Herbal and Nutritional Supplements
Common Uses and Potential Drug Interactions

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Objectives

At the conclusion of this lecture, a pharmacist should be able to:

• Identify potential interactions between Bromelain, Kava Kava, Gingko Biloba, Echinacea, and conventional medicine
• Discuss relevant counseling issues related to Cholestin, Butterbur and 5-HTP
• Discuss two herbs that might be beneficial for someone with menopausal symptoms
• List three popular omega-3 fatty acids and their major uses
• Discuss two supplements that have significant anti-inflammatory properties
5 questions about herbs/supplements!

• What is it?
• What are the purported uses?
• What is the mechanism of action (if known)
• What are the reported adverse reactions (including adverse drug reactions)?
• What is the recommended dosage?
Dietary Supplements

• 1994 FDA passed the Dietary Supplement Health and Education Act (DSHEA)

Supplement defined as:

• Product that supplements diet and contains one or more of: vitamins, minerals, amino acid, herb or other botanical OR

• Dietary substance for use to supplement the diet by increasing the total dietary intake OR
Dietary Supplement

• Concentrate, metabolite, constituent, extract, or combination of any ingredient described above
• Sales exceeded $46 billion in 2008
• Physicianformulas.com lists approximately 300 vitamin and supplement formulations.
• NCCAM budget is $120 million a year
• Controversy about Dietary Supplement Safety Act of 2010 (Bill never passed)
Joint Therapy

- Glucosamine
- Chondroitin
- Methylsulfonylmethane (MSM)
- Hyaluronic acid
- Vitamin C
- Omega-3 joint health (500 mg EPA with 10 IU vitamin E); 3 softgels/day
Chondroitin/Glucosamine

- Chondroitin draws fluid to the cells in the joint; fluid provides lubrication
- Works with glucosamine to replenish collagen and other components that provide building blocks for cartilage
- Glucosamine is also natural constituent of cartilage;
- Osteoarthritis (“Wear-and-tear”) arthritis – cartilage destroyed; bone rubs against bone; stiffness, swelling and pain; NSAIDs prescribed
Chondroitin/Glucosamine

- Glucosamine stimulates production of glycosaminoglycans and incorporation of sulfur into cartilage
- Glucosamine for arthritic pains: take 400 mg 3 times/day on an empty stomach
- Need 2 to 4 months to observe effects
- Drug interactions – Potentiates effect of anticoagulants and antiplatelet drugs
- Injected glucosamine raises blood sugar by affecting insulin and other anti-diabetic agents
Methylsulfonylmethane (MSM)

• A form of organic sulfur found in plants, meat, eggs, poultry and dairy foods
• Critical for the production of amino acids
• Thus critical for the production of enzymes, antibodies, glutathione and proteins involved with connective tissue (e.g. collagen)
• Important for wound healing since it promotes the formation of collagen
MSM

- Strengthens hair and nails; makes hair thicker and shinier
- Effective in relieving severe allergic symptoms and asthma
- Recommended in combination with vitamin C and other bioflavonoids
- Used with glucosamine for the treatment of arthritis
- Dosage – 500 mg t.i.d
- Interactions – Currently no reliable information
Anti-inflammatory

- Boswellia
- Bromelain
- Ginger
- Turmeric (curcumin; Indian saffron)
- Green Tea
- Oregano
- Holy Basil
- All found in Zyflamend (New Chapter)
Boswellia

• Active constituent is Boswellic acid
• Pyrazoline derivative shown to be effective in supporting healthy joints
• Inhibits the activity of 5-lipoxygenase and thus decreases leukotriene synthesis
• Glucosamine may be combined with boswellic acid for healthy joints
• Dose – oral capsules standardized 37.5% to 65% Boswellic acid; 600 mg daily for arthritis
• Interactions – None reported to date
Bromelain

- Enzymes derived from pineapple juice
- Has powerful anti-inflammatory and protein digesting properties
- Food industry use it to tenderize meat
- Blocks inflammation by stimulating the production of plasmin (breaks down fibrinogen, a substance involved in localized swelling)
- Apparently inhibits formation of PGE-2 and stimulates production of PGE-1; also inhibits platelet activating factor (PAF)
Bromelain

• Increases the effect of some antibiotics (e.g. amoxicillin and tetracyline); may amplify effects of coumadin, heparin and benzodiazepines
• Removed fingerprints from pineapple workers (protease effect)
• Look for products with at least 2000 milk clotting units (MCU)/gram
• 3-500mg for inflammation; 1-500mg for cardiovascular
Ginger (Zingiber Officianle)

- Useful for motion sickness; anecdotal claims that it is better than antihistamines
- Shogaol (ingredient in ginger) has antiemetic effect
- Gingerol stimulates gastric secretions and peristalsis
- Structural phenols similar to aspirin and affects PGe2, PGf2 and thromboxanes
- Thus ginger has anti-clotting and anticoagulant effects; inhibits platelet aggregation (> 4000 mg)
- May also lower blood sugar (caution with anti-diabetic medications)
- Take 1000 mg 4 hours before travel
- 500 mg qid for nausea of pregnancy
Green Tea (Camellia Sinensis)

• Green tea polyphenols stimulate the production of antioxidants and detoxifying enzymes
• Contains epigallo-catechin gallate (EGCG) polyphenols (abbreviated as catechin)
• Catechins in green tea may prevent and reduce the severity of rheumatoid arthritis
• Green tea contains an amino acid called L-Theanine (allegedly helps with stress and anxiety)
Green Tea

• Cup of tea contains 50 to 100 mg polyphenols
• Milk can bind antioxidants in green tea and decrease the beneficial effects.
• Tannins in green may decrease absorption of codeine, atropine and iron supplements
• Patients undergoing chemotherapy should avoid consumption of excessive green tea (negates therapeutic effect of velcade; drug for multiple myeloma)
• EGCG increases bioavailability of verapamil and tamoxifen; but inhibits transport of irinotecan
• Typical daily dose ranges from 300 to 400 mg
Turmeric (Curcuma Longa)

- Uses include treatment of diarrhea, bronchitis, leprosy, headaches, loss of appetite, colic and bruising
- One of the active ingredient is curcumin
- Decreases activity of 5-Lipoxygenase and Cox-2
- Typical daily dose for dyspepsia is 1.5 to 3 gm in three divided doses
Turmeric (Curcuma Longa)

- May increase risk of bleeding
- Inhibits cyclophosphamide-induced tumor regression in animal studies
- Inhibits activity of CYP3A4, CYP1A2 but enhances activity of CYP2A6
- Down-regulates level of intestinal P-glycoprotein; increases levels of celiprolol and midazalom
Diabetes

- Chromium
- Cinnamon
- Gymnema Sylvestre
- Fenugreek
Chromium

• Chromium lowers level of LDL and increases HDL
• Works well in combination with inositol hexanicotinate (“no-flush niacin”)
• Helps trim fat and build muscle
• Chromium best absorbed by the body as chromium picolinate
• Picolinate (an amino acid metabolite) facilitates entry of chromium into cells
Chromium

- Chromium polynicotinate (chromium bonded to niacin) is also an effective form
- 200 ug lowers LDL; did not affect HDL in people with high cholesterol
- Excessive intake leads to toxicity; associated with dermatitis, gastrointestinal ulcers, and kidney and liver impairment
- May be found in combination with garcinia cambogia, gymnema sylvestre (gurmar) and vanadium to help metabolism and control body weight
Cinnamon

• Methylhydroxy chalcone polymer (MHCP) found in cinnamon makes fat cells more responsive to insulin.
• Meta analysis indicates benefit for type II diabetics
• Cinnamon appears to increase the metabolism of glucose by about 20X
• May have additive effect with blood glucose lowering medications
• Theoretically coumarins in cinnamon potentiate blood-thinning medications
• Also contains catechins, PCOs (found in grape seed extract) and terpenes
• Usually given at 1 to 1.5 grams/day (half a teaspoon)
Fenugreek (Trigonella)

- Exhibits hypocholesterolemic, hypolipidemic, and hypoglycemic properties in healthy animals and humans.
- 4-hydroxyleucine in fenugreek increases insulin secretion in NIDDM rats when given i.p.
- May potentiate the effect of warfarin and interfere with the cytotoxic effect of cyclophosphamide.
- Dosage approximately 600 – 2500 mg/day
Heart Health

- CoQ$_{10}$
- Garlic
- Ginseng
- Cholestin
- Omega-3 heart health (EPA and DHA 400 mg and 200 mg; 3 softgels/day)
- Omega-3s – **Leading edge Heart Pack** (Mainly Omega-3, Garlic powder, CoQ$_{10}$, and B-complex)
- Source: www.nutrilite.com
Garlic (Allium Sativum)

- Lowers LDL and triglycerides; raises HDL
- Inhibits platelet aggregation; fibrinolytic
- Cuts risk of pre-eclampsia if taken during pregnancy
- Contains alliin, allinase, enzymes, glucosinolates, vitamins A, B, and C
- Heat inactivates allinase
- Allinase converts alliin to allicin (sulphur containing compounds)
- Allicin (and alliin) have antibiotic, antiplatelet and anti-hyperlipidemic properties
Garlic (Allium Sativum)

- Heating or microwaving destroys the activity of allicin
- One clove of fresh garlic provides approximately 4000 mg of allicin
- Garlic inhibits nitrosamine formation
- Two cloves of garlic at the first sign of a cold may help to alleviate symptoms and reduce duration
Garlic

• Discontinue use at least 7 days before surgery
• Monitor insulin due to hypoglycemic effects
• Monitor warfarin; garlic increases fibrinolytic activity and decreases platelet aggregation
• Monitor cyclosporine; garlic increases CYP3A4 metabolism; danger of transplant rejection
• Monitor protease inhibitors (e.g. saquinavir); garlic decreases serum levels by inducing CYP 450 metabolism
Co-Q10

- A vitamin-like substance whose actions resemble those of vitamin E
- Functions in mitochondria to oxidize foods to form ATP
- Supplemental CoQ₁₀ has the ability to counter histamine and may be beneficial for allergies, asthma or respiratory disease
- CoQ₁₀ is oil soluble. Best absorbed when taken with oily or fatty foods
- Bright yellow to orange when pure; keep away from heat and light. **Get a liquid or oil form.** Vitamin E helps to preserve CoQ₁₀
Co-Q10

• Shown to decrease cardiotoxicity of doxorubicin
• Can decrease body’s response to warfarin; Structurally similar to Vitamin K
• HMG-CoA reductase inhibitors decrease levels of CoQ$_{10}$ (same synthetic pathway)
• Some tricyclic antidepressants inhibit CoQ$_{10}$ dependent enzymes; related to cardiac side-effects?
• Delays clearance of theophylline; causes persistent vomiting, arrhythmia
• Dosage usually 100 – 300 mg
Co-Q10

• One study 1200 mg/day for 16 months showed effectiveness in treating Parkinson’s disease
• >60% of oral dose is excreted in the feces
• Absorption better if taken with food of high lipid content
Cholestin

- Cholestin – derived from red yeast rice
- Effective dietary supplement along with a low-fat diet and exercise to promote healthy cholesterol levels
- Contains lovastatin, pigments, and fatty acids
- May lower CoQ_{10} levels (cf. statins)
- Controversy between FDA and Pharmanex (manufacturer)
- Dosage – 1 or 2 - 600 mg tablets twice a day with food
- Interactions – No long term studies but lovastatin content may point to statin interactions
Ginseng

• Three common types: American, Panax (Korean) and Siberian
• Chinese or Korean *(Panax ginseng)* most widely used specie
• American and Asian types contain ginsenosides (4-7% recommended)
• Siberian contains eleutherosides (look for 1% wt/wt)
• Used to enhance athletic performance and detoxify and normalize the entire system
Ginseng

• Beneficial for diabetics because it decreases level of cortisol in the blood; hypoglycemics exercise caution
• May interfere with digoxin monitoring
• May cause headache, tremulousness and manic episodes in patients taking phenelzine sulfate (MAO inhibitors antidepressant)
• Ginseng shows possible additive effects with estrogens and corticosteroids
• Recommend: take for fifteen to twenty days followed by rest period for two weeks
Sexual Issues

- Ashwaganda; Damiana; Black Cohosh
- Yohimbe Bark (optional)
- Catuaba Bark
- Horny Goat Weed (epimedium)
- Muira Puama (“Potency Wood”)
- Tribulus Terrestris

Source: Ray Sahelian, M.D. (Passion Rx)
- Gingko Biloba and Ginseng
**Damiana (Turnera aphrodisiaca)**

- Extracts together with Pinocembrin and acacetin suppress aromatase activity
- Used in the botanical formula called Arginmax (marketed for women)
- Shown to stimulate sexual behavior in mice
- May potentiate the effect of hypoglycemic drugs
- Theoretically may increase the effect of diuretics
- Dosage: Take 450 mg up to t.i.d
Black Cohosh (Cimicafuga racemosa)

- Contains triterpene glycosides, tannins and isoflavones (phytoestrogen)
- Isoflavones linked to relief for osteoporosis
- Shown to have estrogenic activity
- Relieve symptoms of menopause and dysmenorrhea; used for menstrual cramps
- Cases of liver toxicity have been reported
- Dosage 40 – 80 mg/day; standardized to contain 1 mg of deoxyactein
Yohimbine

• Extracted from the Yohimbe bark tree native to West Africa
• An aphrodisiac? Yohimbine Hcl approved by FDA for impotence; YHcl dilates blood vessels
• Weaker yohimbe herbal products sold in combination with zinc, L-arginine, gingko biloba, and Muira Puama
Yohimbine

- Do not eat foods with high quantities of tyramine (cheese, red wine) while taking yohimbine (alpha-2 antagonist)
- Dosage – Usual dose is 15 to 30 mg daily
- Drug interactions – stimulates the CNS; acts as MAO inhibitor and calcium channel blocker
- May cause nervous excitation, nausea, tremors, high blood pressure and vomiting
L-Arginine

• Required for the production of NO, which is important for erections
• Increases blood flow to the penis; effect is short-lived?
• Arginine is precursor in synthesis of putrescine, spermidine, and spermine
• Stimulate the production of growth hormone
• Body builders use it to bulk up and lose flab
• Used in hospitals to promote wound healing after surgery or from severe burns
L-Arginine

- Foods high in arginine include walnuts, peanuts, cashews and dark chocolate (Hmm?)
- Soy protein and other plant proteins are richer in arginine than animal proteins
- Take 3 to 6 grams on an empty stomach 45 minutes before having sexual intercourse?
- Taken together may increase the absorption of ibuprofen; useful for migraine
- May potentiate the effect of viagra and enhance the effect of yohimbine
Tribulus Terrestris

• Active ingredient is protodioscin (a saponin)
• Saponin releases luteinizing hormone into blood to testicles
• Thus raises levels of testosterone
• Recommended dosage is 400 mg daily
• Take tribulus for 8 weeks and rest for at least four weeks
Brain/Memory/Anti-depressants

• Gingko Biloba; DHA
• Rhodiola rosea
• Omega-3 **brain health** (DHA – 500 mg; 3 softgels/day)
• Omega-3 **brainiums** DHA (lemon gummies) (DHA and EPA, 105 mg and 45 mg; eat 8 gummies/day)
5-hydroxytryptophan (5-HTP)

- Sometimes called the natural prozac (SSRI)
- Precursor of serotonin (mood, sleep, appetite)
- 5-HTP is active antidepressant without side effects of prozac
- Serotonin is precursor of melatonin
- Serotonin deficiency implicated in PMS, migraine headaches, anxiety and violent behavior
- Caution: Do not use 5-HTP with other antidepressants or MAO inhibitors
- Dosage – 50 mg/day
**SAMe (S-Adenosyl-L-methionine)**

- Used in Europe for more than 20 years as an antidepressant (expensive)
- Used in treating depression; may be comparable to standard tricyclic antidepressants
- Studies show results in less than a week
- Shown to have anti-inflammatory effect equal to ibuprofen and naproxen (osteoarthritis)
SAMe

- CNS deficiency of SAMe in AIDS patients; maybe linked to defective repair of myelin and oligodendrocytes
- Protects against hepatic dysfunction caused by steroids, phenytoin, MAOI, APAP and alcohol
- Synthesis of SAMe linked to folate and Vitamin B_{12} metabolism
- Supplemental SAMe has limited bioavailability; metabolized in the liver
SAMe

• Take SAMe with B₆; B₁₂ folic acid and trimethylglycine to help rid cells of homocysteine
• 300mg three times/day with meals
• SAMe crosses blood-brain barrier and also gets into joint synovial fluid
• Essential for many functions: Methyl donor for synthesis of creatine, melatonin, glutathione, spermine and spermidine,
• Methylation reqd for DNA, RNA, Phospholipids, serotoinin, dopamine, epi and norepi
SAMe

• Need to replenish methyl groups as we age
• Methyleate homocysteine to form methionine; protect vs heart disease, cancer, depression, arthritis and birth defects
• SAMe is essential for the synthesis of melatonin
• Take 1400 to 1600 mg day on empty stomach
• Look for enteric coated tablets of butanedisulfonate form (most bioavailable)
• May increase the risk of serotonin syndrome if given with SSRIs and MAOIs
St. John's Wort (Hypericum perforatum)

- Where does the name come from?
- An effective anti-depressant; leading anti-depressant in Germany
- 70 million doses with no reports of toxicity, negative drug interactions or undue side effects
- Inexpensive; no side effects as prescription drugs (Celexa, Prozac, Zoloft)
- Herbal phen phen contains St. John’s Wort and ephedra (increases metabolism)
- Controls appetite and food cravings
St. John's Wort

- Caution: ephedra may cause heart arrhythmia
- Caution if taking MAO inhibitor
- Active ingredient is hypericum (good for viral infections)
- Hypericum may block serotonin binding and other neurotransmitters; may inhibit production of stress hormones
- St. John’s Wort may increase photosensitivity
- Contains a host of bioflavonoids, hypericin and pseudohypericin
St. John's Wort

- Hypericin inhibits release of arachidonic acid and leukotriene B
- St. John's Wort found to decrease serum levels of indinavir (44% to 99%)
- Appears to induce cyt 450 3A4 which induces metabolism of ethinyl estradiol
- Thus reduces effectiveness of oral contraceptives
- Seems to increase levels of serotonin (cf. Prozac)
- May promote higher levels of dopamine (cf. MAO inhibitors)
- 300 mg three times a day
Gingko Biloba

- Ginkgo tree is rich source of bioflavonoids
- Extract from leaves is one of world's most popular herbal products
- In animal studies shown to increase the levels of dopamine
- Increases blood flow to the brain
- Helps to improve memory and concentration
Gingko

• Also believed to be effective treatment for erection problems caused by inadequate blood flow
• Helps to maintain optimal levels of nitric oxide (NO)
• Gingkolides and Bilobalide inhibits Platelet Activating Factor; protect CNS from damage during ischemia
• Gingko and ginseng may alter bleeding time; do not use with warfarin
Gingko

- Usual dose is 120 to 160 mg/day
- May potentiate the effects of MAOIs
- Inhibition of PAF by gingkolabide may result in spontaneous bleeding
- Reported case of seizure when taken with drugs that lower seizure threshold
- Can have additive effects when used with NSAIDS
Kava Kava

• Member of the pepper tree family
• A natural mood enhancer
• Used for 3000 years in the South Pacific to induce well-being and relaxation
• Contains kavalactones, natural muscle relaxants, have calming effect on both body and mind
• Needs 70% kavalactones; 300 mg/day
• Acts on limbic system; moderate emotional processes
• Reduces symptoms of anxiety; nonaddictive; does not feel drugged or groggy
Kava kava

• May be useful for treating symptoms of menopause
• Long term consumption may lead to Kava dermopathy
• Skin becomes yellow, dry and scaly; condition is reversible
• Believed to enter breast milk; contraindicated in nursing mothers
• Serious drug interactions with benzodiazepines
• Kava with alprazolam resulted in coma
Valerian (valeriana officinalis)

- Also known as “Herbal Valium”
- Used to treat insomnia, stress, anxiety and tension headaches
- Valepotriates cause DNA-altering and other toxic effects
- May act like benzodiazepines (without drug hangover)
- May have additive effects with barbiturates and benzodiazepine
Valerian

• Seen as tincture, extract or tablets.
• Take 1 tsp in quarter cup of water; 400 to 900 mg/day
• Needs several weeks to see effects
• Long term use linked to hepatotoxicity
• Discontinue one week before surgery; may show interaction with anesthesia
Rhodiola rosea

• Enhance physical and mental performance; fight depression and improve sleep
• Contains catechins and proanthocyanidins (PCOs)
• Inhibits MAO and COMT; thus alters levels of dopamine, nor-epinephrine and serotonin
• Root extracts shown to have strong anti-depressant activity
• Suggested dose of 300 mg/day
• Inhibits activity of CYP3A4 and P-Glycoprotein
• Reported to cause irritability and insomnia
Allergies/Immune System

- Echinacea/Goldenseal
- Grapeseed extract
- Quercetin
- Rutin
- Astragalus
Echinacea Purpurea

- Believed to enhance the immune system
- Address symptoms of colds, flu, sore throat
- Caution to patients with lupus, rheumatoid arthritis and multiple sclerosis
- Look for products standardized to 4% echinacosides (purpurea & angustifolia)
- Pure root products cause a numbing sensation when placed on tongue
- One dropper full of tincture in water or use 2 capsules of freeze-dried extract
- Theoretically may antagonize the effects of immunosuppressants
Grapeseed extract

- Rich in Oligomeric Proanthocyanidin complexes (OPCs) a form of flavonoids
- Brain cells – 50% fatty tissue; subject to attack by free radicals; Protect fat cells from free radicals
- Twenty to fifty times more potent than vitamins C and E in terms of bioavailability and antioxidant properties
- Powerful vascular protectors that support the body’s circulatory system; Inhibits formation of cholesterol deposits
- (OPCs) as antioxidants have protective effect on collagen
Grapeseed extract

• Possibly stabilizes the enzyme alpha-1-antitrypsin
• Thus protects blood vessels, bones, cartilage, gums, eyes, skin
• They are powerful chelating agents; sequesters unstable metals that promote oxidative damage
• Reduces histamine production (moderates allergic and inflammatory responses)
• May act as blood thinner
• Products must contain at least 95% OPCs; take 50 – 100 mg/day
Quercetin

• Bioflavonoid closely related to rutin and hesperidin
• Found in red and yellow onions, apples, dark berries, squash and cocoa beans
• Potent anticancer agent; stops cancer at initiation stage
• Inhibits activity of Cox and Lox and thus blocks the release of leukotrienes
• Also blocks the release of histamines
Quercetin

• Thus effective for allergies and inflammatory disorders
• Inhibits enzyme that produces sorbitol
• Sorbitol linked to nerve, eye, and kidney damage in diabetics
• Shown to inhibit uric acid production similar to allopurinol
• Take 500 mg twice a day 2 months before allergy season and continue throughout.
Rutin

- A bioflavonoid
- Supplements include combination with quercetin and hesperidin
- An anti-inflammatory agent that shows antiviral, antimicrobial, and anticancer activity
- Used as treatment for allergies; slows down release of histamine
Rutin

• Typically included in special antiallergy formulas designed to relieve symptoms of hay fever and asthma
• Has ability to strengthen capillaries; may be effective for treatment of bruises, varicose veins and hemorrhoids
• Used as a form of contraception or emergency contraception in Latin America (tea or 500 mg/day)
Anti-aging

• Alpha-lipoic acid (ALA)
• N-Acetylcysteine (NAC)
• Resveratrol
N-Acetyl Cysteine (NAC)

- NAC is precursor to glutathione (major tripeptide antioxidant)
- Studies show that it helps to prevent bronchitis, bronchial asthma, emphysema, and chronic sinusitis
- Used successfully on people with inner ear infections
- Helps body builders recover quicker from their workouts
- It replenishes blood levels of glutathione, which mops up free radicals to promote quicker recovery
NAC

- Aids in preventing side effects from chemotherapy and radiation therapy
- It may inactivate insulin
- Found to protect the body from acetaminophen toxicity
- Promoted as anti-aging nutrient in combination with alpha-lipoic acid
- 600 mg three times/day helpful in reducing nitroglycerin tolerance (and associated loss of BP control)
Alpha lipoic acid

• The “universal antioxidant” naturally produced in the body
• Enhances the activity of other antioxidants
• Neither fat-soluble nor water-soluble and gets into every cell
• Defuses many different types of free radicals
• Crosses the blood-brain barrier and repairs injured brain cells
• Completely reverse damage caused by stroke in animals
Alpha lipoic acid

- Normalize blood sugar levels; widely used as a treatment for diabetes in Europe
- Unlike other antioxidants, it can “pinch hit” for antioxidants that are in short supply
- Enhances the potency of vitamins C and E
- Topical application may help prevent photoaging of skin
- Body builders claim to recover quicker when using alpha lipoic acid
Resveratrol

- An antifungal compound found in skins of red grapes
- Inhibits the formation of blood clots
- Caution when used with anti-platelet agents
- Plays a role in cholesterol metabolism
- May have role in preventing skin cancers and leukemia
- Reverses malignant cells
- Peanuts contain resveratrol
- 20 – 100 mg/day (equivalent to 41 glasses of red wine)

**Red Wine Polyphenols:**
- Potent antioxidants that protect vs heart disease by blocking oxidation of LDL
- Slowed the development of tumors in mice
- Use capsules instead of alcohol
Prostate

• Saw Palmetto
• Lycopene
• Stinging Nettle
• Phytosterols (beta sitosterol)
• Soy (Genistein; Daidzein)
Saw Palmetto

• A herb for prostate health
• Chemical and nutrient content includes capric, caproic, caprylic, lauric, oleic, and palmitic acids
• At about age 40 prolactin increases; increased production of 5-alpha reductase; converts testosterone to dihydrotestosterone
• Dihydrotestosterone (DHT) increases growth of prostate tissue; leads to benign prostatic hypertrophy (BPH)
• Saw palmetto postulated to keep BPH under control; inhibits production of DHT
Saw Palmetto

• But study published in NEJM shows it no better than placebo
• Sold in combination with stinging nettles (diuretic), zinc and pygeum
• Look for products standardized to 85-95% fatty acids and sterols
• Suggest 160 mg b.i.d for early stages of BPH
• Caution if using with Proscar, anticoagulants (and oral contraceptives?) (hirsutism; bust enhancement)
Lycopene

• Member of carotenoid family; found in tomato and tomato products
• Also in guava, watermelon, red grapefruit and rosehips
• May be more potent antioxidant than beta carotene
• An anticancer agent; first postulated to reduce the risk of prostate cancer
• Also inhibited the growth of cancer cells from breast, lung and endometrial cancers
Lycopene

• Also suggested as protection against photodamage from UV light
• Absorbed by the body from tomato when heated and combined with fat, like olive oil
• Concentrated tomato puree (2 weeks) caused increase in plasma lycopene levels
• No adverse reaction at normal doses (10 mg/day)
• Skin coloration (lycopenodermia) at excessive doses
Liver

- Silymarin
- Phosphatidyl Choline
Silymarin

• From the milk thistle plant
• Contains the bioflavonoids: silybin, silydianin, and silychristin
• Primary herb to treat liver disorders; enhances liver function
• Silymarin is antioxidant; Blocks destructive action of free radicals; increases level of glutathione and SOD
• Treats liver damage due to alcoholism, jaundice, hepatitis, and amanita mushroom poisoning
Silymarin

- Shown to reduce insulin resistance and diabetic complications
- May reduce lipoperoxidation of cell membranes
- Promotes regeneration of damaged liver cells
- Look for capsules containing 70 to 80 percent silymarin
- 150 to 250 mg two to three times daily
- Sometimes sold with olive leaf and schizandra (used for hepatitis)
- At high doses shown to elevate levels of bilirubin and liver enzymes
Eye Heath

• Bilberry
• Alpha- Beta- and gamma-carotene, lutein, cryptoxanthin, zeaxanthin
Bilberry

• Also known as European blueberry; synonymous with healthy eyes
• Contains anthocyanosides – natural antioxidants
• Protects capillaries from free radical damage
• Anthocyanosides involved in regeneration of retinal pigment
Bilberry

- Extracted from the fruit of the tree
- Bilberry compounds inhibit mediators of inflammation: histamine, protease, leukotrienes & prostaglandins
- Bilberry may be beneficial for glaucoma, diabetic retinopathy, macular degeneration, and varicose veins
- Helps strengthen x-linking of collagen matrix
- Stimulates gastric mucous secretion; good for patients on NSAIDs
- May potentiate risk of bleeding
- Dosage – 80 mg capsule to yield 20 mg anthocyanosides
- Myrtocyan is produced from bilberry extract
Berries

- Contain vitamins A, C, E and folic acid
- Great source of chemopreventive compounds
- Compounds in juice, skin and seeds
- Among richest food source of antioxidants; contains anthocyanins
- Also contains ellagic acid in seeds of berries
- Strawberries, blueberries, cranberries, raspberries
Caroteinoids

• >500 different carotenoids in plants; about 50 in edible fruits and vegetables
• Alpha- Beta- and gamma-carotene, lutein, cryptoxanthin, zeaxanthin and lycopene are most common
• Class of compounds related to vitamin A; In some cases act as precursors of vitamin A
• Carotenoids – powerful antioxidant and anticancer properties
• Natural sunscreens that filter out UV light and protect vs environmental carcinogens
Lutein

• An antioxidant; high quantities in spinach, kale, corn, mustard and collard greens
• High concentration in macula of the retina
• Found to lower the incidence of macula degeneration; possibly caused by UV radiation
• Converted in the retina to zeaxanthin
• Combination formulas include lutein, cryptoxanthin, zinc, and zeaxanthin, all found in the macula
• No adverse reaction at normal doses (6 mg about three times each week)
Migraines

- Butterbur
- Feverfew
Butterbur (Petasites hybridus)

- Helpful for preventing migraines and hay fever
- May act by reducing inflammation and spasms in blood vessel walls
- May be as effective as antihistamine drugs for allergies without causing drowsiness
- The sesquiterpene petasin in butterbur may be responsible for its activity by blocking leukotriene and histamine activities
- Calcium channel blocking effect on vascular smooth muscles provides prophylaxis for migraines
Butterbur

• Use 100 – 150 mg/day with meals
• Some products may contain toxic pyrrolizidine alkaloids (PA) that can cause liver damage
• Patients with liver disease should avoid raw butterbur extract;
• No drug interactions documented
Feverfew (Tanacetum Parthenium)

• Active ingredient is parthenolide (a sesquiterpene lactone)
• Parthenolide responsible for anti-inflammatory activity
• Feverfew influences platelet aggregation and relaxes smooth muscle
• Caution using anti-coagulants
• Dosage 100-250 mg daily (0.2% parthenolide)
Sports

• Creatine
• L-Carnitine
• Androstenedione
• Whey Protein Isolate
Creatine

• Creatine occurs naturally in the body
• Synthesized in liver, kidney and pancreas from glycine and arginine;
• Storage of creatine phosphate in cardiac and skeletal muscle; quantity of creatine is related to muscle mass
• Should be taken prior to vigorous exercise
• Creatine supplements helps to re-energize tired muscle cells
Creatine

• 1 - 2% creatine phosphate converted to creatinine and excreted daily
• Caffeine may interfere with the ergogenic effects of creatine supplementation
• Intravenous creatine found to improve heart function in people with CHF
• Side effects – weight gain, renal dysfunction, gastrointestinal distress
• Dose – 5 grams with water (8 ounces)
• Drug interactions – Risk of kidney disease increases if taken with NSAIDS, Aminoglycoside antibiotics and immunosuppressants
Propionyl-L-Carnitine or Acetyl-L-Carnitine

• Converted to L-Carnitine
• Believed to increase physical stamina and promote weight loss
• Lowers triglyceride levels; important for fatty acid oxidation
• Prevents fatty buildup especially in liver, heart, and skeletal muscles
• About 70% of carnitine from food is absorbed; Only 20% from supplements
Propionyl-L-Carnitine or Acetyl-L-Carnitine

• As a sports supplement and for erectile dysfunction only anecdotal success stories
• May improve muscle strength in people with neuromuscular disorders
• Recommended doses: 1 – 3 grams/day
• Drug interactions – May be protective against toxic side effects of AZT (muscle), Doxorubicin (cardiac), Accutane and Valproic acid
Omega Medicine

- Two basic categories of Essential Fatty Acids (EFAs): ω-3 and ω-6
- Typical American diet 20 times more ω-6
- May explain rise in depression and heart disease
- EFAs found in unsaturated vegetable oils
- In flaxseed, hemp, borage, primrose, grape seed, and soybean oils, salmon, and other fish (trout, tuna, sardines); walnuts and almonds
- ω-6 includes linoleic and gamma-linolenic acid (GLA)
Omega Medicine

- GLA found naturally in Borage seed oil
- Found to reverse diabetic neuropathy
- $\omega$-3 includes alpha-linolenic (LNA) acid, eicosapentaenoic acid (EPA), and Docosahexaenoic acid (DHA)
- DHA levels low in children with ADD
- EFAs beneficial for candidiasis, cardiovascular disease, eczema, psoriasis etc.
Omega Medicine

- Lowers cholesterol and triglyceride levels and reduce the risk of blood clot formation
- Essential fatty acids required for the production of prostaglandins and leukotrienes
- EFAs found in high concentrations in the brain; aid in the transmission of nerve impulses
- EFAs beneficial for candidiasis, cardiovascular disease, eczema, psoriasis etc.
Omega Medicine

• Deficiency can lead to impaired ability to learn and recall information (depression? Psychosis?)
• No fat consumption makes you hungry quickly; you will over eat (Recall Atkins diet)
• Eat less fat but take EFAs ;need EFAs for absorption of fat-soluble vitamins
• Lack of EFAs promotes dry skin and brittle hair
Omega Medicine

- **Flaxseed** - one of the best sources of ω-3 fatty acids (alpha linolenic acid - ALA)
- ALA found in canola, soy, black currant and walnut oils
- ALA is converted to EPA and DHA
- Flaxseed oil is rich in lignans: help with cancer and modulate hormone levels – link to menopause
- Has anticancer effect on breast, prostate and lung cancer cells
- Current studies indicate **Flax seeds** effective in combination with Vitamin D
Omega Medicine

- Flaxseed oil shown to lower levels of homocysteine (high levels linked to heart disease)
- Used by body builders for stamina and recovery (possibly linked to its antioxidant and anti-inflammatory properties)
- Deficiencies are rare except in infants fed deficient formula
- Take 1 tablespoon per day in salads or on vegetables
- Drug interactions – Blood thinners
- What about the avocado? Is it fattening?
Omega Medicine

- **Borage Oil** - Treatment for rheumatoid arthritis (1.4 grams daily for at least two months)
- Rich source of gamma linolenic acid (GLA)
- Also used for eczema (atopic dermatitis)
- Showed good response for infantile seborrheic dermatitis
- Borage seeds contain pyrrolizidine alkaloids (PA) - liver toxins
Omega Medicine

- Avoid use during lactation and pregnancy
- GLA from borage oil not good for patients taking phenothiazines - may cause temporal lobe epilepsy
- Evening primrose and black currant oils are safer sources of GLA.
- GLA is also beneficial for nails, hair and skin
- 500 mg TID for two months
- Minor side effects: bloating, nausea, indigestion and headache
Omega-3 and Mental Health

• Low levels linked to depression and ADHD
• Countries with highest fish consumption have lowest rates of depression, bipolar disorder, homicide and suicide
• Mothers transfer DHA to babies to support brain development (affects IQ)
• Pregnancy lowers levels of omega-3 (linked to postpartum depression)
Omega-3 and Mental Health

• Brain cells may use omega-6 which contributes to inflammation and less membrane fluidity
• Low omega-3 levels affect the level of serotonin
• Fish oil supplements also affect dopamine levels (linked to schizophrenia)
• Walnuts, ground flax and wild salmon are good sources
Omega Formulations

• Omega-3 balanced health (EPA and DHA; 150 mg each; need 3 softgels/day)
• Omega-3 brain health (DHA – 500 mg; 3 softgels/day)
• Omega-3 joint health (500 mg EPA with 10 IU vitamin E); 3 softgels/day
• Omega-3s – Leading edge Heart Pack (Mainly Omega-3, Garlic powder, CoQ\textsubscript{10}, and B-complex)
Some Reliable Sources

• nccam.nih.gov
• www.umm.edu/altmed
• www.mskcc.org
• www.drugdigest.org
• www.ncbi.nlm.nih.gov
• Drweil.com
• Nutrilite.com
• Raysahelian.com
• And references therein