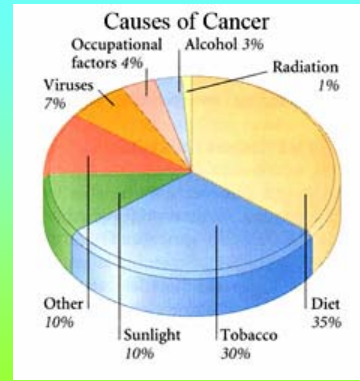


Healthy Breasts



Causes of cancer



2007 AICR: 38% of breast cancer in USA is preventable

Estimates¹ of cancer preventability by appropriate food, nutrition, physical activity, and body fatness in four countries²

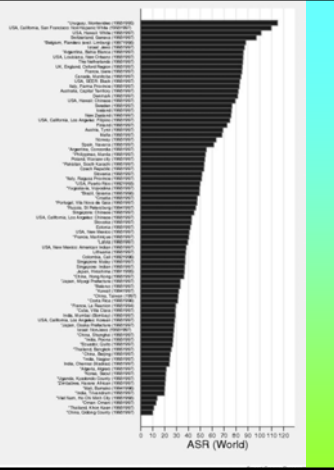
	USA	UK	BRAZIL	CHINA
Mouth, pharynx, larynx	63	67	63	44
Oesophagus	69	75	60	44
Lung	36	33	36	38
Stomach	47	45	41	33
Pancreas	39	41	34	14
Gallbladder	21	16	10	6
Liver	15	17	6	6
Colorectum	45	43	37	17
Breast	38	42	28	20
Endometrium	70	56	52	34
Prostate	11	20	N/A ¹	N/A ¹
Kidney	24	19	13	8
Total for these cancers combined	34	39	30	27
Total for all cancers	24	26	19	20

Incidence of breast cancer in Canada is 8.5 times higher than in Thailand & China



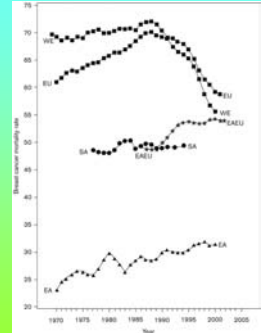
Breast cancer incidence worldwide: age-standardized rates (world population). *Breast Cancer Res.* 2004; 6(6): 229–239

USA California: 110/100,000
 Canada, Manitoba 85/100,000
 Thailand, Khon Kaen 11/100,000
 China, Qidong County 10/100,000



Breast cancer mortality around the world

EU= European Union
 WE= Western countries
 EAEU= Eastern Europe
 SA= South America
 EA= East Asia



Risk factors you can control

- ◆ Inflammation
- ◆ Excess estrogen
- ◆ Nutrient deficiencies
- ◆ Sedentary lifestyle
- ◆ Overweight
- ◆ Pesticide exposure



Anti-inflammatory diet



- ◆ Abundant fruits and vegetables (8-10 servings per day) from a rainbow of colors and kinds
- ◆ Healthy fats: olive oil, nuts, fatty cold water fish, fish oil
- ◆ Green tea, turmeric, ginger, rosemary, oregano

Abundant Fruits and Vegetables



What are phytochemicals?



- ◆ Bioactive compounds found in plant foods that may help to slow the aging process and reduce the risk of chronic disease
- ◆ Many are plant pigments and are found in brightly colored fruits and vegetables
- ◆ Phytochemicals are also found in whole grains, legumes, nuts, seeds, tea, wine, herbs, spices and chocolate
- ◆ Phytochemicals are part of the plants' own protection against disease
- ◆ More than 5000 of these compounds have been discovered and many are still unknown



Carrots

- ◆ Carrots contain over 100 phytochemicals and other substances including: aesculetin, apegenin, arachidonic acid, p-hydroxybenzoic acid, caffeic acid, chlorogenic acid, chlorophyll, chrysin, cinnamic acid, p-coumaric acid, eugenol, ferulic acid, geraniol, beta-ionone, kaempferol, limonene, linalool, linolenic acid, luteolin, methionine, myristicin, oleic acid, alpha-pinene, psoralen, 5-methocypsoalen, quercetin, quercitrin, beta-sitosterol, stigmasterol, umbelliferone, vanillic acid, etc

Dark orange/yellow



Cruciferous vegetables



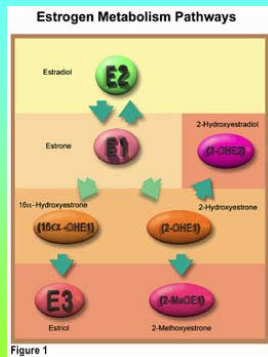
Cabbage family

(cabbage, broccoli, kale, Brussels sprouts, cauliflower, etc)

- ◆ Contain glucosinolates (indoles and isothiocyanates)
- ◆ Consumption of cabbage family foods, especially broccoli and cabbage, is associated with a lower risk of breast, prostate, colon and stomach cancer
- ◆ Cruciferous vegetables should be lightly cooked and well chewed to maximize intake of their phytochemicals



Indoles reduce estrogenic activity by shifting to the 2-hydroxylation pathway



16 α -hydroxyestrone

2-hydroxyestrone

Dark Leafy Greens



Swiss chard, spinach, romaine lettuce, arugula, purslane, lamb's quarters

Red/pink



Tomatoes, watermelon, pink grapefruit, guava

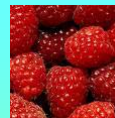


Lycopene

- ◆ Tomatoes are the best source; also other red/pink foods such as watermelon, pink grapefruit, pink guava, papaya, apricots
- ◆ Absorption is best from cooked tomato products with some added fat/oil (e.g. olive oil)
- ◆ Lycopene is a powerful anti-oxidant & may influence the activity of enzymes & hormones
- ◆ Consumption of foods rich in lycopene is associated with a reduced risk of coronary heart disease, stroke and several cancers: prostate, breast, pancreas, ovarian, skin, lung, cervix

Red/Purple/Blue

- ◆ Blueberries
- ◆ Plums
- ◆ Raspberries
- ◆ Cherries
- ◆ Blackberries
- ◆ Saskatoon berries
- ◆ Cranberries



Anthocyanidins



- ◆ Polyphenol pigments found in many foods, especially raspberries and blueberries
- ◆ Anti-oxidant activity
- ◆ Can promote apoptosis (death) of cancer cells
- ◆ Inhibit angiogenesis (growth of new blood vessels)

Citrus fruits



Allium family

- ◆ Onions
- ◆ Garlic
- ◆ Chives
- ◆ Leeks
- ◆ Shallots



How to get enough fruits and vegetables



- ◆ Have at least 2 servings with breakfast & lunch
 - Mixed berries or a glass of fruit juice and an apple with breakfast
 - A salad or raw vegies with dip with lunch
- ◆ Have at least 3 servings with supper
 - Baked squash, green beans and beets
 - Swiss chard, carrots and broccoli
- ◆ Have at least 1 snack (preferably 2) per day
 - A pear, some plums, banana, carrot sticks, etc

Synergistic effects



“We proposed that the additive and synergistic effects of phytochemicals in fruits and vegetables are responsible for these potent antioxidant and anticancer activities and that the benefit of a diet rich in fruits and vegetables is attributed to the complex mixture of phytochemicals present in whole foods. This explains why no single antioxidant can replace the combination of natural phytochemicals in fruits and vegetables to achieve the health benefits.”

Potential Synergy of Phytochemicals in Cancer Prevention: Mechanism of Action Liu The Journal of Nutrition 2004

Healthy fats

- ◆ Extra virgin olive oil: polyphenols have anti-inflammatory effects
- ◆ Omega 3 essential fatty acids-anti-inflammatory
 - Best source is fatty fish such as salmon
 - Canola oil, walnuts, hemp, flax, dark leafy greens

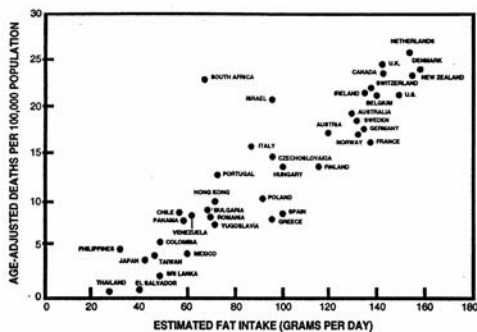


Unhealthy fats

- ◆ Omega 6 vegetable oils-safflower, sunflower, corn, peanut
- ◆ Trans fats-margarine, crackers, peanut butter, deep fried food
- ◆ Saturated fats-meat and dairy products



Total fat intake may also be important



Adapted from "Diet and Cancer," by Leonard A. Cohen. Copyright (November 1987) by Scientific American, Inc. All rights reserved.

Green tea





Phytoestrogens: soy and flaxseed



- ◆ Rich sources of phytoestrogens:
 - Flaxseed contains lignans
 - Soy foods contain genistein and daidzein
- ◆ Phytoestrogens may act as estrogen antagonists or as weak estrogens depending on background hormonal levels.
- ◆ Consumption of phytoestrogens from whole foods is associated with a decreased risk of hormonally sensitive cancers (e.g. breast, endometrial and prostate cancer)

Flax

- ◆ Lignans enhance the safer 2 hydroxy estrogen pathway
- ◆ Flax muffin study
- ◆ 1-2 tablespoons per day of freshly ground flax



Soy

- ◆ Average Japanese diet contains 20-50mg/day of isoflavones
- ◆ Western diets contain ~5mg/day



Soy and breast cancer

- ◆ Soy intake is associated with a decreased risk of premenopausal breast cancer
- ◆ Exposure during adolescence appears to significantly reduce the risk of BC
- ◆ A recent study showed that soy intake reduces the risk of recurrence in breast cancer survivors

Soy recommendations

- ◆ 1-2 servings per day of whole soy foods are recommended
- ◆ Tofu, soy nuts, soy milk, edamame, tempeh
- ◆ Avoid isoflavone supplements, isolated soy protein



Eat a high fiber diet

- ◆ Fiber helps to excrete estrogen from the body
- ◆ Aim to eat at least 25 grams of fiber per day.
- ◆ Choose whole grains, beans and lots of fruits and vegetables.



Supplements

- ◆ Vitamin D
- ◆ Indole-3-carbinol
- ◆ Calcium D-glucarate
- ◆ Turmeric
- ◆ Melatonin



Vitamin D



Sources of vitamin D

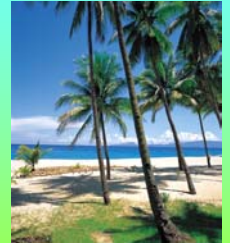
- ◆ UVB exposure
- ◆ Foods: Fatty fish, mushrooms, egg yolks
- ◆ Fortified foods: milk, breakfast cereals, soymilk, butter
- ◆ Supplements: fish liver oils, multivitamins, vitamin D



Cantharellus cibarius
(Chanterelles)

Vitamin D

- ◆ Deficiency is very common
- ◆ From October-March we cannot manufacture vitamin D from the sun
- ◆ Ideal blood level is 100 nmol/l
- ◆ Most people need at least 1000 IU vitamin D3 per day
- ◆ Take with meals



Vitamin D and breast cancer

- ◆ 9 different studies have shown that less sunlight and/or less vitamin D increases breast cancer risk
- ◆ Women with the lowest levels of vitamin D have been found to have 5x higher breast cancer than women with the highest vitamin D levels
- ◆ Vitamin D has many other benefits

Janowsky EC et al. Association between low levels of 1,25-dihydroxyvitamin D and breast cancer risk. *Public Health Nutr.* 1999 Sep;2(3):283-91



Indole-3-carbinol, (Diindolylmethane)

- ◆ These are isolated phytonutrients from cruciferous vegetables (cabbage family)
- ◆ DIM is an active metabolite of I3C
 - Improves conversion to safer 2 OH pathway
 - Stimulates activity of tumor suppressor genes
 - Blocks action of carcinogens on breast tissue



Calcium D-glucarate

- ◆ Naturally found in oranges, apples, Brussels sprouts, apples, broccoli and bean sprouts
- ◆ Inhibits the activity of beta-glucuronidase
- ◆ Hormones and toxins are bound to glucarate and then excreted by the liver into the intestine
- ◆ Beta-glucuronidase (an enzyme) breaks this bond and allow re-absorption of the hormones/toxins
- ◆ Calcium D-glucarate is being studied for use in breast cancer prevention

Turmeric

- ◆ antioxidant
- ◆ anti-inflammatory
- ◆ inhibits angiogenesis
- ◆ induces apoptosis
- ◆ How to use:
 - as a spice or tea
 - supplement



Melatonin



- ◆ A hormone produced by the pituitary gland
- ◆ Regulates sleep/wake cycle
- ◆ Anti-oxidant
- ◆ Cancer protective-promotes tumor cell apoptosis
- ◆ Sleep in a completely darkened room!

Breastfeeding



Maintain Normal Body Weight

Obesity increases the risk of breast cancer



Exercise



And now, a brief mention of a few very bad things...

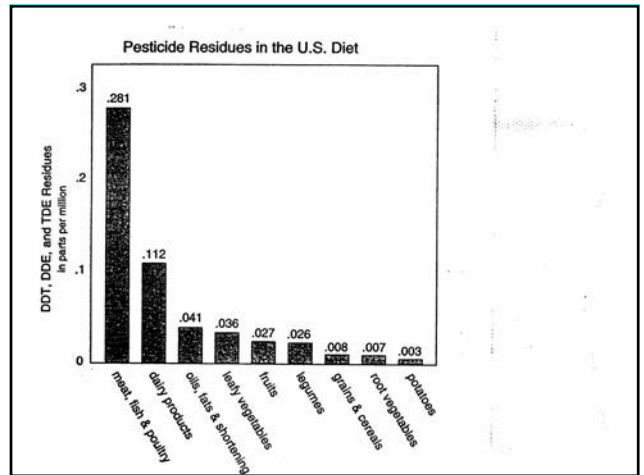


Avoid meats cooked at high temperatures

- ◆ Heterocyclic amines are carcinogenic compounds formed in cooked meat and fish
- ◆ Eating meats broiled, grilled or fried at high temperatures is associated with a higher risk of breast cancer



Pesticides



Lowering exposure to pesticides

- ◆ Eat a plant based diet, low on the food chain
- ◆ Choose organic foods, especially animal products and highly contaminated fruits and vegetables
- ◆ Eat less animal fat
- ◆ Use natural household cleaners and garden products
- ◆ Wash produce thoroughly
- ◆ Store food in glass containers



Other things to think about

- ◆ Alcohol \geq one drink a day increases risk
- ◆ Smoking
- ◆ High insulin levels/eating high glycemic index carbohydrates



Get rid of/avoid excess estrogens

- ◆ Eat a plant based diet
- ◆ Don't heat/store food in plastic
- ◆ Enhance 2 OH pathway by eating more flax and cruciferous vegetables
- ◆ Keep bowels moving regularly
- ◆ Eat more fiber
- ◆ Eat foods that inhibit beta-glucuronidase



Reducing breast cancer risk

- ◆ Eat a 'whole foods' plant based diet
- ◆ Decrease inflammation and increase protective phytochemicals by eating an anti-inflammatory diet:
 - Abundant fruits and vegetables
 - Healthy fats
 - Natural anti-inflammatory foods: green tea, ginger, turmeric, rosemary, oregano
- ◆ Get enough vitamin D
- ◆ Eat freshly ground flax and whole soy foods
- ◆ Consider supplementation with turmeric, fish oil
- ◆ Exercise 4-5 x per week and maintain a healthy weight