutrient supplements (except β -carotene and vitamin E) for the prevention of cardiovascular disease or cancer.
Use of β -carotene or Vitamin E for Prevention of Cardiovascular Disease or Cancer	The USPSTF recommends against the use of β -carotene or vitamin E supplements for the prevention of cardiovascular disease or cancer.

Marijuana

- ❑ Cannabis intake acutely increases sympathetic activity and decreases parasympathetic activity, resulting in release of catecholamines, tachycardia, vasodilation, and an increase in cardiac output and myocardial oxygen demand with little or no increase in blood pressure. Studies have shown association between cannabis smoking and acute myocardial infarction, although the absolute risk appears to be small).

Adverse cardiovascular, cerebrovascular, and peripheral vascular effects of marijuana inhalation: what cardiologists need to know. Am J Cardiol. 2014;113:187-90.

Associations between marijuana use and cardiovascular risk factors and outcomes: a systematic review. Ann Intern Med. 2018;168:187-94.

- ❑ A 2018 systematic review concluded that the overall evidence was of insufficient quality to judge whether cannabis use is associated with acute myocardial infarction or stroke.

Marijuana

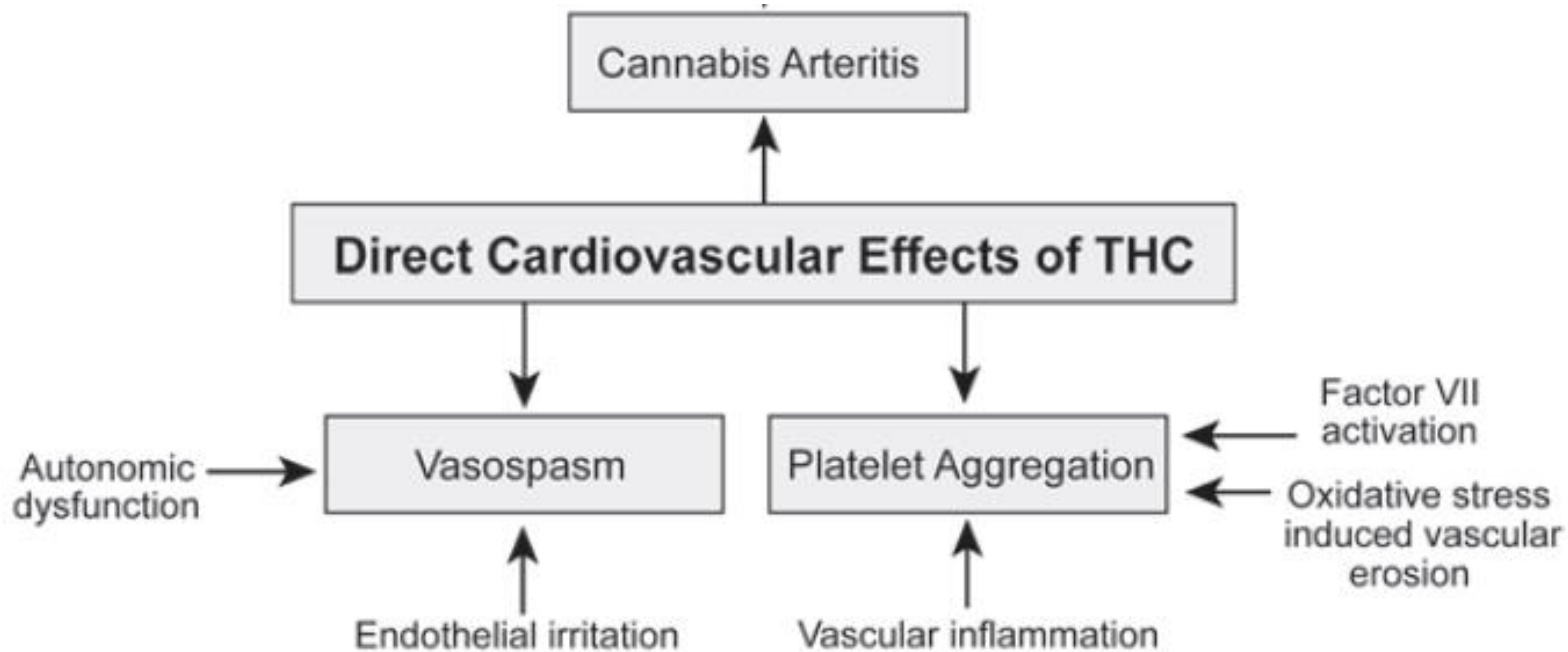


Figure 1. The direct effects of marijuana on the cardiovascular system.

Caution about Herbal Supplements

- ❑ In the United States, herbal medications are regulated by the Food and Drug Administration (FDA) under a category called dietary supplements.

- ❑ Key points of this regulation are as follows:
 - ✓ Herbal medications do not need to be approved by the FDA before they enter the market, and they do not have to be proven safe or effective in the treatment of a given disease or condition.

 - ✓ The FDA's role in regard to these medications relates mainly to monitoring their safety by reviewing serious adverse events reported through the Safety Reporting Portal and taking action against any adulterated or misbranded dietary supplement product after it reaches the market.











Caution about Herbal Supplements

TABLE 1 Which Are the Most Common Concerns?

Concern	Description
Lack of proof of efficacy and safety	Differently from conventional medications, herbal medications do not need proof of efficacy and safety before they enter the market.
Children and pregnant women	Most herbal medications are not tested in pregnant women or children. Their use in children and in pregnant, attempting to become pregnant, or breastfeeding women should be avoided because of the increased risk of side effects, including cardiovascular events.
Contamination and substitution	Substitution of the plants listed on the labels with alternative plant species has been often reported. Contamination with conventional medications has also been described.
Active ingredient	Active ingredients for many herbal medications have not been ascertained, and if ascertained their level might vary considerably in different preparations.
Lack of antidotes	Severe side effects and organ damage might derive from the inappropriate use of herbal medications (i.e., prolonged use or overdose). No antidotes are available to counteract the effect of herbal medications.

Summary about Herbal Supplements

CENTRAL ILLUSTRATION An Evidence-Based Review of Herbal Medications Used in Cardiovascular (CV) Medicine

Clear evidence of benefit	Limited evidence of benefit (to be confirmed in large studies)	No or conflicting evidence of benefit	
	Limited side effects	Limited side effects	Potentially severe side effects
	 Flaxseed oil  Milk-thistle  Grape seeds  Green tea  Hawthorn  Garlic  Soy	 Astragalus  Asian ginseng	 Ginkgo biloba

⚠ High risk of interactions with CV medications

Liperoti, R. et al. *J Am Coll Cardiol.* 2017;69(9):1188-99.

Drug Interactions

TABLE 2 Most Relevant Interactions Between Herbal Medications (Used Both for the Treatment of Cardiovascular Diseases and for Other Conditions) and Cardiovascular Medications

Herbal Medication (Ref. #)	Interacting Cardiovascular Medication(s)	Mechanism of Action	Potential Side Effect
Asian ginseng (14,123)	Warfarin	Induction of CYP2C9	↓ Effect
Cranberry (18,122)	Warfarin	Inhibition of CYP2C9	↑ Risk of bleeding
European elder (125)	Diuretics	Additive diuretic effect	↑ Diuresis
Garlic (55,124)	Aspirin and anticoagulant agents	Reduction of platelet function	↑ Risk of bleeding
Ginkgo (63,64,124)	Aspirin and anticoagulant agents	Reduction of platelet function	↑ Risk of bleeding
Goldenseal (121)	Medications metabolized by CYP2D6 and CYP3A4	Inhibition of CYP2D6 and CYP3A4	↑ Effect
Green tea (76,77)	Warfarin	Contains vitamin K	↓ Effect
Hawthorn (102)	Digoxin	Increased blood concentration of digoxin	Arrhythmias
Licorice root (126)	Loop and thiazide diuretic agents	Mineralocorticoid-like effect	Hypokalemia
Salvia miltiorrhiza (120)	Warfarin	Reduction in binding to albumin	↑ Risk of bleeding
St. John's wort (123)	Medications metabolized by CYP3A4 and CYP2C9	Induction of CYP3A4 and CYP2C9	↓ Effect

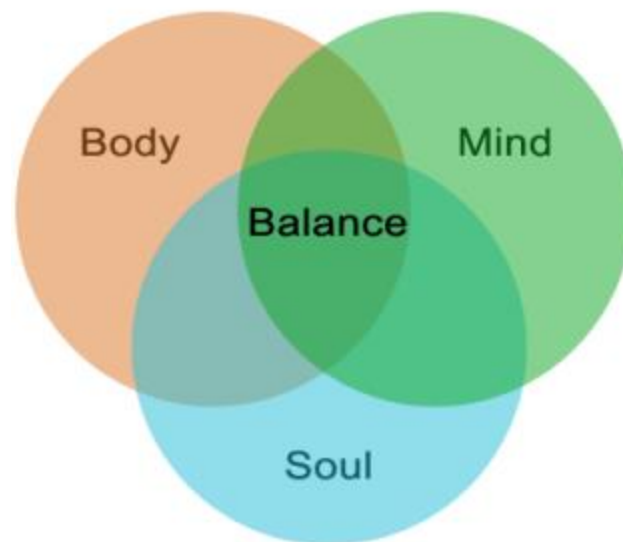
CYP – cytochrome.

Mind-Body Therapies

Mind- Body Therapies

- ❑ Mind-body therapies are a group of healing techniques that enhance the mind's interactions with bodily function, to induce relaxation and to improve overall health and well-being.

- ❑ Examples:
 - ✓ Relaxation techniques
 - ✓ Yoga
 - ✓ Meditation
 - ✓ Prayer
 - ✓ Tai Chi
 - ✓ Hypnotherapy



Impact of stress on CVD Risk Factors

- ❑ Acute stress leads to sympathetic stimulation and an increase in cardiac output, which causes Elevated blood pressure.
- ❑ Sympathetic nervous system activation leads to excessive amounts of cortisol, epinephrine and aldosterone. Chronic stress leads to Hypertension which is sustained by increased vascular resistance.
- ❑ Chronic stress leads to increase in catabolic hormones which antagonize the actions of insulin by mobilizing glucose, fatty acids and protein breakdown.
- ❑ Glucagon and norepinephrine suppress the secretion of Insulin resulting in hyperglycemia, hyperinsulinemia and hyperlipidemia.



Depression and the Development of CVD

-
- Mental stress in daily life have twice the risk of myocardial ischemia.
- Patients with post MI depression have higher mortality rates.
- Patients with depression have lower adherence to a healthy diet, regular exercise and medications.
- Studies have shown that Cardiac Rehabilitation reduces depression and improves quality of life scores and decrease mortality by 25%.
- Studies have shown that high levels of social support predict improvement in depression symptoms.



Mind-Body Therapies

- ❑ MBT are relatively safe and may have measurable benefits for cardiovascular health.
- ❑ MBT use is supported by an established body of research on psychosocial support, stress management in cardiac rehab and the influence of stress hormones, cortisol and the hypothalamic-pituitary-adrenal axis as mediators of cardiac risk.
- ❑ MBT is cost effective in patients with recent cardiac events and after cardiac surgery.



Relaxation Techniques

- ❑ The goal of relaxation techniques is to consciously produce the body's natural relaxation response, characterized by slower breathing, lower blood pressure and oxygen consumption.
- ❑ These techniques include practices such as biofeedback, self hypnosis , deep breathing exercises etc.
- ❑ A 2008 double-blind, randomized trial comparing relaxation versus lifestyle modification found that both groups had similar reductions in systolic blood pressure; however, significantly more participants in the relaxation response group eliminated an antihypertensive medication while maintaining adequate blood pressure control.

Meditation

- ❑ Meditation refers to a group of techniques such as mantra meditation, mindfulness meditation, transcendental meditation, and Zen Buddhist meditation.
- ❑ There is evidence that meditation is associated with potentially beneficial health effects.
- ❑ Transcendental meditation has been linked to reduction in cardiovascular mortality. It can lower blood pressure.
- ❑ Zen meditation has been associated with improved heart rate variability and slowing of respiratory rate.
- ❑ Future research must be more rigorous before firm conclusions may be drawn.



Yoga

- ❑ Movements and positions in yoga and the breathing exercises can lower the blood pressure and alter breathing.
- ❑ Yoga can increase absolute and relative maximal oxygen uptake by 7% and 6%, respectively, after eight weeks in a controlled setting.
- ❑ Yoga has been associated with improved heart rate variability and respiratory variables. There can be a decrease in sympathetic response and changes in baroreflex sensitivity. Yoga may influence the progression and regression of atherosclerosis, and may beneficially alter the lipid profile.
- ❑ Data are too preliminary to make a sound recommendation in favor of yoga.



Tai Chi

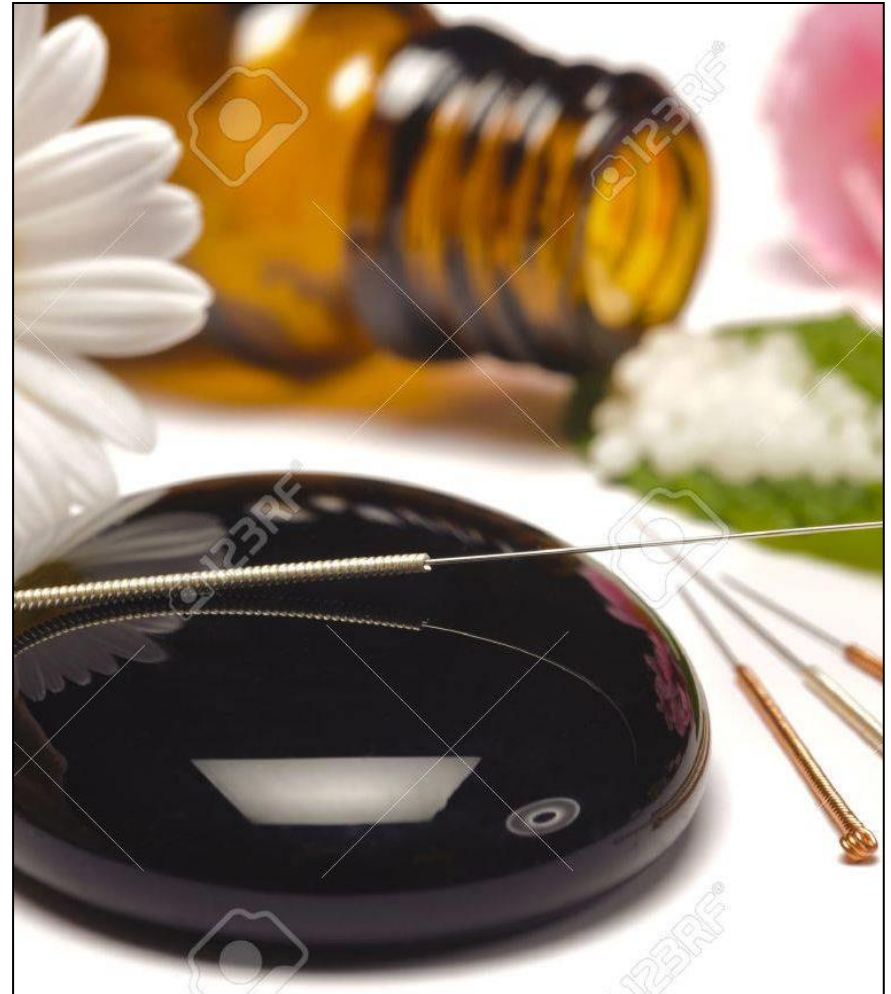
- ❑ Tai chi, sometimes referred to as “moving meditation”, encompasses many styles, but all involve slow, relaxed gentle movements.
- ❑ A systematic review of the literature determined that in 22 of 26 studies, reductions in blood pressure with tai chi were reported.
- ❑ Another systematic review also concluded that tai chi appears to have physiological and psychosocial benefits and appears to be safe and effective in promoting balance control, flexibility, and CV fitness in older populations with chronic conditions.
- ❑ A recent randomized clinical trial found that tai chi may improve quality of life, mood, and exercise self-efficacy in people with chronic heart failure. Further research is needed to explore these possibilities.



Whole Medical Systems

Whole Medical Systems

- Acupuncture
- Ayurveda
- Homeopathy
- Naturopathy



Acupuncture

- ❑ Acupuncture is a therapeutic modality anchored in traditional Chinese medicine.
- ❑ The mechanism by which acupuncture is believed to benefit the subject is through its ability to modulate neural activity in several regions of the brain and thus reduce sympathetic outflow to the heart and vascular system.
- ❑ There are four areas of CVD for which acupuncture eventually may be indicated. These include ischemic CVD, hypertension, heart failure, and arrhythmias.
- ❑ Acupuncture, particularly low frequency (2 to 4 Hz) electro acupuncture, causes the release of opioids in a number of regions in the Hypothalamus, midbrain, and medulla.



Acupuncture

- ❑ Acupuncture appears to be able to inhibit sympathetic outflow and clinical events associated with heightened sympathetic activity.
- ❑ High-frequency electro acupuncture (100 Hz) may influence the cardiovascular system through another opioid neurotransmitter/neuromodulator, dynorphin.
- ❑ Acupuncture can be stimulated either manually by simply inserting a needle in an acupuncture point, then either leaving it in place or twisting and thrusting the needle or by stimulating the needles with a small amount of electrical current at low frequency (2 to 4 Hz).
- ❑ There is some evidence that acupuncture may help to correct various metabolic disorders such as hyperglycemia and hyperlipidemia along with Hypertension and weight loss but further rigorous investigation in this area is warranted.

Manipulative and Body Based Therapies

Manipulative and Body Based Therapies

- ❑ These therapies include massage, chiropractic manipulation, osteopathic manipulation, reflexology et
- ❑ Review of the literature remarked that single treatment reductions in salivary cortisol and heart rate were consistently noted, but sustained reductions for these measures were not supported in the literature. More research on the long-term effects of repeated messages is necessary.
- ❑ Spinal manipulation has been reported to successfully treat Hypertension.
- ❑ A systematic literature review however found that there is a lack of low bias evidence to support the use of spinal manipulation therapy to treat hypertension.



Energy Medicine

Energy Medicine

- ❑ Energy medicine includes healing touch, light therapy, magnetic therapy, Qigong, Reiki, and sound energy therapy. The biofield therapies of Reiki, therapeutic touch, and healing touch are known as “hand-mediated” therapies.
- ❑ They are used to reduce pain and anxiety and to promote health through the direction of healing energy.
- ❑ In a study of immediate post acute coronary syndrome inpatients reiki significantly increased vagal activity as measured by high frequency heart rate variability compared with resting and music control conditions, with a decrease in negative and an increase in positive emotional states
- ❑ More rigorous research is needed to determine the physiologic mechanisms and longterm benefits of these therapies.



Summary

- ❑ CAM use among patients with CVD is prevalent, with biologically-based and mind-body therapies being the most commonly used treatment modalities.
- ❑ Available data do not provide enough evidence to recommend the use of herbal medications in clinical practice.
- ❑ Potential relevant side effects, including increased risk of drug interactions, and the possibility of contamination or substitution with other medications is a concern.
- ❑ Physicians should improve their knowledge of herbal medications to adequately weigh the clinical implications related to their use, and be able to discuss with patients their possible benefits and side effects, and explain that natural does not always mean safe.

Summary

- ❑ There is a growing body of research suggesting that MBT are relatively safe and may have measurable benefits for CV health.
- ❑ MBT use is supported by an established body of research on psychosocial support, stress management, and coping skills in cardiac rehabilitation and the influence of stress hormones, cortisol, and the hypothalamic-pituitaryadrenal (HPA) axis as mediators of cardiac risk.
- ❑ There is necessity of both more rigorous research to determine the precise physiologic effects and long-term benefits on cardiovascular morbidity and mortality with CAM usage.

