

# NUTRITION to aid CHEMO & RADIATION

*Gathered from various sources, some cited at end.*

*These are notes on my research, and I encourage anyone interested to do your own research, carefully weighing the reliability of each source you find:  
What are they selling?*

*What empirical evidence do they cite?*

*Are their assertions internally consistent, and consistent with other sources?*

## GOALS

*Make chemotherapy and radiation more selective and effective*

- Bolster the immune system
- Starve sugar-feeding anaerobic tumor cells, but feed healthy aerobic cells
- Protect healthy cells, while exposing cancer cells to radiation and chemo

## SYNERGY

*Good nutrition and standard oncology are synergistic, not antagonistic.*

This is supported by vetted, peer-reviewed, clinical trials:

<http://www.ncbi.nlm.nih.gov/pubmed/17283738>

The advantages in using an aggressive nutrition program in comprehensive cancer treatment include:

- Avoid malnutrition
- Make chemotherapy and radiation more selectively toxic to the tumor cells
- Stimulate immune function
- Selectively starve the tumor

## IMMUNE SYSTEM

*Attacks cancer, cleans up waste.*

### INCLUDES

- The tonsils and thymus, which make antibodies {but my tonsils were removed because that is where my cancer started}
- The spleen which (along with the lymph nodes) filters out invaders, rogues and dead stuff, for the **Lymphocytes** to kill and clean up {but I lost my spleen in a motorcycle accident}
- Bone marrow, where most blood cells (including **Lymphocytes**) are created
- The lymphatic system of vessels and nodes (somewhat like the cardiovascular system, but with lymphatic fluid instead of blood) where invaders are trapped, killed, and disposed of
- **Lymphocytes** (They hang out mostly in the Lymphatic system) a subset of leukocytes (white blood cells) including T cells, B cells, and NK, or Natural Killer cells) which fight infection and clean up waste. **The NK's are what will finish off any cancer cells left by the chemo and**

**radiation, BUT chemotherapy hinders the production of these important guardians (myelosuppression) in the bone marrow.**

### **IMMUNE SYSTEM ACTIVITIES:**

- Bone immune cells (B-cells) move into the thymus gland for maturation and activation, and are then called “T” cells.
- 40% of the immune system surrounds the GI tract as lymph nodes (Peyer’s patches)
  - Absorb fat-soluble nutrients (like essential fatty acids)
  - Protect against bacterial invasion from the intestine into the bloodstream
  - Stimulate the production of various antibodies that attack invaders
- Filtering: immune cells move through the lymphatic ducts, as blood cells move through the cardio-vascular system. Dead Lymphocytes, and the bacteria and cancer cells they have killed, are filtered out by lymph nodes and the spleen
- Autoimmune (allergic) response imbalances the immune system and detracts from the job of killing cancer cells.
- ANTIOXIDANTS like Selenium and Vitamin E, appear to shield NKC’s from being harmed by their own cancer-killing poisons.
- Vitamin A and beta-carotene stimulate immune responses.
- Magnesium supports lymphocyte growth
- Zinc, Copper, and Selenium give NKC’s more granulocytes and nitric oxide, with which to kill cancer cells.

### **EMPOWERING the IMMUNE SYSTEM:**

#### **BUILD IT UP WITH:**

- Vitamins A, C, E, B-6
- Minerals Zn, Cr, Se
- Micronutrients: Co-Q, EPA, GLA
- Amino acids, esp. Arginine & Glutamic
- **Garlic, Yeast cell wall extracts (1,3 beta glucan), colostrum extracts (lactoferrin, transfer factor), whey extracts, aloe extracts, mushroom extracts (Maitake, AHCC), IP-6 (phytic acid), ImmKine (Aidan 480-446-8181), and Essiac tea.**
- Yogurt, cruciferous vegetables

#### **AVOID:**

- Toxic metals, especially: Cd, Pb, Hg, Ar
- VOC’s, PCB’s, Benzene
- High blood glucose
- $\Omega$  (Omega) fatty acid imbalance: 1:1 is good, but we tend to have many times as much  $\Omega$ -6 as  $\Omega$ -3
- <http://www.ncbi.nlm.nih.gov/pubmed/12442909>
- Stress, Depression

### **BIOOTHERAPY: STIMULATE OR SUPPORT IMMUNE SYSTEM**

- Lymphokine-activated killer (LAK) incubated in the laboratory WITH interleukin-2...
- Interferon, interleukin, monoclonal antibodies, BUT most forms have extremely toxic side effects.

## HERBAL MEDICINE

- Start with garlic, then Astragalus, echinacea, goldenseal, licorice, ginseng, ginkgo, ginger, Rhodiola rosea, and cat's claw

## ANTIOXIDANTS:

- **Vitamins C, E, beta-carotene, selenium, Chromium Picolinate** appear to make cancer cells more susceptible to chemo, radiation, and hyperthermic treatments, while protecting healthy cells.
- **Other anti-oxidants** include: magnesium, lipoic acid, lycopene, glutathione, tocotrienols, quercetin, coenzyme Q-10, thiamin, niacin, riboflavin, oligomeric proanthocyanidins from grape seed, curcumin, ginkgo biloba, and green tea

## HEALTHY FATS

- Aid transport and balance prostaglandins (see below)
- Line healthy cell membranes and help to lower blood glucose, by making insulin more effective.
- Make cancer cells more visible to the immune system.
- **BALANCE** between Omega 3 and omega 6 (usually need to increase 3, decrease 6)

*TRY 1/3C Barleans Flax Oil + 2/3C non-fat cottage cheese, emulsified, provides protein and Omega-3*

- Flax Oil, Fish oil, borage or primrose oil, conjugated linoleic acid (from the meat and milk of ruminants like cows and sheep)

## MINERALS

- Take a basic mineral supplement, containing decent amounts of **calcium, magnesium, chromium, and selenium** (200 µgm daily). Add some kelp,

## VITAMINS

- Add extra **vitamin C** (1-4 grams per day) (WITH l-lysine & l-Proline amino acids), **D3, E** (200-800 mg/ day).
- *Niacin seems to make radiation therapy more effective at killing hypoxic cancer cells. Giving radiation patients 500 mg to 6,000 mg of niacin has been shown to be safe, and is one of the most effective agents known to eliminate acute hypoxia in solid malignancies*
- Folate and B-12 help to provide correct duplication of DNA in healthy cells.

***B-12 is available ONLY from meat: Cyanocobalamin in the US, but hydroxycobalamin (frequently used in Europe) may be superior, and methylcobalamin may be superior to both - especially for neurological disease. BALANCE in the B complex is crucial.***

- Vitamin D helps to squelch the growth of abnormal genetic fragments (episomes)

- Vitamin A has a receptor site on healthy DNA, and when plugged-in, makes the DNA less susceptible to damage.
- ImmunoPower (800-247-6553 or <http://GettingHealthier.com> )

## PROBIOTICS

- Yeast is the final breakdown agent in our digestion, but can attack healthy tissue if unchecked. Control yeast by balancing with other flora.
- High fiber and fluid intake help balance micro-organisms. Fructo-oligosaccharides are special starches found in whole grains and onions that help to nourish the friendly bacteria.
- Some Fermented foods are probiotic, IF they are NOT Pasteurized.: yogurt, tempeh, miso, kimchi, kombucha, kefir, fermented pickles and sauerkraut, fermented condiments such as chutneys and even fermented yogurt and a homemade version of a fermented ginger ale.

## PROSTAGLANDIN SYNTHESIS

*Prostaglandins (eicosanoids) are hormone-like substances that are produced regionally within most cells.*

- **Prostaglandin balance can be upset when our blood glucose is high and our intake of Omega-3 fats is low**
  - emergency prostaglandins (PGE-2) are generated, and augment cancer growth.
- **With blood glucose (60~ 90 mg/dl), and Omega-3 matches Omega-6, then the favorable prostaglandin PGE-1 will:**
- stimulate immune activity
- improve circulation through vasodilation
- reduce the stickiness of cells, which inhibits metastasis through platelet aggregation
- help to produce estrogen receptors to dull the potential damage from circulating estrogen

## BIOENERGETICS: AEROBIC VS ANAEROBIC

- **Cancer cells are generally ANAEROBIC sugar feeders: “obligate glucose metabolizers”**  
This is why the PET scan uses a radioactive glucose [fluorodeoxyglucose](#) (FDG) to show where cancer is eating up all the sugar.
- **Healthy cells are AEROBIC (oxygen-requiring) cells that can burn sugar, protein, or fats.**

Professor Otto Warburg: “... the prime cause of cancer is the replacement of the respiration of oxygen in normal body cells by a fermentation of sugar.”

- **Cinnamon helps to stabilize blood glucose.**
- **Hydrazine Sulfate inhibits gluconeogenesis (conversion of other compounds to the glucose cancer craves) in cancer cells.**
- **Mannoheptulose, extracted from Avocado, inhibits glucose uptake in cancer cells**
- **Raw, unsalted Almonds yield alkaline minerals like calcium and magnesium, which help to ease acidity, while balancing blood sugar, both of which fight cancer. The particular chemotherapy drug I will be getting (Cisplatin) can**

cause deficiencies in Ca (Calcium) Mg (Magnesium) and K (Potassium), all of which affect the body's pH homeostasis.

HOWEVER, this is not as simple nor as universal as it sounds:

<http://www.sciencedirect.com/science/article/pii/S0092867408010660>

- **High blood glucose...**
  - Is the perfect fuel for Cancer cells, while healthy cells can use protein and fat.
  - stimulates high insulin, which decreases the good PGE-1 and increases the bad PGE-2.
  - suppresses the effectiveness of fish oil (EPA) and borage oil (GLA)
  - suppresses the immune system.
- **Glucose/ dextrose: Foods high in glucose (watermelon, sugar, raisins) or starches easily digested into glucose (Baked potato, Popcorn, white bread)**
  - ▶ **high GLYCEMIC LOAD, provoking high blood glucose and all that goes with it.**
  - Glycemic Index and Glycemic LOAD are important to starving cancer cells while feeding healthy cells.
  - I gathered and re-organized: some information on Glycemic Load and Index, which can be read and downloaded here:  
<http://waynesl.me/zombie/wp-content/uploads/2015/09/GlycemicIndexGlycemicLoad.pdf>  
I also embedded it in this blog entry, after this document.
  - **Stevia** is the ONLY non-sugar sweetener with a completely clear reputation.
  - Aspartame, Sucralose, and many other sugar substitutes are bad in various ways.  
Xylitol (Xylitol.com) MAY be OK.

## HEALTHY CELLS

- **A healthy cell membrane** is built from essential fatty acids, such as are found in **flax oil**, **fish oil**, **evening primrose oil**, **lecithin**, **cholesterol**, and other nutrients. A healthy cell membrane allows the normal cell to “breathe” aerobically and to expel waste products.
- **A defective cell membrane** is built from **hydrogenated fats (trans-fatty acids)** and **too much other saturated fat**, and has been “tanned” by exposure to excess sugar floating through the bloodstream, and various other nutritional deficiencies.
- **The ratio of minerals** in the blood, lymph, and interstitial fluid hurts or helps cell membrane structure, and also cell membrane dynamics. The ratio of Na, K, Ca, and Mg is particularly crucial, but the body will regulate it if it is not starved or overloaded with one or more of them.

An ideal ratio of Na to K intake, for instance, is about 1 Sodium to 4 Potassium. (Na:K = 1:4) More important than restricting Sodium intake is **balancing** it with Potassium, and likewise Calcium and Magnesium.

### ALTER TUMOR PROTECTIVE MECHANISMS

- Cancer cells are often coated in HCG (Human Chorionic Gonadotropin) making them look like a fetus to the immune system.
  - ▶ regional immune suppression protects the cancer cell from attack by the immune system, as if it were a fetus.
- High doses of Niacin (B-3) as inositol hexanicotinate, and vitamins E and A, plus digestive enzymes work to dissolve this “stealth” coating of the tumor.
- Tumor necrosis factor (TNF), is specifically made by the immune system to kill cancer cells. HCG is a TNF-inhibitor agonist.

### MISCELLANEOUS ANTI-CANCER AGENTS:

- *Genistein from soy and oligomeric proanthocyanidins from bioflavonoids, may help a cancer cell to revert back to a normal healthy cell in the process of cell differentiation.*
- *FISH OIL. A special fat in fish (EicosaPentaenoic Acid, EPA) improves tumor kill in hyperthermia and chemotherapy, by altering cancer cell membranes for increased vulnerability, AND it increases the ability of adriamycin chemotherapy to kill cultured leukemia cells. Tumors in EPA-fed animals are more responsive to Mitomycin C and Doxorubicin (chemo drugs).*
- *EPA and another gamma linolenic acid (GLA) were selectively toxic to human tumor cell lines while also enhancing the cytotoxic effects of chemotherapy.*
- *QUERCETIN reduces the toxicity and carcinogenic capacity of substances in the body, yet at the same time may enhance the tumor-killing capacity of Cisplatin chemo drug.*

**Improved outcomes for cancer patients augmenting beta-carotene; vitamins A, C, and E; selenium; cysteine; B vitamins; vitamin D3; vitamin K3; and glutathione:**

<http://www.ncbi.nlm.nih.gov/pubmed/17283738>

- *Enteral (oral) formulas fortified with arginine, fish oil, and RNA have been shown to stimulate the immune system, accelerate wound repair, and reduce tumor burden in both animals and humans....*
- *Cancer cells do not absorb nor use antioxidants the same way healthy aerobic cells do. Vitamin C (ascorbic acid) is nearly identical in chemical structure to glucose, which is the favored fuel for cancer cells. When researchers found that radioactively-labeled ascorbic acid was preferentially absorbed by implanted tumors in animals, they concluded that this was because cancer has many more glucose receptors on the cell surface than healthy normal cells. Many studies published in respected, peer-reviewed journal articles say that **Antioxidants protect healthy tissue, but leave the cancer cells more vulnerable to the damage from chemo or radiation..***

## CANNABINOIDS FOR APPETITE AND CONTROL OF NAUSEA

(quote from us Federal publication: [http://www.cancer.gov/about-cancer/treatment/cam/hp/cannabis-pdq#section/\\_13](http://www.cancer.gov/about-cancer/treatment/cam/hp/cannabis-pdq#section/_13) )

*“Several [controlled clinical trials](#) have been performed, and meta-analyses of these support a beneficial effect of cannabinoids ([dronabinol](#) and nabilone) on [chemotherapy](#) -induced [nausea](#) and [vomiting](#) (N/V) compared with [placebo](#). Both [dronabinol](#) and [nabilone](#) are approved by the [U.S. Food and Drug Administration](#) for the [prevention](#) or treatment of chemotherapy-induced N/V in cancer patients but not for other symptom management or off-label use.*

### MORE INFO:

The best I have found so far:

Quillin, Patrick (2011-11-15). **Beating Cancer with Nutrition: Optimal Nutrition Can Improve Outcome in Medically-Treated Cancer Patients.** BookMasters.

NIH on diet: <http://www.cancer.gov/about-cancer/treatment/research/nutrition-during-after-treatment>

Alkaline Diet & Chemo: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3195546/>

### ONLINE INFORMATION SOURCES:

<http://www.healthy.com>

<http://google.com>

<http://www.ask.com/>

National Library of Medicine: <http://www.ncbi.nlm.nih.gov/pubmed>

American Cancer Society: <http://Cancer.org>

OncoLink: <http://www.oncolink.org/>

American Hospice Foundation: <http://AmericanHospice.org>

American Institute for Cancer Research: <http://AICR.org>

American Society of Clinical Oncology: <http://ASCO.org>

R.A. Bloch Cancer Foundation: <http://BlochCancer.org>

Center for Advanced Cancer Education: <http://www.beatcancer.org>

Cure Research Foundation: <http://www.cancure.org>

Head & Neck Treatment protocols: <http://emedicine.medscape.com/article/2006216-overview>

Recent Advances In Radiation Therapy (UCLA) <http://radonc.ucla.edu/body.cfm?id=227>

Medscape: <http://www.medscape.com/oncology>

### ONLINE NUTRITION VENDORS:

<http://amazon.com/>

<http://bulkfoods.com>

<http://enutrition.com>

<http://LEF.org>

<http://mothernature.com>

<http://vitacost.com/>

<http://vitamins.com>

<http://vitaminshoppe.com>

<http://wholepeople.com>

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