

A Path to Better Nutrition

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Why is Diet so Important?

- ◆ Certain foods can reduce the risk of many diseases
- ◆ Cancer-fighting foods include vegetables, fruits, whole grains, and legumes
- ◆ Thousands of studies supporting plant-based foods
- ◆ Even after a diagnosis, food can still help



Why are Plant Foods so Important?

- ◆ Phytochemicals= plant chemicals
- ◆ Beta-carotene, lycopene, flavonoids, etc.
- ◆ Phytochemicals act together in their natural state to help prevent a variety of diseases
- ◆ Research tells us the more phytochemicals we eat, the lower our disease risk
- ◆ Only plants contain phytochemicals
- ◆ Research suggests at least 5 servings of fruits and vegetables per day could prevent at least 20% of cancers!

How do these Foods Help Fight Disease?



- ◆ Numerous theories:
 - Detoxification through enzymes
 - Phytochemicals help destroy carcinogens before they cause cancer
 - Antioxidants

Fruits and Vegetables

- ◆ Protective effect shown in most studies
- ◆ High in dietary fiber
- ◆ 5 to 9 per day = reasonable minimum
- ◆ Preparation methods (boiling, steaming, etc.)
- ◆ Eat from the rainbow
- ◆ Fresh vs. frozen vs. canned



Fruits and Vegetables, continued

- ◆ The cabbage family
 - Arugula, bok choy, broccoli, brussels sprouts, cabbage, cauliflower, collards, cress, wasabi horseradish, kale, mustard greens, turnips,
 - These are variably associated with lower human breast, prostate, and colon cancer incidence.
- ◆ Berries, especially raspberries and blueberries
 - Very high antioxidant levels
 - These markedly reduce the growth of colon and prostate cancer cells



Fruits and Vegetables, continued

◆ Allium Family

- Garlic, onions, scallions, leeks, chives
- Improve the ability to detoxify cancer-causing chemicals
- This may be associated with suppressed tumor growth



The Rainbow Assortment

Red	Dark Green	Yellow and Light Green	Orange	Purple
<p>Red Apples Red Bell Peppers Cherries Cranberries Grapefruit Red Grapes Red Plums Radishes Raspberries Strawberries Tomatoes Watermelon</p> 	<p>Artichoke Asparagus Green Bell peppers Broccoli Brussels sprouts Chard Collard Greens Cucumber Green Grapes Green Beans Honeydew melons Kale, Leeks Lettuce (dark-green) Mustard greens Peas, Spinach Turnip greens</p>	<p>Apples (green or yellow) Avocado Bananas Yellow Bell peppers Bok choy Cabbage Cauliflower Celery, Fennel Kiwi fruit, Lemons Lettuce (light-green) Limes, Onions Pears (green or yellow) Pineapple Yellow squash Yellow zucchini</p>	<p>Apricots Orange Bell peppers Butternut squash Cantaloupe Carrots Mangoes Oranges Papaya Pumpkin Sweet potatoes Yams</p> 	<p>Beets Blackberries Blueberries Cabbage (purple) Cherries Currants Eggplant Grapes (purple) Onions (red) Pears (red) Plums (purple) Radishes</p> 

Eat From the Rainbow

- ◆ For great start, choose at least one food per day from each of the 5 color groups
- ◆ 1 serving size equals:
 - 1 cup raw leafy vegetables
 - ½ cup raw no –leafy or cooked vegetables
 - ½ cup cooked green beans or peas
 - 1 medium fruit
 - ½ cup small or cut up fruit or ¼ cup dried fruit
 - ½ cup 100% juice



Phytochemicals



Phyto-chemical	Actions	Sources
Carotenes	<ul style="list-style-type: none">◆ Antioxidants◆ Enhance immune function	Dark-colored vegetables such as carrots, squash, spinach, kale, tomatoes, Yams, sweet potatoes, Fruits such as cantaloupe, apricots, citrus fruits
Coumarin	<ul style="list-style-type: none">◆ Antitumor properties◆ Enhance immune function◆ Stimulate antioxidant mechanisms	Carrots, celery, fennel, beets, citrus fruits



Phytochemicals...

Dithiolthiones, Glucosinulates, and Thiocyanates	<ul style="list-style-type: none">◆ Block cancer-causing compounds from damaging cells◆ Enhance detoxification	Cabbage family vegetables- broccoli, Brussels sprouts, kale, etc.
Flavonoids	<ul style="list-style-type: none">◆ Antioxidants	Fruits, particularly richly colored fruits- berries, cherries, citrus fruits; also tomatoes, peppers, greens
Isoflavonoids	<ul style="list-style-type: none">◆ Block estrogen receptors	Soy and other legumes
Lignans	<ul style="list-style-type: none">◆ Antioxidants◆ Modulate hormone receptors	Flaxseed and flaxseed oil; whole grains, nuts, seeds

More Phytochemicals...



Limonoids	<ul style="list-style-type: none">◆ Enhance detoxification◆ Block carcinogens	Citrus fruits, celery
Polyphenols	<ul style="list-style-type: none">◆ Antioxidants◆ Block carcinogen formation◆ Modulate hormone receptors	Green tea, chocolate, red wine
Sterols	<ul style="list-style-type: none">◆ Block production of carcinogens◆ Modulate hormone receptors	Soy, nuts, seeds

Whole Grains



- ◆ Whole wheat, corn, oats, quinoa, rye, barley, brown rice, millet, etc.
- ◆ Contain more minerals, vitamins, antioxidants, and fiber than refined grains
- ◆ May be associated with lower risk of breast, prostate, and colon cancer, heart disease and type 2 diabetes

anatomy

Anatomy of a whole grain

Whole grains contain three layers:

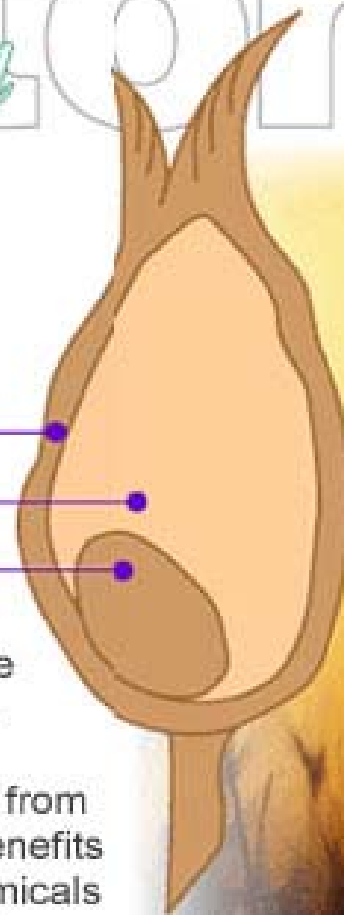
The bran (fiber-rich outer layer)

The endosperm (middle part)

The germ (nutrient-rich inner part)

In contrast, when grains are milled, or refined, the bran and germ portions are removed, leaving only the endosperm.

When you eat a variety of foods made from whole grains, you get the nutritional benefits of the entire grain, including phytochemicals (protective plant substances), vitamins, minerals and fiber.



When Whole Wheat Flour Becomes White Flour

Mineral	Loss (%)	Other Nutrients	Loss (%)
Calcium	60	Strontium	95
Chromium	40	Zinc	78
Cobalt	89	Vitamins B1, B2, B3	72-81
Copper	68	Vitamin B6	50
Iron	76	Pantothenic Acid	50
Magnesium	85	Folacin	67
Manganese	86	Vitamin E	86
Molybdenum	48	Linoleic Acid	95
Phosphorous	71	Alpha-linoleic	95
Potassium	77	Protein	33
Selenium	16	Fiber	95

Whole Grains

- ◆ Read the ingredient list!
 - ‘enriched’ or ‘white flour’ = NOT a whole grain
 - Look for words such as: ‘whole grain’, ‘stone ground’, ‘whole ground’, ‘whole wheat flour’, ‘whole oat flour’, or ‘whole barley flour’.
 - Look for the words ‘100% whole wheat’ on the packaging.



Flax Seed (Linseed)



- ◆ High in omega-3 fatty acids and fiber
- ◆ High in dietary phytoestrogens (lignans and isoflavones)
- ◆ High in antioxidants
- ◆ Seeds must be ground to be accessible to the body
- ◆ Grind in a coffee grinder and store in refrigerator
- ◆ Add 2 Tbsp daily to cold cereal or oatmeal, yogurt or smoothies, baked goods, or topping for fruit crisps.



Flax Seed Study

- ◆ Women who ate 25 gm (4 tablespoons or ¼ cup) ground flaxseed in a muffin had reduced tumor growth at 39 days

Clin Cancer Res 2005; 11:3828-3835

- ◆ Flaxseed lignans reduce breast cancer cell adhesion, invasion and migration in *in vitro* and animal studies

Chen & Thompson Br Ca Res Treatment 2003;80:163-170



Don't Forget the Beans and Legumes



- ◆ Very high in antioxidants, fiber, healthful phytochemicals, and minerals
- ◆ Examples: split peas, lentils, chickpeas, and beans (black, pinto, navy, white, red, kidney, etc.)
- ◆ Reduce the level of serum cholesterol
- ◆ Superior carbohydrate for people with diabetes or blood sugar imbalances

Dietary Fats

Saturated Fat
↓
animal fats = beef,
high-fat dairy;
hydrogenated fats^{1,2}

¹processed foods
crackers, chips,
ready-to-eat meals;
²not really sat fat,
but "acts like sat fat"

PRO-INFLAMMATORY

Limit these fats

Polyunsaturated Fatty Acids (PUFA)

↓
omega-6

and

↓
omega-3

↓
vegetable oils & fats
processed foods
crackers, chips,
ready-to-eat meals

PRO-INFLAMMATORY

↓
fish, flax, walnuts
other nuts, seeds,
canola, seaweed,
wild game

ANTI-INFLAMMATORY

Monounsaturated Fatty Acids (MUFA)

↓
olive oil, olives, canola oil
nuts, seeds, avocado,
safflower oil

ANTI-INFLAMMATORY/NEUTRAL

Eat these fats

Dietary Fat

- ◆ Omega-6 fatty acids
 - Linoleic acid found in corn, safflower, and peanut oils
 - ‘Western’ diets are higher in omega-6 fatty acids
 - Linked to more cancer in animal studies
- ◆ Butter is still probably the best solid fat, used sparingly.





Dietary Fat Continued

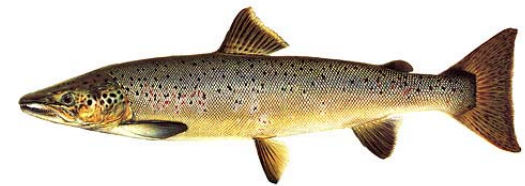
- ◆ Olive oil appears to be the most protective
 - Countries in which olive oil is the predominant fat have lower rates of cancer
 - Great general purpose oil for cooking
 - Extra virgin contains a higher amount of phytonutrients
 - Other good oils = Sesame, Coconut, Flax



Additional Dietary Fat

◆ Omega-3 fatty acids

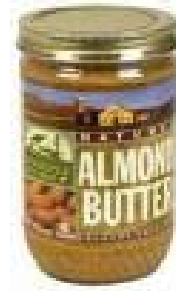
- EPA and DHA found in oily fish
 - Most studies suggest fish is protective against cancer
 - Wild salmon, “light” tuna, mackerel, herring, sardines, and trout
- ALA in flaxseed, canola oil, some green vegetables, and walnuts
- Omega-3 fatty acids have the ability to reduce inflammation in tissues
- May help prevent the spread of some cancers/ boosts the immune system
- Most studies have found additional protection against heart disease and Alzheimer’s disease.



WINS Study- Fat Intake and Breast Cancer

- ◆ Women's Intervention Nutrition Study
 - Looked at adding low-fat diet to usual breast cancer treatment
 - 20% of calories as fat
 - Findings:
 - Significant (6 lb) weight loss
 - Lower breast cancer recurrence rate: after 3 years, 24% less recurrence overall, 40% less ER- tumor recurrence rate

Nuts and Nut Butters



- ◆ Excellent source of proteins, healthy fats, some B vitamins and antioxidants
- ◆ Nuts are very good for people who want to keep weight on.
- ◆ Emphasize nut butter that do not contain added sugars, trans fats or partially hydrogenated oils.

Meat and Dairy Foods



- ◆ Red meat (beef, pork and lamb) appears to be safe up to about 18 oz (raw weight) weekly
AICR 2007
- ◆ Keeping meat intake low is prudent
 - Allows room for protective foods
 - Goal: $\frac{3}{4}$ plate covered by fruit, vegetables, whole grains and legumes
 - It is OK to have $\frac{1}{4}$ plate covered by chicken, meat, or fish
- ◆ Data covering dairy foods is similarly inconclusive
 - Low fat cheese, milk, and yogurt and probably the best choices

Green and Black Tea



- ◆ Both contain beneficial biologically active chemicals
- ◆ Polyphenols protect cells from damage
 - May inhibit the growth of many cancers
 - Colon, lung, breast, prostate, melanoma and leukemia
 - The benefit seems more evident when caffeine is present
 - Decaffeinated appears less beneficial
 - Green and black tea has 10-25% of the caffeine of coffee

Green and Black Tea

- ◆ May also decrease incidence of heart disease
 - Due to aspirin-like effect
 - Reduces tendency of platelets to clot
- ◆ Aim for 3+ cups per day



Soy



- ◆ Edamame, miso, soymilk, soynuts, soy yogurt, tempeh, tofu...
- ◆ Avoid soy protein powders, isoflavones, and processed soy products
- ◆ Excellent source of phytonutrients, fiber, calcium, and high quality protein
- ◆ Contains isoflavones
 - Converted into phytoestrogens
 - MAY be beneficial in reducing the risk of various cancers, heart disease, and osteoporosis

Soy Continued

- ◆ Soy foods appear most protective against breast cancer if eaten in childhood and the early teen years
- ◆ Probably less beneficial later in life; may even be harmful in large amounts
- ◆ Limit intake to 3-5 servings per week



Can I Take a Pill and Get the Same Benefit?

- You get the variety of phytochemicals from food, NOT supplements, to fight disease best
- A higher nutrient intake from the whole food is associated with better cancer outcomes
- Several studies have shown that certain supplements can increase cancer risk in some people
- The Bottom Line? A WIDE VARIETY of plant foods is the key to disease prevention and good overall health

Where do I begin?

- ◆ Choose a balanced diet
 - A plant-based diet does not have to be vegetarian!
 - Many need to simply shift the proportions they eat
- ◆ Become aware of phytochemicals
 - Stimulate the immune system
 - Inhibit enzymes that contribute to cancer growth
 - Act as free radical scavengers
 - Exhibit antibacterial and antiviral activity
 - In general, help your body fight cancer



Where do I begin?



- ◆ Following all the tips at once= recipe for failure
- ◆ Begin with and item that is easiest for you and your family
- ◆ A few weeks later, choose another
- ◆ Repeat the cycle until you've moved into a healthier eating mode

What to Avoid

- ◆ Read labels!
- ◆ Refined flours and sugars
 - Provide empty calories and are low in nutrients
 - Worsen insulin resistance, contribute to obesity
 - Increase breast cancer risk

Int J Cancer 2005; 653-58



Soft Drinks- Regular and Diet



- ◆ One or more daily worsen:
 - Insulin resistance (raises risk of breast cancer)
 - Increases obesity (raises risk of breast cancer)
 - Cholesterol and triglycerides

Framingham, 4 yrs, n=6039, Dhingra *Circulation* 2007; 116:480-88

- ◆ Artificial sweeteners seem to increase total calorie intake through increased appetite

Swithers, S. *Behavioral Neuroscience* 2008; 122:161-73

What to Avoid (Continued)

- ◆ Partially Hydrogenated Oils
 - Contain trans fats
 - Are associated with more cancer, heart disease, and diabetes
 - Found in most restaurant food, commercially fried foods, breads, packaged foods, crackers...



What to Avoid (Continued)

- ◆ Processed or Cured Meats
 - Lunch meats, bacon, ham, hot dogs
 - Contain sodium nitrate and/or sodium nitrite-compounds that keep the food from spoiling
 - These chemicals form highly carcinogenic compounds known as nitrosamines
 - Are associated with more cancer, heart disease, and diabetes



Summary of Recommendations

- ◆ Consume at least 5 servings of whole fruits and vegetables daily
- ◆ Consume at least half of your grains as whole grains (beans included)
- ◆ Olive oil (extra virgin) is the best general-purpose oil.
 - Coconut oil used for baking, pan-frying and deep frying provides many health benefits as well
 - Minimize other vegetable oils
 - Butter, used sparingly, is still the best solid fat (versus margarine)
- ◆ Nuts: almonds, walnuts, filberts, pecans...
- ◆ Keep meat intake low, Eat fish twice per week.
- ◆ Drink half your weight in water.
 - A 200 lb man should drink 100 oz of water per day.

Resources

- ◆ CA Cancer J Clin 2002;52:92-119
- ◆ Katz, Rebecca, One Bite at a Time, 2004
- ◆ Jacobs Nutrition and Cancer 1998 30;85-96
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- ◆ Potter, ed. Food, Nutrition and the Prevention of Cancer. AICR 1997
- ◆ Hardman J Nutrition 2002;132;3508S-3512S
- ◆ Cancer Nutrition Information, LLC
- ◆ American Cancer Society (www.cancer.org)
- ◆ American Institute for Cancer Research (www.aicr.org)
- ◆ Murray, Birdsall, Pizzorno, and Reilly, How to Prevent and Treat Cancer with Natural Medicine, September 2002.