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As one of this year's Platinum Level Conference Sponsors, Delta Dental of Minnesota will be providing a short overview of their business and an introduction of our lecture series speaker today, Dr. Karl Koerner.

We would like to thank all of our sponsors for supporting our annual meeting. We could not make this successful without their partnerships. Please visit the exhibit hall, thank them for their support, and receive a drawing ticket for the drawings to be held today during the Attendee/Exhibitor Social from 4-6 pm.

From your NDDA Board of Trustees and NDDA Central Office team, thank you for attending!



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Where Traditional Wisdom Meets Modern Medicine for Transformational Health

The Latest from the Blog



Tieraona Low Dog, M.D.

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Cancer Prevention for the 21st Century



Tieraona Low Dog, M.D.

Author of National Geographic's
"Fortify Your Life" "Healthy At Home"
and "Life Is Your Best Medicine"

www.DrLowDog.com

Tieraona Low Dog, M.D.

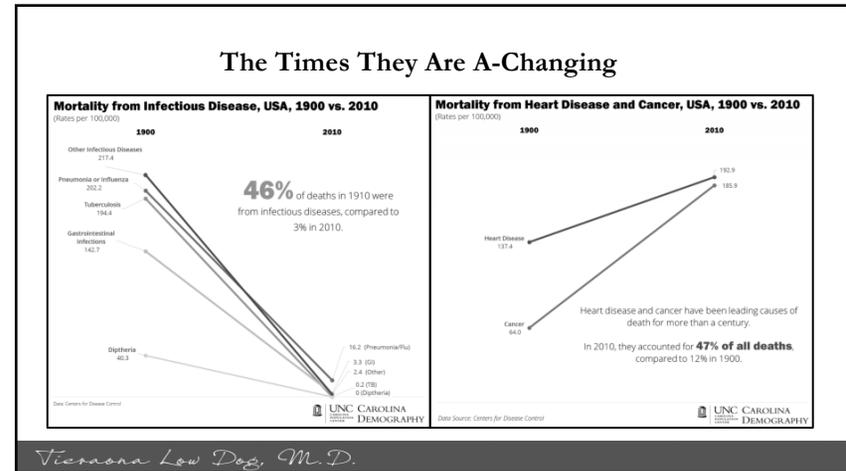
*"God grant me the serenity to accept the things I cannot change;
Courage to change the things I can;
And wisdom to know the difference."*



Reinhold Niebuhr

Tieraona Low Dog, M.D.

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Epigenetics



- The mapping of **human genome** one of the greatest scientific undertakings of past century, **detailing with incredible accuracy the blueprint of our species.**
- It paved the way for field of **epigenetics**, showing that when it comes to our genes, **nurture is inextricably linked with nature.**
- That it is the **way we live our lives - from the moment of conception to our last breath - that influences the expression of our genes.**

Viviana Low Dog, M.D.

- If the American public embraced a **healthier lifestyle**:
 - **no smoking**
 - **no or moderate alcohol consumption**
 - **limited or no exposure to toxic chemicals**
 - **healthy nutrition**
 - **balance of exercise and rest**
 - **stress management**
 - **and healthy social networks**

93% of diabetes, 81% of heart attacks, 50% of strokes, and 36% of all cancers could be prevented.

Ford, et al. *Arch Intern Med.* 2009; 169(15):1355-62.

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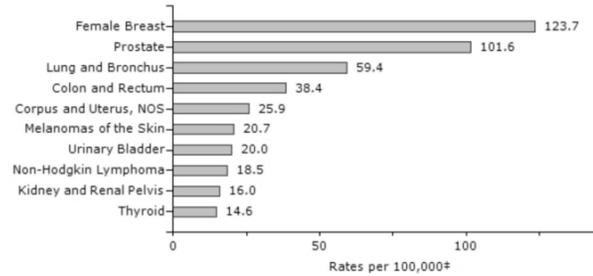
Some Fast Facts

- In 2010, 1.6 million people were diagnosed with cancer.
- In 2030, estimated to increase to 2.3 million.
- Cancer rates are **increasing globally**, people diagnosed at younger ages.
- In US, **one in four people will die from cancer.**
- But *many people survive the disease.*
- **>12 million people have survived cancer** treatment and are looking to prevent cancer recurrence.

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Top 10 Cancer Sites: 2013, Male and Female, United States—All Races

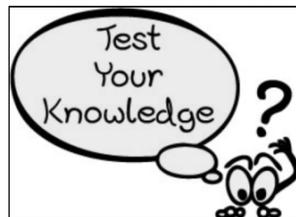


<https://nccd.cdc.gov/uscs/toptencancers.aspx>

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Cancer Prevention Knowledge Quiz (AICR)



Aside from not smoking, research has shown which of these to be a **major cause of cancer?**

1. Hormones in meat
2. Artificial sweeteners
3. Obesity
4. Genetically modified foods

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Cancer Prevention Knowledge Quiz (AICR)



Alcohol has been shown to increase the risk for which cancers?

1. Esophageal cancer
2. Prostate cancer
3. Mouth cancer
4. Breast cancer
5. Lung cancer
6. None of the above

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Cancer Prevention Knowledge Quiz (AICR)



Coffee increases cancer risk.

1. True
2. False

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Coffee and Cancer

- World Health Organization’s International Agency for Research on Cancer concluded drinking coffee **does not cause breast cancer, prostate cancer, or pancreatic cancer.**
- After examining > 1,000 studies, it found that coffee consumption was associated with **reduced risks of liver and endometrial cancers.**
- The AICR includes **coffee on roster of foods that fight cancer.**
- USDA says up to **5 cups per day** can be part of a healthy diet.

www.latimes.com/science/sciencenow/la-sci-sn-fda-coffee-cancer-20180829-story.html

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Cancer Prevention Knowledge Quiz (AICR)



Select all that apply: Diets high in _____ increase cancer risk.

1. Complex carbs
2. Red meat
3. Fats
4. Artificial sweeteners

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Cancer Prevention Knowledge Quiz (AICR)



Physical activity reduces cancer risk.

1. True
2. False

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Cancer Prevention Knowledge Quiz (AICR)



A diet high in fruits can cut cancer risk.

1. True
2. False

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Cancer Prevention Knowledge Quiz (AICR)



Which of the following increase breast cancer risk?

1. Food additives
2. Stress
3. Alcohol
4. Soy

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Recommendations for Cancer Prevention WCRF/AICR

- *Do not smoke or use tobacco products.*
- *Body Fatness* – be as lean as possible within normal range of body weight
- *Physical Activity* – be physically active at least 30 minutes per day
- *Avoid sugary drinks. Limit consumption of energy-dense foods.*
- *Plant Foods* – eat more veggies, fruits, whole grains and legumes

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Recommendations for Cancer Prevention WCRF/AICR

- *Limit intake of red meat and avoid processed meat*
- *Alcoholic Drinks* – limit 2 serving/d men, 1 serving/d women
- *Limit consumption of salty foods and food processed with salt*
- *Don't rely on dietary supplements to protect against cancer*
- *Breastfeeding* – breastfeed babies exclusively for up to six months
- *Cancer Survivors* – after treatment, follow recommendations above

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Smoking Cessation



- Tobacco smoking accounts for 21% of global cancer deaths.
- Smoking cessation dramatically reduces risk for oral cancers.
- Survey 1,802 dentists found > 90% of dental providers routinely ask patients about tobacco use, 76% counsel patients, and 45% routinely offer cessation assistance, defined as referring patients for cessation counseling, providing a cessation prescription, or both.
- Patients are twice as likely to try quitting with advice from a clinician
- Check www.smokefree.gov for your state quit line number

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

Jannat-Khah DP, et al. *Prev Chronic Dis* 2014; 6(11):E196.

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Alcohol and Cancer



- LACE (Life after Cancer Epidemiology) found women drinking more than half-serving of alcohol/day had **35% increased risk of recurrence and 51% increased risk of death due to breast cancer**, especially if **postmenopausal and obese**.
- Women drinking ~1 serving alcohol/d had **increased survival from colorectal cancer compared to non-drinkers**.
- Mixed picture. Good evidence that moderate wine consumption has beneficial effects on heart disease and longevity.

Kwan ML, et al. *J Clin Oncol* 2010; 28(29):4410-6.

Fung TT, et al. *PLoS One* 2014; Dec 15;9(12):e115377

Pavlidou E, et al. *Diseases* 2018; 6(3): pii: E73

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Chronic Inflammation



- Inflammatory response **crucial for survival**. But there is a **dark side**.
- When inflammation becomes chronic it contributes to conditions as varied as **gum disease, osteoporosis, cardiovascular disease, Alzheimer's disease, type-2 diabetes, autoimmune disorders, cancer, and more**.
- A chronic inflammatory state can cause **DNA damage** and promote a tumor-favorable microenvironment. Example: inflammatory bowel disease is associated with an increased risk of colon cancer.

Chang SC, Yang WV. *Crit Rev Oncol Hematol* 2016; 108:146-153

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Factors That Drive Inflammation

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

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WCRF/AICR Recommendations to Reduce Cancer Risk



- Be as lean as possible without becoming underweight. Obesity is a cause for 11 cancers.

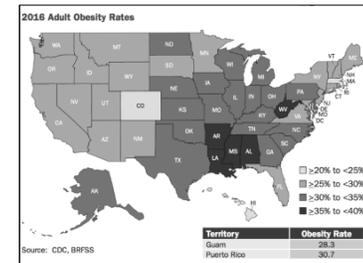
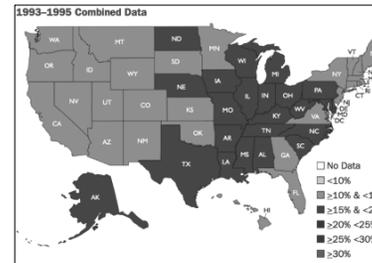


- Be physically active at least 30 minutes/d.

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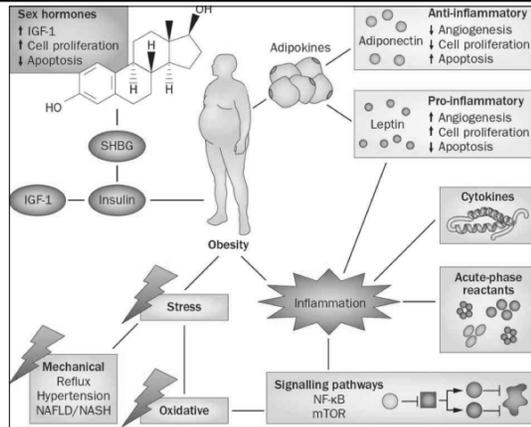
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The Changing Landscape of Adult Weight



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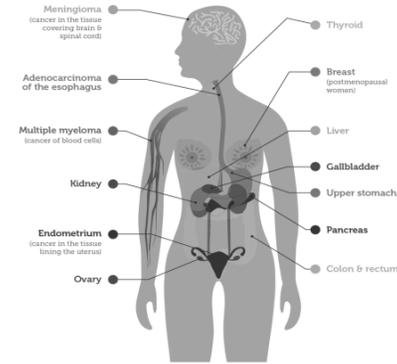
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Cancers Associated with Overweight & Obesity



cancer.gov/obesity-fact-sheet
Adapted from Centers for Disease Control & Prevention

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Mechanisms?

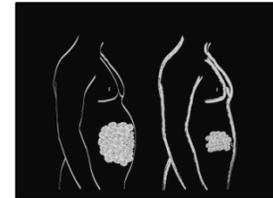
- **Fat tissue produces excess estrogen**, high levels are associated with increased risks of breast, endometrial, ovarian, and some other cancers.
- Obese people often have increased blood levels of **insulin and insulin-like growth factors (IGF-1)**. High levels of insulin and IGF-1 may promote the development of **colon, kidney, prostate, and endometrial cancers**.
- **Obesity** strongly linked with **chronic inflammation**, which can damage DNA
- Fat cells produce adipokines. **Leptin promotes cell proliferation**. Adiponectin less abundant in obese than normal weight—may have **anti-proliferative effects**.

www.cancer.gov/about-cancer/causes-prevention/risk/obesity/obesity-fact-sheet

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Fat Cells Drive Inflammation

- Fat cells, particularly those in the belly, produce and react to hormones that drive **inflammation and insulin resistance**, which promote cell growth.
- The more 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**



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"Cancer Prevention in 21st Century"

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

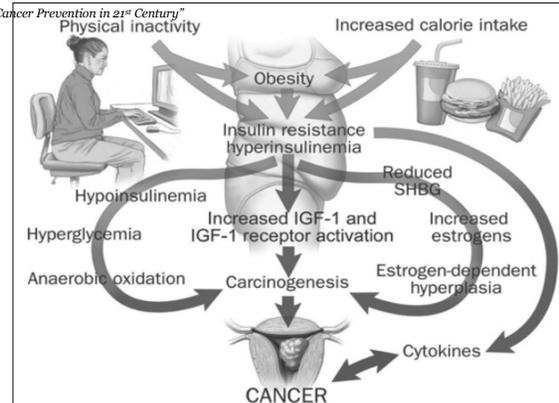
Estimated Cancers

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

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"Cancer Prevention in 21st Century"



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Diet and Cancer

- Study > 2000 women following “Western” diet had increased breast cancer risk, while Mediterranean 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 **Med diet associated with a significant reduction in the risk of overall cancer mortality** (10%), colorectal cancer (14%), prostate cancer (4%) and aero-digestive cancers (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.

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

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Fruits & Vegetables



- Diets rich in fruits and vegetables (5-9 servings/d) **lowers risk of cancers of the lung, mouth, pharynx, esophagus, stomach, colon, and rectum.**
- May reduce risk of cancers of breast, pancreas, ovaries, larynx, and bladder.
- **Cruciferous vegetables include** broccoli, cauliflower, cabbage, Brussel sprouts, bok choy and kale. Rich in glucosinolates, indole-3-carbinol and, especially, isothiocyanates.

National Cancer Institute

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Tomatoes & Lycopene



- Tomato's red hue comes chiefly from a phytochemical called **lycopene**.
- Research has shown substantial and convincing evidence that foods containing **lycopene protects against prostate cancer**.
- In laboratory, tomato components have stopped the proliferation of several other cancer cells types, including breast, lung, and endometrial.
- **Cooked tomatoes are great way to get lycopene in diet.**

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Dark Leafy Greens



- Spinach, kale, romaine lettuce, leaf lettuce, mustard greens, collard greens, chicory and Swiss chard are excellent sources of **fiber, folate** and a wide range of **carotenoids** such as **lutein and zeaxanthin**, along with saponins and flavonoids.
- Research has found that carotenoids in dark green leafy vegetables can **inhibit growth of certain types of breast, skin, lung, and stomach cancers.**

National Cancer Institute

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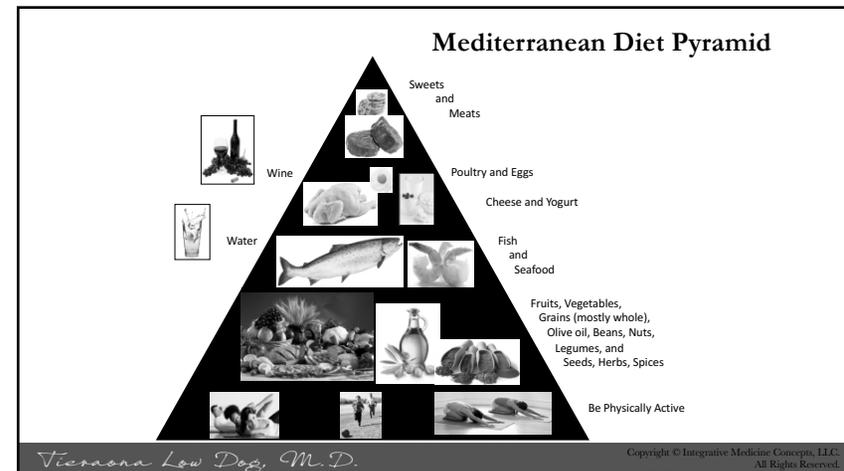
The Allium Vegetables

- Garlic belongs to the *Allium* family, which also includes **onions, scallions, leeks and chives.**
- Impressive number published studies show consumption of onions and garlic has protective effects against stomach, prostate, esophageal cancer.
- **For cancer protection, AICR experts suggest including garlic as part of a well-balanced diet.**

National Cancer Institute

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Cancer Cells and Glucose

- Tumor cells have a **remarkable up regulation of glucose transporter molecules on their surface.**
- This sparked a great deal of interest in **low carb, high fat diets, such as the ketogenic diet.** May be some tumor types would be responsive to a ketogenic diet, while with others it might not be as beneficial.
- **Animal models suggest caloric restriction may lower risk of certain cancers and reduce recurrence but no good studies for review.**

Oliviera CL, et al. *J Acad Nutr Diet.* 2017 Mar 30.

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Tumor Type

- Women's Healthy Eating and Living (WHEL) trial found **carbohydrate restriction was associated with a striking five-fold reduction in breast cancer recurrence in 50% of subjects,** specifically those whose tumors expressed the **IGF-1 receptor.**
- Unfortunately, IGF-1 testing of tumors is not yet a routine clinical practice.

Edmond JA, et al. *Cancer Epidemiol, Biomarkers Prev* 2014; DOI: 10.1158/1055-9965

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1 Prolonged Fasting
Fasting-mimicking Diet (FMD)
Ketogenic Diet

2 Ketogenic Plant-Based Diet (K-PBD)
Low Carbohydrate (non-starch and sugar)
Low Proteins (only plant-based)
High Fats (only plant-based PUFA)

Circulating Metabolites
↓ Glucose
↓ IGF-1
↓ Sulphur Amino Acids
↑ Free Fatty Acids
↑ Ketone Bodies
↑ SCFAs

Immunological Factors
↑ CD 8+ TIL
↑ Common Lymphoid Progenitors
↑ IL-10-mediated
↑ Inflammatory Cytokines

Gut Microbiome Phenotype
↑ Akkermansia
↑ Faecalibacterium
↑ Blautia
↑ Roseburia
↑ Escherichia rectale
↑ Ruminococcus bromii

Image From: Lettieri-Barbato D, et al. Pushing the Limits of Cancer Therapy: The Nutrient Game. *Frontiers Oncology* 2018; 8:148

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Keto Diet: Clinical Trial

- Randomized controlled trial women with **ovarian or endometrial cancer** randomly assigned to **ketogenic diet** (70:25:5 energy from fat, protein, and carbohydrate) or American Cancer Society diet (high-fiber, low-fat).
- **Body composition, fasting serum insulin and IGF-I** obtained at baseline and at end of 12 weeks.
- At end of study, those on **keto diet had statistically significant reduction in fasting insulin and IGF-1 levels, and greater reduction in visceral fat.**

Cohen CW, et al. A Ketogenic Diet Reduces Central Obesity and Serum Insulin in Women with Ovarian or Endometrial Cancer. *J Nutr* 2018; 148(8):1253-1260.

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SCIENTIFIC AMERICAN

PUBLIC HEALTH

The Hunger Gains: Extreme Calorie-Restriction Diet Shows Anti-Aging Results

A new study shows five days of hunger a month may reduce risk factors for aging and age-related diseases

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Caloric Restriction?

- 25 year study University of Wisconsin: **76 rhesus monkeys ages 7-14 years**, fed a diet reduced in calories by 30%.
- **Disease was 3 fold greater in control group.** No evidence of diabetes in any caloric-restricted animal.
- NIA 2-year study randomized 218 non-obese people to current diet or 25% caloric restriction (**11.7% on average**).
- **Statistically significant reduction in inflammatory markers, weight loss, improved mood, sleep duration, etc.**

Canto is 27 year old monkey on CR diet, Owen is 29 year old on unrestricted diet.

news.wisc.edu/monkey-caloric-restriction-study-shows-big-benefit-contradicts-earlier-study/
Ravussin E, et al. : A 2-Year Randomized Controlled Trial of Human Caloric Restriction: Feasibility and Effects on Predictors of Health Span and Longevity. *J Gerontol A Biol Sci Med Sci.* 2015;70(9):1097-104

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Fasting-Mimicking Diets



Wei M, et al. Fasting-mimicking diet and markers/risk factors for aging, diabetes, cancer, and cardiovascular disease. *Sci Transl Med* 2017; 9(377).

- USC study **100 healthy people** randomized into 2 study arms to test effects of FMD done 5 consecutive days each month for 3 months.
 - **1100 calorie first day, 700 calories for 4 days (plant based, multivitamin).** Ate whatever they wanted rest of the month.
- Three cycles reduced **body weight, total body fat; lowered blood pressure, cholesterol, triglycerides and IGF-1.**
- Note: **25% drop-out rate**
- **Effects still noted 3 months AFTER study ended.**

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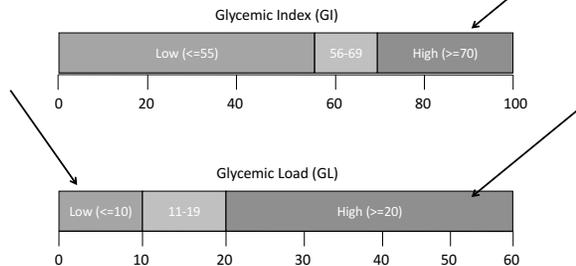
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"THE FOOD YOU EAT
CAN BE EITHER
THE SAFEST
&
MOST POWERFUL
FORM OF MEDICINE
or
THE SLOWEST
FORM OF POISON."

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Glycemic Index & Glycemic Load Rating Chart



Tierona Low Dog, M.D.

Glycemic Index/Load

- **Glycemic load is measurement of impact of carbohydrates on blood sugar/insulin.**
- International **consensus** conference concluded that given **consistency of scientific evidence**, diets **low in glycemic index/load** should be promoted in the **prevention and management of diabetes and coronary heart disease**, and are **particularly important in individuals with insulin resistance.**

Augustin LS, et al. Glycemic index, glycemic load and glycemic response: An International Scientific Consensus Summit from the International Carbohydrate Quality Consortium (ICQC). *Nutr Metab Cardiovasc Dis* 2015 Sep;25(9):795-815.

Low Glycyl Diet Calculator



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Glycemic Load and Mood

- 82 healthy weight and healthy overweight or obese adults enrolled in randomized, crossover controlled feeding study.
- Compared to a low GL diet, consumption of **high GL diet** resulted in:
 - 38% higher score for **depressive symptoms** (P = 0.002)
 - 55% higher score for **total mood disorder** (P = 0.05)
 - 26% higher score for **fatigue/inertia** (P = 0.04), compared to low GL diet.



Breymeyer KL, et al. *Appetite* 2016; Dec 1;107:253-259.

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Glycemic Load

Individual Food Portion

Low	0-10
Moderate	11-19
High	20+

Whole Day

Low	< 80
Moderate	80-120
High	>120

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Food	Serving Size	Glycemic Load	Food	Serving Size	Glycemic Load
Grapefruit	½ large	3	Asparagus	½ cup	2
Apple	1 medium	6	Broccoli	1 cup	4
Banana	1 large	14	Green beans	1 cup	3
Raisins	1 small box	20	Tomato	1 medium	2
Watermelon	1 cup	8	Subway sandwich Turkey breast	6 inch	17
Carrots	1 large	5	Butter pecan ice cream	5.5 ounces (small)	22
Orange	1 medium	6	Vanilla ice cream cone	4.5 ounces (small)	19
Sweet potato	1 cup	17	Potato chips, fat free	1 bag (8 ounces)	49
Baked potato	1 medium	28	Tortilla chips, white corn	3.5 ounces	38
French fries	1 medium serving	26	White bread	1 slice	10
Snickers	1 bar	35	White rice	1 cup	33
Reese's cup	1 miniature	2	Brown rice	1 cup	23
White table wine	5 ounces	1	Spaghetti	1 cup	38
Red table wine	5 ounces	1			
Grape juice	6 ounces	12			

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Pictures of Low/High GI Meals & Snacks



GI = 80 GL = 32

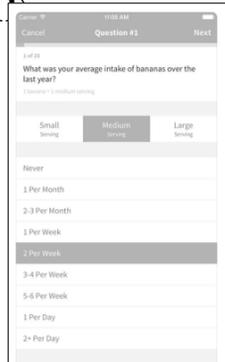


GI = 61 GL = 12

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Dietary Inflammatory Index (DII)

- Inflammation often driven by dietary patterns. An anti-inflammatory diet may reduce **sub-chronic inflammation** and improve **cardiovascular, metabolic, and neurologic parameters**.
- The **Dietary Inflammatory Index** is based on measuring inflammation in the body in response to specific foods (many clinical trials).
- You can take the test by **downloading the app for Dietary Inflammatory Index** (iTunes: DII Screener)



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Inflammatory Food Ratings

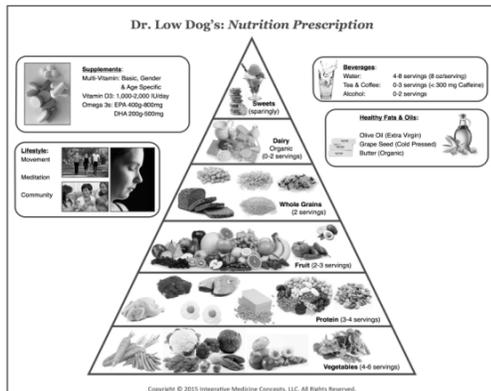
200 or higher	Strongly anti-inflammatory
101 to 200	Moderately anti-inflammatory
0 to 100	Mildly anti-inflammatory
-1 to -100	Mildly inflammatory
-101 to 200	Moderately inflammatory
-201 or lower	Strongly inflammatory

FOOD	SERVING SIZE	SERVING SIZE (GRAMS)	IF RATING
AGAVE NECTAR	1 TBSP	21	-74
ALMOND BUTTER	¼ CUP	64	100
CHEESE, CHEDDAR	1 OUNCE	28.35	-20
CHICKEN BREAST, RSTD	3 OUNCES	85	-19
MILK, WHOLE	1 CUP	246	-46
OLIVE OIL	1 TBSP	14	74
ONIONS, COOKED	½ CUP	105	240
RICE, WHITE	1 CUP	158	-153
SPINACH	1 CUP	30	75
SALMON, SOHO BAKED	3 OUNCES	85	450
TURMERIC	½ TSP	1.5	338

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Dr. Low Dog's: Nutrition Prescription



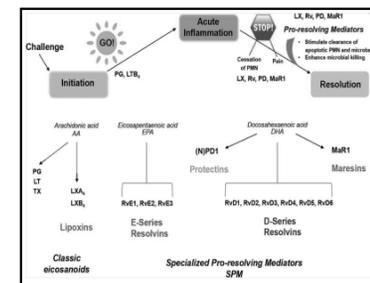
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Resolution Biology

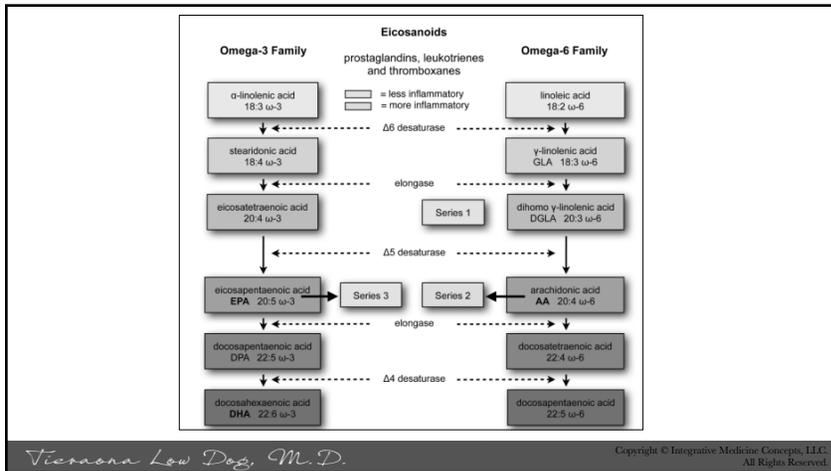
- Resolution of acute inflammation is active, programmed response.
- Omega 3 fatty acids** produce specialized **pro-resolving mediators** – resolvins, protectins and maresins.
- These **active resolvers of inflammation** show great promise for treatment of inflammatory disease.



VanDyke TE. Pro-resolving mediators in the regulation of periodontal disease. *Mol Aspects Med* 2017 Dec;58:21-36.

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Omega 3 Fatty Acid Levels

HS-Omega-3 Index® Target Zones

Undesirable Intermediate Desirable

0% 4% 8%

Percent of EPA + DHA in RBC

- **Omega-3 Index** indicates the percentage of EPA+DHA in red blood cell fatty acids and is gold standard for evaluating omega 3 levels.
- Canadian government found that the mean Omega-3 Index level of Canadians aged 20-79 was 4.5%.
- **Fewer than 3% of adults had levels associated with low CHD risk; 43% had levels associated with high risk.**

Langlois K, et al. *Health Rep* 2015; Nov 18;26(11):3-11

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Different Types of Fish Oil

- **Supplementation is alternative to eating fish; however, not all supplements are equal.**
- Randomized, crossover study of 35 healthy individuals compared four popular brands/types of omega 3 fatty acids:
 - Concentrated triglyceride (rTG)
 - Ethyl ester (EE)
 - Phospholipid krill oil (PL)
 - Triglyceride salmon oil (TG)

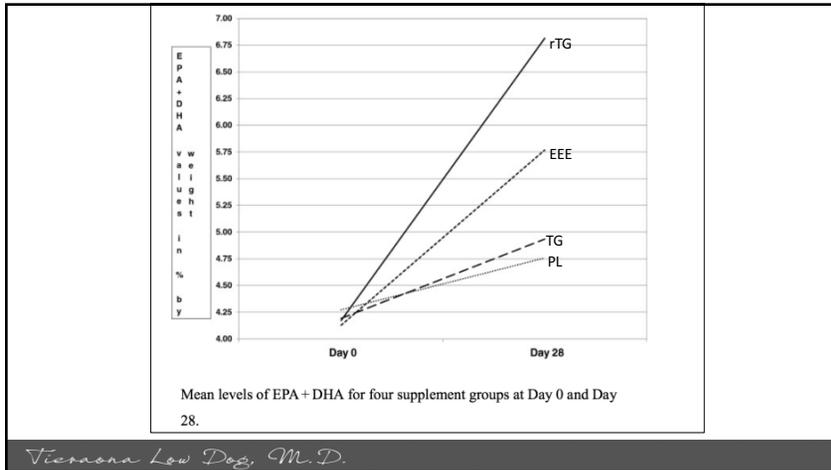
Laidlaw M, et al. *Lipids Health Dis* 2014; 13:99

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Dosing According to Manufacturer's Recommendations

TRT	Product	EPA & DHA per capsule*	Tested values	Label use: caps/day	Daily dosage of EPA + DHA
rTG	Nordic Naturals ProOmega®	325 mg EPA	329.6 mg EPA	2	EPA: 650 mg
	Triglyceride	225 mg DHA	226.0 mg DHA		DHA: 450 mg
EE	Minami MorEPA®	756 mg EPA	774.2 mg EPA	1	EPA: 756 mg
	Platinum Ethyl Ester	228 mg DHA	233.7 mg DHA		DHA: 228 mg
PL	Source Naturals ArcticPure®	75 mg EPA	78.0 mg EPA	2	EPA: 150 mg
	Krill Oil Phospholipid	45 mg DHA	46.7 mg DHA		DHA: 90 mg
TG	New Chapter				
	Wholemega® Salmon	90 mg EPA	96.4 mg EPA	2	EPA: 180 mg
	Oil Triglyceride	110 mg DHA	109.5 mg DHA		DHA: 220 mg

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Omega 3 and Prostate Cancer?

- **SELECT** trial raised concerns about potential link between omega 3s and increased prostate cancer/aggressive cancer.
- European Food Safety (EFSA) concluded, “there is no evidence for a role of EPA and/or DHA intake in the development of prostate cancer.”
- Also, “supplemental intake of EPA and DHA combined at doses up to 5 g/d does not give rise to safety concerns for adults.”

EFSA Journal 10(7): doi:10.2903/j.efsa.2012.2815

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Seafood Calculator

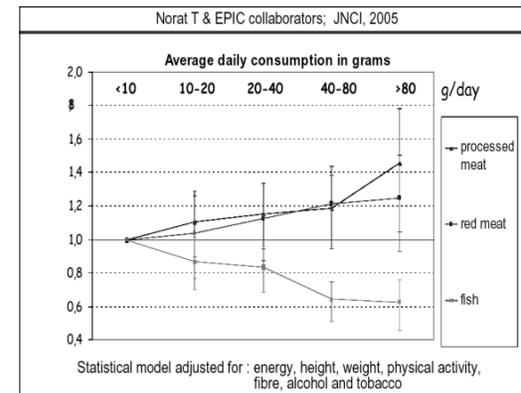
www.ewg.org/research/ewg-s-consumer-guide-seafood/seafood-calculator

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	⊗ ⊕ ⊖

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"Cancer Prevention in 21st Century"

WCRF/AICR Recommendations on Meat

- Limit consumption of red meats (beef, pork, lamb). Aim for no more than 16 ounces (500 g) per week to reduce risk of cancer. Avoid processed red meats.



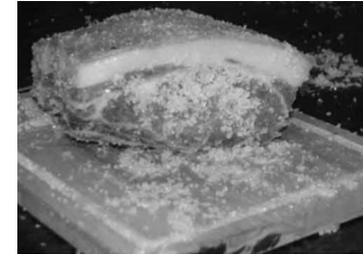
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Processed Meats: Test Your Knowledge

Which of the following preparations are considered processed meats?

1. Curing
2. Smoking
3. Braising
4. Preserved nitrates/nitrites

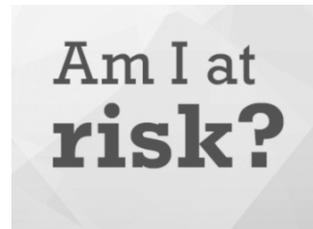


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Processed Meats: Test Your Knowledge

Consumption of processed meats can increase the risk of which cancers?

1. Breast
2. Colon
3. Liver
4. Stomach



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Processed Meat: Test Your Knowledge

Which of the following **would not** be considered a processed meat?

1. Ground turkey burger
2. Bratwurst
3. Canned tuna
4. Hot dog



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- **Red meat** refers to beef, pork, goat and lamb –*hamburgers, steak, pork chops*
- **Processed meat** preserved by smoking, curing, salting or adding other chemical preservatives. *Sausage, bacon, ham, lunch meats, turkey bacon, smoked chicken, are processed meats.*
- WHO showed person eats a little less than 2 ounces/d processed meat (e.g., one small hot dog or two slices of salami) 18% more likely to develop colorectal cancer than those who don't.



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What About Grilling?



Which of the following statements are true?

1. **Marinating** meat, poultry, seafood before grilling reduces production of HCA.
2. **Grilling vegetables** produces the same carcinogens as grilling meat.
3. Cook your **meat on high heat and fast** (seared).

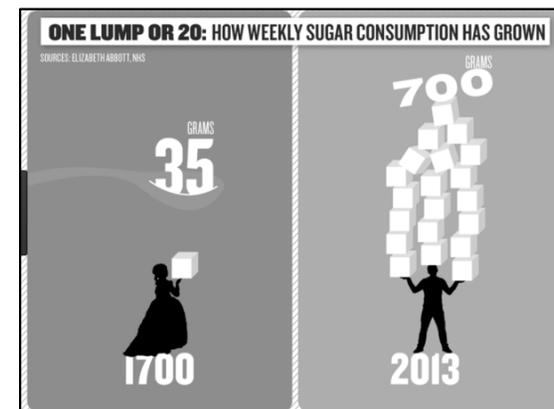
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Tips for Grilling

- **Grilling meat at high temperatures** produces polycyclic aromatic hydrocarbons and heterocyclic amines (HCAs).
- Studies show **marinating meat, poultry and seafood for 30 minutes** reduces formation of HCAs. Vinegar, lemon, wine + herbs and spices.
- Cook meat over **low flame to reduce burning and charring**. **Precooking** reduces formation of carcinogens from grilling.
- **Grilled veggies and fruits do not produce HCAs.**
- It's **WHAT** you cook, however, more than **HOW** you cook it!

<http://www.aicr.org/can-prevent/what-you-can-do/quiz-grilling-and-cancer-risk.html>

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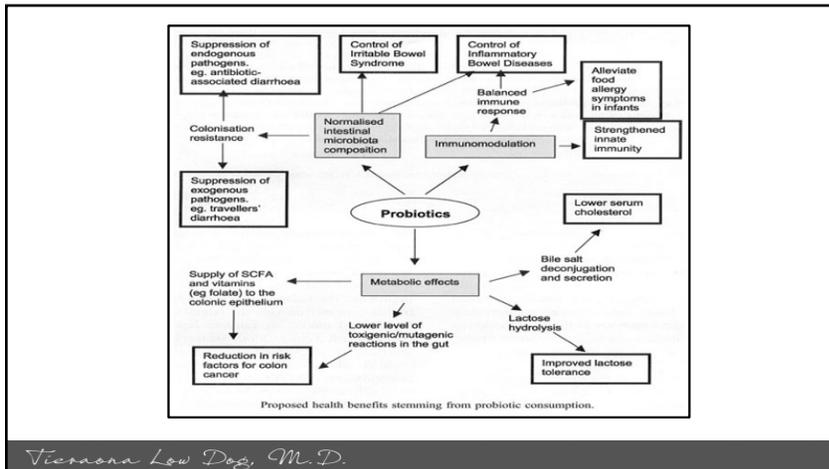
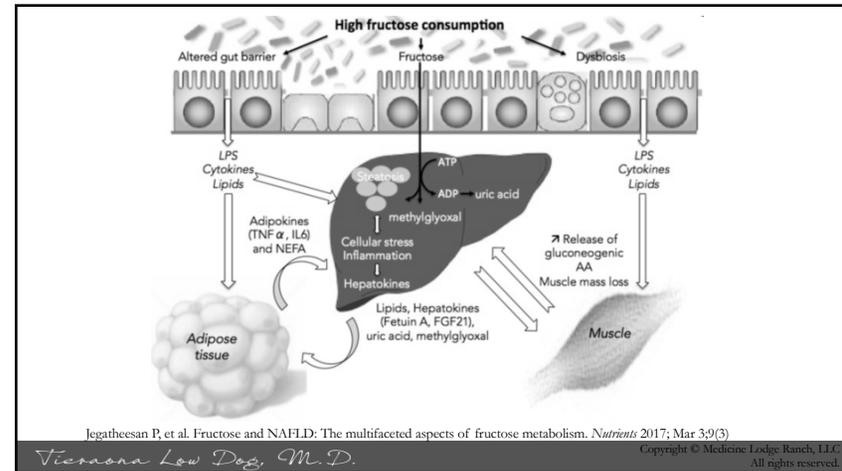
Intestinal Permeability and Systemic Inflammation

- **High fructose consumption** is associated with changes in microbiota composition that **alters gut permeability** by **reducing expression of tight junction proteins**. This causes bacterial translocation and drives inflammation.
- **Insulin resistance** is associated with alterations in **gut permeability**.

Boroni Moreira AP, et al. *Nutr Hosp* 2012; 27(2):382-90
 Jegatheesan P, et al. *Nutrients* 2017; Mar; 9(3): 230.

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Probiotics

- **Regulate/modulate immune function**, reduce risk intestinal infection.
- **Improve intestinal barrier function**
- Induce **hypo-responsiveness to food antigens**
- Improve **glucose control** and **reduce inflammatory** cytokines.
- Inhibit tumorigenesis and **may inhibit cancer progression**
- **Lactobacillus** species most commonly used probiotic in clinical trials: reduce abundance of *Enterobacter* and regulate immune response in patients with colorectal cancer.

Gianotti L, et al. *World J Gastroenterol*. 2010;16:167-175

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Probiotics: Infection



Hao Q, Dong BR, Wu T. Probiotics for preventing acute upper respiratory tract infections. *Cochrane Database Syst Rev*. 2015 Feb 3;(2):CD006895.

- Probiotics **modulate innate and adaptive immunity in elders and also reduce length of respiratory/flu infection in children and adults.**
- Review of 12 studies with 3720 participants found moderate-quality evidence shows number of **people who develop URTI is reduced when taking probiotics and probiotics reduce duration of URTI by ~ 2 days.**

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Vitamin D

- Important for **calcium** regulation
- Higher blood levels **improve breast cancer survival and reduce risk of colorectal cancer.**
- Low vitamin D causes **muscle weakness, lower back and hip pain.**
- **Obesity increases the risk of deficiency.**



Kim Y, et al. *Br J Cancer* 2014; 110(11):2772-84.
Ma Y, et al. *J Clin Oncol* 2011; 29(26):3775-82

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Vitamin D and Cancer



- Review found **four forms of cancer that benefit from vitamin D supplementation during treatment: prostate, breast, and colorectal cancers and melanoma.**
- Review of 30 studies show that higher vitamin D status is **strongly associated with better breast cancer survival.**
- Many **treatments increase risk of osteoporosis,** warranting calcium and vitamin D supplements.

Kim Y, et al. *Br J Cancer* 2014; 110(11):2772-84.
Jacobs ET, et al. *J Cancer* 2016; 7(3):232-40

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Vitamin D and Colorectal Cancer

- Meta-analysis **11 studies** (7,718 CRC patients) showed an **improvement in survival outcomes** with increasing blood 25(OH)D concentrations.
- Roughly **33% increase in survival** in those with highest vitamin D levels compared to lowest. Studies included patients with stages I-IV cancer.
- Authors concluded that there is **“robust evidence of an association between higher blood 25(OH)D concentrations and better survival in CRC patients.”**

Maalmi H, et al. Association between Blood 25-Hydroxyvitamin D Levels and Survival in Colorectal Cancer Patients: An Updated Systematic Review and Meta-Analysis. *Nutrients* 2018; 2018 Jul 13;10(7).

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Drug Induced Osteoporosis

- Drugs include:
 - Glucocorticoids (steroids) – 1:5 cases of osteoporosis
 - **Aromatase inhibitors (breast cancer)**
 - **Anti-androgen therapy (prostate cancer)**
 - Proton pump inhibitors (heartburn)
 - Antiretroviral drugs (HIV, hepatitis)
 - SSRIs (antidepressants) and antipsychotics
 - Anticonvulsants (epilepsy)
 - Loop diuretics (e.g. lasix)
 - Heparin and oral anticoagulants



Mazzioni G, et al. Drug-induced osteoporosis: mechanisms and clinical implications. *Am J Med* 2010; 123:877-84

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Endocrine Society Guidelines

- Serum 25(OH)D level used to evaluate high-risk folks:
 - **Insufficiency defined as 21-29 ng/mL**
 - **Deficiency defined as <20 ng/mL**
- **66.8 million Americans** had vitamin D levels between 12-20 ng/ml
- **23 million Americans** had serum levels less than 12 ng/ml
- All adults vitamin D deficient should be treated with **50,000 IU of vitamin D2/D3 once per week for 8 weeks or 6000 IU of vitamin D3 daily to achieve a blood level of 25(OH)D above 30 ng/ml, followed by maintenance therapy of 1500-2000 IU/d.**

CDC 2nd National Report on Biochemical Indicators of Diet and Nutrition in the U.S. Population
Holick MF, et al. *J Clin Endocrinol Metab* 2011; 96(7):1911-30

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Vitamin D

To get 600 IU/d Vitamin D3 in diet:

- **3-4 ounces sockeye salmon, cooked**
- **11.4 ounces water-packed tuna**
- **26 oil-packed sardines**
- **15 large eggs**
- **6 cups fortified milk OR**
- **30-45 ounces yogurt**



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Green Tea (*Camellia sinensis*)



- **White, green, oolong and black teas** contain polyphenols and flavonoids, particularly catechins.
- Dominant catechin in green tea is epigallocatechin gallate (**EGCG**).
- Inhibits every step of carcinogenesis.
- Most studies are **epidemiological in nature.....**

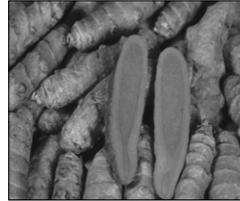
Butt MS, et al. *Crit Rev Food Sci Nutr* 2015; 55(6):792-805.
Pellicore LS, Giancaspro GI, Low Dog T. *Drug Saf.* 2008;31(6):469-84.

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Turmeric (*Curcuma longa* and others)

- Rhizomes provide **bright yellow-orange culinary spice and dye.**
- Yellow pigments = curcuminoids, most abundant is **curcumin.**
- Long history of medicinal use for respiratory, skin, digestive and inflammatory conditions in India.
- More than **65 clinical trials** have shed light on its *potential* role in CVD, diabetes, cancer, fatty liver, arthritis, neuro/psych disorders.



Kunnumakkara AR, et al. *Br J Pharmacol* 2016; Sep 17. doi: 10.1111/bph.13621.

Prasad S, et al. *Biotchnol Adv* 2014; 32(6):1053-1064

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Turmeric/Curcumin

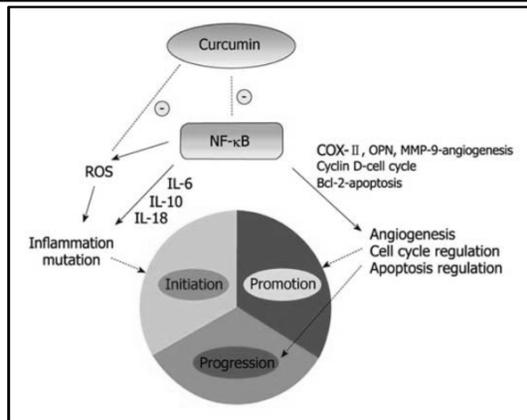
- Beneficial effects on almost every known target/molecule involved in **carcinogenesis.**
- May prevent and be beneficial adjunctive treatment for **colorectal cancer.**
- Acts alone and synergistically with EGCG (green tea) to inhibit malignant changes in **oral epithelium.**



Irving GR, et al. *Cancer Prev Res* 2013; 6(2):119-28.

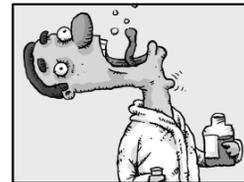
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Mouthwash

- **Turmeric mouthwash** significantly reduced levels of **radiation-induced oral mucositis at all time points.**
- **Lesser incidence of treatment breaks in first half** of treatment schedule ($P < 0.01$) and reduced change in body weight ($P < 0.001$).

Rao S, et al. *Integr Cancer Ther* 2013; 13(3):201-210.

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Cooking Tips:

- Mix ½ teaspoon turmeric in 8 ounces plain yogurt – use as a spread on sandwich or baste for chicken
- Add ½ teaspoon to 2 cups tomato soup
- Add ½ teaspoon to 2 cups steamed rice
- Add ½ teaspoon when stir frying greens such as kale, chard or cabbage

Note: ½ tsp of turmeric powder is approximately 1.5 grams and contains roughly 80-100 mg of curcumin.

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Golden Milk

- 1 inch sliced fresh turmeric or 1/2 teaspoon dried turmeric powder
- 1 inch sliced fresh ginger or 1/2 teaspoon dried ginger powder
- 2 peppercorns
- 1 cinnamon stick or 1/2 teaspoon cinnamon powder
- 2-3 sliced fresh dates
- 2 cups milk or non-dairy milk alternative

Put milk in saucepan and add all ingredients. Bring to a boil, turn heat down to low simmer, cover and cook for 10-15 minutes. Strain, Drink.

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Absorption and Safety Issues

- Curcumin NOT well absorbed from GI tract.
- Nanoencapsulation, bound to phosphatidylcholine, or inclusion of black pepper (piperine), enhance bioavailability.
- Note: Piperine causes inhibition of CYP3A4 at doses of 20 mg/d can cause *clinically relevant drug interactions* especially for drugs with narrow therapeutic indices.
- Dose generally 1200-1500 mg per day of turmeric extract standardized to 95% curcumin, taken in divided doses.

Gurley BJ, et al. *Planta Med* 2012; 78(13):1490-514

Bedada SK, et al. *Drug Res* 2016; Oct 24

Supplement Facts		
Serving Size: 1oz.		
Servings Per Container: 16		
	Amt. Per Serving	% Daily Value
Organic Turmeric Root Extract (Supercritical CO2 Extraction)	500mg	*
Organic Black Pepper Fruit Extract (Standardized to 95% Piperine)	10mg	*

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**Curcumin Bound to Phytosome:
Safer If Taking Medications**

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	*

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Zinc and Taste Protection

- Zinc helps protect cells that line the mouth in those undergoing chemotherapy or radiation.
- Study found half of women undergoing chemotherapy for gynecological cancer experienced altered taste.
 - Serum zinc level consistently below lower limit of normal.
- RDBPCT of adult patients with head and neck cancers received zinc sulfate (50 mg, three times a day) or placebo at start of radiation through one month post. Zinc prevented radiation induced taste alterations.
- Normally, do not take more than 30 mg/d except for short periods.

Nishijima S, et al. *Gynecol Oncol* 2013; 131(3):674-8.
 Najafzade N, et al. *J Res Med Sci* 2013; 18(2):123-6

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Ginseng (*Panax ginseng*) (*Panax quinquefolius*)

- Human studies in healthy people and clinical studies in patients with fatigue confirm the antifatigue property of *P. ginseng*.
- Most studies (both species) show positive influences on intellectual work capacity in normal subjects and those with decreased cognitive functions.
- Considerable variation in quality of product and dose recommendations. *P. ginseng* often standardized to ginsenoside levels (4-10%)

Oliynyk S, et al *J Ginseng Res* 2013; 37(2): 144-166

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Cancer Related Fatigue

- American and Asian ginseng may reduce risk of moderate-severe respiratory infections in patients with CLL
- Four RCT show that both species improve cancer related fatigue.
- Largest study 364 participants from 40 institutions.
- Randomized to placebo or 2000 mg/d of American ginseng for 8 weeks to determine effect on fatigue.
- Ginseng reduced fatigue by almost double that of placebo in those undergoing active cancer treatment. No discernible toxicities.



High KP, et al. *J Support Oncol* 2012; 10(5):195-201.
 Barton DL, et al. *J Natl Cancer Inst* 2013; 105(16): 1230-1238

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Herb-Drug Interactions

- No clinically significant drug interactions observed using approved CYP probe drugs and P-gp probe substrates when *P. ginseng* administered for 2 weeks in healthy volunteers.
- *P. ginseng* 1 gram/d for 6 weeks, no significant change in INR in patients on warfarin.
- ALWAYS talk to health care provider and/or pharmacist when mixing botanicals with drugs.



Kim DS, et al. *J Ginseng Res* 2016; 40(4):375-81
 Andrade AS, et al. *BMC Complement Altern Med* 2008; 8:50
 Lee YH, et al. *nt J Cardiol* 2010; 145(2):275-6.

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Supplement Facts

Serving Size: 2 capsules
Servings Per Container: 25

Amount Per Serving

American Ginseng root (<i>Panax quinquefolius</i>)	1000 mg*
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*Daily Value not established

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Eating alone will not keep a man well. He must also take exercise.

Hippocrates



- Higher risk for heart disease, type 2 diabetes, certain cancers, Alzheimer's disease and increase lower back pain, depression and anxiety.
- Half of baby boomers in the US report having NO exercise.**
- 80 million Americans over age of 6 years of age are entirely inactive**

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BENEFITS OF PHYSICAL ACTIVITY




- Movement increases blood flow to the brain, **stimulating release of endorphins that diminish pain, as well as compounds that elevate mood.**
- More than **400 studies** show exercise can **reduce risk depression/anxiety.**
- 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

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Activity	In 1 hour	In 30 minutes
Running (1 mile in 12 minutes or 5 miles/hour)	590	295
Swimming (slow freestyle laps)	510	255
Walking (1 mile in 13 minutes)	460	230
Playing basketball	440	220
Weight lifting (vigorous effort)	440	220
Heavy yard work (chopping wood or clearing brush)	440	220
Golfing (walking and carrying clubs)	330	165
Dancing	330	165
Light gardening/yard work	330	165
Bicycling (more than 10 miles an hour)	290	145
Walking (1 mile in 17 minutes)	280	140
Weight lifting (general light workout)	220	110

Source: USDA, www.mypyramid.gov

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Keep Track of Your Movement



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"All substances are poisons; there is none which is not a poison. The dose differentiates a poison and a remedy."

Paracelsus (1490-1541)

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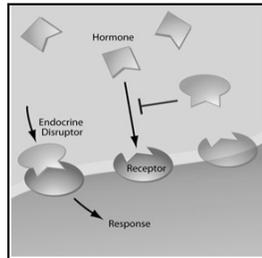
Safe Until Proven Dangerous

- Unlike pharmaceuticals or pesticides, industrial chemicals do not have to be tested before they are put on the market.
- E.P.A. has mandated safety testing for only a small percentage of the 85,000 industrial chemicals in use.
- Once chemicals are in use, the regulatory burden is so high that only five substances have been banned or restricted: polychlorinated biphenyls, dioxin, hexavalent chromium, asbestos and chlorofluorocarbons.

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Endocrine Disruptors



Chemicals that may interfere with the body's endocrine system and produce adverse developmental reproductive, neurological, and immune effects in both humans and wildlife.

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Endocrine Society Second Scientific Statement

- Endocrine disrupting compounds contribute to **impaired reproduction, neurodevelopment, thyroid function, metabolism, and increased propensity for hormone-sensitive cancers.**
- Unfortunately, it is **difficult to directly relate** chronic disease burden to exposures in humans.
- The increased prevalence of such diseases underscores the need to **invoke precaution** in introducing new (and usually untested) chemicals into the environment.



Gore AC, et al. *Endocr Rev* 2015; 36(6):E1-E150.

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Reducing Environmental Exposures

1. Eat **fresh** rather than processed food, when possible
2. **Organic** fruits/vegetables, dairy; **grass fed/finished** meats, **free range eggs**, when possible
3. Reduce consumption of foods/beverages in **cans and plastic containers**
4. Minimize use of personal care products containing **fragrances (skindeep.org)**
5. **Avoid** garden/household/pet pesticides or fungicides. Use **integrated pest management for home/yard.**
6. Use **water filtration system (ewgs-water-filter-buying-guide)**, consider **HEPA** filters in home



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www.ewg.org/foodnews/index.php

The screenshot shows the EWG website interface. On the left, the 'DIRTY DOZEN' list includes: 1. Strawberries, 2. Spinach, 3. Nectarines, 4. Apples, 5. Peaches. On the right, the 'CLEAN FIFTEEN' list includes: 1. Sweet Corn, 2. Avocados, 3. Pineapples, 4. Cabbage, 5. Onions. The website also features sections for 'FOCUS ON SPINACH', 'GROW ORGANICS!', 'NEW TO LIST PEARS', 'STRAWBERRY UPDATE', and 'FOOD SCORES'.

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"If we are going to live so intimately with these [agricultural] chemicals--eating and drinking them--taking them into the very marrow of our bones—we had better know something about their nature and their power."



Rachel Carson,
Silent Spring

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Insecticides and Cancer

- Meta-analysis of 16 studies found **childhood exposure to indoor residential insecticides associated with a significant increased risk of childhood leukemia and lymphomas.**
- Positive but not statistically significant association also found for childhood brain tumors.



Chen M, et al. *Pediatrics* 2015; 136(4):719-29.

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Hormone Therapy During Menopause

- Benefits likely outweigh risks for **symptomatic women before age 60 years or within 10 years after menopause.**
- Symptom control is used to determine the minimum required dose for each woman (not hormone testing!)
- When balancing benefits and risks dose, **type and route of administration need to be considered.**



deVilliers TJ, et al. *Maturitas* 2013; 391-2

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Route and Type

- **Transdermal estradiol** has least effect on lipids and clots.
- **Estrogen alone does not** significantly increase risk of breast cancer.
- **Progesterone** is associated with **lower risk of breast cancer** and venous thrombosis **compared to synthetic progestogens.**
- If symptoms primarily urogenital, **vaginal estrogen** can be used with minimal systemic absorption.

Bhupathiraju SN, et al. *Endocr Prac* 2014; 20:1201-13

L-Hermite M. *Climacteric*. 2013 Aug;16 Suppl 1:44-53.

Hale GE, et al. *Trends Cardiovasc Med* 2015; 25(6):540-9

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HPV Vaccine (Gardasil 9)

- Estimated **24,600 newly diagnosed cancers** attributable to two high-risk HPV types targeted by all currently licensed HPV vaccines
- **Routine HPV vaccination at age 11 or 12 years; and vaccination for females through age 26 years and males through age 21** who were not adequately vaccinated previously.
 - 2 doses 6-12 months apart if before 15th birthday, 3 doses if after.
- CDC, from June 2006-2017, ~100 million doses of HPV vaccines distributed and ~ most adverse events were non-serious.
- After careful review, *none of these adverse events* were any more common after HPV vaccination than among comparison groups.

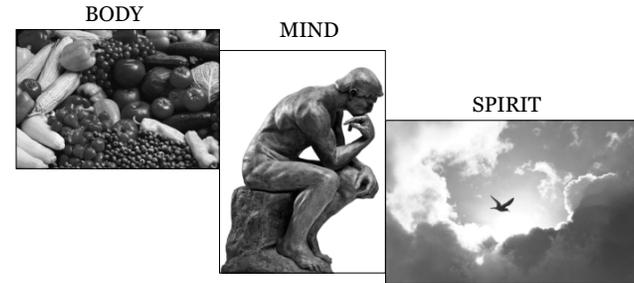
<https://www.cdc.gov/vaccinesafety/vaccines/hpv/hpv-safety-faqs.html>

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"Cancer Prevention in 21st Century"

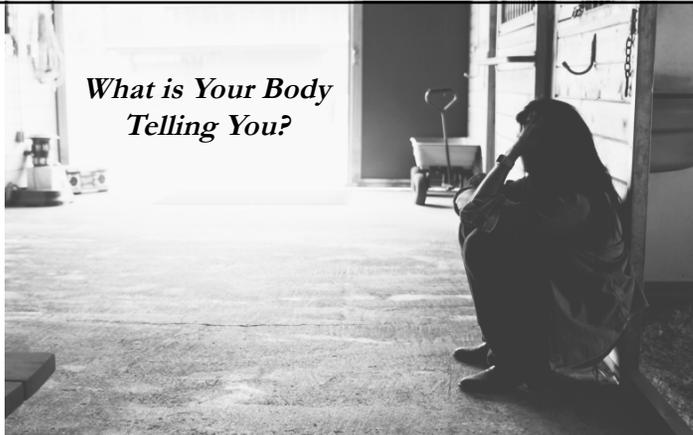
It's All Connected



Viviana Low Dog, M.D.

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What is Your Body Telling You?

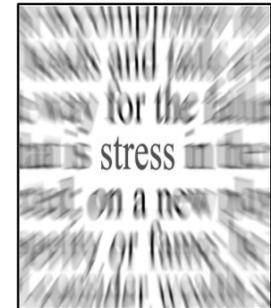


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Stress and Cancer?

- Stress *does not cause* cancer.
- There is evidence that chronic stress, depression and social isolation may promote the growth of tumors *that are already present*.
- Excessive sympathetic tone caused by emotional stress, may decrease survival after a cancer diagnosis.

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



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Loneliness, Social Isolation & Your Health



• **148 studies on the effects of social isolation on health found it is:**

- As bad as smoking 15 cigarettes a day.
- As dangerous as being an alcoholic.
- As harmful as never exercising.
- Twice as dangerous as obesity.

Cacioppo JT, et al. *Ann N Y Acad Sci* 2011; 1231:17-22
 Holt-Lunstad J, et al. *PLoS Med* 2010; 7:e1000316

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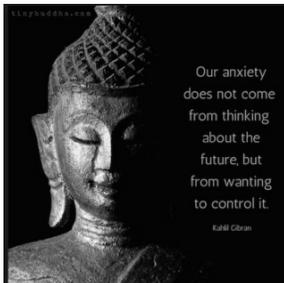
*Call it a clan, call it a network, call it a tribe, call it a family.
 Whatever you call it, whoever you are, you need one.*

~ Jane Howard



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Self Soothing



Our anxiety does not come from thinking about the future, but from wanting to control it.

Kahlil Gibran

- A good way to deal with **anxiety and high stress is to occasionally sidestep the analytical part of your brain** by practicing **relaxation, meditation and/or using guided imagery.**

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Meditation

- Meditation excellent for **reducing stress perception and pain intensity**, while **elevating mood.**
- Long-time meditators have greater activation of areas responsible for **sustaining attention, processing empathy, integrating emotion and cognition.**
- Review of **47 trials** found that meditation improves:
 - Anxiety
 - Depression
 - Pain



Goyal M, et al. *JAMA Intern Med* 2014; 174(3):357-68

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Meditation Resources

- **Guided Mindfulness Meditation:** *A Complete Guided Mindfulness Meditation Program* from Jon Kabat-Zinn
- **Insight Timer** - ~4,000 guided meditations from more than 1,000 teachers (self-compassion, nature, stress, podcasts and more). More than 750 meditation music tracks. Free.
- **Headspace** – very good for beginners with 10 minute meditations. Free.
- **The Mindfulness App** – nice 5 day guided meditation program to get you started. Can be personalized and integrated into other health apps. Free.

Tierona Low Dog, M.D.

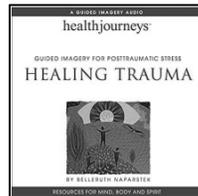
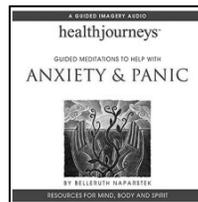
Guided Imagery: *Imagine Yourself.....*

- An immersive, deeply relaxing intervention that uses calming words, soothing music and positive images to structure a healing experience.
- Like meditation, it **focuses attention** and **calms the mind**, working on those parts of the brain where the emotional self dwells.
- Imagery has been shown to **reduce stress, anxiety, and depression**; help with **sleep; lower blood pressure**, and help with **posttraumatic stress**.
- I have found guided imagery a fabulous tool for myself, kids and patients. Very helpful for those with ADHD, anxiety, depression, pain, cancer.

Tierona Low Dog, M.D.

Belleruth Naparstek

- Love, love, love her. Something for everyone.
- She has Guided Imagery Meditations for:
 - Anxiety and Panic
 - Anger and Forgiveness
 - Depression
 - Healing Trauma
 - Ease Grief
 - Relieving Stress
 - Undergoing Surgery
 - Chemotherapy and Radiation



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Music and Quality of Life

- After evaluating 52 music-intervention studies, Cochrane Collaboration reviewers reported that **music reduces anxiety and pain and improves mood and quality of life in people with cancer.**

Bradt J, et al. *Cochrane Database Syst Rev* 2016 Aug 15;(8):CD006911.



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Listen.
 Are you
 breathing
 just a little
 and calling
 it a life?
 ~ Mary Oliver

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*“There are voices which we
 hear in solitude ...
 but they grow faint and
 inaudible as we enter into the
 world.”*

Ralph Waldo Emerson



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WHICH ONE WILL WIN?

THE ONE YOU FEED

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.



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