



Supplements for Heart Health



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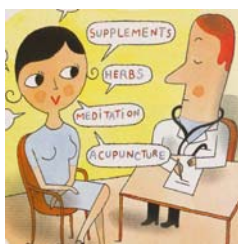
Supplements for Heart Health

- Approximately 1/2 of all Americans use some form of dietary supplement
- 2006 total sales for the US dietary supplement industry: \$22.1 billion
- Includes vitamins, minerals, herbs/botanicals, sports supplements, meal supplements and weight loss products
- Vitamins alone - \$7.2 billion



Eisenberg's Study Opens The Door of CAM –Complementary and Alternative Medicine

- In 1993, \$14 billion spent on CAM.
- 425 million visits to alternative providers.
- 70% of consumers never told physicians.



Current CAM


- Approaching a \$32 billion market.
- Nearly 1/3 of those over 65 use some form of alternative medicine.
- 6% routinely use herbal treatments.
- 40% of insurers covering some forms of CAM.
- Highest users between age 25-49.

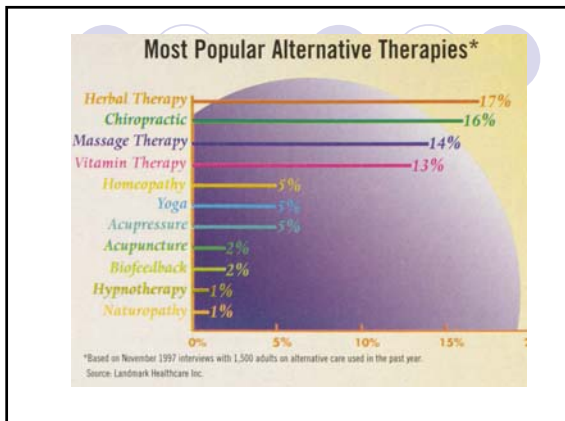
Why do we seek it?

- Back pain
- Allergies
- Insomnia
- Arthritis
- Sprains
- Headache
- High blood pressure
- Digestive
- Anxiety
- Depression

Interesting aspects of CAM

- Patients are more willing to pay for out of pocket expenses.
- More satisfied with interactions of unorthodox rather than orthodox practitioners.
- Low cost interventions are being substituted for high cost drugs & technology





Whole Foods vs Supplements

- Best source of vitamins and minerals
- Offer 3 main benefits over supplements:
- Greater Nutrition: Whole Foods are complex – contain variety of micronutrients. For example an orange has more than just vitamin C. It has beta carotene, calcium and other nutrients.
- Essential fiber: Can help prevent diseases such as type 2 diabetes, heart disease, etc

Whole Foods

- Protective substances: Fruits and vegetables have substances such as phytochemicals, and antioxidants that slow down oxidation which can lead to cell and tissue damage
- Food Synergy!

DSHEA

- Dietary supplements were defined in a law passed by Congress in 1994 –Dietary Supplement and Health Education Act DSHEA
- A dietary supplement must meet all of the following conditions:
 - It is a product (other than tobacco) that is intended to supplement the diet and that contains one or more of the following: vitamins, minerals, herbs or other botanicals, amino acids, or any combination of the above ingredients.
 - It is intended to be taken in tablet, capsule, powder, softgel, gelcap, or liquid form.
 - It is not represented for use as a conventional food or as a sole item of a meal or the diet.
 - It is labeled as being a dietary supplement.

How does the Federal Government regulate supplements?

Through DSHEA Act:

- FDA regulates supplements as foods rather than drugs
- Laws less strict than for drugs
- Manufacturer does not have to prove supplement is safe
- Manufacturer does not have to prove supplement is effective


Supplements

- Manufacturer does not have to prove supplement quality
- FDA does not analyze content of supplements
- Put burden of proof on FDA to prove supplements ARE harmful (Ephedra) rather than safe

Comparing Drugs and Supplements


Drugs:

- Highly regulated
- High cost
- Available only after rigorous and large clinical trials
- High quality control
- Well-supported claims
- Highly effective relief of symptoms
- Side effects may be harsh



Drugs


- According to the Journal of the American Medical Association (JAMA):
- 106,000 hospitalized patients **die** each year from drugs which are properly prescribed and properly administered
- More than 2 million suffer serious side effects
- **4th leading cause of death** after heart disease, cancer and stroke



Comparing Drugs and Supplements


Supplements:

- Not as well regulated
- Most are inexpensive
- Vitamin and mineral use is based on decades of research
- Herbal supplements have been used for centuries by practitioners of medicine
- Less quality control
- Claims sometimes exaggerated
- Milder action
- Fewer side effects



Dietary Supplements

- Manufacturers cannot put a patent on a supplement or vitamin
- Little incentive for anyone to pay for long term research studies for supplements
- “Proprietary blend” can be patented
- Pharmaceutical drugs can be patented
- More scientific evidence for medications
- Huge financial incentive



Supplement Structure/Function Claims


- Structure/Function Claim and Health Claim
- “Structure/Function” claim
- Manufacturer can say that the product addresses a nutrient deficiency, supports health, or reduces risk of developing a health problem, if that is true
- “Calcium builds strong bones”
Structure/Function Claim
- “Calcium prevents osteoporosis” – Health Claim

Structure/Function Claims

- DSHEA allows free reign to make these claims as long as companies:
- Notify FDA within 30 days after using a new claim
- Print the following disclaimer on label, “These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure or prevent any disease.”

Health Claims

- Health claim shows a relationship between a nutrient or other substance and a disease or health-related condition
- Must be sufficient scientific agreement among qualified experts that the claims are factual and truthful
- Examples: Calcium and osteoporosis
- Sodium and Hypertension
- Saturated Fat and Heart Disease
- Fiber and Cancer
- Fiber and Heart Disease



Are Supplements Appropriate for Treating a Disease?

Prescription drugs ¹ (LOVAZA)	✓	✓	✓	✓
Dietary supplements ²			✓*	

Prescription products are appropriate for treating diseases. Dietary supplements are not FDA approved to treat, prevent, or cure any disease.

* Structure, function, and qualifying health claims only.

1. Food and Drug Administration. Drugs at FDA Glossary of Terms. Available at: http://www.fda.gov/cder/drugsatfda/glossary.htm#prescription_drug. Accessed February 13, 2007.

2. Food and Drug Administration. Overview of Dietary Supplements. Available at: <http://vm.cfsan.fda.gov/~dms/ds-overview.html>. Accessed February 13, 2007.

Good Manufacturing Practices

- Supplement manufacturers must meet the requirements of the FDA's Good Manufacturing Practices (GMPs) for Foods
- GMPs describe conditions under which products must be prepared, packed and stored
- Food GMPs do not cover all issues of supplement quality
- Some manufacturers voluntarily follow FDA's GMPs for Drugs, which are stricter

Standardization

- Some manufacturer's use the term "standardized" to describe efforts to make their products consistent
- U.S. law does not define standardization
- Use of this term (or terms such as "verified" or "certified") does not guarantee product quality or consistency
- Comsumerlab.com

What is USP?

- United States Pharmacopeia
- A not-for-profit organization that sets standards for dietary supplements
- Also offers verification programs of other third-party groups such as NSF: national Sanitary Foundation
- A fee-based optional program NOT required by any governing body

USP

- Ensures supplement meets standards for:
- Strength
- Purity
- Disintegration and dissolution
- established by the testing organization U.S. Pharmacopeia (USP)

National Sanitation Foundation-NSF

- A not-for-profit international agency that monitors supplement claims by developing standards for food and supplements as well as scientific research
- NSF label on supplement means it has met 4 main components of NSF Dietary Supplement Certification Program

National Sanitation Foundation NSF

- 1) Verification that contents of supplement actually match what is on label
- 2) Assurance that no ingredients present in supplement are not on label
- 3) Assurance that no unacceptable levels of contaminants present in supplement
- 4) Compliance with GMP – Good Manufacturing Practice

When considering supplements

- Never discontinue or start a medication/supplement without talking with doctor
- Realize that supplements do NOT replace a healthy diet and exercise
- Find the best product. Consumerlab.com evaluates supplements on the market



When considering supplements

- Use one supplement at a time and take it for a trial of 6 weeks.
- Make sure you are taking an effective dose
- If supplement is not working for you, you may need to increase dose, switch to a more reputable brand or discontinue

When considering supplements

- Look for trusted brands that have been around for some time
- Read the label. Serving size. Active ingredients. Amount of active ingredient. What else is in it.
- Look for "USP" on the label. Ensures supplement meets standards for strength, purity, disintegration and dissolution established by the testing organization U.S. Pharmacopeia (USP)

What to look for

- Expiration date. Supplements lose potency over time. If no expiration date – don't buy it
- Avoid megadoses, especially in multivitamins/minerals. In general aim for 100% DV (water soluble vitamins B, C can be higher)
- Watch for extras: allergens, fillers or binders, artificial colors/flavorings

When considering supplements

- 3rd party evaluations: NSF, USP, NNFA (National Nutritional Foods Association) or Consumer Lab
- All supplements must contain manufacturer's information: address, phone number.
- Call them with any questions you have



Multi-vitamins/minerals

- Nutritional "reassurance" to cover dietary shortfalls
- Take based on age and sex
- Do not take megadoses
- 100% of Daily Value (DV) –especially fat-soluble vitamins/minerals (A, D, E & K)
- Take with food!
- See handout on Picking a Multivitamin

Omega 3 Fatty Acids

- Active ingredients EPA and DHA
- Reduce risk stroke and heart attacks
- Make arteries more elastic and reduce blood pressure
- Reduce triglycerides
- Think the blood – similar to aspirin
- Prevent plaque rupture in arteries
- Reduce symptoms of atrial fib



Fish Oils

- Quality matters in fish oils
- Pharmaceutical grade, molecularly distilled to reduce PCBs, mercury, dioxin
- EPA + DHA = 1,000 to 5,000 mg depending on diagnosis and other medications
- For general heart health 1,000 – 2,000 mg EPA + DHA per day

Folic Acid

- Water soluble vitamin
- Recommended 400 mcg per day from supplements and food
- Lots of foods fortified with folic acid
- Don't take more-except pregnant/lactating
- Might increase risk of heart attack in people who have heart problems
- Megadoses might increase risk of cancer

Folic Acid

- Foods high in folic acid:
- Lots of Breakfast cereals fortified with 100% of the DV
- Beef liver, 3 oz 185 mcg
- Blackeyed peas ½ cup 105 mcg
- Spinach ½ cup cooked 100 mcg
- Great Northern Beans ½ cup 90 mcg

Coenzyme Q10

- Vitamin like substance found throughout body
- Especially in heart, liver, kidney, pancreas
- Helps body in production of energy for cells
- Statins reduce levels of Co Q 10 in the body. 100-200 mg per day with food.
- Used in CHF, high blood pressure, migranes

CoQ10 for Pulmonary Hypertension

- One of the nutrients most often recommended to support a failing heart
- Acts as an antioxidant
- Made in the body and found in many foods
- Coenzyme Q is available from three basic types of foods: (1) fish; (2) organ meats, including liver, kidney and heart; and (3) the germs of whole grains.

CoQ10

- Chemically similar to vitamin K
- Theoretical interaction with Coumadin
- Talk with your doctor before starting and before discontinuing
- Other drugs that decrease CoQ10 levels include gemfibrozil, atenolol, propranolol, tricyclic antidepressants such as amitriptyline, doxepin and imipramine and beta blockers

Niacin

- B vitamin
- Lowers cholesterol
- Increases HDL cholesterol
- Can cause flushing, aspirin can help
- Can have lots of interactions at higher doses
- Work with health care provider
- Doses up to 2,000 mg per day

Hawthorn

- Hawthorn is a plant
- Can help improve amount of blood pumped out of heart during contractions and widen blood vessels
- For heart failure, standardized hawthorn leaf with flower extract 160 to 1800 mg (3.5-39.6 mg of total flavonoids calculated as hyperoside or 30-338 mg of proanthocyanidins) has been used in 2-3 divided doses daily. It should be used for 4 to 8 weeks to determine benefit.

Red Yeast Rice


- Product of rice fermented with *Monascus purpureus* yeast
- Effective for high cholesterol and triglycerides
- Same chemical structure as lovastatin (Mevacor)
- No long term studies
- Can cause same side effects as statins such as liver damage and severe muscle pain and damage
- Lots of interactions with meds

Red Yeast Rice




- Most clinical studies have used a specific brand product (Cholestin-no longer available on market). However, most other red yeast brands contain a similar amount of red yeast, 600 mg per tab.
- For hypercholesterolemia, a typical dose of red yeast is 1200 mg two times daily with food. A total daily dose of 2400 mg red yeast contains approximately 9.6 mg total statins, of which 7.2 mg is lovastatin.

Potassium




- A mineral necessary for heart functioning, brain activity and muscle movement
- Central to DASH diet – Dietary Approaches to Stop Hypertension
- Effective for lowering hypertension
- 4700 mg per day recommended in DASH
- Careful with ACE inhibitors, angiotensin receptor blockers and potassium-sparing diuretics – can increase potassium to dangerously high levels

Potassium



- Loop diuretics such as furosemide can cause body to lose a lot of potassium – can be life threatening
- Other drugs that can decrease potassium: NSAIDS like aspirin, ibuprofen, beta-blockers like metoprolol and propranolol, Thiazide such as HCTZ and overuse of antacids

Potassium




- Can take in supplemental form – doctor may recommend
- Best from food sources
- Baked potato 925 mg in 1 medium
- Low sodium V-8 juice 510 mg in 5.5 oz
- Cantaloupe 475 mg in 1 cup
- Apricot raw halves, 400 mg in 1/5 cup
- Banana 365 mg in 1 banana

Magnesium



- Responsible for muscle tone in blood vessel walls
- Calcium stimulates smooth muscle while magnesium relaxes it
- Magnesium increases amount of blood flow through heart with each beat
- Helps prevent formation of blood clots
- Diuretics increase loss of magnesium

Magnesium



- Magnesium can correct heart arrhythmias, relieve muscle cramps, improve sleep and reduce anxiety, depression and effects of stress
- 25 to 38% of diabetics are deficient in magnesium
- Doctor can monitor levels and recommend supplements if needed
- Best sources: magnesium citrate, gluconate, malate and lactate

Magnesium



- Magnesium oxide or hydroxide can cause diarrhea
- Best food sources of magnesium: whole grains, oatmeal, tofu and soybean flour, Brazil nuts, almonds, cashews, black walnuts, pistachio nuts, pine nuts, pumpkin and squash seeds, peanuts, green leafy vegetables and blackstrap molasses

Calcium



- Needed to regulate heartbeat and for proper blood clotting
- Required for muscle contraction and nerve transmission
- Helps lower blood pressure, reduce irritability, insomnia, PMS, osteoporosis
- Diuretics cause calcium to be lost in urine

Calcium



- Soft drinks, sodium, sugar, caffeine and alcohol can increase loss of calcium in urine
- Calcium carbonate is cheapest form of calcium
- Needs acid to be absorbed – must take with meals (Antacids contain carbonate)
- Calcium citrate – better absorption. Can take with or without meals

Calcium



- Do not take oyster shell calcium, coral, bone meal and Dolomite – these can be contaminated with lead
- Vitamin D enhances absorption of calcium as does magnesium
- Best foods: dairy products, almonds, Brazil nuts, hazelnuts, greens like collards, turnip and mustard, broccoli, kale, dried figs and oysters

Plant Sterols



- Substances that occur naturally in various plants
- Structurally similar to cholesterol
- Interferes with absorption of cholesterol from food and removes cholesterol from substances made in the liver that are recycled through the digestive tract
- Cholesterol lowering effects in the body

Plant Sterols




- Dosage is 2,000 mg per day with food
- Promise Activ Supershots
- Promise Activ Spread, Benecol
- Tablet form – Cholest-off, Moduchol
- Some concern as to whether it interferes with absorption of vitamins A, E and D
- No studies show problems at recommended doses

Garlic

- An herb
- Chemical called allicin
- Possibly effective for high blood pressure, hardening of arteries
- Contradictory evidence about the effects of garlic on cholesterol and triglyceride levels. Most studies flawed.
- Garlic extract 600-1200 mg divided and given three times daily has been used in clinical trials. Most clinical studies have used a standardized garlic powder extract containing 1.3% alliin content

Grape Seed Extract

- From grapes
- Possibly effective for circulation problems such as chronic venous insufficiency that can cause legs to swell
- Antioxidants help to prevent heart disease
- Grape leaf may reduce inflammation




Grape Seed Extract

- **Cardiovascular disease:** 200-300mg daily
- **Chronic pancreatitis:** 200-300mg per day has been studied
- **Chronic venous insufficiency:** 150-300mg per day for 28-30 days has been studied
- **Diabetic retinopathy:** 150mg per day for two months has been studied
- **Hypercholesterolemia:** Study in healthy individuals found that tablets containing 200-400mg grape seed extract (GSE) (calculated as proanthocyanidin) exerted reducing effects on oxidized LDL following 12-week administration
- **VITAMIN C:** Preliminary evidence suggests that patients with hypertension who take both vitamin C 500 mg/day plus grape seed polyphenols 1000 mg/day have significantly increased systolic and diastolic blood pressure. The potential mechanism of this interaction is not known.

Grape Seed Extract

- For chronic venous insufficiency
- Taking grape seed extract seems to reduce subjective symptoms of chronic venous insufficiency and improve venous tone
- In one clinical trial, a specific grape leaf extract, known as red vine leaf extract was given orally to patients with stage I and stage II chronic venous insufficiency.
- Leg edema significantly decreased after 6 weeks of treatment compared to placebo. Doses of 360 mg and 720 mg daily were both effective, but the higher dose produced a slightly greater effect.


Green Tea



- From Camellia sinensis plant
- Possibly effective for reducing cholesterol
- Antioxidants help protect heart and blood vessels
- More than 5 cups per can cause side effects
- Doses of green tea vary significantly, but usually range between 1-10 cups daily. The commonly used dose of green tea is based on the amount typically consumed in Asian countries, which is about 3 cups per day, providing 240-320 mg of polyphenols

Green Tea


- Green tea may affect INRs
- If you use Warfarin/Coumadin, keep an eye on your green tea consumption and be consistent in intake



Vitamin D

- A fat-soluble vitamin
- D3 – cholecalciferol is made by the body and is the preferred form of supplement to take
- D2 – ergocalciferol is most often added to milk and other foods and supplements
- Regulates amount of calcium and phosphorus in body

Vitamin D



- Recent studies found that men with low levels of vitamin D in the blood – 15 ng/mL and lower – were at increased risk for heart attack compared to those with 30 mg/mL or higher
- Lower levels associated with higher risk and severity of depression
- Lower levels associated with increased risk of cancer, Alzheimer's, Diabetes

Arginine

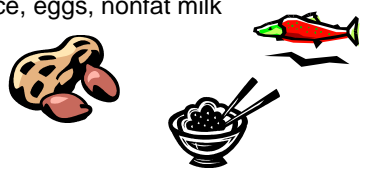
- Amino Acid
- Body uses L-Arginine to make nitric oxide
- Helps relax blood vessels
- CHF, Angina
- Potential to increase pain-free walking for those with intermittent claudication
- Dosage: 6-20 grams per day

Arginine

- Evidence from several studies suggests that arginine may improve exercise tolerance and blood flow in arteries of the heart
- Studies of arginine in patients with chronic heart failure have shown mixed results. Some studies report improved exercise tolerance.
- A small number of studies report that arginine therapy may improve walking distance in patients with intermittent claudication. Further research is needed.
- A common dose is 2-3 grams taken by mouth three times daily.

L-Arginine

- Food sources: lean ground beef, garbanzo beans, salmon, peanuts, soy milk, brown rice, eggs, nonfat milk



L-Carnitine

- Amino acid made in the body
- Preliminary studies suggest benefit for ischemia, MI (heart attack), PVD (peripheral vascular disease) Congestive heart failure and arrhythmias
- Helps body produce energy
- Most studies use 2-4 grams
- Interacts with Sintrom, Thyroid hormones and Coumadin
- No series adverse effects reported

L-Carnitine

- Some studies have suggested that carnitine might be effective in treatment of heart failure
- Results are mixed
- 600 mg 3 x/day used in clinical studies
- Side effects: nausea, vomiting, diarrhea, rash and headache

L-Carnitine

- Help your body make its own carnitine
Made from the amino acid lysine in protein foods with help of vitamin C, B6, niacin, iron and the amino acid methionine
- Food sources: lean ground beef, codfish, chicken breast, asparagus
- More studies needed



Taurine

- Improves ability of the heart muscle to contract
- Protects heart from calcium imbalances that can cause cell death
- Powerful antioxidant that protects heart cells from free radical damage
- Reduces platelet aggregation
- May lower cholesterol and blood pressure

Taurine

- Dose used in clinical studies ranged from 500 mg/day to 3 grams/day in two doses
- Like all amino acids, best taken on empty stomach
- No significant side effects
- Best Food Sources of Taurine: Cold-water fish such as salmon and cod are recommended as these are also rich in beneficial omega-3 essential fatty acids.

Olive Leaf Extract



- May help reduce cholesterol and blood pressure
- 1000 mg per day reduced systolic and diastolic blood pressure by 11 and 5 mmHg, respectively, over 8 weeks in one study
- Active compound called oleuropein as well as other polyphenolic compounds in olive plants act as antioxidants

Supplements to Avoid if you have Heart Disease

- Vitamin A – beta carotene best
- Ephedra – increase blood pressure, heartbeat, palpitations, heart failure, death
- Chinese black licorice - hypertension
- St. John's wort – activates an enzyme in liver that breaks down many medicines – check interactions before beginning
- Yohimbine – increases blood pressure and heart rate

Remember

- Talk to health care provider
- Be aware some supplement compounds can be toxic if take too much
- Can interact with medications
- ALWAYS discuss supplement use with doctor well in advance of any surgery
- Do not self-diagnose
- Do not substitute supplements for prescription meds or healthy foods
- "Natural" does not mean safe
- Learn to spot false claims –If sounds too good to be true – it probably IS!

Remember

- Supplements are an alternative way to enhance health
- Will NOT replace healthy diet and exercise
- Each individual is different – supplements work differently for each person as do medications
- You and doctor/dietitian should seek to find best combination of supplements and, if need be, medications that work for YOU!