



# Personalized Nutrition - How to Thrive

UCLA-LIVESTRONG™ Survivor Education Day

**Carolyn Katzin, MS, CNS**

*Saturday April 6, 2008*



# Overview

- What you need to know to improve your outcome and thrive - optimizing your Health Span
- DNA Integrity and the 3 A's:
  - Antioxidants
  - Anti-inflammatories
  - Anticarcinogens
- Symptom management
- Weight management
- Supplements – risk or benefit?
- Your Nutrition Health Check



# Nutrition: What You Really Need to Know to Thrive


- **Work with the 3 A's**
  - Antioxidants
  - Anti-inflammatories
  - Anticarcinogens
- **Enhance your natural immunity and resilience**
  - Choose foods that balance the 3 A's
  - Mushrooms
  - Berries and cherries
- **Maintain a healthy weight/waist**
  - Moderate your calories to match your activity level
  - Assess your current waist to height ratio (should be 0.5 or less)
  - Avoid stress related eating with mindfulness



# What are the Three A's? Your DNA Integrity Protectors

- **Antioxidants** reduce oxidation at the cellular level from metabolic or external radiation causes
- **Anti-inflammatories** reduce inflammation (redness, heat, swelling) often prevent metabolic “mistakes” that may lead to cancer
- **Anti-carcinogens** reduce the overall risk of developing cancer

*Cancer is the result of mutated or altered function DNA*



# 1. Antioxidants protect integrity of DNA (sequence of nucleotides and gene expression by "quenching" free radicals formation)

- **Lutein and zeaxanthin** from spinach and other dark green leafy vegetables
- **Limonene, tangeretin, nobelitin** and other flavonoids from citrus fruits (rind is especially rich in essential oils)
- **Punicalagins and polyphenols** in pomegranates
- **Culinary herbs**  
**Cloves** have the highest antioxidant content (ORAC score) followed by **oregano, ginger, cinnamon and turmeric**

*(Wu, X et al, 2004)*



# Antioxidant Assessment (ORAC)

- *Beyond Vitamins A, C and E – how antioxidants work*
- In 2001, first ORAC scores identified. Water-soluble fruits and vegetables with high antioxidant capacity using color change test rated **BLUEBERRIES** and **SPINACH** highest
- Recent ORAC scores rate fat-soluble antioxidants **AVOCADO** and **ALMONDS**
- Highest overall are culinary herbs, spices **TURMERIC, CLOVES, ROSEMARY** and **OREGANO**
- **POMEGRANATE, ACAI** and **GOJI** also have exceptionally high ORAC scores (*Trolox units*)

*Source: United States Department of Agricultural (USDA) and Tufts developed ORAC test, Oxygen Radical Absorbance Count*

# Antioxidant Activity of Fruits and Vegetables

## Oxygen Radical Absorbance Capacity (ORAC)

In Trolox equivalents per gram

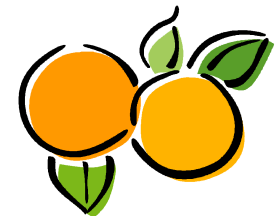


Source: Tufts University, 2001

Blueberry	23
Blackberry	20
Garlic	19
Kale	17
Raspberry	15
Spinach	13
Brussels sprouts	10
Plum	9
Broccoli	9
Beet	8
Red grape	8
Kiwi	5
Pink grapefruit	5

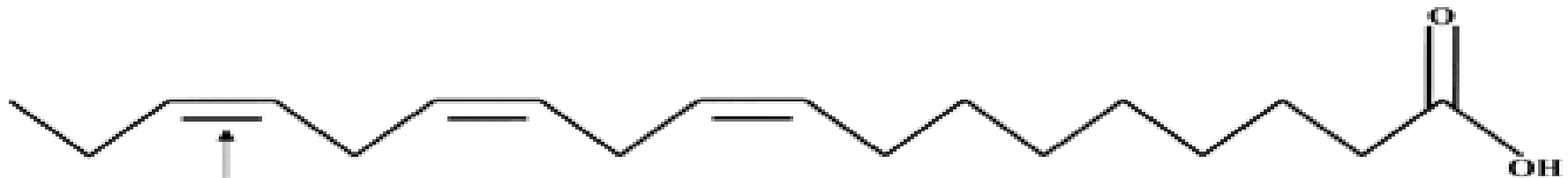
## 2. Anti-inflammatories

- Omega 3 fatty acids (EPA and DHA)
- Flaxseed, borage and blackcurrant seed oils beneficial fatty acids (GLA and ALA)
- Natural salicylates, e.g. turmeric, rosemary, thyme, apricots, broccoli
- Lutein and other carotenoids, e.g. spinach, egg yolk
- Naturally occurring bioflavonoids with apoptosis and anti-angiogenesis inhibitor activity, e.g. tangeretin and nobiletin from citrus fruit
- Naturally occurring NSAID's or COX-2 Inhibitors, e.g. green tea and cocoa





# Omega-3 fatty acids from Plants and Algae



The first double bond occurs after the 3rd carbon atom from the methyl terminal, so this is an **Omega-3 Fatty Acid**.

Linolenic Acid  
or 9,12,15-Gammalinolenic Acid  
or 18:3 $\Delta$ 9,12,15  
or 18:3 $\omega$ 3

Linolenic Acid is found in Blackcurrant seed Borage and Evening primrose oil as GLA

Refined linseed oil or flaxseed oil and mustard are rich sources of Alpha linolenic acid (ALA or 18:3)




# Sugar and Inflammation

- Inflammation and high sugar intake may be linked
- IGF-1 (Insulin-like Growth Factor) is a genetic marker found to increase in high sugar diet
- Caloric restriction also lowers IGF-1
- Inflammatory reactions, wheat sensitivity - some benefit from avoiding gluten
- Glucose uptake from foods and beverages is measured by **Glycemic Index (GI)** and Glycemic Load
- Some medications affect insulin sensitivity (raise blood glucose)
- Consume plenty of dietary fiber to maintain healthy blood sugar levels

### 3. Anticarcinogens (Anti-cancer)

- **Black Raspberries**
- **Curry powder** ( a combination of turmeric, cumin and other spices)
- **Citrus** fruits (naringinin and limonene)
- **Green tea** (EGCG and other natural ingredients)
- **Pomegranates** (especially the oil from the seeds)
- **Brazil nuts** (excellent source of selenium)
- **Tomatoes** (excellent source of lycopene)
- **Saffron** a rare, yellow colored treat
- **Red grapes and red wine** (resveratrol)





# 3. Anticarcinogens

## Vitamin D - New Findings

- **Vitamin D** is also a hormone when activated in the skin by UV light. Aging may affect renal activation
- Functions:
  - **Calcium** uptake and bone breakdown regulation
  - Carbohydrate and insulin regulation
  - Brain and nervous system function
- Prostate, breast and colorectal cancer relationship thought to be associated with Vitamin D receptor polymorphisms and UV light exposure
- **Daily requirement may be higher than earlier thought** – 800 – 2000 IU (Daily Value is 400 IU).
- Blood level is good test of adequacy (should be 50-80 ng/ml ideally)

*Source: Vitamin D status and cancer: new insights*

*Schwartz, GG and Skinner, HG CurrCurr Opin Clin Nutr Metab Care 10:6–11 2007*



# Food Sources of Vitamin D

Food	Serving Size	Vitamin D (IU)	Note
Sardines	3 ½ ounces (100g)	500	Canned in oil
Salmon	3 ½ ounces (100g)	360	Cooked
Mackerel	3 ½ ounces (100g)	345	Cooked
Tuna	3 ½ ounces (100g)	200	Canned in oil
Milk	1 cup	90	
Breakfast cereals	¾ - 1 cup	40	Usually 10% DRI
Egg	1 whole	20	
Liver, beef	1 ounce	15	
Swiss cheese	1 ounce	12	

# Anticarcinogens as Phytonutrients: Cancer fighters or Phyters

- Garlic, onions, chives (**Allium** family) are rich in sulfur amino acids and phytonutrients - **SHALLOTS**
- Cruciferous or cabbage family (**Brassica** family) also rich in sulfur amino acids, indoles and other phytonutrients - **WATERCRESS**
- Green and black **tea** (**Camellia sinensis**) are rich in phytonutrients and may enhance some chemotherapy treatments – **GREEN TEA**



# The Three A's Star Foods

- Elderberry
- Dark red cherry
- Pomegranate
- Oregano, Rosemary, Thyme and other **culinary herbs**
- Turmeric, coriander and other **spices** also found combined in curry



**Many culinary herbs are rich in all 3 A's**



# What are Nutrient Rich Foods? Protein (from Latin *for life*)

**Choose protein regularly during treatment**

**1-2 extra servings each day**

*(15 grams of protein in about 4 ounce serving)*

- eggs, fish, chicken, turkey, lean meat
- tofu and beans
- pre-digested or hydrolyzed protein (milk protein as whey or casein, soy, etc.)
- rice and beans

**For most people - 6-7 servings per 24 hours**

**2 servings at each meal plus one or more as a snack  
(smoothie for example)**

**After treatment continue with extra protein until you  
feel “back to normal” -**



# Valuable Protein-rich Foods

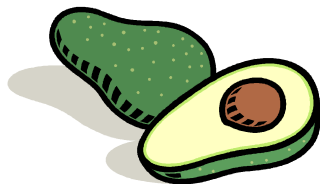
- Almond or peanut butter (*unsweetened, not hydrogenated*)
- Almonds, peanuts, walnuts, pignolas (pine), pistachios, pecans and other **Nuts**
- Non-fat dairy products (cottage cheese, whey protein)
- **Eggs** (egg whites have no cholesterol and can be freely eaten)
- Lean meat and poultry, especially when cooked slowly in liquids
- **Fish** and shellfish
- **Beans**
- Tofu and other fermented bean products



# What is a Healthy Balance of Fat?

*Recommended Fatty Acid Balance (Omega 6:3 of approx 4 to 1 – typical American diet is 15 to one)*

- **1 part Omega-3** (DHA and EPA from oily fish like salmon and sardines, walnuts and pine nuts)
- **3 parts mono unsaturated** (olive oil, almonds and avocado)
- **1 part saturated** fat (cocoa butter, palm oil or coconut)
- Supplement with 100 mg DHA and 500 mg borage or blackcurrant seed oil (as a source of GLA)



# Omega-6 and Omega-3

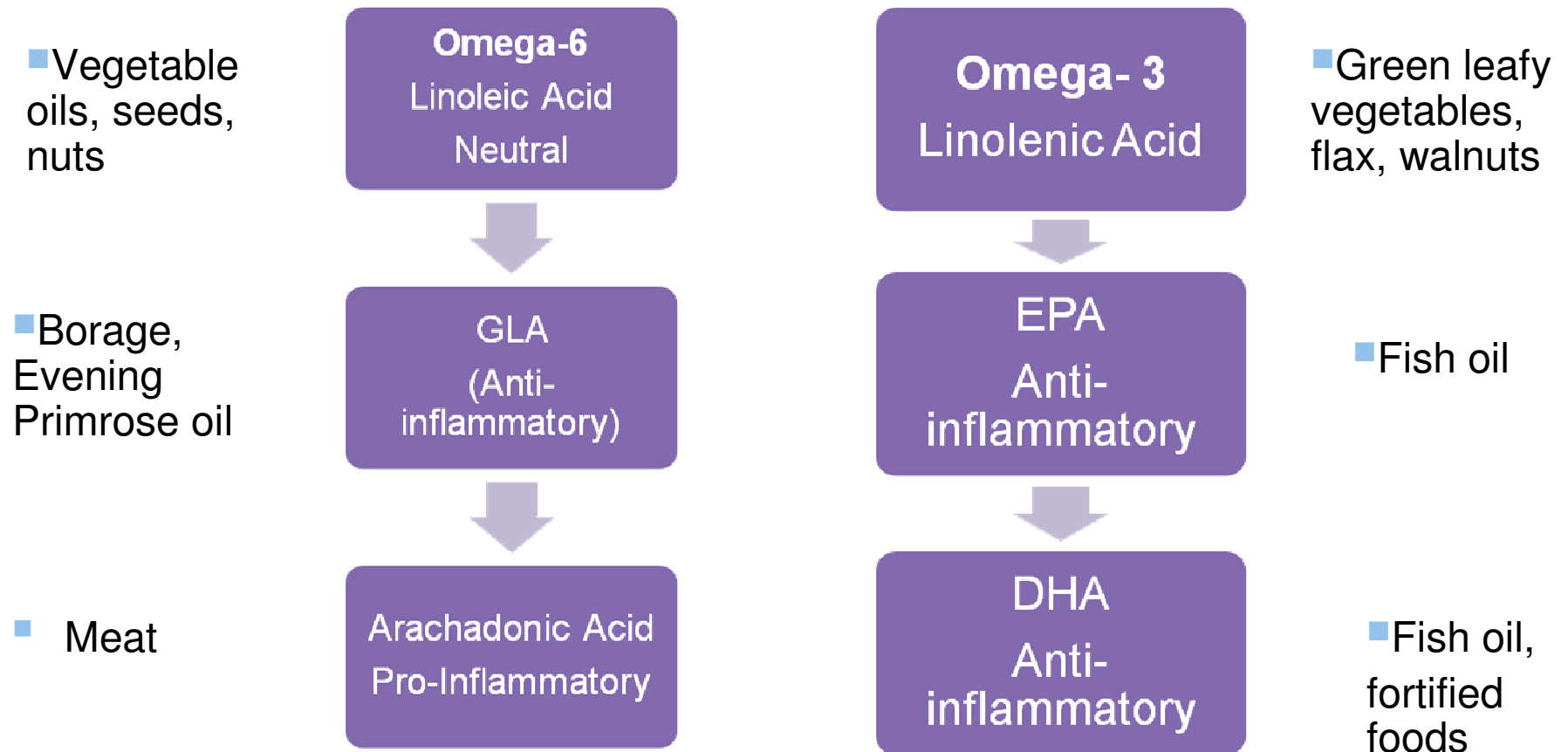



Table adapted from Simopolous, A (1998)



# What is a Healthy Balance of Carbohydrate?

- Carbohydrate provides energy and bulk to our diet
- Sugars provide energy
- Starches also provide energy but more slowly
- Glycemic Index is a measure of how fast this energy is released in the blood stream (how fast glucose levels rise)
- Dietary Fiber is indigestible carbohydrate or bulk
- Dietary fiber affects the Glycemic Index (slows down rate of glucose entering the blood stream)
- Dietary fiber is also beneficial for a healthy balance of intestinal flora
- Choose whole grains, beans and other sources of dietary fiber for an ideal balance of healthy carbohydrate



# Glycemic Index

## High Glycemic Index Foods

*(not good)*

Candy  
Corn chips  
Cornflakes  
Ice cream  
Mashed potato  
Plain bagels  
Pretzels  
White bread

## Low Glycemic Index Foods

*(good)*

Beans  
Breakfast cereals (high fiber)  
Fruit  
Milk  
Nuts (from trees)  
Oatmeal  
Pasta  
Whole grains

*Combinations of foods are described as having a Glycemic Load*



# Phytoestrogens and Lignans

- Lignans are a type of dietary fiber (assist in optimizing your colon health and reducing the Glycemic Load of your meals)
- Phytoestrogens are botanicals called isoflavones found in soy and red clover with estrogen like activity
- Lignans are not flavonoids but act more like antioxidants and may help regulate estrogen and other steroid hormones
- Lignans are found in dark rye, flaxseed, pumpkin seeds, sesame seeds and the woody part of plants such as tree barks
- Lignans are acted on by intestinal bacteria to enterolactone and enterodiol



# Food sources of Lignans

Food	Serving size	Lignans (mcg)	Notes
Flaxseed	100 grams	301,129	As secoisolariciresinol
Sesame seeds	100 grams	29,331	
Whole grain flaxseed bread	100 grams	12,474	
Curly kale	100 grams	2321	
Multigrain bread	100 grams	6744	
Broccoli	100 grams	1325	
Sunflower seeds	100 grams	891	
White cabbage	100 grams	787	
Cashew	100 grams	629	
Apricot	100 grams	450	
Strawberry	100 grams	334	
Dark rye bread	100 grams	320	
Red wine	100 mls	91	

Source: Miller, IEJ et al, 2005



# Personalized Nutrition Health Supplements: Risk or Benefit?

- **Avoid mega-doses** (more than twice RDI or Acceptable Intake) of any supplemental nutrient (*unless specifically prescribed by your physician or oncologist*)
- **Be cautious with herbal products.** Many affect drug detoxification pathway efficiency and may interfere with other medications (reduce therapeutic dose or increase toxicity)
- **Pharmacogenomics** is a new field of personalized medicine
- Grapefruit and Seville oranges may cause adverse drug reactions by inhibiting enzymes that metabolize medications
- Choose nutrient dense foods rather than take supplements and **tell your health team about EVERYTHING you take**



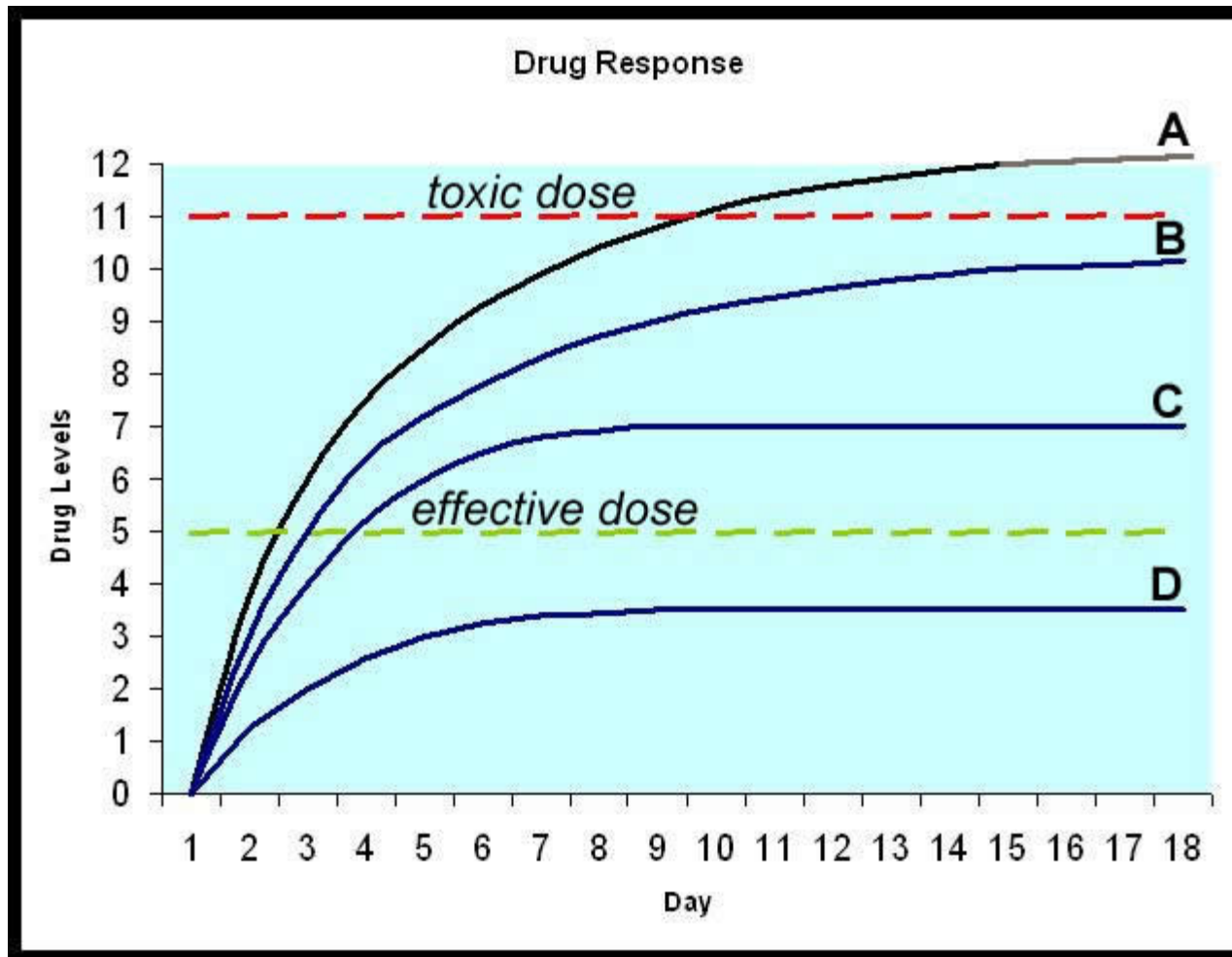




# Personalized Nutrition Health Nutrigenomics

- New field of nutrition and genetic expression
- **Personalized, predictive and preemptive** health using the latest molecular tools including genome wide associations
- My nutrigenomics research looking at a panel of genes including MTHFR, GST's, IL-6, VDR and how diet affects measurable outcomes (blood levels of homocysteine, hs CRP or Vitamin D for example)
- **Carolyn Katzin's The DNA Diet™** personalized recommendations based on genetic testing data ([www.thednadiet.com](http://www.thednadiet.com))

# Personalized Health: Pharmacogenomics



- Poor Metabolizer
- Intermediate Metabolizer
- Extensive (normal) Metabolizer
- Ultra Metabolizer

**Foods affect drug clearance**



# Diet and Chemotherapy

- [Arimidex](#) (*anastrozole*) – a non steroidal aromatase inhibitor. Ensure adequate Vitamin D and bone building minerals (calcium, magnesium, zinc, boron and silica)
- [Avastin](#) (*bevacizumab*) – a targeted therapy used with other chemotherapy agents like CPT-11 or 5-FU. Eat small, easy to digest meals frequently
- [Tarceva](#) (*erlotinib*) – a tyrosine kinase inhibitor (TKI). Avoid grapefruit juice. Tell medical team of any herbs you may take. As with all medications supplements may affect dosage and possible toxicity
- [Rapamycin](#) (*sirolimus*)– IL-2 inhibitor. Avoid grapefruit and grapefruit juice which affects liver handling of this medication and may increase side effects

# Fatigue Management

- **Maintain a healthy weight** carrying around extra weight is tiring
- **Regular physical activity** can improve mood and fatigue levels. Activity is also helpful for insomnia – try T'ai Chi or visit an art museum
- **Protein**, iron, zinc, B vitamins and Vitamin C all important for red cell production to minimize anemia related fatigue
- **Avoid caffeine** and stimulants
- **Drink green tea** (not after 4 pm or decaffeinated)
- **Eat dark chocolate** (not after 4 pm)





# Taste

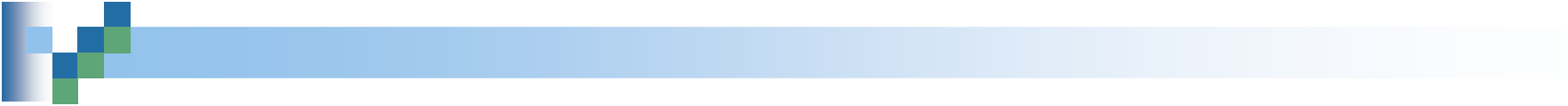
- Choose foods that are tasty and appealing
- Dysgeusia (taste distortion) is common during treatment
- Temperature affects taste
- Try using different textures
- The sequence of foods order of eating often affects taste
- Some people find plastic utensils minimize metallic taste
- Eat in a relaxed environment and be mindful as you dine
- Use garnishes and attractive place settings
- Structure your meals to optimize your appetite and energy levels
- Bitter flavors may indicate foods that are beneficial for your liver
- Salt enhances sweet flavor



# Weight and Waist Management

- BMI usual measure of healthy weight (ideal 19-24)
- Waist or abdominal girth is a better guide to health than body weight alone
- Central adiposity is associated with inflammation, increased risk of metabolic syndrome
- *Waist measurement is the easiest body fat to lose*
- **Men** - usually 2 inches more than pant size
  - ideally **under 40 inches** (under 38 even better)
- **Women** – ideally **under 35 inches** (under 32 even better)
  
- **Waist to height ratio should be 0.5 or less**

Source: Ashwell, M and Hsieh, D. 2005



# Healthy Food Choices - Nutrition to Thrive

- Choose **fish** at least 3 times a week
- Choose **fruit** for dessert and snacks
- Choose **2 or more vegetables for lunch and dinner**
- Take a multivitamin and mineral supplement daily
- **Cook often with herbs, curry and spices**
- Think of food as sustenance – make healthy food your friend not a dietary restriction
- Seek professional advice to help you craft an eating plan that works for you and your family



# Proactive Nutrition - Your Personal Nutrition Health Check

- Keep a personal record of your nutrition related health data (see hand out)
- Share this data with your health care team
- Optimize your health span by balancing the 3 A's  
Antioxidants, Anti-inflammatories and Anticarcinogens
- Choose fresh, locally grown, organic food
- Avoid fad diets
- Maintain your energy with a consistent intake of nutrient rich foods balanced with an active lifestyle and regular sleep





# Balancing the Three A's

- Antioxidants

- increase if exposed to tobacco smoke or other environmental pollutants
- Increase if traveling long distances (natural radiation exposure) or if having X-rays

- Anti-inflammatories

- Increase if your waist to height ratio is 0.5
- Increase if you suffer from an autoimmune disorder

- Anticarcinogens

- Increase if you are a cancer survivor
- Increase if you are preparing food for a cancer survivor or if you are related to one



"There are only two ways to live your life.  
One is as though nothing is a miracle.  
The other is as though everything is a  
miracle"

Albert Einstein (1879-1955)



“There is no sincerer love than the love of food ”

George Bernard Shaw (1856-1950)



# For more information and support

[www.cancernutrition.com](http://www.cancernutrition.com)

[www.carolynkatzin.com](http://www.carolynkatzin.com)

[www.cancer.org](http://www.cancer.org)



**Carolyn Katzin, MS**

*Certified Nutrition Specialist*

Thank you!