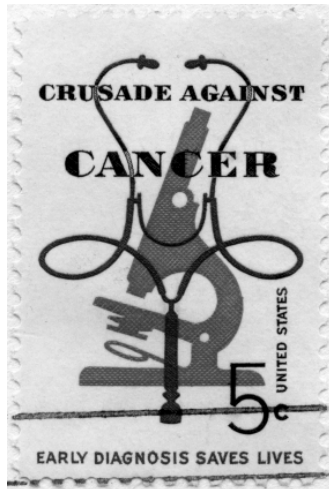


“The Role of Nutrition and Lifestyle in Cancer Prevention”



Tieraona Low Dog, MD

Director of the Fellowship in Integrative Medicine
Arizona Center of Integrative Medicine

Clinical Associate Professor
Department of Medicine
University of Arizona

www.DrLowDog.com

Author of
“Healthy At Home” and
“Life Is Your Best Medicine”

Copyright © 2009-2014 Integrative Medicine Concepts, LLC. All Rights Reserved.

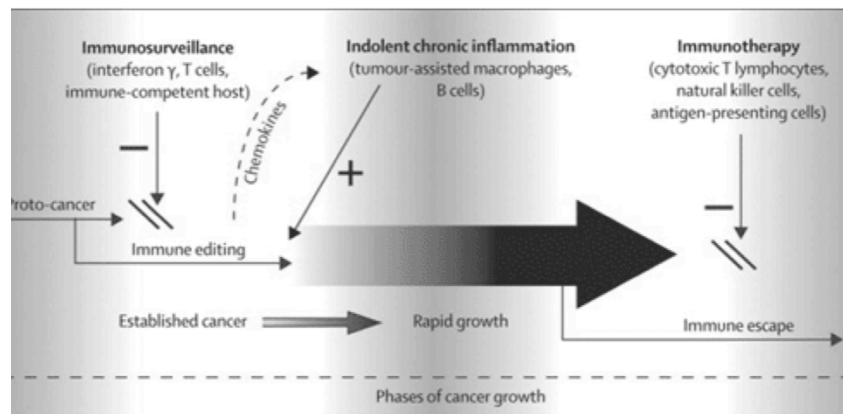
“Cancer Prevention in 21st Century”



Copyright © 2009-2014 Integrative Medicine Concepts, LLC. All Rights Reserved.

Statistics

- In US, one in four people will die from cancer. One in 2 men and one in 3 women will be diagnosed with cancer in their lifetime.
- In 2010, 1.6 million people were diagnosed with cancer. In 2030, this number is estimated to increase to 2.3 million.
- Cancer rates are increasing globally, people being diagnosed at younger and younger ages.
- But many people who are diagnosed also survive the disease. >12 million people have survived cancer treatment and are looking to prevent cancer recurrence.



Carcinogenesis broken into three stages:

1. Initiation 2. Promotion 3. Progression

http://clinicalcenter.nih.gov/dtm/our_research.html

Integrative Approach

*Chemoprevention —risk reduction.

Adjunctive — the stage when people are actually receiving chemotherapy, radiation or other conventional treatment methods.

Antineoplastic — drugs or natural substances with direct anti-cancer activities.

“Cancer Prevention in 21st Century”

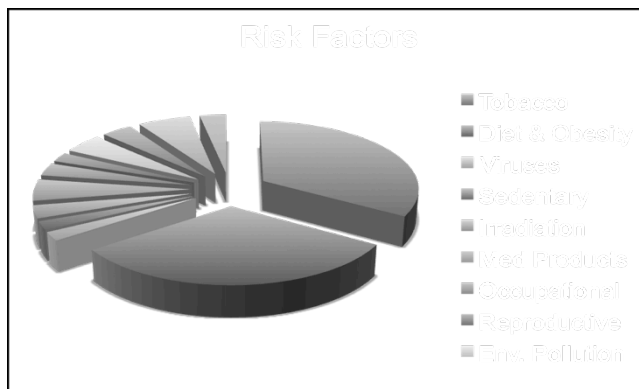
Recommendations for Cancer Prevention WCRF/AICR

- *Body Fatness* – be as lean as possible within normal range of body weight
- *Physical Activity* – be physically active as part of everyday life
- *Foods and Drinks that Promote Weight Gain* – limit consumption of energy-dense foods. Avoid sugary drinks
- *Plant Foods* – eat mostly foods of plant origin
- *Animal Foods* - limit intake of red meat, avoid processed meat
- *Alcoholic Drinks* – limit alcoholic drinks (2 serving/d men, 1 serving/d women)
- *Preservation, Processing, Preparation* - limit consumption of salt
- *Breastfeeding* – mothers to breastfeed, children to be breastfed

Cancer Survivors – follow recommendations listed for cancer prevention

"Cancer Prevention in 21st Century"

Can Cancer be Prevented? Maybe 30-50%



Copyright © 2009-2014 Integrative Medicine Concepts, LLC. All Rights Reserved.

Tobacco

- Tobacco use is a well-established risk factor for cancers of the lung, head and neck, nasopharynx, esophagus, stomach, pancreas, liver, kidney, bladder, leukemia, and cervix.
- Tobacco smoking estimated to account for 21% of cancer deaths worldwide.

Lee YC, et al. *Ann Glob Health* 2014; 80(5):378-383.

Alcohol

- High alcohol consumption is a well-established risk factor for cancers of the head and neck, esophagus, liver, colorectum; and breast in women.
- There is clear evidence of beneficial effects of moderate wine consumption in cardiovascular disease, diabetes, osteoporosis, maybe neurological diseases, and longevity.

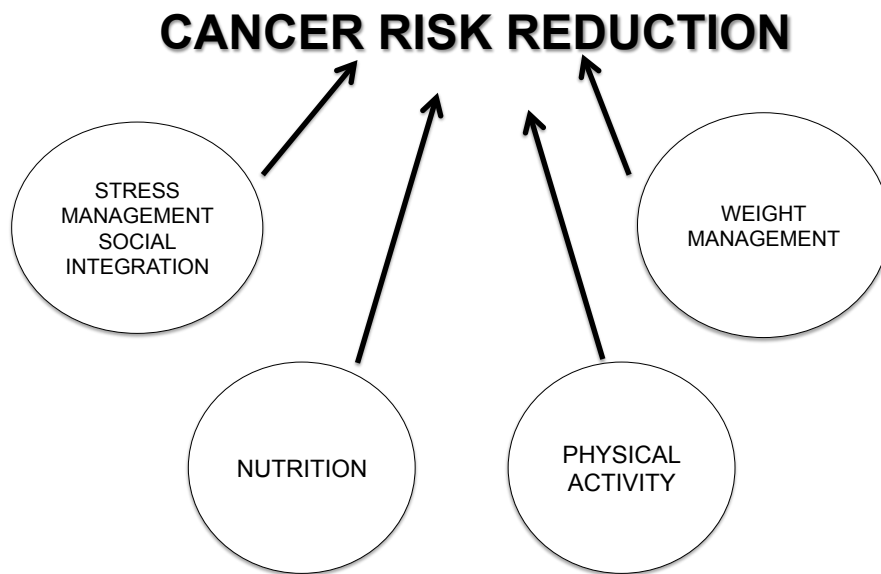
Artero A, et al. *Maturitas* 2015; Jan;80(1):3-13.

Alcohol and Cancer



- LACE (Life after Cancer Epidemiology) study found women drinking > 5 grams of alcohol per day had a 35% increased risk of recurrence and 51% increased risk of death due to breast cancer, especially if postmenopausal and obese.
- Women drinking 5-15 g/d had increased survival from colorectal cancer compared to non-drinkers.
- One standard drink is 10 grams alcohol.
- May be differences between types of alcohol consumption with regards to cancer.

Kwan ML, et al. *J Clin Oncol* 2010; 28(29):4410-6.
Fung TT, et al. *PLoS One* 2014; Dec 15;9(12):e1115377



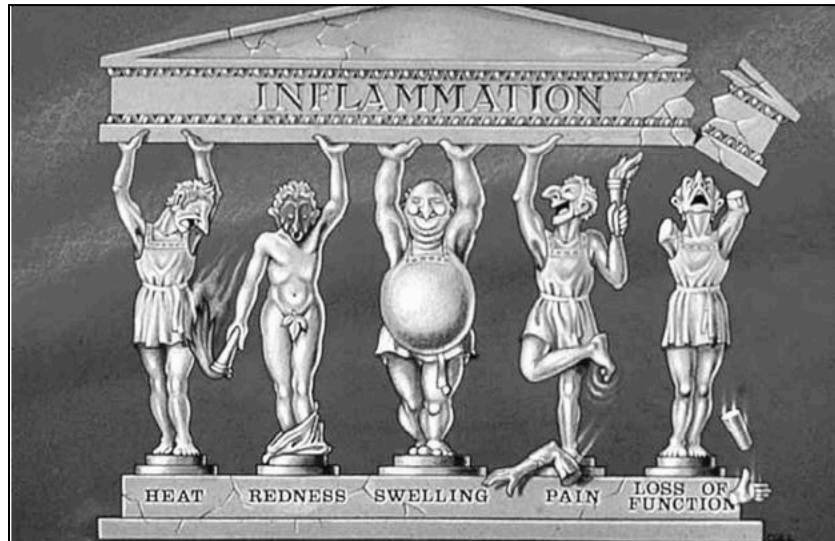
Copyright © 2009-2014 Integrative Medicine Concepts, LLC. All Rights Reserved.

Two Unifying Themes

When we look at what appears to be driving much of our chronic disease, including some cancer, we see:

*Chronic Inflammation
and
Insulin Resistance*

Copyright © 2009-2015 Integrative Medicine Concepts, LLC. All Rights Reserved.

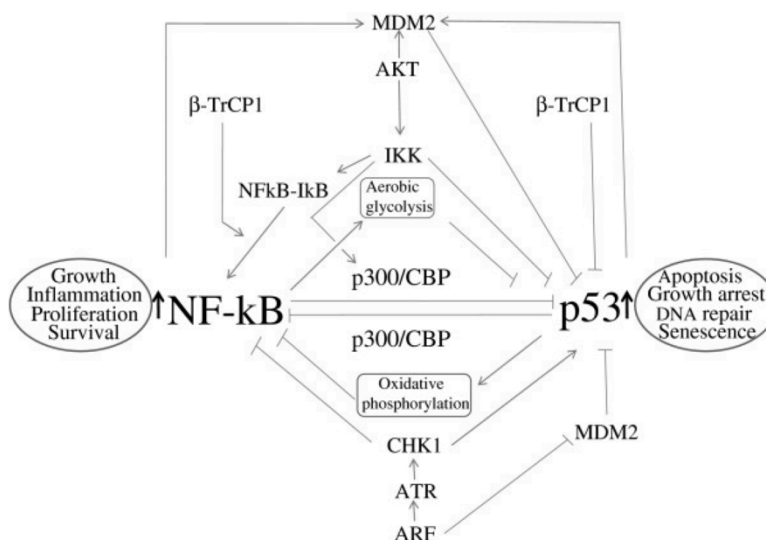


Copyright © 2009-2015 Integrative Medicine Concepts, LLC. All Rights Reserved.

Inflammation and Cancer

- Activation of NF- κ B is vital for our body's ability to defend itself against infection and is a central mediator of inflammation.
- But many things activate NF- κ B and when it is persistently "turned on" it induces genes that are responsible for increasing cell survival, proliferation, migration and invasion. It also turns down growth regulators (e.g., p53) that suppress tumor growth.

Pal S, et al. J Inflamm 2014; Aug 9; 11:23



Pal S, et al. J Inflamm 2014; Aug 9;11:23.

Copyright © 2009-2014 Integrative Medicine Concepts, LLC. All Rights Reserved.

Factors That Drive Inflammation and Insulin Resistance

- Sedentary lifestyle, lack of exercise
- Pattern of central obesity
- Western-dietary pattern, high fructose
- Prolonged psychosocial stress
- Environmental exposures (smoke, toxins)
- Alterations in oral and gut flora and intestinal permeability

Copyright © 2009-2014 Integrative Medicine Concepts, LLC. All Rights Reserved.

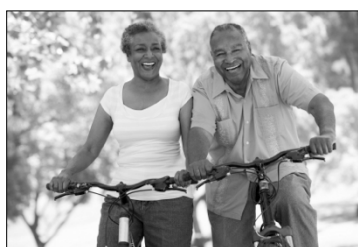
"Cancer Prevention in 21st Century"

WCRF/AICR Recommendations to Reduce Cancer Risk



- Be as lean as possible without becoming underweight.

- Be physically active for at least 30 minutes/d.



Copyright © 2009-2015 Integrative Medicine Concepts, LLC. All Rights Reserved.

"Cancer Prevention in 21st Century"

- According to AICR, estimated number of US cancers that are currently linked to excess body fat include:

Estimated Cancers

Percentage	Cancer Site	Cases Per Year
49	Endometrial cancers	21,300
35	Esophageal cancers	5,824
28	Pancreatic cancers	12,079
24	Kidney cancers	13,978
21	Gallbladder cancers	2,050
17	Breast cancers	35,540
9	Colorectal cancers	12,831
	TOTAL	103,602

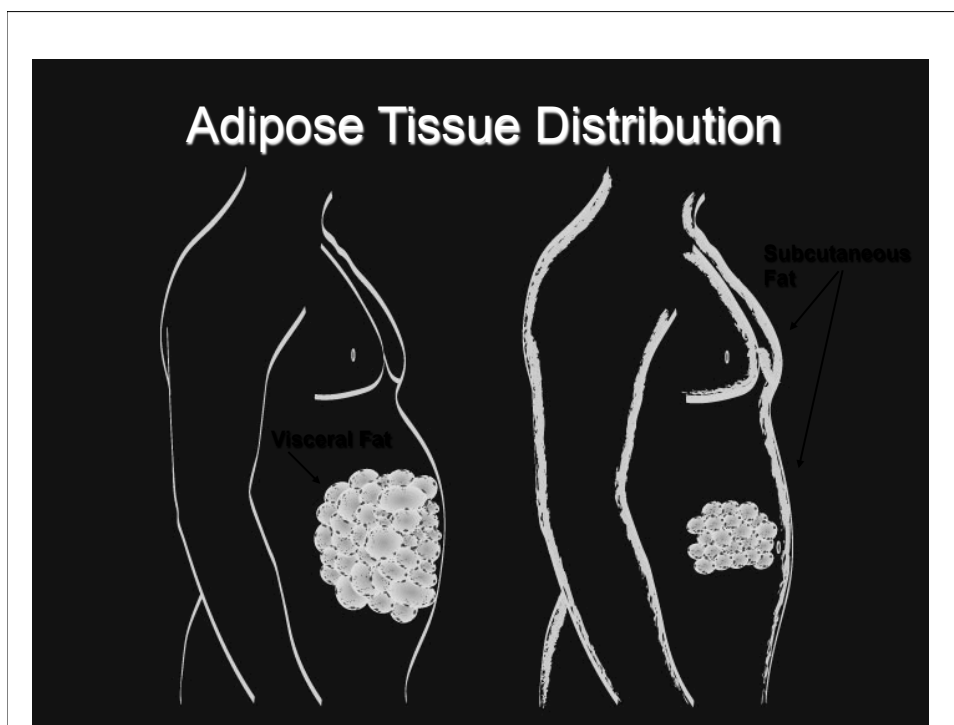
Copyright © 2009-2014 Integrative Medicine Concepts, LLC. All Rights Reserved.

"Cancer Prevention in 21st Century"

Obesity and Cancer: What is The Connection?

- Fat cells, particularly those in the belly, produce and react to hormones and proteins that drive **inflammation and insulin resistance**, which promote cell growth. The more often cells divide, the more opportunity there is for cancer to develop.
- Waist measurements indicating increased risk:
 - 31.5 inches or more for women
 - 37 inches or more for men
- High risk
 - 35 inches or more for women
 - 40 inches or more for men

Copyright © 2009-2014 Integrative Medicine Concepts, LLC. All Rights Reserved.



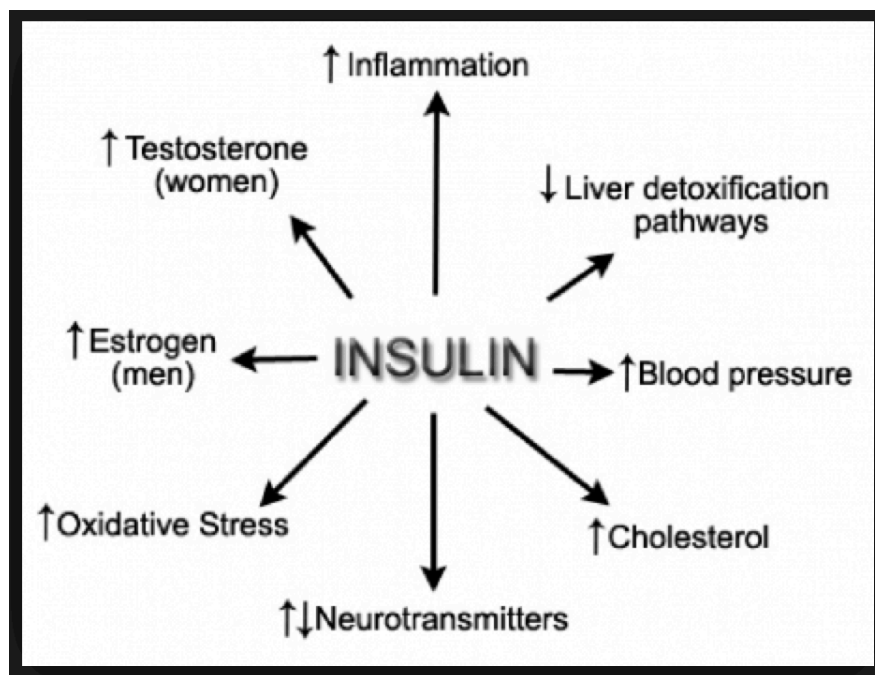
"Cancer Prevention in 21st Century"

Obesity and Insulin Growth Factors

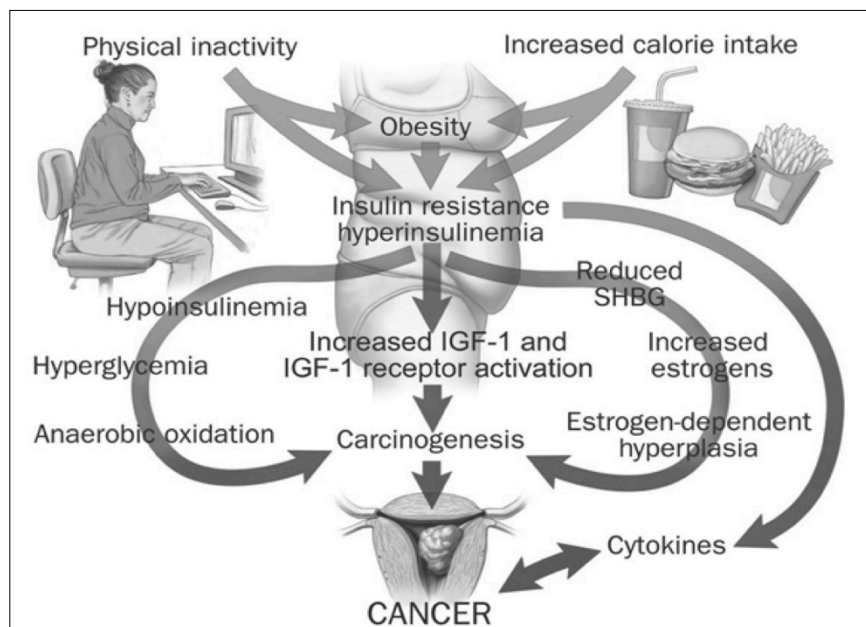
- Obesity is associated with multiple factors that may cause an increased risk for cancer and cancer-related mortality including insulin resistance, high blood sugar and insulin-growth factors (IGF).
- Elevated insulin increases tumor growth and aggressiveness.
- IGF-1 and IGF-2 have been identified as tumor promoters in multiple studies.

Belardi V, et al. *J Mammary Gland Biol Neoplasia* 2013; 18(3-4):277-89

Copyright © 2009-2014 Integrative Medicine Concepts, LLC. All Rights Reserved.



"Cancer Prevention in 21st Century"



Copyright © 2009-2014 Integrative Medicine Concepts, LLC. All Rights Reserved.

Ways to Reduce Insulin Resistance



- Maintain healthy weight
- Regular physical activity
 - Cells use available insulin AND muscle cells can take up glucose without insulin
- Low glycemic load diet
 - Reduce insulin spikes
- Adequate magnesium in diet
 - Increases insulin sensitivity

"Cancer Prevention in 21st Century"

BENEFITS OF PHYSICAL ACTIVITY



- Resets stress response, takes more physical and emotional strain to increase cortisol levels.
- Lowers risk of diabetes by enhancing skeletal uptake of blood sugar.
- American Cancer Society, ***exercise may reduce risk of cancer by reducing insulin and insulin-like growth factors levels, associated with increased cell/tumor growth.***
- Review of 73 studies found 25% average risk reduction for breast cancer amongst physically active women.

Lynch, et al. Recent Results Cancer Res 2011; 186:13-42

Copyright © 2009-2014 Integrative Medicine Concepts, LLC. All Rights Reserved.

"Cancer Prevention in 21st Century"

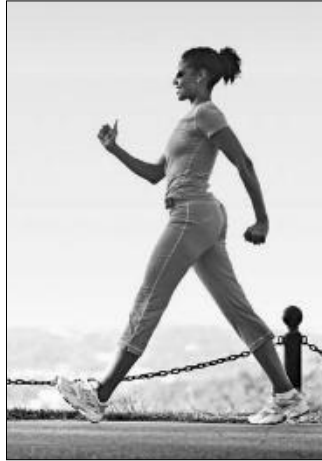
Insulin and Breast Cancer

- Dr. Celia Byrne (Harvard University) compared C-peptide levels, a marker for insulin, from 463 women who developed breast cancer in Nurses Health Study to women who didn't develop breast cancer.
- Those with highest C-peptide had a 70% greater chance of developing breast cancer.
- C-peptide levels are higher in overweight and obese women who ***aren't physically active.***

Copyright © 2009-2014 Integrative Medicine Concepts, LLC. All Rights Reserved.

"Cancer Prevention in 21st Century"

Keep Track of Your Movement



- Work up to 10,000 steps per day.
- I love my Fitbit – keeps track of my movement and aerobic activity.
- Omron HJ-112 is under \$25 and is also great.

Copyright © 2009-2014 Integrative Medicine Concepts, LLC. All Rights Reserved.

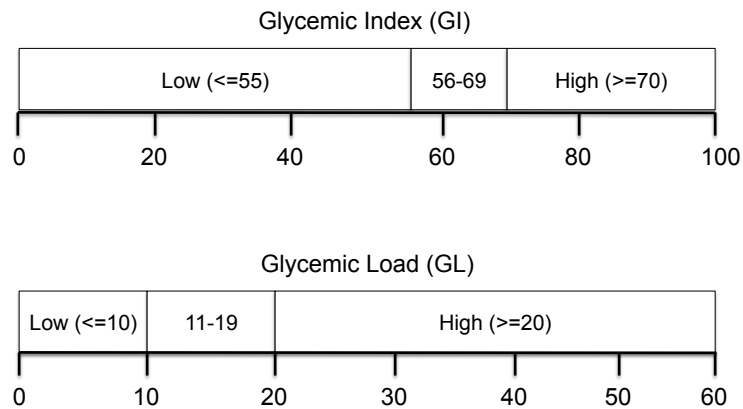
"Cancer Prevention in 21st Century"



Copyright © 2009-2014 Integrative Medicine Concepts, LLC. All Rights Reserved.

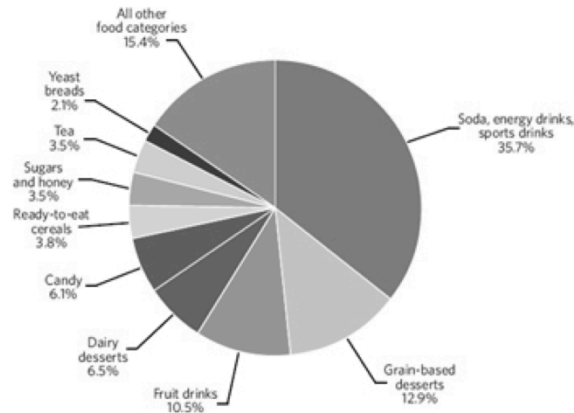
"Cancer Prevention in 21st Century"

Glycemic Index & Glycemic Load Rating Chart



Copyright © 2009-2014 Integrative Medicine Concepts, LLC. All Rights Reserved.

FIGURE 3-6. Sources of Added Sugars in the Diets of the U.S. Population Ages 2 Years and Older, NHANES 2005-2006^a



a. Data are drawn from analyses of usual dietary intake conducted by the National Cancer Institute. Foods and beverages consumed were divided into 97 categories and ranked according to added sugars contribution to the diet. "All other food categories" represents food categories that each contributes less than 2% of the total added sugar intake.

Source: National Cancer Institute. Sources of added sugars in the diets of the U.S. population ages 2 years and older, NHANES 2005-2006. Risk Factor Monitoring and Methods. Cancer Control and Population Sciences. http://riskfactor.cancer.gov/diet/foodsources/added_sugars/table5a.html. Accessed August 11, 2010.

"Cancer Prevention in 21st Century"

www.glycemicindex.com

Total GL
~ 80
per day.

Food	Serving Size	Glycemic Load
Grapefruit	½ large	3
Apple	1 medium	6
Banana	1 large	14
Raisins	1 small box	20
Watermelon	1 cup	8
Carrots	1 large	5
Orange	1 medium	6
Sweet potato	1 cup	17
Baked potato	1 medium	28
French fries	1 medium serving	26
Snickers	1 bar	35
Reese's cup	1 miniature	2

Copyright © 2009-2014 Integrative Medicine Concepts, LLC. All Rights Reserved.

"Cancer Prevention in 21st Century"

www.glycemicindex.com

Total GL
~ 80
per day.

Food	Serving Size	Glycemic Load
Asparagus	½ cup	2
Broccoli	1 cup	4
Green beans	1 cup	3
Tomato	1 medium	2
Subway sandwich Turkey breast	6 inch	17
Butter pecan ice cream	5.5 ounces (small)	22
Vanilla ice cream cone	4.5 ounces (small)	19
Potato chips, fat free	1 bag (8 ounces)	49
Tortilla chips, white corn	3.5 ounces	38
Eggo oat waffles	1 serving	13

Copyright © 2009-2014 Integrative Medicine Concepts, LLC. All Rights Reserved.

"Cancer Prevention in 21st Century"

www.glycemicindex.com

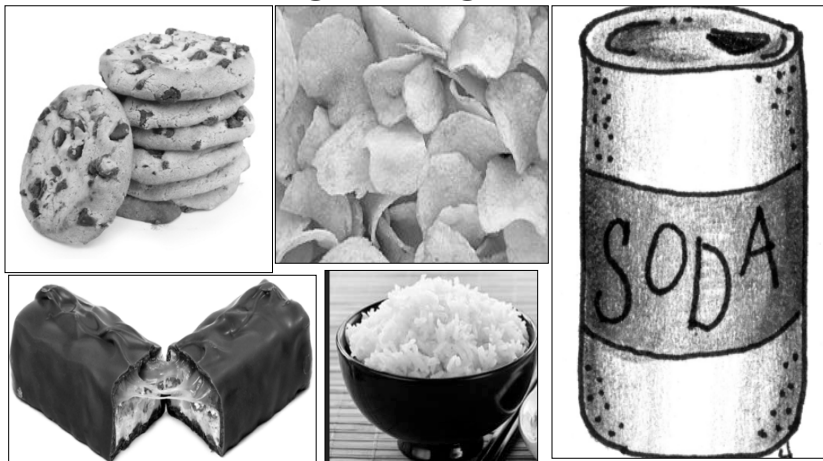
Total GL
~ 80
per day.

Food	Serving Size	Glycemic Load
Spaghetti	1 cup	38
Brown rice	1 cup	23
White rice	1 cup	33
White bread	1 slice	10
Whole grain bread	1 slice	5
Bagel, cinnamon raisin	1 3.5 inch	24
Pumpernickel bread	1 slice	6
Macaroni and cheese	1 cup prepared	31
Chocolate doughnut	1 doughnut (80 g)	25
Glazed doughnut	1 doughnut (80 g)	12

Copyright © 2009-2014 Integrative Medicine Concepts, LLC. All Rights Reserved.

"The Fire Within"

**CUT BACK ON REFINED GRAINS &
SWEETS!!**



Copyright © 2009-2014 Integrative Medicine Concepts, LLC. All Rights Reserved.

Sugar and Cancer

- ***Sugar does NOT cause cancer.***
- However, excessive consumption of sugar in combination with low physical activity induces metabolic changes that drive inflammation and insulin resistance, which drive heart disease, diabetes, non-alcoholic fatty liver disease and tumor growth.
- WHO recommends no more than 25 grams per day of added sugars (6 tsp).

"Cancer Prevention in 21st Century"

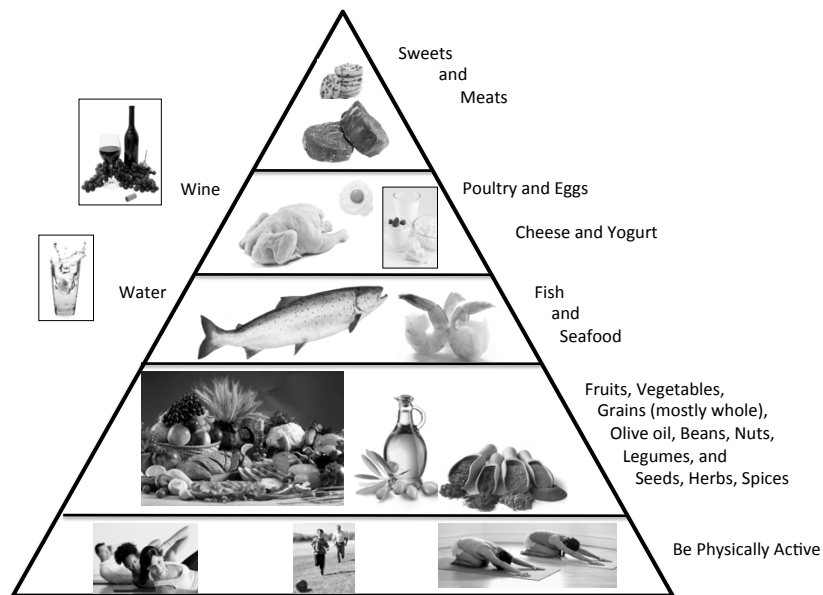
Resources

- The New Glucose Revolution by Jennie Brand-Miller, PhD
- The Glycemic Load Diet by Rob Thompson MD
- The Glycemic Load Diet Cookbook by R. Thompson
- The Easy GL Diet Handbook by Fedon Lindberg MD
- The 150 Healthiest 15-Minutes Recipes on Earth by Jonny Bowden, PhD



"Cancer Prevention in 21st Century"

Mediterranean Diet Pyramid



Copyright © 2009-2014 Integrative Medicine Concepts, LLC. All Rights Reserved.

Diet and Cancer

- Study > 2000 women confirmed that “Western” diet increased breast cancer risk, while Med Diet rich in fruits, vegetables, legumes, oily fish and vegetable oils lowered risk of all breast cancer subtypes, particularly triple-negative tumors.
- Another review found strong evidence of a beneficial role of the Mediterranean diet on oral and pharyngeal cancer.
- High adherence to MD associated with a significant reduction in the risk of overall cancer mortality (10%), colorectal cancer (14%), prostate cancer (4%) and aerodigestive cancer (56%)

Castello A, et al. Br J Cancer 2014; 111(7):1454-62

Filomeno M, et al. Br J Cancer 2014; 111(5):981-6.

Schwingshacki L, et al. Int J Cancer 2014; 135(8):1884-97.

Inflammation and Aging

- Med Diet has shown anti-inflammatory effects when compared with typical North American and Northern European dietary patterns in most observational and interventional studies.
- Review of large Nurses Health Study by researchers at Harvard School of Public Health found greater adherence to the Mediterranean diet was associated with longer telomeres.

Crous-Bou M, et al. BMJ 2014; Dec 2;349:g6674.

Galland L. Nutr Clin Pract 2010; Dec;25(6):634-40.

ORIGINAL CONTRIBUTION

Effect of a Mediterranean-Style Diet on Endothelial Dysfunction and Markers of Vascular Inflammation in the Metabolic Syndrome

A Randomized Trial

“Compared with patients consuming the control diet, patients consuming the intervention diet had significantly **reduced serum concentrations of hs-CRP, IL-6, IL-7, and IL-18**, as well as **decreased insulin resistance**.”

“A **Mediterranean-style diet** might be effective in **reducing the prevalence of the metabolic syndrome** and its **associated cardiovascular risk**.”

estimated 24% of the adult population affected.¹ Its clinical identification is based on measures of abdominal obesity, atherogenic dyslipidemia, elevated blood pressure, and glucose intolerance.² The etiology of this syndrome is largely unknown but presumably represents a complex interaction between genetic, metabolic, and environmental factors including diet.³ Several recent studies also suggest that a proinflammatory state is one component of the metabolic syndrome.^{4,5} Moreover, evidence has accumulated indicating that low-grade inflammation is associated with endothelial dysfunction.^{6,7}

foods rich in monounsaturated fat, polyunsaturated fat, and fiber and had a lower ratio of omega-6 to omega-3 fatty acids. Total fruit, vegetable, and nut intake (274 g/d), whole grain intake (103 g/d), and olive oil consumption (5 g/d) were also significantly higher in the intervention group ($P < .001$). The level of physical activity increased in both groups by approximately 60%, without difference between groups ($P = .22$). Mean (SD) body weight decreased more in patients in the intervention group (-4.0 [1.1] kg) than in those in the control group (-1.2 [0.6] kg) ($P < .001$). Compared with patients consuming the control diet, patients consuming the intervention diet had significantly reduced serum concentrations of hs-CRP ($P = .01$), IL-6 ($P = .04$), IL-7 ($P = 0.4$), and IL-18 ($P = 0.3$), as well as decreased insulin resistance ($P < .001$). Endothelial function score improved in the intervention group (mean [SD] change, $+1.9$ [0.6]; $P < .001$) but remained stable in the control group ($+0.2$ [0.2]; $P = .33$). At 2 years of follow-up, 40 patients in the intervention group still had features of the metabolic syndrome, compared with 78 patients in the control group ($P < .001$).

Conclusion A Mediterranean-style diet might be effective in reducing the prevalence of the metabolic syndrome and its associated cardiovascular risk.

JAMA. 2004;292:1440-1446.

www.jama.com

See also pp 1433 and 1490.

1440 JAMA, September 22/29, 2004—Vol 292, No. 12 (Supplement)

Author Affiliations are listed at the end of this article.
Corresponding Author: Carlo Gaetano, MD, PhD,
Division of Metabolic Diseases, Department of
Geriatrics and Metabolic Diseases, Policlinic Sec-
onda Università di Napoli, Piazza L. Miraglia, 80131
Napoli, Italy (cgaetano@unina2.it).

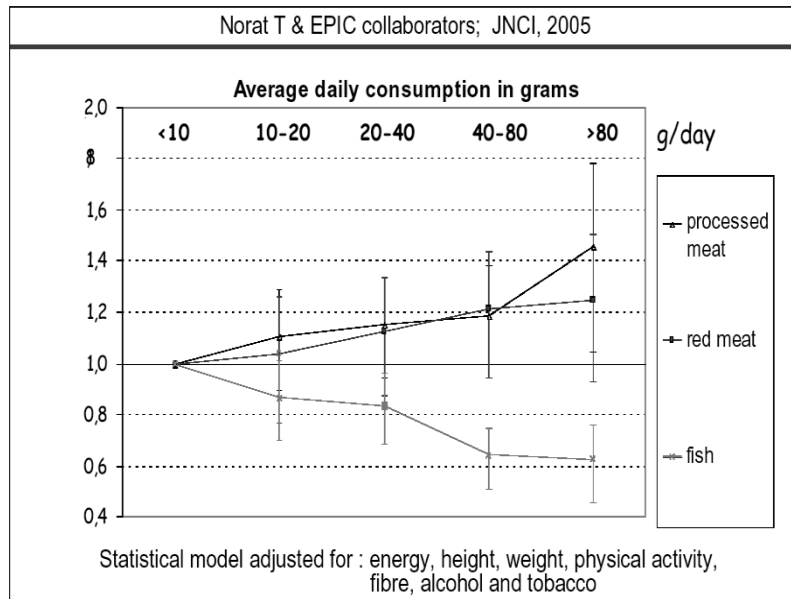
©2004 American Medical Association. All rights reserved.

Notice: This material may be
protected by copyright law
(TITLE 17, U.S. CODE.)

Downloaded from: www.jama.com at Neagetrics Inc. on January 8, 2007

Esposito et al., JAMA 2004; 292:1440-1446

“Cancer Prevention in 21st Century”



Copyright © 2009-2014 Integrative Medicine Concepts, LLC. All Rights Reserved.







Fish and Cancer

- There seems to be a U-shaped trend with fatty fish consumption and total mortality and with total fish consumption and cancer mortality ($p = 0.046$).
- Studies are complicated by intake of different fish (ocean, oily, freshwater); presence of environmental toxins, etc.
- 2 servings per week of low mercury, omega 3 fatty fish is current recommendation.

Engeset D, et al. Eur J Epidemiol 2014; Nov 7

Seafood Calculator

www.ewg.org/research/ewg-s-consumer-guide-seafood/seafood-calculator

Calculations are based on 4 oz. serving size				
CATEGORY	SPECIES	WEEKLY MERCURY	SUSTAINABILITY	CONCLUSION
 EWG'S BEST BETS! Very High Omega-3s, Low Mercury, Sustainable	SALMON	NaN%	Best Choice: Wild Alaska	
	SARDINES	NaN%	Best Choice: Pacific	
	MUSSELS	NaN%	Best Choice: Farmed	
	RAINBOW TROUT	NaN%	Best Choice: Farmed	
	ATLANTIC MACKEREL	NaN%	Best Choice: Not Trawled	

"Cancer Prevention in 21st Century"

WCRF/AICR Recommendations to Reduce Cancer Risk (2007)

- Limit consumption of red meats (beef, pork, lamb) and avoid processed meats. Aim for no more than 18 ounces per week (10 ounces higher risk)



Copyright © 2009-2014 Integrative Medicine Concepts, LLC. All Rights Reserved.

"Cancer Prevention in 21st Century"

- **Red meat** refers to beef, pork and lamb – *foods like hamburgers, steak, pork chops and roast lamb.*
 - Studies show we can eat up to 18 ounces a week of red meat without raising cancer risk.
- **Processed meat** is red meat that is preserved by smoking, curing, salting or adding other chemical preservatives. *Sausage, bacon, ham and lunch meats (such as bologna, salami and corned beef) are processed meats.*
 - The evidence is convincing that processed meats raise your risk of colorectal cancer. *For every ounce and half of processed meat eaten per day, risk rises by 21%.*

Copyright © 2009-2014 Integrative Medicine Concepts, LLC. All Rights Reserved.

Dietary Fat and Cancer Systematic Review

- No associations were found for prostate cancer, esophageal cancer, gastric cancer, renal cell cancer, bladder cancer, lung cancer, postmenopausal breast cancer, or skin cancer by the total intake or types of dietary fat.
- There *may* be an association between total dietary fat and premenopausal breast cancer.
- Ovarian cancer there was limited-suggestive evidence for a positive association with intake of saturated fats.

Schwab U, et al. Food Nutr Res 2014; 10;58. doi: 10.3402/fnr.v58.25145.

Interesting Review on Fat and Breast Cancer

- Striking differences in breast cancer incidence between Asian and western women, with Mongolia's rates even lower than China.
- The *almost exclusive dietary reliance* of Mongolians on meat and dairy argues against beneficial effects of a low-fat diet on circulating hormones explaining international breast cancer differences.

Troisi R, et al. PLoS One 2014; Dec 23;9(12):e114455.

- Prostate cancer is unique in that most cases will remain indolent, while only some will become virulent. Therefore, some men will choose active surveillance rather than more aggressive treatment.
- University of Alabama researchers concluded that ***flax seed*** is safe, inexpensive, easy to obtain, and its metabolic products reduce cell proliferation in the prostate.

Azrad M, et al. J Med Food 2013; 16(4):357-60

“Cancer Prevention in 21st Century”

Source	Lignans/100 g
Flax seed	300,000 mcg (0.3 g)
Sesame seed	29,000 mcg (29 mg)
Grains	7-764 mcg

- Flax is **applied for** use in cancer prevention.
- Lignans block powerful growth factor receptors like epidermal growth factor (***EGF***), **Her2**, Insulin like growth factor-1 (***IGF-1***), and vascular endothelial growth factor (***VEGF***), the hormone responsible for stimulating blood vessels into tumors.

"Cancer Prevention in 21st Century"

Flaxseed

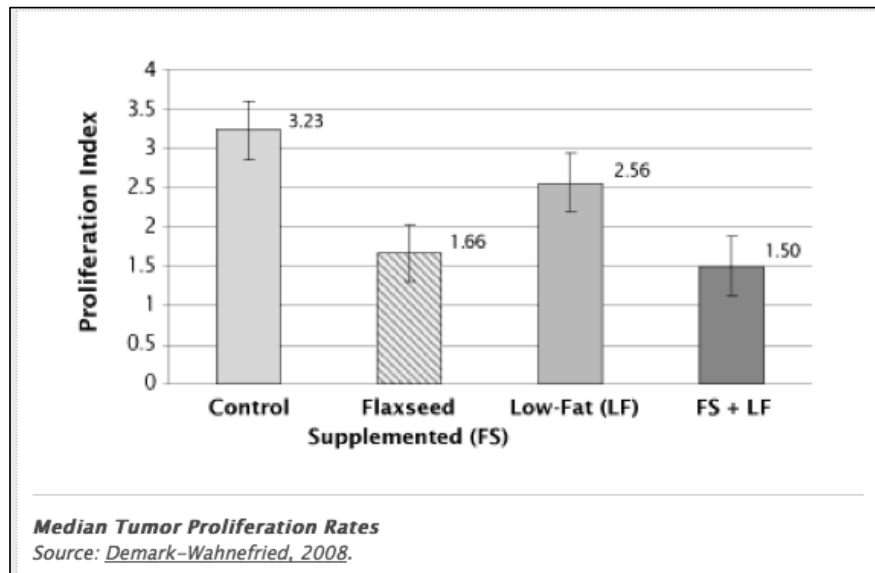


- In one study, 161 men with prostate cancer were randomized to a diet high in flax (30g/day), a low-fat diet, both high-flax and low-fat or control group between their prostate biopsies and prostatectomies, an average of 30 days.
- The study demonstrated lower rates of proliferation in prostate cancer tissue among those eating flax.

Demark-Wahnefried, et al. *Cancer Epid Biomark Prev* 2008; 17(12):3577-87

Copyright © 2009-2014 Integrative Medicine Concepts, LLC. All Rights Reserved.

"Cancer Prevention in 21st Century"



Copyright © 2009-2014 Integrative Medicine Concepts, LLC. All Rights Reserved.

Flax Seed Take Away

- Purchase whole seeds and grind before using.
- Heat does not damage beneficial components.
- 1 Tbsp whole flax seed ~ 14 grams



Calcium and Prostate Cancer?

- Harvard review Health Professionals Study: 47,885 men in cohort reported diet data in 1986 and every 4 y thereafter. From 1986-2010, 5861 cases of prostate cancer were identified, including 789 lethal cancers (fatal or metastatic).
- Calcium intake > 2000 mg/d was associated with increased risk of advanced-stage/high-grade disease 12-16 y after exposure.

Wilson KM, et al. Am J Clin Nutr 2015; 101(1):173-83.

Soy and Breast Cancer

- Soy in childhood may be protective against breast cancer. Dietary soy is safe and possibly beneficial in breast cancer.
- LACE trial saw a 60% reduction in risk of breast cancer recurrence in women taking tamoxifen who were in the highest quintile of soy intake.
- Supplemental soy isoflavones significantly reduce hot flash frequency and severity, particularly those that provide a minimum of 18 mg/d of genistein.

Korde LA, et al. *Cancer Epidemiol, Biomarkers Prev* 2009; 18(4): 1050-1059.

Fritz H, et al. *PLoS One*. 2013; 8(11): e81968

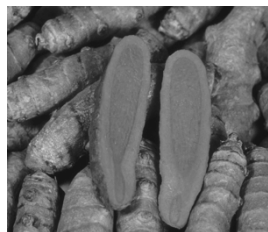
Taku K, et al. *Menopause* 2012; 19(7):776-790

Turmeric (*Curcuma longa*)



Curcumin

- Curcumin is the yellow pigment in turmeric and has powerful health benefits. Human and animal data suggest it may be beneficial for:
 - Brain health
 - Inflammation
 - Heart disease
 - Cancer
 - Depression
 - Skin Conditions



Copyright © 2009-2015 Integrative Medicine Concepts, LLC. All Rights Reserved.

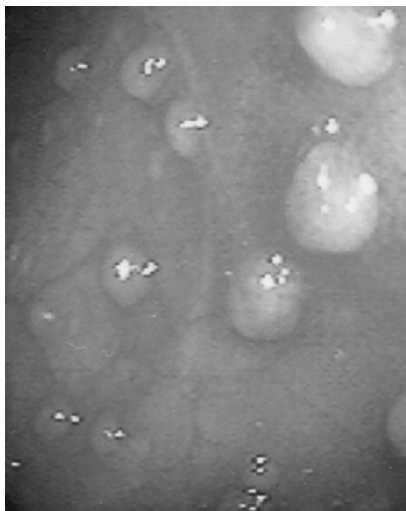
Curcumin



- Effective anti-inflammatory; strong inhibitor NF-kB very favorable clinical trials in knee osteoarthritis.
- 25 clinical trials using curcumin in a variety of cancers, curcumin is the most promising polyphenol as possible future adjuvant in colorectal cancer management.

Irving GR, et al. *Cancer Prev Res* 2013; 6(2):119-28.
Shanmugam MK, et. Al. *Molecules* 2015, 20(2), 2728-2769

Early Investigation



- Colonic polyps are a precursor to colorectal cancer.
- A small pilot study of 5 patients with familial adenomatous polyps found that after six months of taking 480 mg of curcumin and 20 mg quercetin taken three times a day, polyp numbers were reduced by 60%.

Cruz-Correa M, Clin Gastroenterol Hepatol. 2006;4:1035-1038

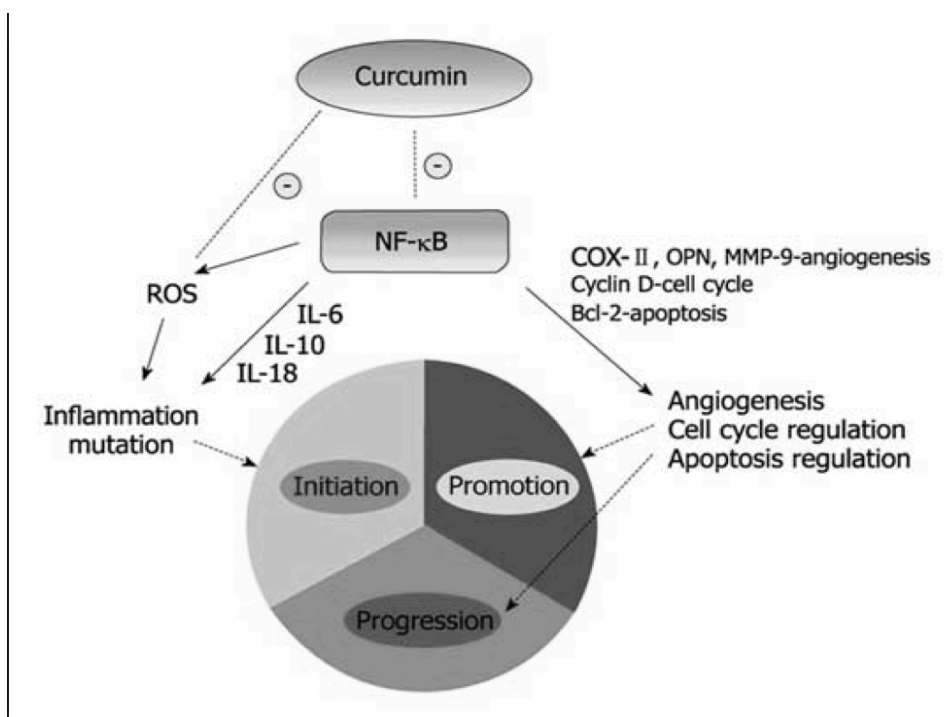
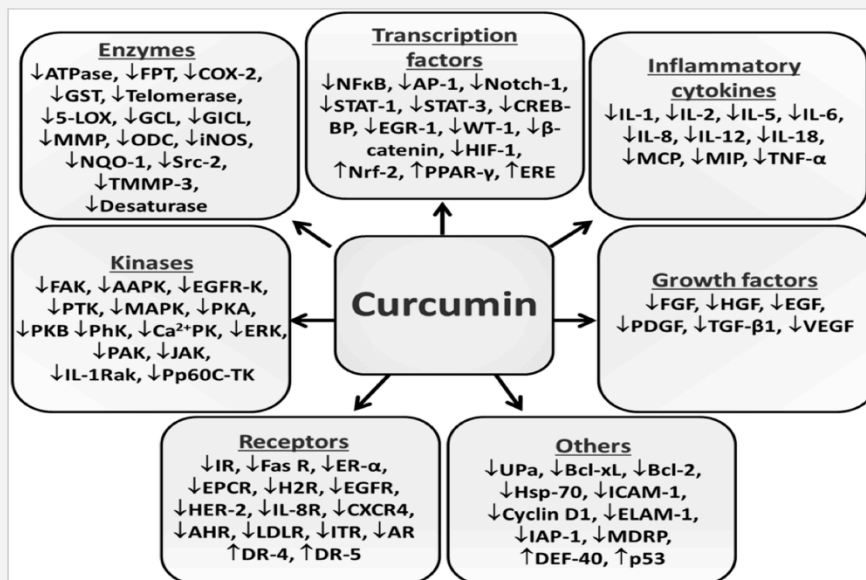


Figure 2. Molecular targets modulated by curcumin. ↓ Down-regulated targets; ↑ Up-regulated targets.



Shanmugam MK, et. Al. *Molecules* **2015**, 20(2), 2728-2769

Beneficial Effects in the Gut

- Distribution studies show curcumin preferentially accumulates in intestine, colon and liver.
- Early research is promising in cases of ulcerative colitis, NAFLD, FAP. Strong hepatoprotectant.
- For systemic absorption consider using phytosome bound curcumin. Peak plasma approximately 5-fold higher than traditional curcumin products.

Dulbecco P, et al *World J Gastroenterol* 2013; 19(48): 9256–9270.



Absorption



- Most research has used range of 1200-6000 mg of *curcumin*.
- Doses up to 12 grams per day for three months not associated with toxicity HOWEVER, GI upset is common complaint.
- Curcumin is poorly absorbed from the GI tract.
- Preparations that increase absorption include: nanoformulations, phytosome, and those with piperine (alkaloid from black pepper).

Kanai M. World J Gastroenterol 2014; 20(28):9384-91.

Kakarala M, et al. Breast Cancer Res Treat 2009; 122:777-785

Label: Curcumin with Piperine

Suggested Use

As a dietary supplement, take 1-3 capsules daily, in divided doses, between meals.

Supplement Facts

Supplement Facts		
Serving Size: 1 Capsule		
Servings Per Container: 60		
	Amount Per Serving	% Daily Value
Vitamin C (ascorbyl palmitate)	10 mg	7%
Turmeric (curcuma longa) Extract (root) (standardized to contain 95% curcuminoids)	500 mg	*
Bioperine (piper nigrum) Extract (fruit) (standardized to contain 95% piperine) ←	5.3 mg 5 mg	*

Curcumin Bound to Phytosome

Serving Size: Two Capsules		
Servings Per Container: 60		
Two Capsules Contain:	Amount Per Serving	% DV
Curcumin Phytosome† (Curcuma longa extract (root) / Phosphatidylcholine complex)	500 mg	*

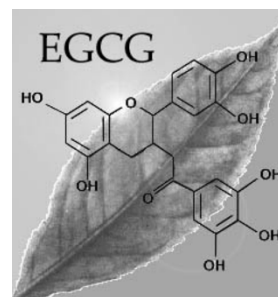
"Cancer Prevention in 21st Century"

Green Tea (*Camellia sinensis*)



- **White, green, oolong and black teas** contain polyphenols and flavonoids, particularly catechins.
- White and green are richer sources of catechins than black.
- The dominant catechin in green tea is epigallocatechin gallate (EGCG), which exerts potent antioxidant activity and activate detoxification enzymes.

Green Tea in Cancer



- Green tea polyphenols have been shown to inhibit every step of carcinogenesis. It stimulates DNA repair and inhibits two proteins that promote tumor cell growth and migration — namely, vascular endothelial growth factor (VEGF) and hepatocyte growth factor (HGF).
- It also inhibits NF- κ B and induces P53.

Butt MS, et al. Crit Rev Food Sci Nutr 2015; 55(6):792-805.

Oral Cancer

- 6th most common cancer globally with an annual incidence of > 300,000 cases and an increase of 62% has been reported in the developing countries.
- Smokers 4-7 times higher prevalence than nonsmokers.
- If also drink or chew tobacco, risk increased 19 and 123 fold, respectively.
- HPV, particularly 16, may also be increasing risk.
- Preliminary data using both topically applied and oral dosing of EGCG have found clinical and biochemical improvement.

Ramshanker V, et al. Chemoprevention of oral cancer: green tea experience. J Nat Sci Biol Med 2014; 5(1):3-7.

Green Tea and Prostate Cancer



- RDBPCT 60 men with high-grade prostate intraepithelial neoplasia (PIN) given 600 mg of EGCG or placebo for 1 year.
- In green tea group, only 3% converted into prostate cancer versus 30% in placebo group.
- UK study: 199 men (~74 years) localized prostate cancer, randomized to oral capsule containing pomegranate, green tea, broccoli, turmeric; or identical placebo for 6 months.
- Median rise in PSA in supplement group was 14.7% as opposed to 78.5% in the placebo group; difference 63.8% (P=0.0008).

Bettuzzi S, et al. Cancer Res 2006; 66(2):1234-40

Thomas R, et al. Prostate Cancer Prostatic Dis 2014; 17(2):180-6

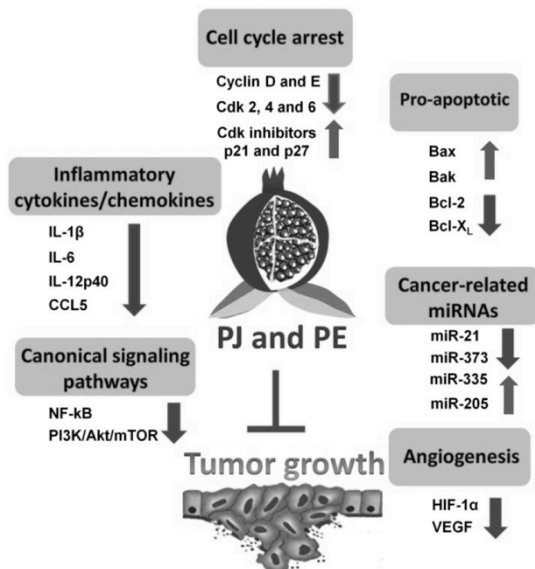
Green Tea

- Drinking 3-5 cups green tea quite safe.
- If using concentrated EGCG extracts, ***take with food***.
- Dose is typically 600-800 mg/d



Sarma DN, et al. Drug Saf. 2008;31(6):469-84.

Pomegranate (*Punica granatum*)



Wang L, et al Int J Mol Sci 2014; 15(9):14949-66.



Pomegranate and Prostate Cancer

- 2-year, open-label, phase II human study demonstrated that pomegranate consumption reduces PSA levels; 16 of 46 patients (35%) exhibiting a PSA decline during treatment, 4 of whom achieved a PSA decline of more than 50% (Pantuck, 2006).
- In a four-year follow-up, researchers found that for men who continued to drink pomegranate juice, the time to double PSA levels was roughly four times longer than it had been at the study outset.

Pantuck AJ, et al. Clin Canc Res 2006; 12(13):4018-26

Vitamin D and Cancer

- Large ESTHER study ~10,000 women and men (50-74 yrs) found vitamin D deficiency significantly increased cardiovascular mortality over a follow up median of 9.5 years.
- Vitamin D deficiency was also associated with *significantly increased cancer mortality*.

Schottker B, et al. *Am J Clin Nutr* 2013 Apr;97(4):782-93.

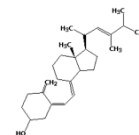
Vitamin D and Breast Cancer



- Some research suggests serum 25(OH)D level of 47 ng/ml is associated with a 50% lower risk of breast cancer.
- Review of 30 studies show that high vitamin D status is *strongly associated with better breast cancer survival*.

Mohr SB, et al. *Anticancer Res* 2011;31(9):2939-48
Kim Y, et al. *Br J Cancer* 2014; 110(11):2772-84.

Vitamin D and Colorectal Cancer



- Review ~ 1,000,000 participants found 10 ng/mL increment in blood 25(OH)D level conferred a *26% reduction in risk*.
- Reviewers from National Cancer Institute found Prostate, Lung, Colorectal and Ovarian Cancer Screening Trial supports association between higher vitamin D status and substantially lower colorectal cancer risk even after adjusting for known colon cancer risk factors.
- Higher serum 25(OH)D is associated with lower mortality of patients with colorectal cancer. Colorectal cancer patients with deficient levels of serum 25(OH)D should have levels restored to range (30-50ng/ml).

Ma Y, et al. *J Clin Oncol* 2011; 29(28):3775-82

Weinstein SJ, et al. *Int J Cancer* 2014; doi: 10.1002/ijc.29157.

Mohra SB, et al. *J Steroid Biochem Mol Biol* 2014; S0960-0760(14)00316-1.

Vitamin D and Prostate Cancer

- Blood levels of 25-OHD on the risk of total, low-, and high-grade prostate cancer were examined in the Selenium and Vitamin E Cancer Prevention Trial (SELECT) and Prostate Cancer Prevention Trial.
- The results from these large prevention trials support the hypothesis that circulating levels of 25-OHD decrease the risk of clinically relevant prostate cancers.

Schwartz GG. *Cancer Epidemiol Biomarkers Prev* 2014; 23(8):1447-9.

“Cancer Prevention in 21st Century”

Hormone Therapy: Update

- Guidelines from North American Menopause Society, Endocrine Society, International Menopause Society, and the European Menopause and Andropause Society for the management of menopausal women with a personal or family history of thromboembolic disease ***all contain positive statements regarding both transdermal estradiol and micronized progesterone, especially for obese women.***

Simon JA. *Climacteric* 2012 15S 1:3-10

Copyright © 2009-2014 Integrative Medicine Concepts, LLC. All Rights Reserved.

“Cancer Prevention in 21st Century”

Gardasil HPV Vaccine

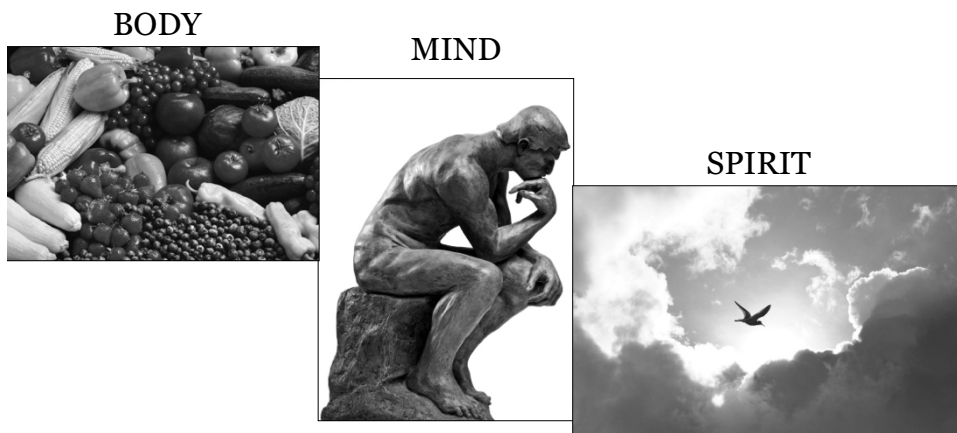
- Advisory Committee on Immunization Practices recommends HPV vaccination for females 11–12 years—ideally before sexually activity. “Catch up” vaccination, aged 13–26, is also recommended. Appears to offer life-long protection.
- According to CDC, from June 2006-March 2014, ~67 million doses of HPV vaccines distributed and ~ 25,000 adverse events were reported; 92% were classified as non-serious.
- After careful review, *none of these adverse events* were any more common after HPV vaccination than among comparison groups.

www.cdc.gov/vaccinesafety/vaccines/HPV/index.html

Copyright © 2009-2014 Integrative Medicine Concepts, LLC. All Rights Reserved.

"Cancer Prevention in 21st Century"

It's All Connected



Copyright © 2009-2014 Integrative Medicine Concepts, LLC. All Rights Reserved.

Stress and Cancer

- While stress does not cause cancer, there is growing evidence that chronic stress can promote the growth of tumors that are already present.
- Studies clearly demonstrate that social isolation and depression promote tumor growth.
- Excess sympathetic tone caused by emotional stress, can decrease cancer survival.

DeCouck M, et al. Oncol Rep. 2013; 30(5): 2435-2441.

Yoga

- Largest yoga study to date randomized 200 breast cancer survivors to 12 weeks of twice-weekly, 90-minute classes and home practice or to a wait list control.
- Practice of yoga was associated with less fatigue and higher levels of vitality and markers for inflammation were 10-15% lower.

Kiecolt-Glaser JK, et al. JCO. 2014; 32(10): 1040-1049

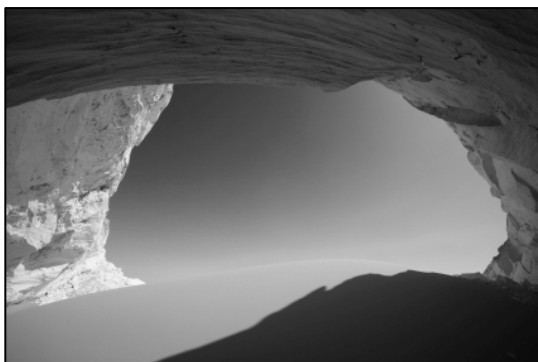
"Cancer Prevention in 21st Century"



Copyright © 2009-2014 Integrative Medicine Concepts, LLC. All Rights Reserved.

"Cancer Prevention in 21st Century"

The Medicine of My Life



"The cave you fear to enter holds the treasures you seek."

—Joseph Campbell

Copyright © 2009-2014 Integrative Medicine Concepts, LLC. All Rights Reserved.

"Cancer Prevention in 21st Century"

Letting Go.....

"Healing may not so much be about getting better, but about letting go, of all the expectations, all of the beliefs, and becoming who you are."

— Rachel Naomi Remen, M.D.



Copyright © 2009-2014 Integrative Medicine Concepts, LLC. All Rights Reserved.