Hair Loss

• Antioxidants help prevent hair loss.
• If hair loss does occur and the patient is taking antioxidants the hair grows back faster and healthier.
• Add biotin to antioxidants
• Avoid shampoos that contain sodium lauryl sulfate
• Dry hair naturally or with a dryer set on low
• Wash hair qod instead of qd
Hair Loss (Cont.)

• Supplements to reduce hair loss
  – 3 mg of biotin BID during chemo and for 2 weeks later then decrease to 3 mg qd
  – MVI without methionine
  – 400 IU vitamin E succinate TID
  – 500 mg of quercetin TID with meals
  – 500 mg of curcumin TID—dissolve the contents of one capsule in one tbsp of extra virgin olive oil
  – 100 mg of decaffeinated green tea extract with each meal

  » Ibid., Blaylock, p. 87-8.
Depressed Production of Blood-Forming Cells

• Nutrients that protect the bone marrow and stimulate return of normal cells
  – Curcumin 500 mg TID—dissolve the contents of one capsule in one tbsp of extra virgin olive oil
  – Folate 800 micrograms
  – Methylcobalamin 1,000 micrograms SL TID during chemotherapy then BID when chemotherapy is completed
  – Pyridoxal-5-phosphate 50 mg
Depressed Production of Blood-Forming Cells (Cont.)

- MVI without methionine
- Vitamin C (magneisum ascorbate form) 500 mg TID between meals
- Vitamin E succinate 400 IU TID
- Niacinamide 500 mg BID (does not cause flushing)
  - Ibid., Blaylock, p. 90-1.
Chemotherapy That Can Cause Heart Damage

- Adriamycin
- Daunorubicin
- Ara-C
- Doxorubicin
- Mitoxantrone
- Cyclophosphamide
- Taxol
Cardiac Toxicity

• Seen with doxorubicin (adriamycin)
• Methods of action of doxorubicin
  – Inhibition of DNA and RNA replication
  – Blocks the topoisomerase II enzyme
  – Blocks membrane binding
  – Stops production of hydroxyl free radical
    • Heart damage is suspected to be cause by this action
    • Myocardial toxicity can occur at time of treatment or many years later
Cardiac Toxicity (Cont.)

• Cardiac toxicity can also be seen with Herceptin

• Methods of action of Herceptin
  – Suppresses the overactive human epidermal growth factor 2 (HER 2) receptor (growth factor protein found in 25-30% of patients with breast cancer)
  – Can lead to severe CHF
Cardiac Toxicity (Cont.)

• Taxol and Taxotere can make already existing heart disease worse.

• 5-FU can also cause cardiac toxicity
  – Sudden death that mimicks a heart attack
  – Angina
  – Pulmonary edema
  – Arrhythmias
Cardiac Toxicity (Cont.)

• Doxorubicin (cont.)
  – When used with other chemotherapeutic agents can cause more heart damage
  – Amount of heart damage is dose dependent
  – Delayed heart damage does not respond to treatment
  – Biopsies of the heart muscle reveal damage to the mitochondria
Cardiac Toxicity (Cont.)

• Cardiac toxicity can also be caused by cyclophosphamide, cytarabine, daumomycin, actinomycin D, and mitoxantrone.
Treatment of Cardiac Toxicity

• Vitamin E
  – Give before treatment
  – Can reduce acute heart damage-- but not delayed damage
  – Does not interfere with doxorubicin
Treatment of Cardiac Toxicity (Cont.)

• Vitamin C
  – Protects the heart against the acute toxicity of doxorubicin
  – Does not compromise the effectiveness of doxorubicin
  – Increases the ability of doxorubicin and other chemotherapeutic agents to kill cancer
Treatment of Cardiac Toxicity (Cont.)

• Selenium
  – High dose---1,000 micrograms QID for 8 days starting 4 days before chemotherapy
    • Selenium in this dose is toxic and should only be taken for 8 days
  – Can use low dose---200 micrograms BID starting at least one week before chemotherapy and continuing one week into the treatment
Treatment of Cardiac Toxicity (Cont.)

• NAC
  – Protects against acute toxicity but not delayed
  – Use larger dosages if started just before chemotherapy
  – Can use smaller dosages if start weeks before chemotherapy---500 mg TID then continue 3 weeks post chemotherapy

Treatment of Cardiac Toxicity (Cont.)

• Coenzyme Q-10
  – Protects against acute AND delayed cardiac toxicity
  – Mechanisms of action
    • Doxorubicin depletes the body of coenzyme Q-10 and Co Q-10 replenishes this depletion
    • Co Q-10 binds with free iron in the heart muscle which can generate free radicals
Treatment of Cardiac Toxicity (Cont.)

• Coenzyme Q-10 (cont.)
  – Dosage: 200 mg QID starting one week prior to chemotherapy and continuing for 2 weeks after chemotherapy then 100 mg TID
    • Ibid, Blaylock, p. 94-5.
Treatment of Cardiac Toxicity (Cont.)

• Other nutrients that protect the heart from cardiac toxicity causes by chemotherapy
  – Magnesium ascorbate 500 mg TID
  – Curcumin 500 mg TID—dissolve the contents of one capsule in one tbsp of extra virgin olive oil
  – Bioflavonoid complex containing rutin, quercetin, and hesperidin
  – Decaffeinated green tea extract 100 mg qd
  – Propolis extract 400 mg BID (high bioflavonoids)
Treatment of Cardiac Toxicity (Cont.)

• Other nutrients that protect the heart from cardiac toxicity causes by chemotherapy (cont.)
  – EPA/DHA
    • Dosage: 2,000 mg qd
  – Hawthorne extract
    • Improves blood flow through the coronary arteries and increases cardiac muscle strength
    • Treatment also for HTN
Treatment of Cardiac Toxicity (Cont.)

- Avoid products with MSG
  - Can overstimulate the electrical conduction system of the heart.
Nutrients That Improve Cardiac Muscle Strength

• Acetyl-L-carnitine 500 mg TID on an empty stomach or L-carnitine fumarate which improves cardiac function more
Pulmonary Toxicity

- Busulfan is associated with pulmonary fibrosis.
- The fibrosis can occur within 8 months of having the chemotherapy or can occur 10 years later. The average onset is 4 years.
- Free radical damage is what causes the scarring in the lungs.
Pulmonary Toxicity (Cont.)

• Nutrients that protect against busulfan toxicity
  – Rutin, quercetin, and hesperidin.
  – Can be taken together to protect the lungs from free radical damage and iron excess injury--called Bioflavonoid Complex with Quercetin.
    • Take two capsules TID with meals during therapy and for 3 weeks following chemotherapy. Then take one capsule TID. If pulmonary symptoms increase then return to the higher dosage until the symptoms are gone.
    • Ibid., Blaylock, p. 96.
Pulmonary Toxicity (Cont.)

• Nutrients that protect against busulfan toxicity (cont.)
  – Green tea extract
    • High in flavonoids catechin and epigallocatechin gallate
    • Strengthens blood vessel walls and air passages
    • Strong antioxidants and chelates iron
    • Use decaffeinated form to avoid insomnia and jitteriness if caffeine is a problem
    • Dosage: 300 mg TID with meals
Pulmonary Toxicity (Cont.)

• Nutrients that protect against busulfan toxicity (cont.)
  – Curcumin
    • Anti-inflammatory and antioxidant to protect the lungs
  – Vitamin E
    • Helps prevent scarring from injury of any type
    • Reduces scarring of the lungs from chemotherapy and radiation
    • Combine natural mixed tocopherols and vitamin E succiente
Pulmonary Toxicity (Cont.)

• Nutrients that protect against busulfan toxicity (cont.)
  – Boswellia
    • Is an anti-inflammatory
    • Strengthens the connective tissues
    • Dosage: 300 mg BID between meals
    • Can be taken long term
      – Ibid., Blaylock, p. 96-7.
GI Complications

• Alkylating agents cause the biggest problems
• Also Actinomycin D can cause GI toxicity
• Complications that may occur with chemo
  – Leaky gut syndrome
  – Yeast overgrowth
  – Malabsorption
  – Loss of digestive enzymes
  – Low stomach acid
Liver Damage

• The more medications that are combined for chemotherapy--- the more risk there is of liver toxicity.

• Taxol is very liver toxic especially in patients with previous liver disease.

• Busulfan can cause esophageal varices in patients on continuous treatment when combined with thioguanine for CML.
Treatment of Liver Damage

• Nutrients that can improve liver detoxification and are used to prevent and treat cancer
  – Curcumin
    • Also improves dead cell removal from the body (RES)
  – Indole-3-carbinol
  – Carotenoids
  – D-glucarate
  – MSM
  – Taurine
    • Ibid., Blaylock, p. 100.
Kidney Damage

• Most chemotherapeutic agents are cleared through the kidneys.

• Nutrients that protect the kidneys
  – Quercetin has been shown to protect kidney cells in culture from the side effects of cisplatin.
Kidney Damage (Cont.)

- Nutrients that protect the kidneys (cont.)
  - Curcumin has been shown to protect the kidneys from injury.
Kidney Damage (Cont.)

• Nutrients that protect the kidneys (cont.)
  – Panax ginseng has been shown to protect the kidneys from the damage that can be caused by cisplatin in mice.
Kidney Damage (Cont.)

• Nutrients that protect the kidneys (cont.)
  – Studies have shown that IV glutathione can reduce the kidney toxicity significantly that is caused by cisplatin.
Kidney Damage (Cont.)

– Glutathione: Mechanism of action
  • Interacts with cisplatin and blocks its ability to kill cells.
  • Glutathione does not interfere with cisplatin’s ability to kill cells since cancer cells take up very little glutathione and healthy cells take up a lot of glutathione.
  • Studies have shown that patients treated with IV glutathione and cisplatin have a better remission rate that those patients treated with cisplatin alone.
Cisplatin

• Associated with side effects to the kidneys and nervous system
• Depletes the body of magnesium
• Quercetin is a flavonoid that reduces side effects of cisplatin and enhances its effectiveness
  – Can take as a supplement
  – Found in apples, onions, teas
Kidney Damage (Cont.)

• Nutrients that protect the kidneys (cont.)
  – NAC
    • Has been shown to decrease the incidence of hemorrhagic cystitis caused by cyclophosphamide and ifosfamide
    • Bleeding caused by metabolic product of the medications called acrolein which depletes the body of antioxidants especially glutathione from the bladder cells.
Kidney Damage (Cont.)

- Nutrients that protect the kidneys (cont.)
  - Large doses of NAC were used in the trials (9 grams a day).
  - Large doses may cause nausea and vomiting
  - Give smaller doses over a longer period of time (1-2 grams) over several weeks
  - NAC does not interfere with chemotherapy
Kidney Damage (Cont.)

• Nutrients that protect the kidneys (cont.)
  – Magnesium citramate
  – Vitamin E succinate
  – Magnesium ascorbate
  – Calcium-AEP
  – Asparagus extract
  – MVI without methionine
    • Ibid., Blaylock, p. 102.
Neurological Complications

• Affects may occur right away or years later
• All of the cells in the brain and plasticity can be injured by chemotherapy and radiation.
• Study of men with nonseminomatous testicular cancer treated with cisplatin found that 28% suffered polyneuropathy symptoms.
Neurological Complications (Cont.)

• Mitochondrial DNA are 10x more sensitive to free radical injury than nuclear DHA because mitochondrial DNA have few repair enzymes.
Neurological Complications (Cont.)

• Chemotherapeutic agents that cause neurological complications
  – Procarbazine (part of MOPP) used to treat Hodgkin’s disease
    • Somnolence
    • Confusion
    • Cellebellar ataxia
  – Cisplatin
    • Tinnitus
    • Hearing loss
Neurological Complications (Cont.)

• Many chemo drugs do not cross the BBB until a condition makes the BBB permeable.
  – Fever
  – Brain tumors
  – Hypertension
  – Medications
  – Presence of neurological disease (eg., Parkinson’s)
  – Radiation to head
  – Aging
Nutrients That Protect The Nervous System

- Alpha lipoic acid 200 mg BID with meals throughout treatment and then for 3 weeks afterward. Then 100 mg BID afterwards.
- Curcumin 500 mg TID—dissolved in one tbsp of extra virgin olive. Do not combine with ASA or other anticoagulant medication.
- Quercetin 500-1,000 mg TID
- Milk thistle 175 mg qd
Nutrients That Protect The Nervous System (Cont.)

- Gingko biloba 160-320 mg qd on an empty stomach. Do not take with blood thinners.
- Vitamin E succinate 400 IU TID
- Magnesium ascorbate 750 mg TID
- Magnesium citramate 300 mg TID
- Coenzyme Q-10 120-240 mg BID starting at least one week before chemotherapy and continuing for 3 weeks post chemotherapy.
  - Ibid., Blaylock p. 104-05.
Lymphedema

- Horse chestnut
- Butcher’s broom
- Gotu kola
- May come mixed as one compound by nutriceutical company or can use standardized horse chestnut alone.
- Dose: take 3-6 capsules qd
  - Ibid., Yance, p. 309.
Lymphedema (Cont.)

• OPCs
  – Dose: 100-400 mg capsules. Use 2-4 capsules TID.

• Bromelain
  – Dose: 500-750 mg tablets. Take one tablet with turmeric TID-QID—30 minutes before meals or two hours after meals
    • Ibid, Yance, p. 310.
Lymphedema Formula

- Echinacea 30 ml
- Red root 20 ml
- Poke 10 ml
- Figwort 15 ml
- Baptisia 15 ml
- Blue flag 10 ml
- Bladderwrack 10 ml
- Stillingia 5 ml
- Corydalis 5 ml
Lymphedema Formula (Cont.)

• Dose: 60 to 120 drops (1/2 to 1 tsp) TID in small amount of water
  — Ibid., Yance, p. 310.
Radiation

• Mild hyperbaric oxygen treatments makes the tumor more susceptible to radiation and chemotherapy.

• The normal tissues need to be protected by taking antioxidants, mineral, and flavonoids during hyperbaric treatments.
Radiation (Cont.)

• People with inborn defects in DNA repair or fragile chromosomes are more likely to develop cancer following radiation therapy. These people also have cancers sooner.

• This is especially true when radiation is combined with chemotherapy.

• Nutrients can help protect the healthy tissue around the radiation site and have also been shown to enhance the effect of the radiation.
Radiation Damage

• One chest CT scan = 400 chest X-rays
• Patients with a chronic disease such as autoimmune diseases and diabetes—have normal cells outside of the cancer that are very vulnerable to radiation effects, more so than patients without the chronic disease.
Nutrients To Protect Against Radiation Necrosis

• Mixed carotenoids 25,000 IU (extracted from the algae D. salina) BID (dosage may be an problem in patients with lung cancer)
• Magnesium ascorbate 1,000 mg TID between meals
• Vitamin E succinate 400 IU TID
• MVI without iron, copper, or methionine
Nutrients To Protect Against Radiation Necrosis (Cont.)

• Curcumin 500 mg TID—dissolve the content of one capsule in one tbsp of extra virgin olive oil

• Alpha lipoic acid 200 mg BID with meals during treatment and for 3 weeks afterward. Then take 200 mg qd subsequently.

• Quercetin 500-1,000 mg TID
Nutrients To Protect Against Radiation Necrosis (Cont.)

• Ashwaganda (Withnia somnifera) 1:2 extract in water qd or BID.
  – Protects the DNA and cell integrity
  – Protects BM from damage during radiation
  – Increases the number of cells within the BM following radiation
  – Do NOT use ashwagandha with amphetamines or CNS depressant medications
    • Ibid., Blaylock, p. 113.
Nutrients To Protect Against Radiation Necrosis (Cont.)

• These nutrients not only make the normal surrounding cells more resistant to radiation, but make the cancer cells more sensitive to the radiation.
Nutrition and Radiation

- Patients who have nutritional deficiencies increase their susceptibility to radiation injury.
- Factors that increase the risk of radiation injury
  - Age, (very young or very old)
  - Smoking
  - Illegal drug use, especially marijuana use
  - Chronic illness
  - Low intake of fruits and vegetables
Nutrition and Radiation (Cont.)

• Factors that increase the risk of radiation injury (cont.)
  – High intake of red meat or other sources or iron
  – High intake of copper
  – Chronic stress
  – Chemotherapy
  – Poor general health
  – Impaired or fragile DNA repair system
  – Extreme athletic exertion
    • Ibid., Blaylock, p. 115-16.
Nutrition and Radiation (Cont.)

• Radiation to the abdomen, especially when combined with chemotherapy, can kill the good bacteria in the GI tract.
• In patients who have leukemia, lymphoma, or medullablastoma--- radiation injury to the BM may occur since the radiation is extensive.
Nutrients That Increase The Effectiveness of Radiation

• Carotenoids has been found to enhance the effectiveness of radiation therapy probably by suppressing cancer growth.
  – Beta-carotene
  – Vitamin A
  – Canthaxanthins
  – Alpha-carotene
  – Lutein
  – Lycopene
Nutrients That Increase The Effectiveness of Radiation (Cont.)

• Start nutrients before radiation if possible. The nutrients are also effective if begun several days after radiation commences. Start resveratrol before the radiation. Use carotenoids from D. salina algae.
  – 50,000 IU of mixed carotenoids BID with meals
  – 500 mg of niacinamide TID with meals during radiation and for 3 weeks afterward
  – 10 mg of resveratrol TID
    • Ibid., Blaylock, p. 119.
Nutrients That Increase The Effectiveness of Radiation (Cont.)

• Niacinamide increases blood flow through tumors which elevations the oxygenation within the cancer cells.
• High oxygen levels in cancer cells makes them very sensitive to destruction by radiation.
• Niacinamide should be started several days before the radiation is started and continued throughout the entire treatment course.
Nutrients That Increase The Effectiveness of Radiation (Cont.)

• Resveratrol has the opposite effect on normal cells than it does on cancer cells.
  — Normal cells are protected from radiation.
  — Cancer cells are made more vulnerable to radiation.

• Substances that inhibit COX-1 enzyme make the cancer cells more susceptible to radiation but also protect the normal cells from radiation.
  • Ibid., Blaylock, p. 120.
Nutrients That Increase The Effectiveness of Radiation (Cont.)

• Beta-1,3 glucan is a polysaccharide extract from mushrooms and the outer wall of baker’s yeast.
  – Protects against radiation damage especially protecting the spleen, BM and lymph nodes
  – Also stimulates the immune system
  – Study in mice found beta-1,3-glucan increased survival rate.

Nutrients That Increase The Effectiveness of Radiation (Cont.)

• Cox-2 inhibitors protect normal cells from radiation and increase the cancer-killing effectiveness of the therapy.

• Flavonoids such as curcumin, quercetin, hesperidin, and kaempferol also block Cox -2.
Nutrients That Increase The Effectiveness of Radiation (Cont.)

• Curcumin
  – Blocks Cox-2 to protect from radiation damage
  – Inhibits the growth, invasion, and metastasis of many cancers
    • Ibid., Blaylock, p. 123.

• Ashwagandha
  – Protects from high-dose radiation and increases WBCs
Nutrients That Increase The Effectiveness of Radiation (Cont.)

• Magnesium is a natural calcium channel blocker.

• Calcium channel blocking medications have been shown to protect the cells against radiation and increased the killing of the cancer cells.
  
Nutrients That Increase The Effectiveness of Radiation (Cont.)

• While beta-carotene has been shown to protect the spleen but not the BM from radiation in one study.

• Therefore, it is important to use more than one nutritional supplement.
Nutrients That Increase The Effectiveness of Radiation (Cont.)

- Gingko enhances memory but also contains antioxidant flavonoids that have been shown to protect cells against radiation-induced damage.
  - Apigenin
  - Quercetin
  - Kaempeferol
  - Ibid., Blaylock, p. 124.
Nutrients That Increase The Effectiveness of Radiation (Cont.)

• People when exposed to high doses of ionizing radiation develop proteins in the blood called clastogenic factors. These proteins are a good method to measure the damage being done.
• Clastogenic factors can persist in the blood 30 years after exposure.
Nutrients That Increase The Effectiveness of Radiation (Cont.)

• In the Chernobyl accident ginkgo was taken TID, it lowered the clastogenic factor and continued to have an effect 7 months after discontinuation.

• Ginkgo also protects the blood vessels by thinning the blood which may reduce metastasis.
  – 240 mg of ginkgo is equal to one ASA qd
Nutrients That Strengthen BV Wall Which Decreases Metastasis

– Decaffeinated green tea extract 300 mg BID with food (also helps prevent iron absorption)
– Curcumin 500 mg TID—dissolve the contents of one capsule in one tbsp of extra virgin olive oil
– Selenomethionine 200 micrograms qd
– Zinc 25 mg qod
– Ginkgo biloba 120 mg qd. Do not take with blood thinners
– Magnesium citramate 300 mg TID
Metabolic Treatments of Colon Cancer

• Life style modification
  – Large study of patients at all stages of colon cancer revealed that physical activity following diagnosis reduced the risk of death due to cancer substantially.
  – Smoking cessation, decreasing alcohol, and red meat intake
Nutrition and The Treatment of Cancer

• “The hypotheses that antioxidants’ inhibition of free-radical activity may negate cytotoxic properties of some cancer therapies have been dependent on naïve and inaccurate assumptions.”

  – Dr. Jerome Block. Former Chief of Medical Oncology At Harbor-UCLA Medical Center

Nutrition and The Treatment of Cancer (Cont.)

• The only studies that showed an increase in tumor growth or interference with chemotherapy effectiveness were when an antioxidant was used alone.
  – Ibid., Blaylock, p. 163.
Metabolic Treatments of Colon Cancer

• Aged garlic extract
  – Potential in suppressing tumor formation and inhibits angiogenesis of colorectal cancer cells

• Anthocyanidins (extracts from berries)
  – Protects against colon cancer development

• Arabinogalactans (polysaccharide)
  – May prevent metastasis to the liver
    • Ibid., Alschuler, p. 31.
Metabolic Treatments of Colon Cancer (Cont.)

• Curcumin
  – Inhibits cell growth, reduces inflammation and has apoptotic effects

• Flaxseed and flax lignans
  – Helps to prevent colon cancer development and decreases levels of COX-1 and COX-2

• Folic acid
  – Reduction of colon cancer morality in people with a history of moderate to heavy alcohol use
    – Ibid., Alschuler, p. 31.
Metabolic Treatments of Colon Cancer (Cont.)

• Green tea
• Indole-3-carbinol
  – Can inhibit proliferation of colon cancer cells
• Glutamine
  – Can prevent chemotherapy induced diarrhea
• Melatonin
  – Induces apoptosis of colon cancer cells
  – Stimulates direct antitumor immune response
    – Ibid., Alschuler, p. 31-2.
Metabolic Treatments of Colon Cancer (Cont.)

• Mushroom extracts
  – Maitake, reishi, Cordyceps and others
  – Stimulate cytotoxic aspects of the immune response and may decrease metastasis

• Omega-3-fatty acids
  – Induce apoptosis of colon cancer cells
  – Help delay onset of cachexia and decrease severity
    • Ibid., Alschuler, p. 32.
Metabolic Treatments of Colon Cancer (Cont.)

• Quercetin
  – Modifies genetic expression in colon cancer cells resulting in decreased division and apoptosis

• Resveratrol
  – Inhibits colon cancer development

• Vitamin D and calcium
  – Intake decreases colon cancer
    • Ibid., Alschuler, p. 32.
Metabolic Treatments of Colon Cancer (Cont.)

• Vitamin E succinate
  – Induces apoptosis
  – Reduces cell proliferation
    • Ibid., Alschuler, p. 32.
Non-Chemotherapeutic Treatments for Colon Cancer

• Study revealed that colon cancer cells treated with cimetidine had a better response to chemotherapy than those patients that did not receive cimetidine.
Non-Chemotherapeutic Treatments for Colon Cancer

• In another trial, 7 days of cimetidine (400 mg BID) for 5 days pre-operatively and IV for 2 days post-operatively decreased the mortality rate at three years from 41% to 7%.
Non-Chemotherapeutic Treatments for Colon Cancer

• Study in Japan with 15 collaborating institutions that gave cimetidine post-operatively IV with chemotherapy. Then participants were divided into two groups. One getting fluorouracil only and the other group receiving 800 mg of oral cimetidine and 200 mg of fluorouracil daily for one year.

• Results of the trial showed that the cimetidine improved the 10-year survival rate.
Metabolic Treatments of Gastric Cancer

• Life style modification
  – Stop smoking, alcohol use, and loss weight if overweight
  – Garlic and onions can protect the gastric epithelium
Metabolic Treatments of Gastric Cancer (Cont.)

• Astragalus
  – Inhibits tumor growth
  – Decreases toxic effects of chemotherapy
  – Increases immune activity
  – Improves quality of life

• Ginkgo biloba
  – Inhibits growth of gastric cancer cells in vitro
    • Ibid., Alschuler, p. 33.
Metabolic Treatments of Gastric Cancer (Cont.)

• Green tea
  – Inhibits gastric cancer cell growth in vitro

• PSK (mushroom polysaccharide)
  – Trial revealed that it enhanced survival time and produced a positive immune response
  – Was used with chemotherapy following surgery

• Panax ginseng
  – Study showed that it enhanced immune activity during chemotherapy post-op
    • Ibid., Alschuler, p. 33.
Metabolic Treatments of Gastric Cancer (Cont.)

• Procyanidins
  – From apples
  – Apoptotic effect on gastric cancer cells--in vitro

• CLA
  – Induces apoptosis of gastric cancer cells in vitro

• Vitamins C and E, selenium
  – May have protective effect
    • Ibid., Alschuler, p. 33.
Metabolic Treatments of Kidney Cancer

• Life style modification
  – Avoid known kidney carcinogens
    • Solvents, pesticides, and herbicides, copper sulfates, benzene, benzidine, coal tar, soot, pitch, creosol, lubricating oil, mustard gas, vinyl chloride, and DNT
  – Do not smoke
  – Control blood pressure
  – Lose weight if overweight
  – Control blood sugar
Metabolic Treatments of Kidney Cancer (Cont.)

• Alpha-lipoic acid
  – Reduces oxidative stress to the kidneys

• Green tea
  – Upregulates unmuted p53 which increases apoptosis

• L-carnitine
  – Improves kidney function
    • Ibid., Alschuler, p. 35.
Metabolic Treatments of Kidney Cancer (Cont.)

• Melatonin
  – Study showed it was synergistic with interferon in metastatic renal cell carcinoma
  – Can however exaggerate adverse side effects of IL-2—do no use with IL-2

• Panax ginseng
  – Can inhibit renal cell carcinoma by inhibiting proliferation
    • Ibid., Alschuler, p. 35.
Metabolic Treatments of Kidney Cancer (Cont.)

• Vitamin A and zinc
  – Patients with kidney cancer have low vitamin A and low zinc levels
  – Both nutrients support apoptosis

• Vitamin D
  – Inhibits proliferation of cancer cells by stopping their ability to divide and replicate
  – Induces apoptosis
  – Reduces production of insulin-like growth factor
    • Ibid., Alschuler, p. 35.
Antioxidant Use With Chemotherapy and Radiation

• For the last 30 years 280 peer-review studies have been published including 50 human clinical trials using non-prescription antioxidants and other nutrients and 50 studies on prescription antioxidants.

• Studies have shown that non-prescription antioxidants and other nutrients do not interfere with cancer therapies.
Antioxidant Use With Chemotherapy/Radiation (Cont.)

• The non-prescription antioxidants and other nutrients were found to increase the killing of cancer therapies, decrease their side effects, and protect healthy tissues. In 15 human trials--- over 3,500 patients had longer survival.

Antioxidant Use With Chemotherapy/Radiation (Cont.)

• There are now two prescription antioxidants on the market which reduce the side effects of treatment but do not interfere with the ability to kill the cancer.
  – Amifostine
  – Dexrazoxane

Amifostine

• Numerous studies have shown that Amifostine decreases the side effects of chemotherapy and radiation along with increases the effectiveness of both therapies.
Dexrazoxane

• Dexrazoxane has been shown in numerous clinical trials to protect the heart from adriamycin toxicity without changing the effectiveness of the drug.
Dexrazoxane (Cont.)

• It works by chelating iron that would form free radicals.
Herbal Combinations

• Several trial have used different herbal combinations and conventional chemotherapy with the herbs providing statistically significant improvement.
References (Cont.)


Nutrients That Decrease Effectiveness of Chemotherapy

• NAC is suspected of decreasing the effectiveness of doxorubicin.

• NAC may interfere with cisplatinum.
Nutrients That Decrease Effectiveness of Chemotherapy

• Tangeretin may decrease the effectiveness of tamoxifen.