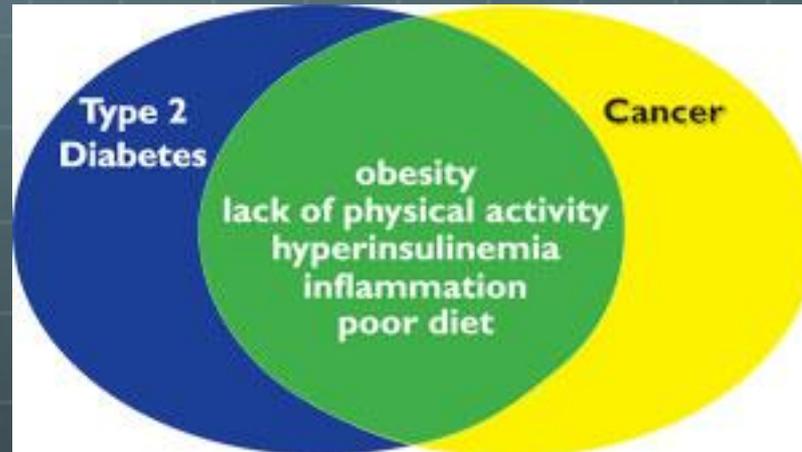


Oncology Nutrition Nuggets

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Tumor Risk Influenced by Glucose & Insulin



Tumor Risk Influenced by Glucose & Insulin

 The diabetes-cancer link seems connected to several highly inter-related factors:

1) Obesity

2) Insulin resistance

3) Inflammation

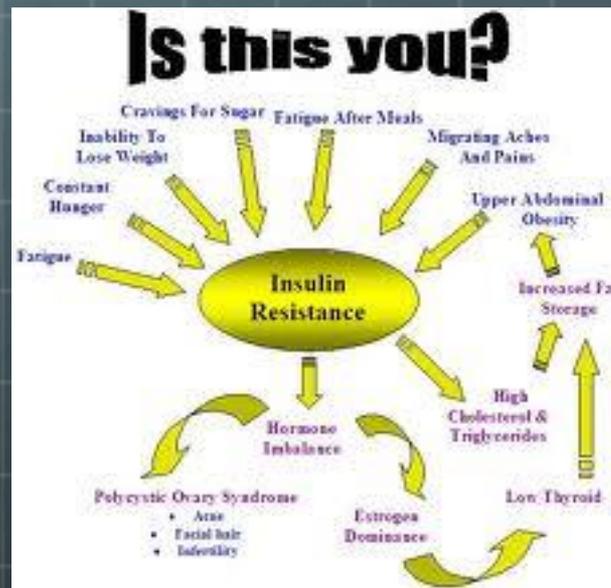
4) Chronic hyperglycemia

The Diabetes-Cancer Connection

- Risk is most clearly elevated for cancers of the:
 - liver
 - pancreas
 - colon
 - endometrium
 - breast (postmenopausal)
 - bladder
 - kidney
 - non-Hodgkin lymphoma

The Diabetes-Cancer Connection

- 🌐 Increase in cancer risk may occur with **early metabolic changes that precede the development of full-blown diabetes.**



The Diabetes-Cancer Connection

- Lifestyle choices can influence risk of both diabetes and cancer.
- Many strategies that decrease risk of cancer also promote control of diabetes.
 - Weight : Excess body fat is strongly related to risk of both diabetes and cancer.
 - Physical activity: Lowers risk both directly and through promoting weight management benefit.
 - Diet: Emphasis on minimally processed, fiber-containing plant foods supports lower risk of diabetes and cancer through a variety of means.

The Diabetes-Cancer Connection

- Type 2 diabetes is associated with three of the five leading causes of cancer mortality in the United States
 - cancers of the colon
 - breast (postmenopausal)
 - pancreas
- Vigneri P, Frasca F, Sciacca L, Pandini G, Vigneri R. (2009). Diabetes and cancer. *Endocr Relat Cancer*, 16(4):1103-23.;

The Diabetes-Cancer Connection

- Type 2 diabetes is associated with three of the five leading causes of cancer mortality in the United States.
- MANY study references regarding this topic:
 - Hjartåker A, Langseth H, Weiderpass E. (2008) Obesity and diabetes epidemics: cancer repercussions. *Adv Exp Med Biol*, 630:72-93. Hemminki K, 2010;
 - Chodick G, Heymann A, Rosenmann L, Green M, Flash S, Porath A, Kokia E, Shalev V. (2010). Diabetes and risk of incident cancer: a large population-based cohort study in Israel. *Cancer Causes Control*. 2010 Jun;21(6):879-87.
 - Coughlin S, Calle E, Teras L, Petrelli J, Thun M. (2004). Diabetes mellitus as a predictor of cancer mortality in a large cohort of US adults. *Am J Epidemiol*, 159(12):1160-7.

The Diabetes-Cancer Connection

 Mortality rates of cancer patients with pre-existing diabetes seem to be 40 to 50 percent higher than for those without diabetes

 Barone B, Yeh H, Snyder C, Peairs K, Stein , Derr R, Wolff A, Brancati F. (2010). Postoperative mortality in cancer patients with preexisting diabetes: systematic review and meta-analysis. *Diabetes Care*, 33(4):931-9.

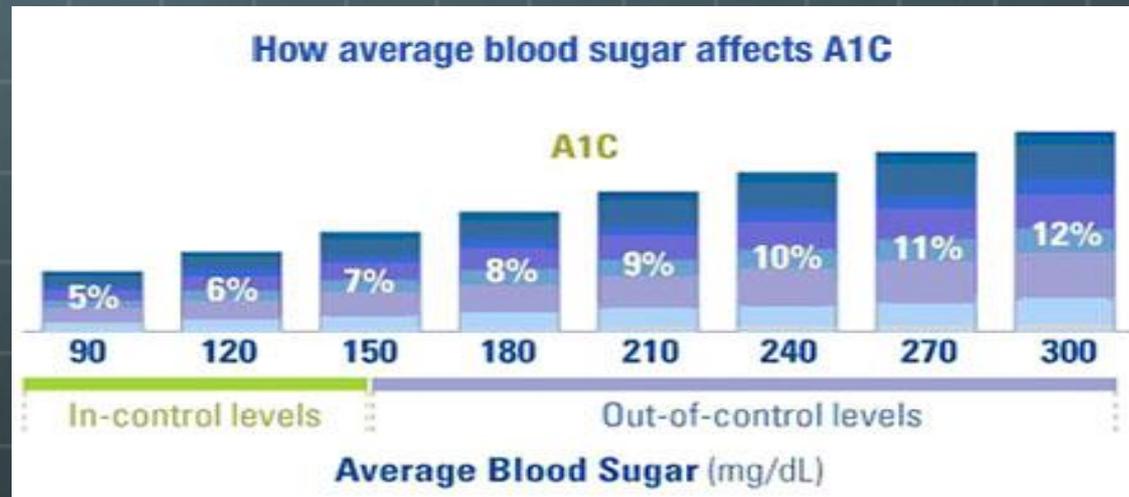
 Barone B, Yeh H, Snyder C, Peairs K, Stein K, Derr R, Wolff A, Brancati F. (2008). Long-term all-cause mortality in cancer patients with preexisting diabetes mellitus: a systematic review and meta-analysis. *JAMA*, 17;300(23):2754-64.

The Diabetes-Cancer Connection

-  Mortality rates are especially noted to increase for those with cancers of the colon, breast and endometrium.
-  Larsson S, Orsini N, Wolk A. (2005). Diabetes mellitus and risk of colorectal cancer: a meta-analysis. *Journal of the National Cancer Institute*, 97(22): 1679-1687. Barone B, Yeh H, Snyder C, Peairs K, Stein K, Derr R, Wolff A, Brancati F. (2008). Long-term all-cause mortality in cancer patients with preexisting diabetes mellitus: a systematic review and meta-analysis. *JAMA*, 300(23):2754-64.
-  Meyerhardt J, Catalano P, Haller D, Mayer R, Macdonald J, Benson A III, Fuchs C. (2003). Impact of diabetes mellitus on outcomes in patients with colon cancer. *J Clin Oncol*,
-  Larsson S, Mantzoros C, Wolk A. (2007). Diabetes mellitus and risk of breast cancer: a meta-analysis. *Int J Cancer*, 121(4):856-62. 21:433-440.

The Diabetes-Cancer Connection

- It's unclear whether diabetes makes cancer more aggressive (perhaps through hyperglycemia or hyperinsulinemia), or whether health problems that may accompany diabetes impair response to cancer therapy, or both.



The Diabetes-Cancer Connection

- 🌐 Does diabetes independently increases risk for these cancers?
- 🌐 Or do the two diseases occur together because of a shared link to obesity, lack of physical activity and tobacco smoking ?
- 🌐 Giovannucci E, Michaud D. (2007a). The role of obesity and related metabolic disturbances in cancers of the colon, prostate, and pancreas. *Gastroenterology*, 132(6):2208-25.

The Metabolic Syndrome Connection

The Metabolic Syndrome



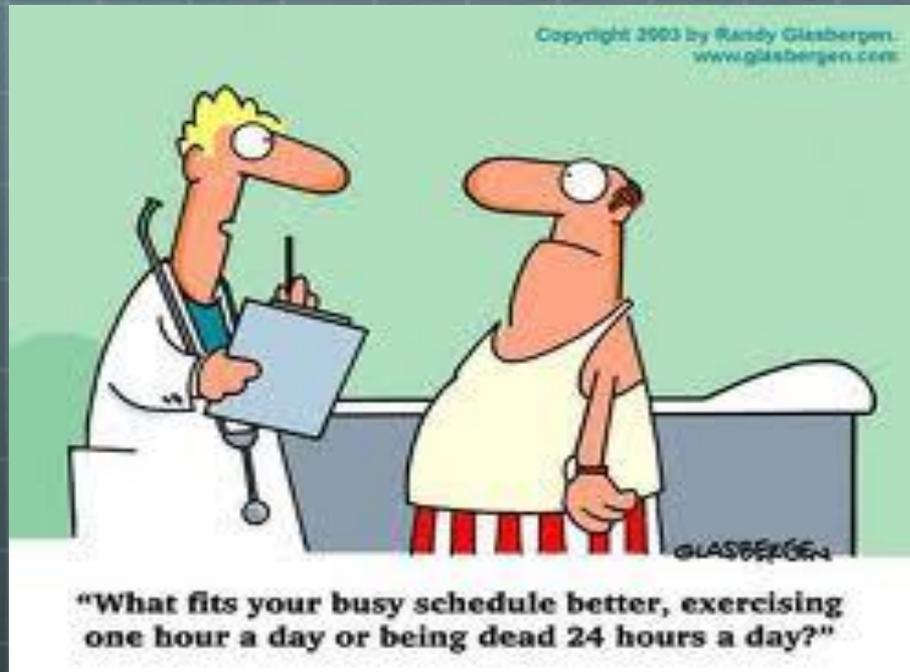
FOR MEN:

- Waist Circumference \geq 40 inches
- Triglycerides \geq 150 mg/dL
- HDL Cholesterol $<$ 40 mg/dL
- Blood Pressure \geq 130/85 mm Hg
- Fasting Glucose \geq 100 mg/dL

FOR WOMEN:

- Waist Circumference $>$ 35 inches
- Triglycerides $>$ 150 mg/dL
- HDL Cholesterol $<$ 50 mg/dL
- Blood Pressure $>$ 130/85 mm Hg
- Fasting Glucose $>$ 100 mg/dL

The Inactivity-Cancer Connection



The Diabetes-Cancer Connection

 **Hyperinsulinemia and insulin resistance may cause pre-malignant lesions to grow into invasive cancer**

 Godslan I. (2009). Insulin resistance and hyperinsulinaemia in the development and progression of cancer. *Clin Sci (Lond)*, 118(5):315-32.

 **When insulin binds to its receptor, it promotes proliferation of cells, both normal and cancerous**

 Pais R, Silaghi H, Silaghi A, Rusu M, Dumitrascu D. (2009). Metabolic syndrome and risk of subsequent colorectal cancer. *World J Gastroenterol*, 15(41):5141-8. Xue F, 2007)

The Diabetes-Cancer Connection

- 🌐 Many cancer cells reportedly have increased concentrations of insulin receptors, as a result, cancer cells may be especially responsive to growth signals from elevated insulin levels
- 🌐 Xue F, Michels K. (2007). Diabetes, metabolic syndrome, and breast cancer: a review of the current evidence. *Amer J Clin Nutr*,86(3):s823-35.
- 🌐 Becker S, Dossus L, Kaaks R. (2009). Obesity related hyperinsulinaemia and hyperglycaemia and cancer development. *Arch Physiol Biochem*, 115(2):86-96.

The Diabetes-Cancer Connection

-  As a result, more insulin is required and the pancreas tries to keep up by producing more.
-  Normal or near-normal blood sugar levels may occur in IR as long as pancreatic beta-cells are able to continually increase insulin secretion.
-  IR may exist for many years before a diabetes diagnosis.

The Diabetes-Cancer Connection

- Higher blood levels of insulin and a biomarker of insulin secretion (C-peptide) are associated with some cancers
- A two- to three-fold increase in colon cancer risk in men (with mixed results in women)
- A two- to four-fold increase in pancreatic cancer
 - Becker S, Dossus L, Kaaks R. (2009). Obesity related hyperinsulinaemia and hyperglycaemia and cancer development. *Arch Physiol Biochem*, 115(2):86-96.
 - Pais R, Silaghi H, Silaghi A, Rusu M, Dumitrascu D. (2009). Metabolic syndrome and risk of subsequent colorectal cancer. *World J Gastroenterol*, 15(41):5141-8.

The Diabetes-Cancer Connection

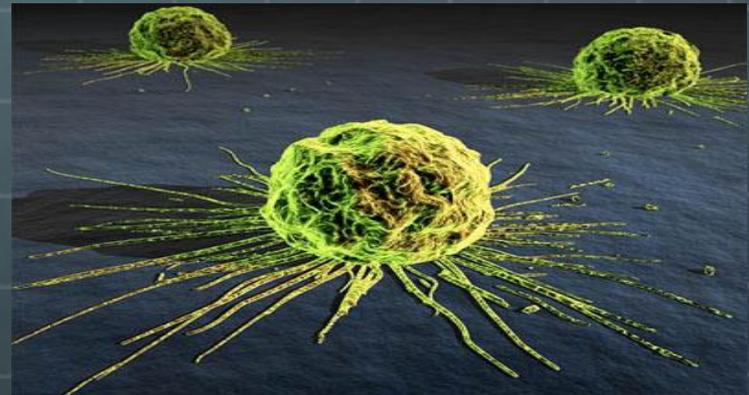
- Increased insulin levels decrease liver synthesis of insulin-like growth factor binding proteins
 - This leads to an increase in bioavailable insulin-like growth factor-1 (IGF-1).
 - Like insulin, IGF-1 promotes cell proliferation and inhibits apoptosis in many tissues
- Becker S, Dossus L, Kaaks R. (2009). Obesity related hyperinsulinaemia and hyperglycaemia and cancer development. Arch Physiol Biochem, 115(2):86-96.

The Diabetes-Cancer Connection

-  Elevated blood glucose levels and impaired glucose tolerance without diabetes are both associated with increased cancer risk.
-  Cancer cells use glucose for proliferation, and some laboratory studies suggest that higher circulating glucose may especially support malignant cell growth

The Diabetes-Cancer Connection

- Research suggests that implementation of the recommendations could prevent about one-third of our most common cancers



- World Cancer Research Fund / American Institute for Cancer Research. (2009). Policy and action for cancer prevention. Food, nutrition, and physical activity: a global perspective. Washington DC: American Institute for Cancer Research.

Fixing the Cancer Connection

- **Fixing the Problems – General Recommendations:**
 - Help those at risk to set initial goal of 5-7% wt loss
 - Decrease daily calorie consumption by 500 Kcals/day
 - Set goal to increase physical activity
 - Teach persons to increase the fiber content of the diet
 - Educate regarding appropriate fat consumption
 - Teach appropriate serving sizes of red and processed meats
 - Explain recommendations regarding alcohol consumption
 - Include regular and varied sources of vegetables, and beans

The Hormone-Cancer Connection

- 🌐 The impact of insulin resistance on estrogen is complex.
- 🌐 Hyperinsulinemia inhibits aromatase activity
 - 🌐 Aromatase functions to decrease estrogen production in postmenopausal women

The Hormone-Cancer Connection

- 🌐 There is an increased bioavailability of estrogen and testosterone
 - 🌐 insulin resistance decreases circulating levels of sex-hormone-binding globulin (SHBG)

The Inflammation-Cancer Connection

- 🌐 Chronic inflammation leads to high concentrations of free radicals that can damage cell DNA and disrupt insulin signaling
- 🌐 Genetic mutations lead to tumor formation
- 🌐 Vigneri P, Frasca F, Sciacca L, Pandini G, Vigneri R. (2009). Diabetes and cancer. *Endocr Relat Cancer*, 16(4):1103-23.

Nan's Nutrition

Nuts & Bolts for Patients

-  **Phytonutrients**
-  **Inflammation management**
-  **Carb/Protein relationships**
-  **Immune System Repair**
-  **Red Meat Limitation**
-  **Healthy Fats**

Nuts & Bolts Phytonutrients

PHYTOCHEMICALS FOUND IN FRUITS

FRUITS

	CAROTENOIDS				FLAVONOIDS				SULPHORAPHANE	LIMONENE	INDOLES	ELLAGIC ACID	ALLIUM COMPOUNDS
	beta-carotene	lutein	lycopene	zeaxanthin	resveratrol	anthocyanins	quercetin	hesperidin					
apples													
apricots													
blackberries													
blueberries													
cantaloupe													
cherries													
currants													
grapefruits													
kiwifruit													
limes													
mangoes													
oranges													
papaya													
pears													
pink grapefruit													
plums													
prunes													
raisins													
raspberries													
red grapes													
strawberries													
tangerines													
watermelon													

[● vegetables](#)
[print phytochemicals summary ●](#)
[print phytochemicals chart ●](#)

Nuts & Bolts Phytonutrients

PHYTOCHEMICALS FOUND IN VEGETABLES													
VEGETABLES	CAROTENOIDS				FLAVONOIDS				SULPHORAPHANE	LIMONENE	INDOLES	ELLAGIC ACID	ALLIUM COMPOUNDS
	beta-carotene	lutein	lycopene	zeaxanthin	resveratrol	anthocyanins	quercetin	hesperidin					
bok choy													
broccoli													
broccoli sprouts													
brussel sprouts													
cabbage													
carrots													
cauliflower													
chives													
collard greens													
corn													
garlic													
kale													
leaf lettuce													
leeks													
onions													
pumpkins													
red peppers													
romaine lettuce													
scallions													
spinach													
sweet potatoes													
Swiss chard													
tomatoes													
turnips													
watercress													
winter squash													

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Nuts & Bolts

Phyto-nutrients

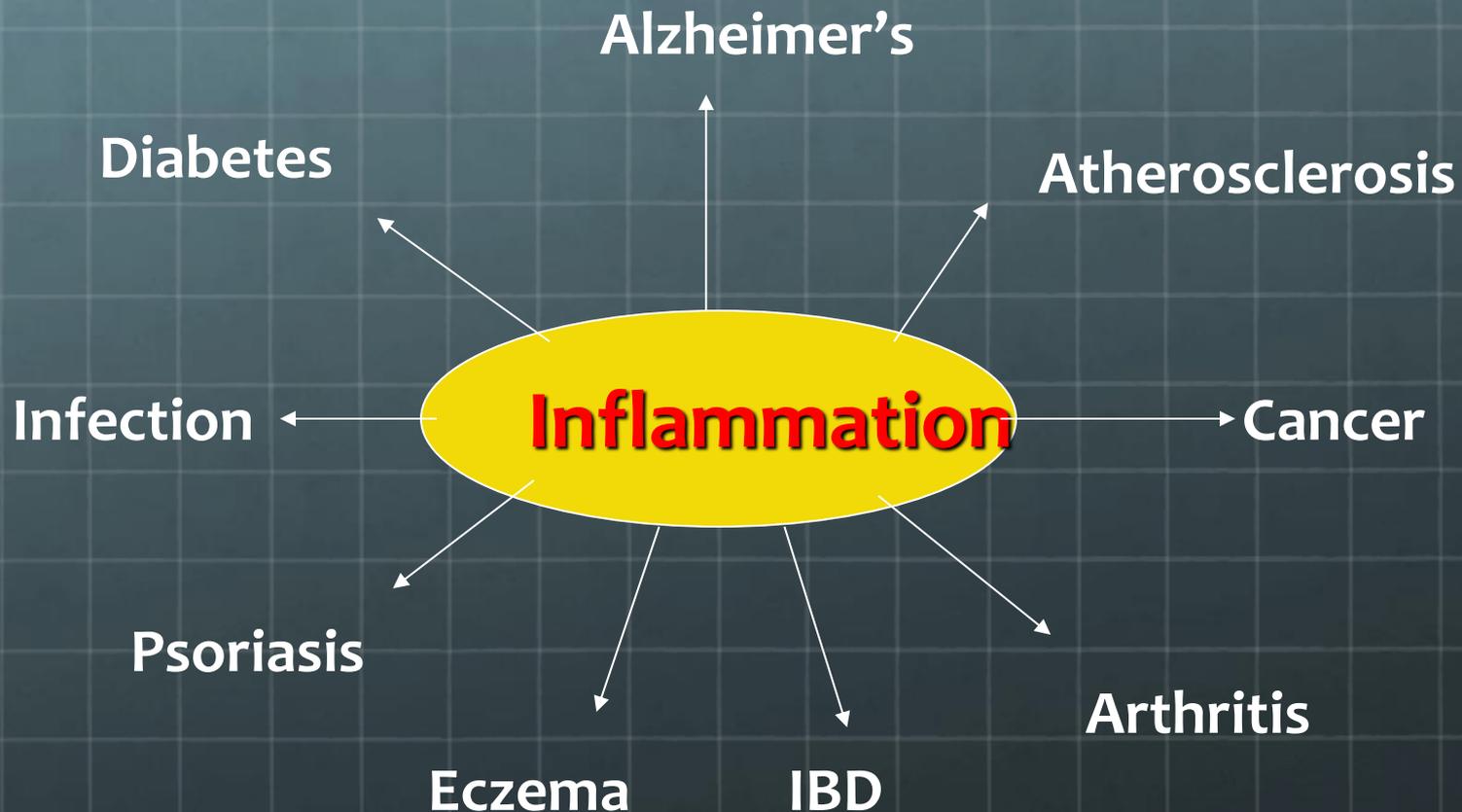
- 🌐 **Key Points for our Oncology Patients:**
 - 🌐 **The phyto worksheets are not 100% inclusive**
 - 🌐 **Distributed by the Dole produce company**
 - 🌐 *What is Dole known for??*
 - 🌐 **Eat the complete list once every 3 days**
 - 🌐 **Eat 5 times the volume of veggies as fruit**
 - 🌐 *Do you know why??*
 - 🌐 **Half pound raw plus half pound cooked each day**
 - 🌐 **“Fresh” may not necessarily be better as the phytonutrients are lost at rate of 20% each day**

Nuts & Bolts

Phyto-nutrients

- 🌍 **Key Points for our Oncology Patients:**
 - 🌍 **Fruit “recipe” for completion of the “puzzle”/3 days**
 - 🌍 20 organic red grapes
 - 🌍 2 kiwi
 - 🌍 2 tangerines
 - 🌍 **Veggie “recipe” for the every 3 days “puzzle”**
 - 🌍 Spinach
 - 🌍 Kale, Frozen broccoli/ cauliflower or cabbage
 - 🌍 Tomatoes or organic red bell peppers
 - 🌍 Onions, garlic and chives

Chronic inflammation



Lifestyle Changes and Inflammation

-  **Healthy waist size**
-  **Women who have a waist measurement of over 35 inches and men of over 40 inches are likely to have high levels of inflammation, since excess abdominal fat cells churn out too many inflammatory chemicals.**
-  **What's deceptive is that many of these individuals also have high levels of the "good" HDL cholesterol and wrongly think they're protected from heart disease, says UCLA cardiologist Karol Watson, MD.**

Inflammation - Too much of the wrong fats!

- 🌐 Around 1900, Americans only had less than a pound of processed vegetable oil per year.
- 🌐 In 2007 we had over 80 pounds per year. This is quite a radical difference.
- 🌐 We simply were not designed to have these high levels of vegetable fats in our diet. There is a major confusion around PUFAs in the mind of most consumers.

Omega 6 vs Omega 3 Fats

- Because of the increased amounts of omega-6 fats in the Western diet, the eicosanoid metabolic products from arachadonic acid, specifically prostaglandins, thromboxanes, leukotrienes, hydroxy fats, and lipoxins, are formed in larger quantities than those formed from omega-3 fats, specifically EPA. A diet rich in omega-6 fats shifts the physiologic state to one that is prothrombotic and proaggregatory, with increases in blood viscosity, vasospasm, and vasoconstriction and decreases in bleeding time.

Essential Fatty Acids & Inflammation

- 🌐 The main fatty acids of interest with inflammation are:
 - 🌐 n-6 PUFA arachidonic acid (AA), which is the precursor of inflammatory eicosanoids like prostaglandin E(2) and leukotriene B(4)
 - 🌐 n-3 PUFAs eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA)
 - 🌐 EPA and DHA are found in oily fish and fish oils. EPA and DHA inhibit AA metabolism to inflammatory eicosanoids.

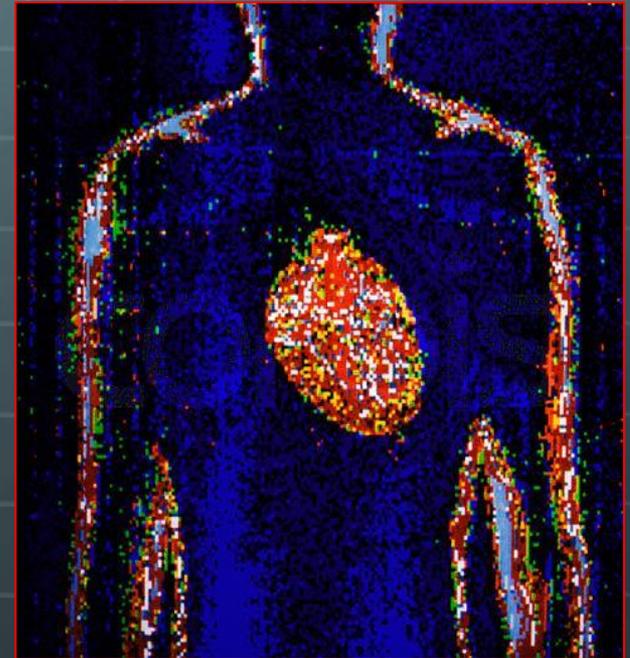
Essential Fatty Acids & Inflammation

- When you eat fish or fish oil, the EPA and DHA partially replace the omega-6 fats especially arachidonic acid in cell membranes.
- The anti-inflammatory fats are resolvins, specifically made from the omega-3 fatty acids found in oily fish.
- Goal dose = 2400 mg EPA/DHA per day



What are the health benefits of essential fatty acids?

- Body composition
- Inflammation
- Cardiovascular
- Blood sugar regulation
- Nervous system and mood
- Mother, infant, and child
- Hormones
- Breast cancer
- Bones, joints, and skin
- Prostate



Support for numerous organ systems!

Sleep and Inflammation

- 🌐 Adequate sleep – it's important!
- 🌐 Poor sleep habits appear to increase levels of inflammatory chemicals.
- 🌐 A recent Duke University study found that women who took longer than 30 minutes to fall asleep had higher levels of CRP and another inflammation marker called interleukin-6 compared with those who fell asleep right away.



Macronutrient Distribution

- 🌐 **Picking The Right Diet - Carbs Aren't Bad - They Work Best When They Have Some Balance!**
- 🌐 **Weight loss still requires a caloric deficit – one pound requires a loss of 3500 calories**
- 🌐 ***The content of the food plan, however does make a difference!***

Nuts & Bolts

Control Insulin Production

- 🌐 Who are the carbs??
- 🌐 Total Carbohydrates on the food label =
 - 🌐 Sugars
 - 🌐 Starches
 - 🌐 Fibers

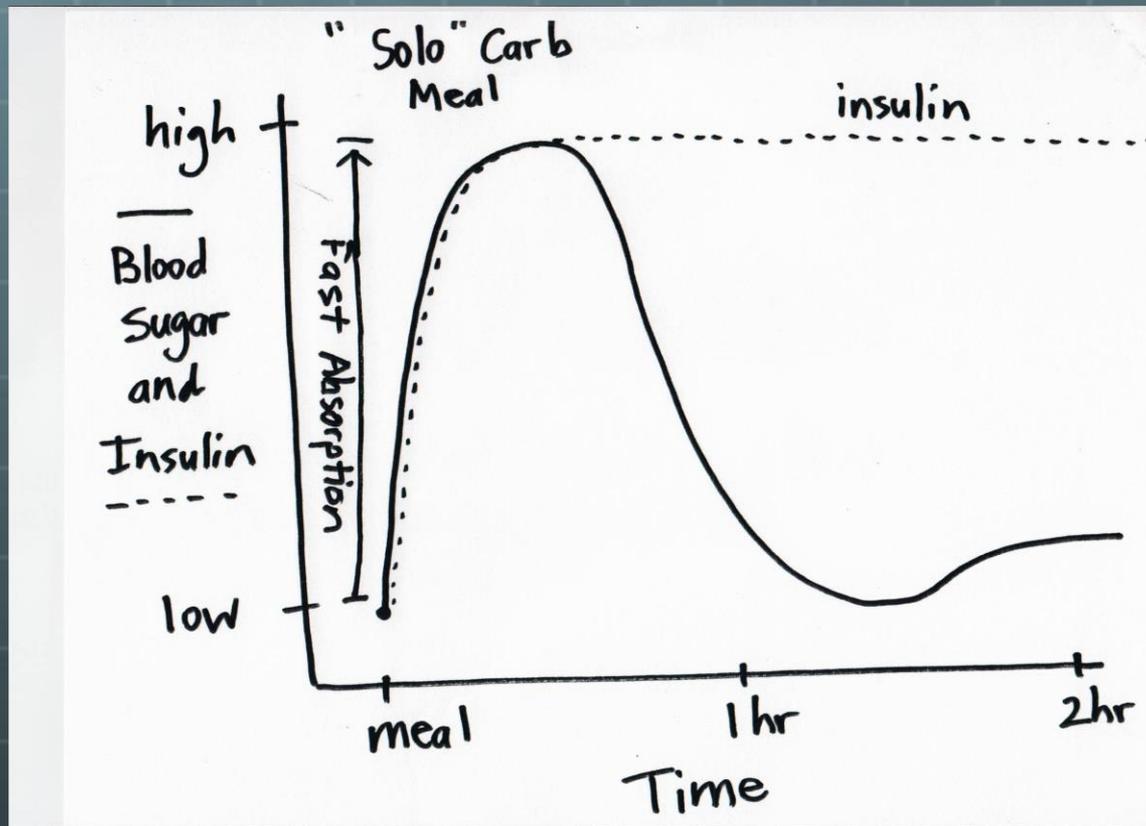
Rocket *FAST* !!

- 🌐 Carbs can be converted into blood glucose within 10 to 20 minutes after ingestion

Teach your patients about the “demolition team”
that lives in their GI tract

Nuts & Bolts

Control Insulin Production



Macronutrient Distribution

Important Absorption Issue

-  The rate that blood glucose changes will influence the amount of insulin secreted.

Insulin = Cells' Garage Door Openers

- Remember that insulin is required to allow passage of glucose into the cells
- Trademarks of the metabolic syndrome are
 - excess production of insulin
 - cellular insulin resistance

Macronutrient Distribution



Proteins



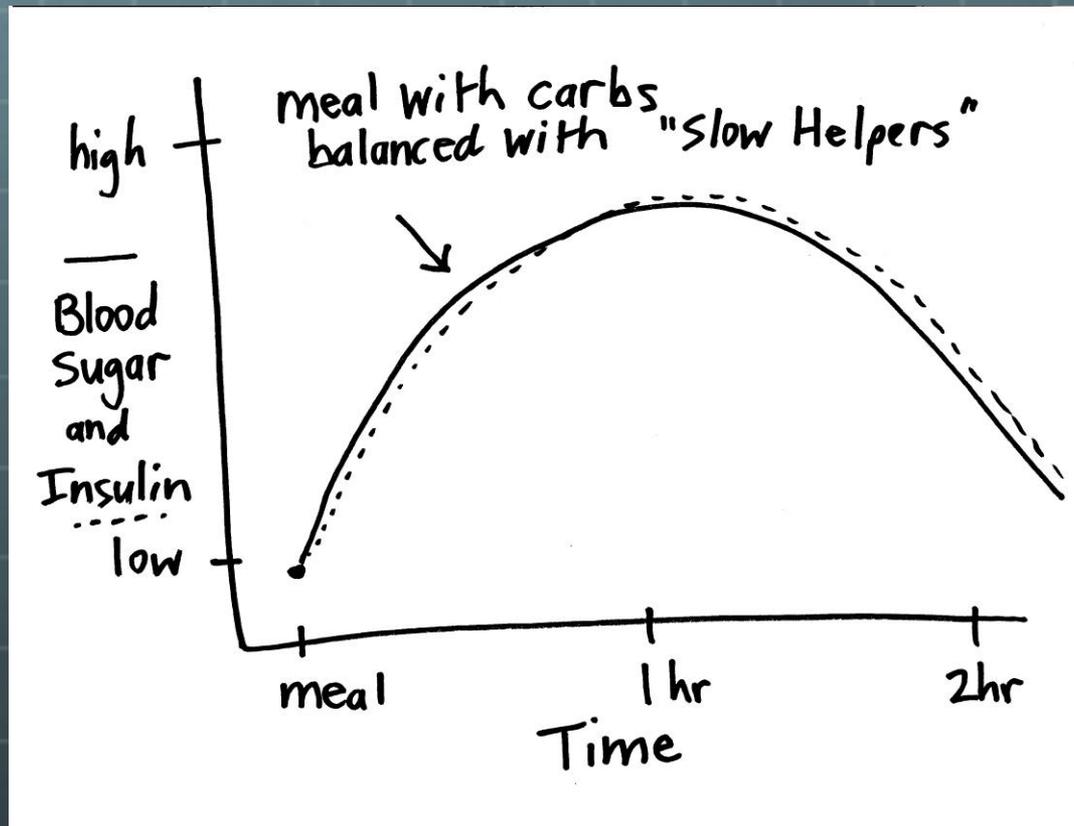
chicken, shrimp, eggs, low-fat cheeses, tuna, whey protein powders are absorbed into the system very slowly



speed to impact blood sugar - after 2 to 3 hours

Nuts & Bolts

Control Insulin Production



Nuts & Bolts

Control Insulin Production !

- 🌐 Developing the food plan - consider these key points:
 - 🌐 Macronutrient distribution of 45% CHO, 30% Pro, 25% fat
 - 🌐 Easy to use “2 to 1 carb to protein ratio”
 - 🌐 Distribute the carbs fairly evenly during the day
 - 🌐 Encourage patients to not ever eat “naked” carbs
 - 🌐 Work on feeding within 30 minutes of arising
 - 🌐 Subsequent meals every 3 – 4 hours
 - 🌐 Super-important to get that mid-afternoon snack!

Nuts & Bolts Immune System

- 🌐 Ask your patients, “Where does your immune system live??” (do they know that it’s in their gut?)
- 🌐 Teach about the “insults” to the immune system:
 - 🌐 Diets loaded with simple sugars
 - 🌐 Too much alcohol
 - 🌐 Poor sleep
 - 🌐 Significant stress
 - 🌐 Travel
 - 🌐 2-3 hours intense cardio

Nuts & Bolts Immune System

- 🌐 Once there have been the “insults” to the immune system, intestinal villi are shortened
- 🌐 “short villi” + “exposure” = illness
- 🌐 Think about the week after a 24 year-old gets married or your friend who did a marathon last weekend?
 - 🌐 How often are they sick on the honeymoon?
 - 🌐 Are the athletes sick the week after the event??

Nuts & Bolts Immune System

- 🌐 Now how about our oncology patient on chemo?
 - 🌐 What happens to the WBC?
 - 🌐 Implications of continuing with the chemo protocol?
 - 🌐 How often is the chemo schedule halted when WBC counts drop too low?
 - 🌐 Impact upon survivorship????

Fixing the Gut - Glutamine

- 🌐 **Glutamine is essential for maintaining intestinal structure and serves as metabolic fuel for enterocytes that line the colon and affect cell proliferation.**

🌐 Sacks GS. Glutamine supplementation in catabolic patients. *Ann Pharmacother.* 1999;33:348-54.

🌐 Miller AL. Therapeutic considerations of L-glutamine: a review of the literature. *Altern Med Rev.* 1999;4:239-48.



Fixing the Gut - Glutamine

EMERSON
ECOLOGICSSM

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GLUTAMINE 1.1 LB (GL205)



Manufacturer: **Progressive Labs**
Vendor Item Code: 3300
Retail Price: \$29.50

Product Description:
Glutamine 1.1 lb

Dietary Supplement:

Supplement Facts
Serving Size: 1 teaspoon (5 grams) powder
Servings Per Container: 100
Amount Per Serving:
L-Glutamine 5 g

Directions: Mix 1 teaspoon with your beverage of choice. Glutamine is a top amino acid used to increase cell volume. For best results use one serving 15 minutes after workout and another serving before bed to promote lean muscle mass and cell growth. *

Sold only for dispensing by a licensed health care professional.

TAMPER EVIDENT RESEALABLE BAG. DO NOT USE IF BAG HAS BEEN OPENED. KEEP OUT OF REACH OF CHILDREN.

Muscle Performance*
Cell Volumizer*
Dissolves Quickly

*These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.

You might also like:

🌐 Daily dose for persons on chemotherapy is 5 to 10 grams daily

🌐 Best taken on empty stomach

🌐 For persons not on chemo but having been “exposed” 5 grams daily x 3 days

🌐 Consider mixing with 1 packet of Emergen-C

🌐 stock code: GL205

Fixing the Gut – restore the helpful bacteria

When selecting a quality
probiotic, confirm:

- 1) At least 5 different strains
of bacteria
- 2) At least 20 Billion CFUs

This sample is stock code:

IFLOR

from Emerson Ecologics

 **emerson**
ecOLOGICS
dedicated to improve health

[Close Print View](#)

IFLORA MULTI (SEDONA LABS PRO) 60VCAPS (IFLOR)

Brand: Douglas Labs
Vendor Item Code: 201864-60X
Retail Price: \$31.99



IFlora™ Multi-Probiotic™ Capsules 60 vcap
(Formerly Sedona Labs Pro)

Dietary Supplement

Suggested Usage: Take 2 capsules daily. May increase to 4 daily.

Supplement Facts

Serving Size 2 Vegetarian Capsules
Servings Per Container 30
Proprietary 560 mg

Synbiotic Blend (yielding 40 Billion CFU)
Short Chain Fructooligosaccharide (NutraFlora® sCFOS®),
Bifidobacterium bifidum, Bifidobacterium breve, Bifidobacterium lactis
(infantis), Bifidobacterium lactis M9129, Bifidobacterium longum,
Lactobacillus acidophilus, Lactobacillus brevis, Lactobacillus bulgaricus,
Lactobacillus casei, Lactobacillus gasseri, Lactobacillus paracasei,
Lactobacillus plantarum, Lactobacillus rhamnosus, Lactobacillus
salivarius, Lactococcus lactis, Streptococcus thermophilus

Other Ingredients: hydroxypropyl methylcellulose (capsule), vegetable
stearate, and silica.

For optimal storage conditions, store in a cool, dry place:
(59°-77°F/15°-25°C) (35-65% relative humidity). After opening, keep
refrigerated with lid tightly sealed.

NutraFlora® and sCFOS® are registered trademarks of GTC Nutrition.

This item cannot be shipped to all locations.

It cannot be shipped to:

Countries: AT, DE, NL, CA

Active Ingredients:
Bifidobacterium bifidum
Bifidobacterium breve
Bifidobacterium lactis
Bifidobacterium longum
Lactobacillus acidophilus
Lactobacillus brevis
Lactobacillus bulgaricus
Lactobacillus casei
Lactobacillus gasseri
Lactobacillus lactis
Lactobacillus paracasei
Lactobacillus plantarum
Lactobacillus rhamnosus
Lactobacillus salivarius

Probiotics
Short Chain Fructooligosaccharide
Streptococcus thermophilus

Inactive Ingredients:
Cellulose, PDS (fructooligosaccharides), Magnesium stearate, Silica,
Succinic acid

Dietary Considerations:
Not evaluable

Delivery Formats:
Capsules (vegetarian)

Intended Users:
Not specified

Disclaimer

Nuts & Bolts Red Meats

Red Meats are a problem !

MAX weekly intake is 14 ounces

Sat fats increase tumor growth

Concentrated toxins in red meat

Creation of heterocyclic amines
are formed with fatty red meats
are grilled at high temps

Biggest problems come from
“well-done” meats



Nan's Nutrition Nuts & Bolts

- 🌐 Do you have some new tools in your toolbox for your oncology patients?
- 🌐 Waking The Warrior Goddess by Christine Horner, MD
- 🌐 The Definitive Guide to Cancer by Lise Alschuler, ND
- 🌐 Suggested supplement resource for clinicians:
 - 🌐 Emerson Ecologics www.emersonecologics.com
 - 🌐 1-800-654-4432 set up account w/customer service

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