Food for Thought—Healing Foods to Savor – Vicky Newman, MS, RD
Cancer Prevention & Control Program, Moores UCSD Cancer Center
UCSD School of Medicine, www.healthyeatingucsd.org

Food for Thought
Healing Foods to Savor
www.healthyeatingucsd.org

Vicky Newman, MS, RD
Director, Nutrition Services, Cancer Prevention Program,
Moores UCSD Cancer Center
Associate Clinical Professor, Voluntary
Department of Family & Preventive Medicine,
UCSD School of Medicine

Diet Influences
Genetic & Epigenetic Events
Associated with Disease Processes

Toxin & Carcinogen Metabolism
Cell Cycle
Bioactive Food Components
DNA Repair
Hormonal Regulation
Cellular Differentiation
Apoptosis (programmed cell death)

Adapted from: Milner JA. J Nutr 2004;134:2492S-2498S.
www.eating.ucsd.edu—Food for Thought

October 26, 2010
Protective Compounds from Diet

<table>
<thead>
<tr>
<th>Group</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrients</td>
<td>Vitamins, minerals, trace elements</td>
</tr>
<tr>
<td>Phytochemicals</td>
<td>Carotenoids, flavonoids, indoles, isothiocyanates, allyl sulfur</td>
</tr>
<tr>
<td>Zoochemicals</td>
<td>Conjugated linoleic acid, omega-3 fatty acids</td>
</tr>
<tr>
<td>Fungochemicals</td>
<td>Beta-glucans &amp; other compounds in mushrooms</td>
</tr>
<tr>
<td>Bacteriochemicals</td>
<td>Equol, butyrate, &amp; other compounds formed by GI flora</td>
</tr>
</tbody>
</table>

Adapted from: Trujillo E. J Am Diet Assoc 2006;106:403-413.
vnewman@ucsd.edu – Food for Thought

Anti-Inflammatory Diet
Lowers Risk of Chronic Disease

- Mainly plant foods (vegetables, fruits, beans/legumes)
- Lower glycemic load (less refined carbohydrates)
- More fish & seafood
- Low in meat & dairy products (large land animals)
- High ratio of monounsaturated fatty acids (olive, avocado, nuts) to polyunsaturated fatty acids (corn, soy, safflower, sunflower)
PHYTOCHEMICALS
(Plant Protectors)

- Produced by plants to protect them from damage from environment (predators, pathogens, solar radiation).
- Include toxins to fight off predators. When eaten by humans, these increase detoxifying enzymes.
- Non-nutritive (do not provide energy, vitamins, or minerals)
- Most are heat stable and not significantly lost in cooking water.
- Organically grown produce often contains higher levels.

5 – 9 Servings/Day
BOLD is BEST
BIG Color & BIG Flavor

Vegetables—dark green, orange, tomato, cabbage family, onions/garlic
Fruits—berries, citrus, melons
Vitamin A -- Carotenoids & Retinol

- Carotenoids, found in deep orange & dark green vegetables & fruits, are powerful antioxidants.
- Some carotenoids (like alpha- & beta-carotene) metabolized to vitamin A (retinol).
- Retinol (pre-formed vitamin A) critical for:
  - normal vision;
  - immune functioning;
  - health of epithelial cells;
  - reproduction;
  - gene expression.
- Certain gene variants associated with poor conversion of carotene to retinol.
- Food sources of retinol are limited & include fortified milk products, breakfast cereals, & dietary supplements.
- Those with poor conversion of carotene to retinol need to check labels to make sure vitamin A is in form of retinol and not just carotene.

CITRUS FRUIT

Vitamin C

- Fights infection.
- Antihistamine effects.
- Antioxidant (protects cell membranes & DNA from oxidative damage).
- Decreases conversion of nitrate to nitrite (reducing nitrosamines).
- Necessary for synthesis of collagen (main component of connective tissue—tendons, ligaments, skin, cornea, cartilage, bone, blood vessels, gut, intervertebral discs).

D-limonene, Flavonoids, Glucarates

- Contain D-limonene, a terpenoid shown to increase activity of detoxification enzymes (glutathione transferase).
- Flavonoids act as antioxidants; also extend activity of vitamin C & have anti-inflammatory action.
- Citrus pulp & white inner peel rich in glucarates (potential to prevent breast cancer & lower PMS symptoms).
Aromatic Herbs & Spices

- Terpenoids, responsible for flavors of many herbs & spices, increase activity of detoxification enzymes.
- Herbs & spices contain potent antioxidants & anti-inflammatory compounds (whole leaf or unground form best).
- Tumeric in curry powder is rich in curcumin, a polyphenol thought to have antioxidant & anti-inflammatory properties.
- Curcumin also found in botanically associated ginger & lemon grass.
- Synergy--anti-inflammatory effects of curcumin enhanced when combined with black pepper.

---

Flavonoids--Roles

- Anti-inflammatory
- Antioxidative
- Anti-microbial
- Anti-allergic
- Anti-cancer
- Cardio-protective
- Color pigments (anthocyanidins)
### Flavonoids Protective

<table>
<thead>
<tr>
<th>Food</th>
<th>Serving size</th>
<th>Flavonoids/serving</th>
</tr>
</thead>
<tbody>
<tr>
<td>cocoa powder, unsweetened</td>
<td>2 tbsp.</td>
<td>216</td>
</tr>
<tr>
<td>broccoli, raw</td>
<td>1 cup</td>
<td>828</td>
</tr>
<tr>
<td>chocolate, dark, bar</td>
<td>1 oz</td>
<td>1,510</td>
</tr>
<tr>
<td>apple, raw, with skin, slices</td>
<td>1 cup</td>
<td>1,540</td>
</tr>
<tr>
<td>cranberries, raw</td>
<td>1 cup</td>
<td>2,208</td>
</tr>
<tr>
<td>kale, raw</td>
<td>1 cup</td>
<td>2,308</td>
</tr>
<tr>
<td>parsley, raw</td>
<td>2 tbsp.</td>
<td>2,340</td>
</tr>
<tr>
<td>onions, yellow, raw</td>
<td>1 cup</td>
<td>2,458</td>
</tr>
<tr>
<td>orange juice, raw</td>
<td>8 oz</td>
<td>2,555</td>
</tr>
<tr>
<td>capers, canned</td>
<td>1 tbsp.</td>
<td>5,051</td>
</tr>
<tr>
<td>wine, red</td>
<td>8 oz</td>
<td>8,363</td>
</tr>
<tr>
<td>raspberries, raw</td>
<td>1 cup</td>
<td>7,192</td>
</tr>
<tr>
<td>onions, red, raw</td>
<td>1 cup</td>
<td>8,320</td>
</tr>
<tr>
<td>blueberries, raw</td>
<td>1 cup</td>
<td>17,228</td>
</tr>
<tr>
<td>cherries, sweet, raw</td>
<td>1 cup</td>
<td>18,980</td>
</tr>
<tr>
<td>tea, black, brewed</td>
<td>8 oz</td>
<td>27,880</td>
</tr>
<tr>
<td>tea, green, brewed</td>
<td>8 oz</td>
<td>32,975</td>
</tr>
</tbody>
</table>


---

### FIBER-RICH FOODS

(Vegetables, Fruits, Whole Grains, Beans)

- Rich sources of protective nutrients & phytochemicals.
- Lower glycemic load (lower insulin & insulin-like growth factor).
- Feel full with fewer calories (lowers risk obesity).
- Fiber speeds transit through GI tract (enhances excretion of carcinogens & excess hormones).
- Soluble fiber helps to lower cholesterol.
- Fibrous foods increase protective gut bacteria.
## Getting Enough Fiber? (25-35 g/day)

<table>
<thead>
<tr>
<th>Food</th>
<th>Recomm Serv/Day</th>
<th>Fiber/Serv (g)</th>
<th>Total Fiber (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetables</td>
<td>4 - 5</td>
<td>2</td>
<td>8 - 10</td>
</tr>
<tr>
<td>Fruit</td>
<td>2 - 3</td>
<td>2</td>
<td>4 - 6</td>
</tr>
<tr>
<td>Whole Grains</td>
<td>2 - 3</td>
<td>3</td>
<td>6 - 9</td>
</tr>
<tr>
<td>Beans</td>
<td>½ - 1</td>
<td>6</td>
<td>3 - 6</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td>21 - 31</td>
</tr>
</tbody>
</table>

## Salad Bar Choices

<table>
<thead>
<tr>
<th>Food</th>
<th>Serving</th>
<th>Lettuce Needed for Equiv Fiber (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kidney beans, ckd</td>
<td>½ cup</td>
<td>8 cups</td>
</tr>
<tr>
<td>Squash, winter, ckd</td>
<td>½ cup</td>
<td>5 cups</td>
</tr>
<tr>
<td>Broccoli, cooked</td>
<td>½ cup</td>
<td>4 cups</td>
</tr>
<tr>
<td>Peas, cooked</td>
<td>½ cup</td>
<td>4 cups</td>
</tr>
<tr>
<td>Spinach, cooked</td>
<td>½ cup</td>
<td>3 cups</td>
</tr>
<tr>
<td>Corn, cooked</td>
<td>½ cup</td>
<td>2 cups</td>
</tr>
</tbody>
</table>
Increased Glycemic Load
Associated with Chronic Disease

- Obesity (increases insulin levels; insulin promotes fat storage = weight gain).
- Diabetes (more weight = more insulin resistant, so need more insulin to maintain normal blood sugar).
- Cancer (insulin-like growth factor promotes cancer growth).
- Heart disease (high glycemic diet associated with elevated triglyceride & LDL-cholesterol levels).

Glycemic Load

<table>
<thead>
<tr>
<th>Type of Carbohydrate</th>
<th>Glycemic Load (g) in Typical Serving Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonstarchy vegetables</td>
<td>1 - 5</td>
</tr>
<tr>
<td>Fruits</td>
<td>5 - 10</td>
</tr>
<tr>
<td>Grains, pasta, rice, potatoes</td>
<td>20 - 30</td>
</tr>
<tr>
<td>Junk food (candy, chips, soda, juices)</td>
<td>20 - 30</td>
</tr>
</tbody>
</table>

Low glycemic load = 0 – 10;
Medium Glycemic Load = 11 – 19;
High Glycemic Load = 20+

vinewman@ucsd.edu – Food for Thought
Fat & Disease

- Fat-soluble contaminants
  - eat lower on food chain
  - eat smaller animals, fish
  - buy organic

- Energy density
  - careful—extra calories = more weight

- Omega-6 to omega-3 ratio
  - eat less corn, cottonseed, soy, safflower, sunflower oils
  - eat more fish, seafood, flaxseeds, pasture-fed animals

- Trans (hydrogenated) fats
  - eat less processed foods

- Rancid fats
  - eat less aged cheese, aged meats, deli meats

High Omega-6 to Omega-3 Ratio Associated With Disease

- Increased risk cancer risk.

- Greater fat storage.

- Greater risk heart disease (especially if triglycerides elevated).

- Mood disorders.
# Omega-3 Fatty Acid Recommendations

(American Heart Association, except where noted)

<table>
<thead>
<tr>
<th>Population</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy people</td>
<td>Eat fish twice/week, &amp; include other foods rich in alpha-linolenic acid (flaxseed, leafy greens).</td>
</tr>
<tr>
<td>Healthy people—International Guidelines (see Simopoulos AP. PLEFA-2000;83(3):119-121).</td>
<td>650 mg/day (EPA+DHA) preferred DHA at least 220 mg/day EPA at least 220 mg/day</td>
</tr>
<tr>
<td>Patients with documented heart disease</td>
<td>1,000 mg/day EPA+DHA (preferably from fish).</td>
</tr>
<tr>
<td>Patients who need to lower triglycerides</td>
<td>2,000-4,000 mg/day EPA+DHA (monitored by physician).</td>
</tr>
</tbody>
</table>

Intakes above 3g/day can cause excessive bleeding in some people.

*vinewman@ucsd.edu* – Food for Thought

---

<table>
<thead>
<tr>
<th>Fish</th>
<th>Cooked Ounces Required to Provide 1,000 mg/d EPA+DHA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Halibut</td>
<td>3.0 - 7.5</td>
</tr>
<tr>
<td>Mackerel</td>
<td>2.0 – 8.5</td>
</tr>
<tr>
<td>Salmon</td>
<td>1.5 – 4.5</td>
</tr>
<tr>
<td>Sardines</td>
<td>2.0 – 3.0</td>
</tr>
<tr>
<td>Scallops</td>
<td>17.5</td>
</tr>
<tr>
<td>Shrimp</td>
<td>11.0</td>
</tr>
<tr>
<td>Trout</td>
<td>3.0 - 3.5</td>
</tr>
<tr>
<td>Tuna, light, water-pack</td>
<td>12.0</td>
</tr>
<tr>
<td>Tuna, albacore, water-pack</td>
<td>4.0</td>
</tr>
<tr>
<td>Tuna, fresh</td>
<td>2.5 – 12.0</td>
</tr>
</tbody>
</table>

*Safer choices are highlighted – www.montereybayaquarium.org/about/SeafoodWatch*

*vinewman@ucsd.edu* – Food for Thought
To Reduce INFLAMMATION

- Avoid excess weight (fat)—especially abdominal fat (secretes pro-inflammatory cytokines).
- Avoid excessive food intake.
- Avoid food containing high amounts of polyunsaturated (omega-6) & trans fatty acids.
- Balance omega-6 with omega-3 fatty acids (4:1 or less).
- Avoid foods sweetened with sugar & high-fructose corn syrup.
- Eat plenty of vegetables, fruits, whole grains, & beans for antioxidants.

Bottom Line

- Eat food*
- Not too much*
- Mostly plants*
- Drink pure water
- Eat slower
- Exercise
- Practice gratitude

*Michael Pollan says, "Eat food rather than "edible food-like substances""

More of Pollan’s useful tips in: Food Rules & In Defense of Food: An Eater’s Manifesto