Module 1: Importance of nutrition/lifestyle medicine
- Nutrition and body chemistry
- Macronutrients: Protein, Carbohydrates, Fats
  - Artificial sweeteners, alcohol, fiber
- Water and hydration
- Micronutrients: Water/Fat soluble vitamins, Minerals/Metals
  - RDAs, deficiency, toxicity, therapeutic considerations
- Conditionally essential nutrients
- Glandulars & therapeutic enzymes
- Organic Foods and Health

Module 2: Nutritional counselling
- Nutritional screening/diet history assessment
- Nutritional exam & testing
  - In-house testing
  - Laboratory data
  - Functional testing
- Supplements and Nutrition
- Supplement quality
- Codex Alimentarius & DSHEA
- Nutrient-Drug-Food Interactions
Module 3
- Supplementation and Nutrition
- Standard American Diet
- Organ system dysfunction, diseases and conditions
  - Including etiology, signs & symptoms, lab/nutritional assessment and management with nutraceuticals/nutrition

<table>
<thead>
<tr>
<th>Condition Type</th>
<th>Organ System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inflammation</td>
<td>Musculoskeletal</td>
</tr>
<tr>
<td>Gastrointestinal Disorders</td>
<td>Cardiovascular Conditions</td>
</tr>
<tr>
<td>Nervous System Conditions</td>
<td>Immune Conditions</td>
</tr>
<tr>
<td>Respiratory Conditions</td>
<td>Endocrine Conditions</td>
</tr>
<tr>
<td>Urinary Conditions</td>
<td></td>
</tr>
</tbody>
</table>

Module 4
- Nutrition across the lifecycle
- Nutrition & common conditions
  - Therapeutic use of diet & nutraceuticals
- Obesity management and control
  - Children and adults
  - Sports nutrition

Module 1: Day 1
- Importance of Nutrition & Lifestyle Medicine
- Nutrition and Body Chemistry
- Macronutrients
  - Protein, Carbohydrates and Fats
  - Alcohol, Artificial Sweeteners & Fiber
- Water and hydration
- Organic Foods and Health
Module 1: Day 2

- Micronutrients
  - Water soluble vitamins: RDAs, deficiency, toxicity
  - Fat soluble vitamins: RDAs, deficiency, toxicity
  - Minerals: RDAs, deficiency, toxicity
  - Metals: RDAs, deficiency, toxicity
  - Phytonutrients
  - Non-essential and conditionally essential nutrients
  - Efficacy, safety, risks and benefits of glandular products and therapeutic enzymes

Why Lifestyle Medicine

- Your Patients NEED it
  - Lifestyle related diseases are the leading cause of death worldwide
  - Cardiovascular disease, cancer, respiratory disease, diabetes, obesity
  - It has been estimated that 80% of chronic disease can be prevented with modification of lifestyle factors, including not smoking, maintaining a healthy weight, engaging in physical activity and adhering to healthy dietary principles.
  - Many rely on their medical doctors for this information

"The natural healing force within each one of us is the greatest force in getting well. Our food should be our medicine. Our medicine should be our food."

-Hippocrates
Orientated toward acute care
- Diagnosis & treatment of acute illness
- Immediate need and short duration of treatment
- Ill equipped to address complex, chronic disease
- Current medical curriculum does not address underlying causes of these disorders

Medical doctors have insufficient training:
- Only 27% of medical schools provide 25 hours of nutritional education
  - Most average 19.6 hours
- Only 6% have required curriculum in exercise
- No curriculum guidelines for lifestyle medicine
- Medical doctors have no time:
  - Average 15.7 minutes/person & cover 6 topics
    - ~ 5 minutes on main, 1.1 minute on each of others

Can address the cause(s) of disease
- Nutrition
- Physical activity
- Stress management/reduction
- Establishing and maintaining a healthy weight
- Smoking cessation
- Avoidance of alcohol abuse
- Sleep and rest
Chiropractors – Unique Position

- Optimal health requires biomechanical and biochemical synergy
- As chiropractors, you can address all the causes of physical/nervous system depletion:
  - Acute trauma
  - Chronic pain and inflammation
  - Stress
  - Nutritional deficiency

Lifestyle Medicine – More Than Prevention

- “Lifestyle medicine is now the recommended foundational approach to preventing and treating the majority of chronic diseases.”
  - American College of Preventative Medicine
  - http://www.acpm.org/?page=LifestyleMedicine

Lifestyle Medicine Resources

- The Institute of Lifestyle Medicine
  - www.instituteoflifestylemedicine.org
- American College of Preventative Medicine
  - www.acpm.org
- The Institute for Functional Medicine
  - www.functionalmedicine.org
Benefits for the Patient

Benefits for the Provider

History of USDA’s Food Guidance
Name of the Game...

- Reference Daily Intake = Recommended Daily Intake (RDI)
  - Daily intake considered sufficient to meet requirements of 97-98% of 'healthy' individuals in every demographic in US
- RDI is used to determine Daily Value (DV)
  - Printed on nutrition labels – regulated by FDA
- RDI is based on older Recommended Dietary Allowance (RDA) from 1968
  - US Department of Agriculture (USDA)
- HOWEVER, newer RDAs have been introduced in the Dietary Reference Intake (DRI)
  - Institute of Medicine (US National Academy of Sciences)
- All are different

DRI of Questionable Utility

“Dietary Reference Intakes (DRIs) are reference values that are quantitative estimates of nutrient intakes to be used for planning and assessing diets for healthy people.”

“Although the reference values are based on data, the data are often scanty or drawn from studies that had limitations in addressing the question. Thus, scientific judgment is required in setting the reference values…”

RDA Not to Be Used to Plan Diets

- “The RDA for a nutrient is a value to be used as a goal for dietary intake by healthy individuals. The RDA is not intended to be used to assess the diets of either individuals or groups or to plan diets for groups.”
- But they ARE used to formulate dietary guidelines
  - Standard used by medical doctors and dieticians
Body chemistry is the result of everything the body does (metabolic functions) plus what we put into it (foods, liquids, toxins, etc.). Body chemistry dependant upon:
- Our environment – food, drink, air, state of mind, stress, etc.
- Body functions – reactions to our environment, healing, exercise, detoxification, etc.

Almost everything we do and experience creates acids in the body:

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Stress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chewing</td>
<td>Trauma / Injury</td>
</tr>
<tr>
<td>Healing</td>
<td>Digestion</td>
</tr>
<tr>
<td>Pollution</td>
<td>Processed Foods</td>
</tr>
<tr>
<td>Proteins, Starches, Fats</td>
<td>Thinking...</td>
</tr>
</tbody>
</table>
Blood pH must be kept alkaline (~pH = 7.35-7.45)

The body has several buffering mechanisms to maintain balance
- Blood buffering systems (i.e., bicarbonate, etc.)
- Greatly affected by diet
- Breathing/Respiratory
- Kidneys
- Our body has to neutralize the daily onslaught of acids to keep us alive

Our body has to neutralize the daily onslaught of acids to keep us alive.

Chad Oler, ND

If you don’t take in enough alkaline forming nutrients, your body starts to break down to release necessary nutrients to buffer acids.

Depletion of your alkaline/buffering reserves causes your body to liberate alkaline nutrients from tissues/bone which causes breakdown, decreased recovery, injury and illness.

Easily maintaining an alkaline body chemistry is the key to optimal health, faster recovery and improved performance.

What you take into your body will largely determine your body chemistry – it’s what you can control.

Food – has an acid or alkaline effect on the body
- Based on mineral/nutrient profile
  - Alkaline foods higher in K, Na, Mg, Ca
  - Acidic foods higher in S, P, fats, carbohydrates
- In general:
  - Vegetables & fruits have more of an alkaline effect on body chemistry
  - Fats, starches & proteins have more of an acidic effect on body chemistry
Maintaining Body Chemistry

When we speak of an ‘acidic’ body chemistry, we are simply saying that the body has encountered more acid forming substances than is optimal (usually through what we put into it), which can lead to detrimental changes (i.e., injury, illness, slow healing, disease) in our health.

Food

- In general, we need to consume more alkaline forming foods than acid forming
  - ~70% alkaline, 30% acidic general rule
  - About ¼ of your plate should be vegetables & fruits
  - ¼ should be protein, starches and fats

Healthy meal

- What your plate should look like
Eating plenty of alkaline forming foods
- At least 70% vegetables and whole fruit
- Eliminating very acidic foods
  - Soda, coffee, caffeine, table salt, anything that contains white sugar/flour, processed foods, red meat, cheese/dairy, alcohol, deep fried foods
- Eat clean sources of protein
  - Fish, legumes, seeds/nuts, powders (pea, brown rice)
- Utilize proper nutrient timing
- Deep breathing – do throughout the day
- Get as physically fit as possible
  - High aerobic capacity – more alkaline
- Stay hydrated!

Provides fuel for energy and nutrients for improving health, vitality and well-being.
- The fuel (calories) in food used for energy are contained within the macronutrients:
  - Protein
  - Carbohydrates
  - Fats
- The micronutrients provide the catalysts:
  - Vitamins
  - Antioxidants
  - Minerals
  - Phytonutrients
- Enjoy eating – take pleasure in feeding your body

“Macro” means “large” and is measured in grams
- Protein, Carbohydrates and Fats

“Micro” means “small” and are measured in milligrams (mg = 1000th of a gram) or micrograms (μg/mcg = 1,000,000 of a gram)
- Vitamins, Minerals, Antioxidants, Phytonutrients
The ratio of nutrient content to calories

Nutrient-dense foods provide substantial amounts of nutrients (vitamins, minerals, fiber, essential fatty acids and phytonutrients) and relatively few calories.

Nutrient Dense Foods

No foods are more nutrient dense than whole, organically-grown foods. The reason is simple: nothing is contained in a fresh, whole organic food that doesn't need to be there.

- Brightly colored vegetables and fruits, dark green vegetables, nuts/seeds, fish, legumes – highest nutrient density
- Unrefined grains, low-fat meat (chicken, turkey, wild game, lamb), dairy (yogurt, feta, cottage cheese, whey) – next best

Energy Dense, Nutrient Poor Foods

- High in sugar and fat
  - Refined breads, pastas, pastries, processed lunch meats and cheeses, ice cream, candy, soda, potato chips, corn chips, etc.
  - JUNK FOOD!
- These foods rob your body of nutrients to be properly digested and eliminated!
Energy Dense, Nutrient Poor Foods

- Nutrient Robbers – Anti-Nutrient Rich
- Any food that requires more nutrients for the body to make use of it than the food itself provides
- 2/3 of the average US diet!
- Supplements can help in the short term, but the long term solution is to maximize intake of nutrient dense foods and minimize nutrient poor foods

Anti-Nutrient Rich

Partial List of Anti-Nutrient Rich Foods/Items

<table>
<thead>
<tr>
<th>Ice Cream</th>
<th>All deep fried foods</th>
<th>TV dinners</th>
<th>Tap water (in city)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chips</td>
<td>Most bakery goods</td>
<td>Any ‘fortified’ foods</td>
<td>Conventionally grown produce</td>
</tr>
<tr>
<td>Popsoda</td>
<td>Processed cheese foods</td>
<td>Most ‘energy’ drinks/bars</td>
<td>Any products containing white flour or sugar</td>
</tr>
<tr>
<td>Candy</td>
<td>Microwave popcorn</td>
<td>Coffee/cappuccino</td>
<td>Antibiotics / drugs</td>
</tr>
<tr>
<td>Alcohol</td>
<td>Hot dogs / bologna</td>
<td>Almost anything in a box</td>
<td>Tobacco</td>
</tr>
<tr>
<td>All fast food</td>
<td>Cured meats</td>
<td>Aspirin/painkillers</td>
<td>Recreational drugs</td>
</tr>
</tbody>
</table>

Choose Nutrient Dense Foods

- Choose nutrient-dense foods over energy-dense, nutrient poor (anti-nutrient rich) foods
- Maximize nutritional value/benefit of eating
- Tastes terrific, digests easily and you will require less food
- Less Stress = faster recovery and improved performance
- Nutrient density refers to the amount of micronutrients (vitamins, minerals, antioxidants and phytonutrients) in the macronutrients (proteins, carbohydrates and fats)
Macronutrients
- Protein, Carbohydrates and Fats

Micronutrients
- Vitamins, Minerals, Antioxidants, Phytonutrients
- Conditionally Essential Nutrients

Other Nutrients
- Water
- Fiber

Protein
- 4 calories/gram
- Made from amino acids
- Functions: energy, growth, repair, immune, enzymes, structure

Carbohydrate
- 4 calories in one gram
- Made up of Carbohydrates
- Functions: energy

Fat
- 9 calories/gram
- Made up of fatty acids
- Functions: energy, protection, thermal, cell membrane, lubricant, O2 transport

Macronutrient Sources
- Protein: Animal muscle, Dairy/Dairy Alternatives, Nuts and seeds, Legumes, Medical Foods, Protein powders
- Carbohydrate: Vegetables, Fruits, Legumes, Grains, Sugar & sweeteners
- Fat: Oils, Butter/ghee, Animal fat, Nuts and seeds, Fish/fish oils
Protein

- Vital to life – thousands of different kinds
  - Enzymes, hormones, structural tissue (muscle, tendons, ligaments) and transport molecules
  - Constructed from amino acids
  - Wear out and must be replaced through diet
  - Quality most often tied to how well a given protein provides the necessary amino acids to replace our body’s proteins

Protein deficiency

- Outright deficiency uncommon in US
- Protein malnutrition leads to kwashiorkor
- Lack of protein can cause:
  - Failure to grow
  - Loss of muscle mass/inability to build muscle
  - Cardiovascular weakness
  - Death
## Amino acids

### Essential Amino Acids
- Leucine
- Isoleucine
- Valine
- Lysine
- Phenylalanine
- Tryptophan
- Threonine
- Methionine
  - Must be supplied in the diet

### Non-Essential Amino Acids
- Proline
- Glycine
- Alanine
- Serine
- Cysteine
- Tyrosine
- Histidine
- Arginine
- Glutamine
- Asparagine
  - Conditionally essential in many cases

## Conditionally Essential...

### Effect of Disease and Trauma on Protein Requirements

![Graph showing effect of disease and trauma on protein requirements]

### Conditionally Essential...

#### Fat Soluble Toxins
- Phase 1 (Cytidine Triphosphate Oxidation)
- Phase 2 (Cytidine Triphosphate Oxidation)
- Nutrients Needed
  - Vitamin A, E, B6, B12
  - Taurine
  - Glutathione

#### Water Soluble Waste
- Phase 2 (Cytidine Triphosphate Oxidation)
- Nutrients Needed
  - Methionine
  - Vitamin C, B12
  - Glutamine
  - Taurine
**Protein Quality**

- Example: multicolored string of beads
- ~8-10 'essential' amino acids must be provided by the diet
- Protein Quality: is the ability of food proteins to provide the right kinds and amounts of amino acids to make our new proteins.
- Animal proteins – milk & eggs – 'high quality'
- Plant protein – ‘lower quality’ but as a group, provide all necessary AA
- Quality = efficiency with which food proteins are used to promote growth

*Chad Oler, ND*

---

**Protein Quality**

- Quality = efficiency with which food proteins are used to promote growth ≠ greatest health
- Plant protein – slow but steady synthesis of new proteins
- ‘High quality’ is a marketing term
- Science shows that plant protein supply all necessary AA and are healthier for daily consumption

*Chad Oler, ND*

---

**Protein & Cancer – The China Study**

- Up to 10-12% (of total calories) animal protein – did not cause cancer, more than 12% animal protein did
- Casein (cow’s milk protein) most strongly associated with cancer promotion
- Plant protein did not promote cancer growth, even at 20% of total calories
- You can use diet to turn cancer ‘on’ and ‘off’
- Nutrients from animal-based foods increase tumor development, while nutrients from plant-based foods decrease tumor development

*Chad Oler, ND*
Animal Products

- Animal protein – high in saturated fat – destructive to health

<table>
<thead>
<tr>
<th>Food</th>
<th>% Calories from Fat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sirloin Steak</td>
<td>83%</td>
</tr>
<tr>
<td>Bacon, lean</td>
<td>82%</td>
</tr>
<tr>
<td>Ham, lean</td>
<td>69%</td>
</tr>
<tr>
<td>Whole cow’s milk</td>
<td>64%</td>
</tr>
<tr>
<td>Ground beef, lean</td>
<td>61%</td>
</tr>
<tr>
<td>Soybeans</td>
<td>42%</td>
</tr>
<tr>
<td>Salmon</td>
<td>38%</td>
</tr>
<tr>
<td>Low-fat milk (2%)</td>
<td>35%</td>
</tr>
<tr>
<td>Chicken, light meat, no skin</td>
<td>26%</td>
</tr>
<tr>
<td>Spinach</td>
<td>14%</td>
</tr>
<tr>
<td>Peas</td>
<td>5%</td>
</tr>
<tr>
<td>Carrots</td>
<td>4%</td>
</tr>
</tbody>
</table>

- High animal protein = high (saturated) fat
  - High blood cholesterol = ↑ CVD risk
  - Higher hormones (estrogen)
  - Significantly higher incidence of cancer
  - Highly acidic – imbalances body chemistry
- NO fiber in animal products
  - Increases gastrointestinal problems & cancer
- No antioxidants in animal products
  - Increases free radical damage – aging, stiffness

Americans Eat a LOT of Animals

- Typical American gets 40% of total calories from animal products
- Zone and South Beach Diet: 60%
- Atkins Diet: 80%
Most people think that the only way to become bigger/stronger is by eating animal protein. Data shows many problems with this notion:

- ↑ risk of heart disease, cancer and diabetes
- ↑ body weight, body fat, total & LDL cholesterol
- Can you achieve your genetic potential for growth and body size while minimizing health risk?
- YES – on a predominantly plant-based diet

AND dramatically improve recovery
- Heal faster, decrease inflammation
- Train harder, longer and more frequently
- Significantly improving performance

Fiber exclusively in plant-based foods
- High fiber (plant) diet significantly ↓ cancer risk
- Lower blood cholesterol
- Lower estrogen levels
- High Antioxidants - ↓ free-radical damage
- We don't make ANY, so we must get from food
- High in complex carbohydrates
- Required for optimal health
- More alkaline producing – neutralizes acids, leading to faster recovery and improved performance

Many sources
- Legumes (beans, peas, lentils, dahl)
- Soy (tempeh, tofu, miso, soy milk)
- Nuts and seeds
- Pea or Brown rice protein powder
  - (Non-GMO, no additives/preservatives, low temp)
- Whey Protein
  - (Organic, casein-free, no additives/preservatives, hydrolyzed, ion-exchanged and/or cross filtered)
- Eggs (organic, pasture fed)
- Yogurt (organic, pasture fed)
### The Soy Controversy

<table>
<thead>
<tr>
<th>Advantage</th>
<th>Disadvantage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete protein for humans</td>
<td>Endocrine disruptors (plant)</td>
</tr>
<tr>
<td>Improved body composition</td>
<td>Possible food allergen</td>
</tr>
<tr>
<td>Improved insulin resistance</td>
<td>Poor digestibility without proper preparation (plant)</td>
</tr>
<tr>
<td>Acts as weak estrogen</td>
<td>Acts as weak estrogen</td>
</tr>
<tr>
<td>Improved cardiovascular health</td>
<td>Contains goitrogens (plant)</td>
</tr>
<tr>
<td>Improved bone health</td>
<td>Textured vegetable protein</td>
</tr>
<tr>
<td>Improved cognitive function</td>
<td></td>
</tr>
</tbody>
</table>

- Avoid soy (food) if have thyroid issues, food allergy or poor digestion.
- Can use soy-based powders/medical foods as needed.

### Protein Powders

- Easy way to get enough protein, especially post-workout or if digestion is sub-optimal.
- Digestibility, BCAA content and bioavailability (amount your body can use) are key.
- Brown rice, pea and whey (isolate) best.

<table>
<thead>
<tr>
<th>Source</th>
<th>Isoleucine (mg)</th>
<th>Leucine (mg)</th>
<th>Valine (mg)</th>
<th>Total BCAA (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egg white, powder</td>
<td>1200</td>
<td>1791</td>
<td>1352</td>
<td>4343</td>
</tr>
<tr>
<td>Egg white, raw</td>
<td>1188</td>
<td>1774</td>
<td>1340</td>
<td>4302</td>
</tr>
<tr>
<td>Brown rice protein</td>
<td>910</td>
<td>1721</td>
<td>1241</td>
<td>3872</td>
</tr>
<tr>
<td>Pea protein</td>
<td>1120</td>
<td>1688</td>
<td>1086</td>
<td>3864</td>
</tr>
<tr>
<td>Whey protein</td>
<td>922</td>
<td>1719</td>
<td>836</td>
<td>3577</td>
</tr>
<tr>
<td>Soy protein</td>
<td>896</td>
<td>1481</td>
<td>923</td>
<td>3290</td>
</tr>
<tr>
<td>Hemp protein</td>
<td>367</td>
<td>618</td>
<td>454</td>
<td>1439</td>
</tr>
</tbody>
</table>

*per 100-calorie sample

- Pea or Brown rice protein powder
  - Non-GMO, no additives/preservatives, low temperature processing
- Whey Protein
  - Organic, no rBGH, caesin-free, no additives/preservatives, hydrolyzed, ion-exchanged and/or cross filtered
  - 1 serving should be ~20-25 grams/protein
  - Especially good post-workouts in smoothies and/or for an easily digestible breakfast.
Wild caught, deep-sea fatty fish:
- Mackerel (Atlantic), Herring, Tuna (albacore), Salmon, Sardines, Lake Trout
- Organic, pasture fed meat
  - Chicken, turkey, beef, lamb
- Organic, pasture fed eggs
- Wild Game
  - Elk, Mule Deer, Antelope, etc.

Avoid farm-raised fish and feedlot-raised animals
- Found at the supermarket/grocery store and most restaurants, including ALL fast food restaurants
- Composition of meat and fats dramatically inferior to wild game and organic animals
  - Much higher saturated fat, ω-6, hormones, antibiotics, pollutants, bacteria; much lower ω-3, carnitine, taste
- Serious ethical, economic and environmental implications

Meet Your Meat -
https://www.youtube.com/watch?v=ykTH_b-cXyE&oref=https%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3DykTH_b-cXyE&has_verified=1
Another alternative for meat –
http://www.youtube.com/watch?v=CaHIX5jLLB_i
The Meatrix - http://www.themeatrix1.com/
### Protein Quick Reference

<table>
<thead>
<tr>
<th>Food</th>
<th>Amount</th>
<th>Protein (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Almonds/Nuts</td>
<td>1 oz (~20)</td>
<td>7-8</td>
</tr>
<tr>
<td>Pistachios</td>
<td>1 oz (~20)</td>
<td>7-8</td>
</tr>
<tr>
<td>Pumpkin seeds</td>
<td>2 Tbsp</td>
<td>11</td>
</tr>
<tr>
<td>Sunflower seeds</td>
<td>2 Tbsp</td>
<td>8</td>
</tr>
<tr>
<td>Hemp seeds</td>
<td>2 Tbsp</td>
<td>11</td>
</tr>
<tr>
<td>Almond butter</td>
<td>2 Tbsp</td>
<td>8</td>
</tr>
<tr>
<td>Beans</td>
<td>1/4 cup</td>
<td>7-8</td>
</tr>
<tr>
<td>Lentils</td>
<td>1/2 cup</td>
<td>8</td>
</tr>
<tr>
<td>Egg/egg white</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Beef, poultry, fish</td>
<td>1 oz.</td>
<td>7</td>
</tr>
<tr>
<td>Cashews</td>
<td>1 oz.</td>
<td>5</td>
</tr>
<tr>
<td>Vegetables</td>
<td>1/4 cup</td>
<td>2</td>
</tr>
</tbody>
</table>

### Grams of Protein in Foods

<table>
<thead>
<tr>
<th>Meals</th>
<th>Grams of Protein</th>
<th>Servings Serves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steak</td>
<td>17g per oz</td>
<td>3.5 x oz portion of meat + 1 deck of cards</td>
</tr>
<tr>
<td>Chicken</td>
<td>3.5g per oz</td>
<td></td>
</tr>
<tr>
<td>Fruit and vegetable</td>
<td>1 egg</td>
<td>1 egg = 6 grams</td>
</tr>
</tbody>
</table>

### Grams of Protein in Foods

<table>
<thead>
<tr>
<th>Cheese and Diary</th>
<th>Grams of Protein</th>
<th>Serves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cheese</td>
<td>4g per oz</td>
<td></td>
</tr>
<tr>
<td>Mozzarella</td>
<td>25g per oz</td>
<td></td>
</tr>
<tr>
<td>Swiss cheese</td>
<td>72g per oz</td>
<td></td>
</tr>
<tr>
<td>Gouda cheese</td>
<td>14g per oz</td>
<td></td>
</tr>
<tr>
<td>Mozzarella (1/2 c)</td>
<td>6g per oz</td>
<td></td>
</tr>
<tr>
<td>Swiss cheese (1/2 c)</td>
<td>10g per oz</td>
<td></td>
</tr>
<tr>
<td>Yogurt</td>
<td>12g per oz</td>
<td></td>
</tr>
<tr>
<td>Gouda cheese (1/2 c)</td>
<td>14g per oz</td>
<td></td>
</tr>
<tr>
<td>1 oz of cheese = 2 slices</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/2 half of mozzarella cheese = 3/4 slices</td>
<td>3.5-4 oz of cheese + 1 deck of cards</td>
<td></td>
</tr>
</tbody>
</table>
Vegetable proteins give you more of what you need and less of what you don’t
- More vitamins, minerals, antioxidants, fiber, complex carbohydrates, alkaline reserves
- Less/no saturated fat, cholesterol, hormones, antibiotics, disease, acids

Get 20-25% of total calories from protein
- Will use BIA and training volume to determine
- Eat no more than 20% animal protein
- 1 deck of cards sized protein 4-5x/week
- Organic, pasture fed or wild caught ONLY
- Avoid ALL factory farmed animals products
- Fast food, restaurants, grocery store/deli

Protein
- 4 calories/gram
- Made from amino acids
- Function: energy, growth, repair, immune, enzymes, structure

Carbohydrate
- 4 calories in one gram
- Made up of Cx(H2O)y
- Function: energy

Fat
- 9 calories/gram
- Made up of fatty acids
- Function: energy, protection, cell membrane, transport
High carb, low carb, no carb, carbo loading, glycemic index.....AHHH!
Think in terms of body chemistry and nutrient density
- Vegetables, fruits, legumes, whole grains
- NOT breads, bagels, energy bars/gels....

Rates how foods raise blood sugar levels compared with glucose/white bread
Compares equal quantities of carbohydrate (50 grams) among foods to evaluate blood sugar responses
- Does NOT take into account the actual amount of carbohydrate in a typical serving of food
- Can be very confusing
### GI Example

- Watermelon – GI = 72
- Milk Chocolate Candy Bar – GI = 43
  - Candy Bar better for you than watermelon?!
  - NO!
- 3 oz Candy Bar = 50 grams carbs
- 1.5 lbs. Watermelon = 50 grams carbs

### Glycemic Load

- GL = GI x carbohydrate content in a typical serving
- Allows for real-world comparisons of foods
- Almost all processed foods made from refined grains/sugars have high GL
- Almost all vegetables and fruits have low GL

### GI vs. GL

<table>
<thead>
<tr>
<th>Refined Foods</th>
<th>Unrefined Foods</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Glutinous rice</td>
<td>84</td>
</tr>
<tr>
<td>Cornflakes</td>
<td>64</td>
</tr>
<tr>
<td>Rice cakes</td>
<td>52</td>
</tr>
<tr>
<td>Table sugar</td>
<td>54</td>
</tr>
<tr>
<td>Sugar-free candy</td>
<td>54</td>
</tr>
<tr>
<td>Honey</td>
<td>74</td>
</tr>
<tr>
<td>Corn chips</td>
<td>77</td>
</tr>
<tr>
<td>Milk chocolate</td>
<td>43</td>
</tr>
<tr>
<td>Whole wheat</td>
<td>51</td>
</tr>
<tr>
<td>Bagel</td>
<td>72</td>
</tr>
<tr>
<td>Whole wheat bread</td>
<td>75</td>
</tr>
</tbody>
</table>
Vegetables and Fruits

- Loaded with healthy carbohydrates – low GL
- High nutrient density – improve energy
- Full of fiber – keep things moving
- Alkaline effect on body chemistry – speed recovery
- Low in calories (you can eat A LOT of them)
- Taste GREAT!

What the Average American Eats

>80% Acidic and <10% alkaline forming foods – SAD indeed!!

Top 5 Picks for Fruits and Vegetables in US

- Head (iceberg) lettuce
- Tomatoes (includes sauces)
- Potatoes (mainly French fries)
- Bananas
- Oranges (mainly as juice)
Juice vs. Whole fruit

<table>
<thead>
<tr>
<th>Fruit</th>
<th>SERVING</th>
<th>Calories</th>
<th>Fat (g)</th>
<th>Protein (g)</th>
<th>Carb (g)</th>
<th>Sugar (g)</th>
<th>Fiber (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple</td>
<td>1 medium</td>
<td>74</td>
<td>0.20</td>
<td>0.60</td>
<td>14</td>
<td>12</td>
<td>0.3</td>
</tr>
<tr>
<td>Orange</td>
<td>1 whole</td>
<td>49</td>
<td>0.21</td>
<td>1.77</td>
<td>17.9</td>
<td>11.6</td>
<td>3.7</td>
</tr>
<tr>
<td>Strawberry</td>
<td>1 small</td>
<td>113</td>
<td>0.81</td>
<td>1.74</td>
<td>20.5</td>
<td>20.9</td>
<td>0.6</td>
</tr>
</tbody>
</table>

Macronutrient balance (food combinations)
- ALWAYS eating carbohydrates with protein and/or fat
- Portion size and meal frequency
  - Quit eating before full; eat every 3-4 hours
- Being Carb Conscious (choose wisely)
  - Complex carbohydrates
    - Legumes, whole fruits/vegetables, whole grains, nuts/seeds
  - Fiber
  - Minimal processing
Simple Carbohydrates

- Simple carbohydrates are sugars or are made up of sugars/processed grains. They break down quickly, are rapidly digested and cause a large insulin response.

<table>
<thead>
<tr>
<th>Table Sugar</th>
<th>Brown sugar</th>
<th>Corn syrup</th>
<th>HFCS</th>
<th>Maple syrup</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molasses</td>
<td>Fructose</td>
<td>Sucrose</td>
<td>Honey</td>
<td>Soft drinks</td>
</tr>
<tr>
<td>Candy</td>
<td>Fractose</td>
<td>Pasta (flour)</td>
<td>Bread (flour)</td>
<td>Jams, jellies</td>
</tr>
<tr>
<td>White/wheat flour (enriched or not)</td>
<td>Fruit juices/drinks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All baked goods made with white flour</td>
<td>Most packaged cereals</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Complex Carbohydrates

- Complex carbohydrates – made up of strands of sugar molecules; often rich in fiber

- All whole/unprocessed fruits and vegetables
- Green vegetables (lettuce, spinach, kale)
- Beans, peas and lentils
- Whole grains (brown rice, millet, quinoa, buckwheat, oatmeal & products)
- Yogurt, low-fat dairy

Complex vs. Simple Carbohydrates

Complex Carb Cheat Sheet

- Spinach
- Tomato
- Lettuce
- White onion
- Asparagus
- Artichoke
- Onion
- Cabbage
- Green onion
- Cucumber
- Bell pepper
- Red onion
- Broccoli
- Brussels sprouts
- Eggplant
- Zucchini
- Onions
- Whole wheat bread
- Quinoa
- Asparagus
corn
- Grapes
- Lettuce
- Spinach
- Broccoli
- Brussels sprouts
- Cabbage
- Onion
- Green onion
- Sweet potato
- Sweet potato
- White onion
- Bell pepper
- Cucumber
- Red onion
- Broccoli
- Brussels sprouts
- Eggplant
- Zucchini
- Onions
- Whole wheat bread
- Quinoa
- Asparagus
- Corn
- Grapes
- Lettuce
- Spinach
- Broccoli
- Brussels sprouts
- Cabbage
- Onion
- Green onion
- Sweet potato
- Sweet potato
- White onion
- Bell pepper
- Cucumber
- Red onion
- Broccoli
- Brussels sprouts
- Eggplant
- Zucchini
- Onions
- Whole wheat bread
- Quinoa
- Asparagus
- Corn
- Grapes
- Lettuce
- Spinach
- Broccoli
- Brussels sprouts
- Cabbage
- Onion
- Green onion
- Sweet potato
- Sweet potato
- White onion
- Bell pepper
- Cucumber
- Red onion
- Broccoli
- Brussels sprouts
- Eggplant
- Zucchini
- Onions
- Whole wheat bread
- Quinoa
- Asparagus
- Corn
- Grapes
- Lettuce
- Spinach
- Broccoli
- Brussels sprouts
- Cabbage
- Onion
- Green onion
- Sweet potato
- Sweet potato
- White onion
- Bell pepper
- Cucumber
- Red onion
- Broccoli
- Brussels sprouts
- Eggplant
- Zucchini
- Onions
- Whole wheat bread
- Quinoa
- Asparagus
- Corn
- Grapes
- Lettuce
- Spinach
- Broccoli
- Brussels sprouts
- Cabbage
- Onion
- Green onion
- Sweet potato
- Sweet potato
- White onion
- Bell pepper
- Cucumber
- Red onion
- Broccoli
- Brussels sprouts
- Eggplant
- Zucchini
- Onions
- Whole wheat bread
- Quinoa
- Asparagus
- Corn
- Grapes
- Lettuce
- Spinach
- Broccoli
- Brussels sprouts
- Cabbage
- Onion
- Green onion
- Sweet potato
- Sweet potato
- White onion
- Bell pepper
- Cucumber
- Red onion
- Broccoli
- Brussels sprouts
- Eggplant
- Zucchini
- Onions
- Whole wheat bread
- Quinoa
- Asparagus
- Corn
- Grapes
- Lettuce
- Spinach
- Broccoli
- Brussels sprouts
- Cabbage
- Onion
- Green onion
- Sweet potato
- Sweet potato
- White onion
- Bell pepper
- Cucumber
- Red onion
- Broccoli
- Brussels sprouts
- Eggplant
- Zucchini
- Onions
- Whole wheat bread
- Quinoa
- Asparagus
- Corn
- Grapes
- Lettuce
- Spinach
- Broccoli
- Brussels sprouts
- Cabbage
- Onion
- Green onion
- Sweet potato
- Sweet potato
- White onion
- Bell pepper
- Cucumber
- Red onion
- Broccoli
- Brussels sprouts
- Eggplant
- Zucchini
- Onions
- Whole wheat bread
- Quinoa
- Asparagus
- Corn
- Grapes
- Lettuce
- Spinach
- Broccoli
- Brussels sprouts
- Cabbage
- Onion
- Green onion
- Sweet potato
- Sweet potato
- White onion
- Bell pepper
- Cucumber
- Red onion
- Broccoli
- Brussels sprouts
- Eggplant
- Zucchini
- Onions
- Whole wheat bread
- Quinoa
- Asparagus
- Corn
- Grapes
- Lettuce
- Spinach
- Broccoli
- Brussels sprouts
- Cabbage
- Onion
- Green onion
- Sweet potato
- Sweet potato
- White onion
- Bell pepper
- Cucumber
- Red onion
- Broccoli
- Brussels sprouts
- Eggplant
- Zucchini
- Onions
- Whole wheat bread
- Quinoa
- Asparagus
- Corn
- Grapes
Natural Sweeteners

- Simple carbohydrates:
  - Sucrose, glucose, fructose, dextrose
  - Maltose, lactose
  - Brown sugar, raw sugar, blackstrap molasses, honey, maple syrup, agave
- Non-caloric:
  - Xylitol, sorbitol, mannitol
  - Stevia

Artificial Sweeteners

- Many names:
  - Saccharin: Sweet and Low, Sweet Twin, Sweet‘N Low, Necta Sweet
  - Aspartame: Nutrasweet, Equal, Sugar Twin
  - Sucralose: Splenda
  - Acesulfame K: acesulfame potassium, Ace-K, Sunett
- Recently, starting to blend them together
  - NO studies have been done on safety
**Aspartame**
- Nutrasweet, Equal, Sugar Twin
- Accounts for ~70% of ALL complaints to the FDA
- Extensive research indicates numerous detrimental effects:
  - Phenylketonuria (PKU) effect – enzyme deficiency
  - Disrupts neurotransmitter (NT) balance:
    - Decreased serotonin → cravings (carbohydrates), insomnia, temp changes, headaches/migraines, seizures, moodiness
    - Increased excitatory neurotransmitters → anxiety, dizziness, memory loss, spasms, muscle pain, tinnitus, blurred vision
  - If taken during pregnancy: mental retardation, impaired vision, birth defects; emotional, behavioral and learning difficulties
  - Weight gain: due to NT imbalances and increased food intake

**Sucralose / Splenda**
- Is a chlorocarbon – sugar molecule with 3 chlorine molecules attached to it
- Hits GI tract, causes irritation, possible immune reaction and diarrhea
- If does break down, can release chlorine and has been shown to cause:
  - Immune dysfunction/suppression
  - Reduced growth rate
  - 1 Red blood cell count
  - Cancer
  - Aborted pregnancy
  - Enlarged liver/kidneys
  - 1 Retinal body weight
  - Diarrhea

**Acesulfame K**
- Another chlorine based artificial sweetener
- VERY few human studies
- Shown to cause:
  - Headaches
  - Depression
  - Nausea
  - Mental confusion
  - Liver effects
  - Kidney effects
  - Visual disturbances
  - Cancer
Artificial Sweeteners

- Aspartame (160’s sweetness)
  - Nutrasweet, Equal
  - Aspartic Acid (40%), Phenylalanine (50%), Methanol (10%) formaldehyde
- Sucralose (600’s sweetness)
  - Splenda
  - Produced by chlorinating sucrose
  - Accumulates in body fat, a considered carcinogen
- Sucralose-fed animals had
  - Stunted growth
  - Increased incidence of gastric adenomas and hyperplasia of the proventriculus
  - Increased incidence of cancer, decreased thymus size, and increased rate of hibernation

- Saccharin (300’s sweetness)
  - Sweet’n low, Sugar Twin
  - O-toluene sulfonamide (crude oil and gas), reactions greater in those with sulfa allergies
  - Used to have cancer warning label, now lifted

Artificial Sweeteners Lead to Weight GAIN

- Animals fed artificially sweetened foods/liquids tended to eat more, consume more calories and gain more weight than animals fed glucose sweetened foods
- You can’t fool Mother Nature...
  - Body expects calories with sweet-foods
    - Increases temperature, metabolism, activity and naturally decreases calorie intake
  - Artificial sweeteners trick the body
    - When no calories, temp doesn’t rise, metabolism slows, activity slows, hunger/food intake ↑ and fat accumulation ↑

Findings match emerging data in humans

What is Alcohol?

- Alcohol is an ‘anti-nutrient’
  - Depletes the body of needed vitamins, minerals and water
  - Interferes with body’s absorption, storage and use of nutrients
- Alcohol is a drug
  - Most widely used drug in the world
    - 10-15 million Americans are alcoholics
  - >100,000 deaths each year due to alcohol consumption
  - Majority of population drinks moderately/occasionally
How is Alcohol Metabolized?

- Protein, carbohydrate and fat can be stored in the body
- Alcohol cannot
  - It takes priority over everything else
  - All other processes that should be taking place get interrupted
  - Alcohol does not need to be processed to be absorbed
- Metabolized in the stomach and liver
  - \( \frac{1}{4} \) to \( \frac{1}{3} \) ounce pure ethanol per hour

Hit brain within minutes of ingestion
- Initially give temporary stimulation, then acts as a sedative, anesthetic and hypnotic
- Within 5 minutes, there is enough to measure
- Blood alcohol content (BAC) determined by:

<table>
<thead>
<tr>
<th>Gender</th>
<th>Race</th>
<th>Food consumed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic alcohol consumption</td>
<td>Drinking pattern</td>
<td>Medications</td>
</tr>
</tbody>
</table>

- Once you stop drinking, your blood alcohol level decreases by about 0.01% per hour

Hours to Zero BAC

<table>
<thead>
<tr>
<th>Number of Drinks</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 drinks</td>
<td>35</td>
<td>39</td>
</tr>
<tr>
<td>14 drinks</td>
<td>30</td>
<td>34</td>
</tr>
<tr>
<td>13 drinks</td>
<td>25</td>
<td>31</td>
</tr>
<tr>
<td>12 drinks</td>
<td>20</td>
<td>26</td>
</tr>
<tr>
<td>11 drinks</td>
<td>15</td>
<td>21</td>
</tr>
<tr>
<td>10 drinks</td>
<td>10</td>
<td>16</td>
</tr>
<tr>
<td>9 drinks</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>8 drinks</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>7 drinks</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>6 drinks</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>5 drinks</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>4 drinks</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3 drinks</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2 drinks</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1 drink</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
A Calorie is a Calorie... except with Alcohol

- Example:
  - If a 120 lb woman has 2 drinks or a 180 lb woman has 3 drinks in 1 hour, your BAC ~0.08-0.10
  - It will take between 8-10 hours to have the alcohol clear your system, assuming you don’t drink another drop
  - All the calories you consume in that 8-10 hours will be converted mainly to body fat
  - Your body will not be able to burn fat for fuel in those 8-10 hours

Eat 20% more if alcohol consumed b4 meals
Consume 33% more calories when alcohol is consumed
Any foods consumed while there is alcohol in your system will be converted into fat
Alcohol consumption raises cortisol and increases the breakdown of testosterone for up to 24 hours = less muscle & more fat

<table>
<thead>
<tr>
<th>Alcohol Drink Combination</th>
<th>Calories</th>
<th>Calories for 8 oz Drink</th>
<th>Calories</th>
<th>Calories for 6 oz Drink</th>
<th>Calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long Island Ice Tea (12 oz.)</td>
<td>185</td>
<td>Beer, light, 12 oz.</td>
<td>120</td>
<td>Beer, regular, 12 oz.</td>
<td>150</td>
</tr>
<tr>
<td>Margarita (12 oz.)</td>
<td>242</td>
<td>Rum, triple sec, 3.5 oz.</td>
<td>216</td>
<td>Vodka, 1.5 oz.</td>
<td>190</td>
</tr>
<tr>
<td>Pina Colada (6 oz.)</td>
<td>316</td>
<td>Vodka, 1.5 oz.</td>
<td>270</td>
<td>Rum, 4 oz.</td>
<td>250</td>
</tr>
<tr>
<td>Chocolate Martini (6 oz.)</td>
<td>316</td>
<td>Wine, 4 oz.</td>
<td>300</td>
<td>Wine, dessert, 4 oz.</td>
<td>310</td>
</tr>
<tr>
<td>Mai Tai (4 oz.)</td>
<td>308</td>
<td>Beer, light, 12 oz.</td>
<td>200</td>
<td>Wine spritzer, 4 oz.</td>
<td>310</td>
</tr>
<tr>
<td>Rum &amp; Coke (10 oz)</td>
<td>396</td>
<td>Vodka, 1.5 oz.</td>
<td>310</td>
<td>Wine, dessert, 4 oz.</td>
<td>310</td>
</tr>
<tr>
<td>White Russian (3 oz.)</td>
<td>316</td>
<td>Vodka, 1.5 oz.</td>
<td>300</td>
<td>Wine spritzer, 4 oz.</td>
<td>310</td>
</tr>
</tbody>
</table>

http://www.fitday.com/webfit/calories/calories_93.html
Blood sugar comes from 3 sources:
- Foods we eat, glucose stored in muscles, and other nutrients (i.e., fats & protein) in the body
- Blood sugar is regulated by insulin and glucagon
- Alcohol interferes with all three sources of blood sugar and the hormones needed to maintain healthy blood sugar levels
  - Leads to overproduction of insulin, resulting in hypoglycemia; over time, leads to insulin resistance
  - Alcohol consumption post exercise is particularly bad
  - Keeps blood sugar levels low and prevents recovery

How does alcohol affect blood sugar?

Soft Drinks

- Account for more than 27% of total beverage consumption in the US
- Average American drinks over 54.5 gallons of soft drinks per year (almost 600 12 oz. cans)
- 46% of added sugar intake comes from soda
  - Single largest source of refined sugar in US diet!
- In 2004, Americans spent almost $66 billion buying soft drinks
- For every 16 oz. bottle of water consumed, Americans drank 64 oz. of soda

Liquid Candy (Soda)

- Largest source of calories in the American Diet
- Provides average teen with 10-15 tsp of sugar/day = total recommended from all foods
- Associated with numerous nutritional deficiencies (vitamins, minerals, water, fiber)
- Directly related to weight gain, obesity, diabetes, kidney stones, heart disease and osteoporosis
- Pose a risk for what they contain (extra calories, sugar, additives, artificial sweeteners) and for what they replace in the diet (beverages and foods that contain nutrients & water)
Soda and Obesity

- Soft drinks (both regular and diet) promote obesity
- National Cancer Institute scientists found:
  - Soda provides a larger % of calories in overweight youths than others
  - No difference in overall caloric intake
  - Consuming the same amount of calories, but those that drink soda were overweight...??!

Soda and Obesity

- Harvard Study:
  - Women who ↑ soda from <1/week to >1/day gained an average of 18 lbs.
  - Women that consumed 1 soda/week gained 6 lbs.
  - Women who drank soda had 200% ↑ risk of diabetes

The Obesity Link

- Soda contributes to weight gain by increasing intake of fructose/high-fructose corn syrup
  - Disrupts insulin, leptin and ghrelin
    - Leads to insulin resistance, cravings, decreased fat burning and increased appetite/food consumption
- Another reason: calories consumed as a liquid (soda) are more likely to promote obesity than those consumed as a solid (or liquid with fiber)
  - Reason: people compensate for calories consumed in solid form; not so with liquids
  - Leads to overconsumption of calories
To burn off the 250 calories in a 20-ounce bottle of non-diet soda, a 135 lb person would have to:
- Walk 3 miles in 45 minutes
- Play vigorous basketball for 40 minutes
- Bike vigorously for 22 minutes
- And that's to just burn off the calories and to prevent fat storage from drinking 1 soda...

Remember that the body must maintain an alkaline (pH<7.0) chemistry, so a low pH is BAD!

<table>
<thead>
<tr>
<th>Substance</th>
<th>pH</th>
<th>Substance</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pure water</td>
<td>7.0</td>
<td>Diet Mountain Dew</td>
<td>3.34</td>
</tr>
<tr>
<td>Cow's milk</td>
<td>6.5</td>
<td>Mountain Dew</td>
<td>3.22</td>
</tr>
<tr>
<td>Barq's</td>
<td>4.61</td>
<td>Orange Slice</td>
<td>3.12</td>
</tr>
<tr>
<td>Beer</td>
<td>4.4</td>
<td>Nestea</td>
<td>3.04</td>
</tr>
<tr>
<td>Diet 7Up</td>
<td>3.67</td>
<td>Gatorade</td>
<td>2.95</td>
</tr>
<tr>
<td>Wine</td>
<td>3.5</td>
<td>Coke / Pepsi</td>
<td>2.50</td>
</tr>
<tr>
<td>Diet Coke</td>
<td>3.39</td>
<td>Battery Acid</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Ditch the soda!

The bottom line is health
- Soft drinks and alcohol provide an enormous amount of calories and NO/FEW beneficial nutrients
- Contribute to weight gain/obesity as well as a host of other health conditions
- Artificial sweeteners compound the problem, increasing toxicity, cause neurotransmitter imbalances, and still lead to weight gain and health issues
**Healthy Alternatives**

- WATER!!!!
- Seltzer water and unsalted club soda
- Spritzer – half seltzer, half juice
- Vegetable and fruit juices
- Emer-Gen-C drinks!
- If need alternative sweeteners – try Stevia

**What is fiber?**

- **Soluble fiber** is made up of carbohydrates that contain 3 or more molecules of simple carbohydrates
- It **DOES dissolve in water**
- Helps to regulate blood sugar and also aids in lowering the total and LDL cholesterol counts

- **Insoluble fiber** is mainly made up of plant cell walls
- It **DOES NOT dissolve in water**
- Helps to move bulk through the intestines
- Helps in alleviating constipation
- Helps to sweep toxins out of the body

**Fiber for Intestinal Health**

- Low-fiber diets responsible for constipation and "leaky gut"
- Fiber intakes well below recommended levels
  - Recommend: 25-40 grams
  - Most people get < 10 grams

---

www.naturalpathhealthcenter.com
Fiber Types

- **Soluble**
  - Dissolves in water – forms a gel
  - Feeds and nourishes intestinal bacteria
  - Slows down digestion/emptying of stomach
  - Decreases production of cholesterol
  - Slows glucose absorption

- **Insoluble**
  - Does not form a gel in water
  - Speeds up transit time/aid in elimination
  - Inactivates many intestinal toxins
  - Slows glucose absorption

---

Fiber

- The average person in the US consumes < 10-15 grams fiber/day
- Recommendations are at least 30-35 grams

![Fiber content graph](image)

Average fiber content in 1000 calories

---

Sources of Soluble Fiber

- Oats
- Beans
- Peas
- Barley
- Some fruits
  - Apples, berries
- 1-3 servings/day
Sources of Insoluble Fiber

- Whole grains and cereals
- Vegetables

Sources of soluble fiber: oatmeal, oat cereal, lentils, apples, oranges, pears, oat bran, beans, dried peas, blueberries, psyllium, cucumbers, celery, and carrots.

Sources of insoluble fiber: whole wheat, whole grains, wheat bran, corn bran, barley, couscous, brown rice, bulgur, zucchini, celery, broccoli, cabbage, onions, tomatoes, carrots, cucumbers, green beans, dark leafy vegetables, raisins, grapes, fruit, and root vegetable skins.

Fiber Sources

- Psyllium Husks
- Flaxseed
- Bran (oat, rice)
- Pectin
- Fiber-Stat – 1 fl. Oz.
  - Provides 15 grams of soluble fiber
- MetaFiber – 1 scoop (10 grams)
  - Provides 1 gram soluble & 5 grams insoluble fiber

Supplemental Fiber
How to Get Enough Fiber

- Ensure 25 – 30 grams per day
  - 5 servings of fruits and vegetables
  - 2 servings whole grains or legumes
- Tips
  - Add slowly if not used to eating fiber
  - Drink 6 – 8 glasses of water per day

Processed foods

- Any food that has been altered from its natural state in some way, either for safety reasons or convenience
- Often remove fiber and germ (grains)
- Many nutrients are destroyed during process
- Many things added
  - Salt, sugar and fat, trans-fats
  - Preservatives, artificial colors, flavors
- Many are simply manufactured (ex. Soda)

Refined Grains

[Graph showing Refined Grains]

[Graph showing Enriched Grains]
Legumes are plants that have pods containing seeds:
- Lentils, peas, peanuts and beans
- High in protein, fiber, vitamins, minerals, AA
- Lentils and split peas do not need to be soaked
- Soak other legumes overnight, rinse, cook, rinse – reduces gas
- Add seaweed while cooking to further reduce gas
- If use canned beans – rinse until the foam is gone
- Sprouting raw legumes improves nutritional value and digestibility

<table>
<thead>
<tr>
<th>Beans</th>
<th>Lentils</th>
<th>Peas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adzuki</td>
<td>Brown</td>
<td>Black-eyed</td>
</tr>
<tr>
<td>Black</td>
<td>Green</td>
<td>Green, split</td>
</tr>
<tr>
<td>Chickpeas</td>
<td>Red</td>
<td>Yellow, split</td>
</tr>
<tr>
<td>Fava</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kidney</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Navy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pinto</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Common Allergies:
- Sugar – look for dark circles under eyes
- Gluten-containing grains
  - Rye
  - Barley
  - Wheat
  - Spelt
  - Kamut
Grains

- Avoid gluten as much as possible – digestion
  - Wheat, rye, barley
- Whole grains best – cook like rice, can sprout
  - Amaranth – nutty flavor, minerals, fiber, lysine
    - Combine with other grains; 1:3 water, 25 min
  - Buckwheat – mild flavor, tryptophan, Mn, B, E
    - Get unroasted; combine with other grains; 1:3 water, 20 min
  - Quinoa – mild taste, lysine, protein, B-vit, Fe, K
    - Must rinse thoroughly before cooking; 1:2 water, 20 min
- Brown rice – mild, nutty flavor, Mn, Se, Mg, B-vit
  - Put in pot with water, bring to boil; simmer 45 min, 1:2 water
- Millet – mild flavor, B-vit, Mg, tryptophan
  - Only grain that has a (slightly) alkaline effect on body chemistry
    - 1:3 water, 35 min

Sprouting

- Very inexpensive – extremely beneficial
- Sprouting converts the densely packed nutrients into easier to digest fuel
  - Proteins are converted to amino acids
  - Fats are converted into fatty acids
  - Digestive enzyme inhibitors are eliminated
  - Vitamins, minerals and enzymes are activated
  - Highly alkaline

<table>
<thead>
<tr>
<th>Best Legumes, Nuts and Seeds for Sprouting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amaranth</td>
</tr>
<tr>
<td>Buckwheat</td>
</tr>
<tr>
<td>Beans (all)</td>
</tr>
<tr>
<td>Chickpeas</td>
</tr>
<tr>
<td>Lentils (all)</td>
</tr>
<tr>
<td>Quinoa</td>
</tr>
<tr>
<td>Sunflower seeds</td>
</tr>
</tbody>
</table>

How to Sprout

- Need: glass jar, cheesecloth, elastic band
- Rinse sprout-to-be well and put in jar; fill to about ¼ mark
- Fill jar at least ¼ with water
- Let sit overnight
- Pour out the water and rinse with fresh water
- Put back in jar and put cheesecloth over the top, holding it down with the elastic band
- Briefly turn the jar upside down to let water drain out
- Within about 24 hours, sprouts will appear
- Make sure sprouts stay moist by pouring water into the jar
  and then turning it upside down to drain
- Sprout times vary – 2 days is typical
- Rinse sprouts with fresh water
- Store sprouts in a clean, uncovered container in the refrigerator
- Sprouts will stay up to 1 week
Advantages of Eating Lots of Vegetables & Fruits

- Low GL – maintain blood sugar levels
- Stabilize mood, energy, muscle growth
- High nutrient density – maximize nutrients
- Speed repair & recovery, improve performance/health
- Balance body chemistry – high alkaline reserves
- Speed recovery, reduce inflammation/injury, improve performance/energy/health
- Improves overall health – fiber, nutrients, water

Carbohydrate Summary

- Eat A LOT of vegetables and fruit
  - Have at every meal
  - ~75% of your plate should be vegetables/fruit
  - Limit grains (ideally meal after exercise/workouts)
  - Avoid processed & refined grain/sugar products

The Macronutrients

- Protein
  - 4 calories/gram
  - Made from amino acids
  - Function: energy, growth, repair, immune, enzymes, structure

- Carbohydrate
  - 4 calories/gram
  - Made up of C(H2O)y
  - Function: energy

- Fat
  - 9 calories/gram
  - Made up of fatty acids
  - Function: energy, protection, thermal, cell membrane, lubricant, O2 transport
Three main types:
- Saturated
- Monounsaturated
- Polyunsaturated

Getting the right kinds into your diet can:
- Improve performance, strength, body composition
- Reduce your risk of many inflammatory diseases, heart disease, certain autoimmune diseases and some cancers

It’s not the total amount of fat in the diet that matters, it’s the kind of fat
- Quality matters as much or more than quantity
- Polyunsaturated fats are good for us when we have the correct balance of ω-6: ω-3
- Monounsaturated fats and some saturated fats (like those found in coconut) are good for us
- Most saturated fats, along with all trans fats (hydrogenated or partially hydrogenated) are deadly

Contain no double bonds – ‘saturated’ with hydrogen (H) -> Heat stable
- There are different kinds of saturated fats
  - Differ in # of carbon (C) atoms
  - Different lengths = different properties
Fatty Acid Composition

Monounsaturated Fats

- Much better for your health than saturated fats
- ‘Mono’ = one double bond
- Found in nuts, avocados, and olive oil
- Oils very good for low to medium heat cooking

Oleic Acid: A typical monounsaturated fatty acid c18:1ω9 (omega 9)

Naming Fats

- Fatty acids use Greek alphabet (α, β, ..., ω) to identify the location of double bonds
- ‘Alpha’ (α) carbon is the carbon closest to the carboxyl group and the ‘omega’ (ω) carbon is the last carbon in the chain because omega is the last letter in the Greek alphabet
- To determine a fats classification, you subtract the highest double-bond location (start counting from the α carbon) in the scientific name from the number of carbons in the backbone
Name That Fat...

- Subtract 14 from 20 = 6
  - Omega-6 fatty acid
  - WINNER!!

Polyunsaturated Fats – Omega-6s

- ‘Poly’ meaning ‘many’ – contain 2 or more double bonds between carbon atoms in backbone
- Omega-6s – found in corn oil, safflower oil, sunflower oil, soybean oil and other vegetable oils
- Excess promotes heart disease, inflammation & cancers
- Typical American diet has too many omega-6s

Polyunsaturated Fats – Omega-3s

- Alpha-linolenic acid (ALA) – 18:3w3
- Flaxseeds & flaxseed oil best source
- Omega-6 & Omega-3 – essential fatty acids (EFAs)
  - The body cannot create them from other fatty acids

Omega-6s – found in corn oil, safflower oil, sunflower oil, soybean oil and other vegetable oils
- Excess promotes heart disease, inflammation & cancers
- Typical American diet has too many omega-6s

Linoleic acid: Omega-6 polyunsaturated fatty acid; c18:2w6

Linolenic acid: Omega-3 polyunsaturated fatty acid; c18:3w3
Eicosapentaenoic acid (EPA) – 20:5w3
Docosahexanoic acid (DHA) – 22:6w3

**Classification of Fatty Acids by Length**

- **Short Chain**
  - 4 to 6 carbon atoms
  - Always saturated
  - Includes butyric acid shown to be a primary fuel for colonic epithelium; caproic acid shown to have antimicrobial function
  - Contribute to the health of the immune system
  - Directly absorbed for quick energy
- **Medium Chain**
  - 8 to 12 carbon atoms: caprylic acid and lauric acid
  - Antimicrobial properties, absorbed quickly, contribute to the health of the immune system
- **Long Chain**
  - 14 to 18 carbon atoms
  - Includes gamma-linolenic acid (GLA), Oleic acid
- **Very Long Chain**
  - 20 to 24 carbon atoms
  - Mainly polyunsaturated
  - Includes essential fatty acids (omega 6 and omega 3)

**Importance of Fatty Acids**

- **Structural**: all animals' cell membranes
- Membrane stability
- Membrane fluidity
- Membrane bound enzyme activates
- Permeability
- Ion-channel modulation
- Eicosanoid formation
- Cholesterol transport and oxidation
- Regulation of gene expression:
  - FAs "talk to our genes"
A diet rich in omega-3 EFAs:
• Improves response to signaling agents
• Reduces inflammatory potential
• Achieve 8-10% cellular EPA/DHA content
- 1 gram EPA/DHA per day for approximately 3 months

Support For Every Organ System!
Improved Function and Reduced Disease Risk

EPA&DHA: The Super Nutrients

A Question of Balance
The average American diet is at least 20 times higher in omega-6 EFAs (plant oils) to omega-3 EFAs. This imbalance can lead to numerous health complications.
75% of Americans may have “silent” inflammation
Underlying cause of conditions such as Alzheimer’s and cardiovascular diseases

Solution

- Increase EPA-DHA consumption (AA/EPA 1.5 to 3):
  - Displace inflammatory compounds such as PGEs
  - Increase formation of anti-inflammatory compounds such as PGEs
- Reduce body fat; insulin increases stored AA which is pro-inflammatory

Omega-6 Fatty Acids
- Linoleic Acid
- Gamma-Linoleic Acid (GLA)
- Arachidonic Acid (AA)

Omega-3 Fatty Acids
- Alpha-Linolenic Acid (ALA)
- EPA
- DHA
- PGE2
- LTB4

Pro-Inflammatory Compounds
Anti-Inflammatory Compounds

- ω-6 : ω-3 in US ~25:1; we need a ratio ~2:1

Reducing Inflammation with EFAs

- Typically, diet high in ω-6, AA and saturated, hydrogenated or partially hydrogenated fats – intensify inflammation – ELIMINATE THESE
- ω-3 – EPA and DHA – cold water fish (salmon, trout, halibut), leafy green vegetables, flax – anti-inflammatory – EAT THESE
- ω-3s comparable to aspirin as anti-inflammatory
- ω-3s shown to reduce exercise-induced constriction of airways & exercise induced asthma
  ⇒ Consume 1-2 Tbsp flaxseed oil/day, eat fish 3-5x/week and/or take 2-10 grams EPA/DHA (fish oils) daily
Omega-3 Fatty Acids Are Anti-Inflammatory

Omega-3 fatty acids:
- Displace pro-inflammatory arachadonic acid reducing the cells' inflammatory potential
- Provide the substrate for anti-inflammatory substances
- Genetically induce anti-inflammatory pathways

Supplementing with omega-3 fatty acids reduces inflammation.

Omega-3 Reduce the Risk of Heart Attacks

Adapted from Siscovich et al. JAMA. 1995;274:1363-1367.

Omega-3 EFAs from fish support short-term as well as long-term cardiovascular health.

"Our finding contradict the current belief in the medical community that increasing the intake of omega-3 fatty acids produces only long-term cardiac benefits."

Dr. Fernando Holguin
### Omega-3 and Healthy Brain Function

“People who eat oily fish or take fish oil supplements score 13 percent higher in IQ tests and are less likely to show sign of Alzheimer’s disease.”

“The results suggest that fish oil users have younger brains than non-users. The aging of the brain is being slowed down by a year or two.”

Dr. Lawrence Whalley

### Omega-3 and Healthy Body Composition

- Fish oil concentrates not only caused weight reduction in the mice but also appeared to stop the animals from gaining weight when given free access to food
- Additionally, omega-3 concentrates reduced the number of fat cells, especially in the abdominal region
- Researchers showed that concentrated fish oil increased oxidation of fat by activating genes that break down fat in the mitochondria and peroxisomes


### How Much EPA-DHA Should Your Patients Take?

<table>
<thead>
<tr>
<th>Application</th>
<th>Daily Levels:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult Maintenance</td>
<td>1-2 grams EPA-DHA</td>
</tr>
<tr>
<td>Cardiovascular Health</td>
<td>1-2 grams EPA-DHA</td>
</tr>
<tr>
<td>Healthy Blood Fat Levels</td>
<td>2-4 grams EPA-DHA</td>
</tr>
<tr>
<td>Inflammation</td>
<td>2-7 grams EPA-DHA</td>
</tr>
<tr>
<td>Mental Function</td>
<td>2-10 grams EPA-DHA</td>
</tr>
<tr>
<td>Prenatal Health</td>
<td>1 gram EPA-DHA</td>
</tr>
<tr>
<td>Children</td>
<td>100 mg DHA</td>
</tr>
</tbody>
</table>

Chad Oler, ND
Summary — PCBs in farmed salmon

July 2003 - Results from tests of store-bought farmed salmon show seven of 10 fish were so contaminated with PCBs that they raise cancer risk.

Salmon farming has made salmon the third most popular fish in America and comprises 22% of all retail seafood counter sales. However, research shows that farmed salmon are likely the most PCB-contaminated protein source for people in the U.S. (Source: Environmental Working Group)

Government studies show that one of every six pregnant women in the U.S. will give birth to a baby whose blood is contaminated with mercury at levels above the federal safety standard. Emitted from coal-fired power plants and other sources, the pollutant builds up in some types of seafood, including canned tuna. Nutrients in fish are vital for a baby's brain development, but too much mercury can cause lasting brain damage. (Source: Environmental Working Group)

Results for a male weighing 200 pounds: (Assuming you eat no other seafood)

**Albacore:**

According to FDA health standards, you can safely eat 6.3 ounces of Albacore tuna per week (assuming that every can of tuna has an average amount of mercury*). That's 1 can of tuna.

One can of tuna delivers approximately 530 mg of EPA/DHA—roughly half the minimum daily requirement of these important nutrients.

USDA analysis

**Omega-3 Formulas Should Be Purity Guaranteed & Meet EPA-DHA Label Claim**

Free of:
- Mercury
- Lead
- Dioxins
- PCBs
- Yeasts, molds, and bacteria

Guaranteed to meet or exceed EPA-DHA label claim!
For Your Patients’ Good Health Look for These Quality Features

- **Quality & Safety**
  - Efficacy: Pharmaceutical grade, ultra refined oils
  - Safe: Free of pesticides and heavy metals
  - Peace of mind: Third-party assayed for purity
  - Fresh and stable: Proprietary antioxidant blend
  - Compliance: Lemon flavored, enteric coated options
  - Variety: Available in various sizes, concentrations and delivery forms (softgel, liquid, chewable)

Six Steps to Superior Quality

1. **Molecular Distillation for Purity and Concentration**
   - **Purpose:** Removes contaminants such as PCBs, dioxin, and pesticides—as well as undesired fatty acids—which helps to concentrate desirable fatty acids such as EPA & DHA.
   - **Process:** Similar to distillation. Oil is heated in a vacuum to separate the contents of the oil.

2. **De-Acidification Removes Free Fatty Acids**
   - **Purpose:** Removes unwanted free fatty acids, color bodies, and other soluble and insoluble impurities. After this process, the oil is clearer with less color, flavor, and odor.
   - **Process:** Free fatty acids, etc. are turned into soaps which can then be extracted with water and steam.

3. **Bleaching Removes Color Pigments & Heavy Metals**
   - **Purpose:** Removes color pigments, heavy metals and other environmental pollutants present in the oil, including any residue from the de-acidification process.
   - **Process:** Oil is heated using low-pressure steam and then filtered through natural clay and carbon filters.

4. **Deodorization Improves Taste & Reduces PCB and Dioxin**
   - **Purpose:** Removes volatile materials affecting flavor, taste, color, and stability of the oil, and helps to eliminate man-made pollution such as PCB and dioxins.
   - **Process:** Oil is heated under vacuum while steam is injected through the oil.

5. **Winterization Removes Solid Particles**
   - **Purpose:** Removes solids from oils that can cause cloudiness and turbidity when kept refrigerated. This process is particularly important for liquid formulas.
   - **Process:** Oil must be cooled down under controlled conditions then filtered to remove solid substances.

Every Batch of Oil Should Be Third-Party Purity-Certified

- Third-party certified by the world’s leader in chemical analysis, Wertz Laboratories in Hamburg, Germany
- Assays available online listed by product and date tested
### Assessing Quality: Using Your Eyes, Nose, and Mouth

**Attributes of High Quality Fish Oil**
- Light, clear, not "cloudy"
- Minimal fish odor
- Minimal fish taste / repeat

### Hydrogenation & Partial Hydrogenation

- Hydrogenation is a chemical process to add more hydrogen to natural fats to decrease the number of double bonds to increase shelf life.
- Become ‘saturated’ with hydrogen:
  \[
  \text{C} = \text{C} + \text{H}_2 \rightarrow \text{C} - \text{C} - \text{C} - \text{C} - \text{C} - \text{C} - \text{C} - \text{C}
  \]
- Partial hydrogenation turns natural fats into Trans fats.

### Cis vs. Trans Fats

- **Cis** = ‘on the same side’
  - Natural / Good
- **Trans** = ‘on the other side’
  - Unnatural / Very, very BAD
Trans Fats

The body cannot properly break down trans fats
- Incorporate into cell membranes – alter function
- In ALL partially hydrogenated oils
- NAS concluded in 2005: “there is no safe level of trans fat consumption”

<table>
<thead>
<tr>
<th>Effect of Trans Fats on Health</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LDL Cholesterol</td>
<td>↑ risk of cardiovascular disease</td>
</tr>
<tr>
<td>HDL Cholesterol</td>
<td>↓ mental performance</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>↑ risk of multiple sclerosis (MS)</td>
</tr>
<tr>
<td>Insulin resistance</td>
<td>↑ risk Parkinson’s Disease</td>
</tr>
<tr>
<td>Risk of diabetes</td>
<td>↑ risk Alzheimer’s Disease</td>
</tr>
<tr>
<td>Risk of hypertension</td>
<td>Can pass through breast milk!</td>
</tr>
</tbody>
</table>

Trans fats = MUST read labels
### Fatty Acid Composition of Nuts and Seeds

<table>
<thead>
<tr>
<th>Nut</th>
<th>ω-6:ω-3 ratio</th>
<th>% MUFA</th>
<th>% PUFA</th>
<th>% SAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walnuts</td>
<td>4.2</td>
<td>23.6</td>
<td>69.7</td>
<td>6.7</td>
</tr>
<tr>
<td>Macadamia nuts</td>
<td>5.3</td>
<td>61.6</td>
<td>1.9</td>
<td>16.5</td>
</tr>
<tr>
<td>Pecans</td>
<td>20.9</td>
<td>39.5</td>
<td>31.5</td>
<td>9.0</td>
</tr>
<tr>
<td>Pine nuts</td>
<td>31.6</td>
<td>39.7</td>
<td>44.3</td>
<td>16.6</td>
</tr>
<tr>
<td>Cashews</td>
<td>47.6</td>
<td>61.6</td>
<td>17.6</td>
<td>20.6</td>
</tr>
<tr>
<td>Pine nuts</td>
<td>51.9</td>
<td>56.5</td>
<td>31.8</td>
<td>12.7</td>
</tr>
<tr>
<td>Sesame seeds</td>
<td>56.2</td>
<td>39.5</td>
<td>45.9</td>
<td>14.6</td>
</tr>
<tr>
<td>Hazelnuts (filberts)</td>
<td>39</td>
<td>78.7</td>
<td>13.6</td>
<td>7.7</td>
</tr>
<tr>
<td>Pumpkin seeds</td>
<td>114.4</td>
<td>32.5</td>
<td>47.6</td>
<td>19.9</td>
</tr>
<tr>
<td>Brazil nuts</td>
<td>477.9</td>
<td>36.2</td>
<td>38.3</td>
<td>25.5</td>
</tr>
<tr>
<td>Sunflower seeds</td>
<td>514.4</td>
<td>20.0</td>
<td>69.0</td>
<td>11.0</td>
</tr>
<tr>
<td>Almonds (high ω-3)</td>
<td>66.6</td>
<td>25.3</td>
<td>8.1</td>
<td></td>
</tr>
<tr>
<td>Coconuts (high ω-3)</td>
<td>4.4</td>
<td>1.3</td>
<td>94.3</td>
<td></td>
</tr>
<tr>
<td>Peanuts</td>
<td>204.2</td>
<td>52.1</td>
<td>33.3</td>
<td>14.6</td>
</tr>
</tbody>
</table>

### Animal Fat

#### Comparison of Animals’ Muscle Fatty Acid Concentrations (mg fatty acids/100 g sample)

<table>
<thead>
<tr>
<th>Fatty Acid</th>
<th>Elk</th>
<th>Mule Deer</th>
<th>Antelope</th>
<th>Pasture-Fed Steer</th>
<th>Grain-Fed Steer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saturated</td>
<td>610</td>
<td>989</td>
<td>895</td>
<td>310</td>
<td>1509</td>
</tr>
<tr>
<td>Monounsaturated</td>
<td>507</td>
<td>612</td>
<td>610</td>
<td>793</td>
<td>1856</td>
</tr>
<tr>
<td>Total Polyunsaturated</td>
<td>625</td>
<td>746</td>
<td>754</td>
<td>262</td>
<td>341</td>
</tr>
<tr>
<td>Omega 3 PUFA</td>
<td>178</td>
<td>225</td>
<td>216</td>
<td>61</td>
<td>46</td>
</tr>
<tr>
<td>Omega 6 PUFA</td>
<td>448</td>
<td>524</td>
<td>536</td>
<td>138</td>
<td>243</td>
</tr>
<tr>
<td>Ratio ω-6:ω-3</td>
<td>2.5:1</td>
<td>2.3:1</td>
<td>2.5:1</td>
<td>2.3:1</td>
<td>5.3:1</td>
</tr>
</tbody>
</table>

* Organic, 100% pasture fed ideal

### Omega-3 content of foods

<table>
<thead>
<tr>
<th>Food</th>
<th>LNA (mg)</th>
<th>EPA (mg)</th>
<th>DHA (mg)</th>
<th>Total ω-3 (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mackerel, Atlantic</td>
<td>100</td>
<td>900</td>
<td>1000</td>
<td>2000</td>
</tr>
<tr>
<td>Herring (souper)</td>
<td>100</td>
<td>700</td>
<td>900</td>
<td>1700</td>
</tr>
<tr>
<td>Lake Trout</td>
<td>400</td>
<td>500</td>
<td>1100</td>
<td>2000</td>
</tr>
<tr>
<td>Tuna, Albacore</td>
<td>200</td>
<td>300</td>
<td>1000</td>
<td>1500</td>
</tr>
<tr>
<td>Salmon, Chinook</td>
<td>100</td>
<td>600</td>
<td>600</td>
<td>1500</td>
</tr>
<tr>
<td>Salmon, Pink</td>
<td>400</td>
<td>600</td>
<td>1000</td>
<td>1500</td>
</tr>
<tr>
<td>Sardines, canned</td>
<td>500</td>
<td>400</td>
<td>800</td>
<td>1500</td>
</tr>
<tr>
<td>Egg yolk</td>
<td>700</td>
<td>100</td>
<td>700</td>
<td>1500</td>
</tr>
<tr>
<td>Walnuts</td>
<td>1040</td>
<td>-</td>
<td>1000</td>
<td>10400</td>
</tr>
<tr>
<td>Flaxseed</td>
<td>18100</td>
<td>-</td>
<td>-</td>
<td>18100</td>
</tr>
<tr>
<td>Flaxseed oil</td>
<td>53300</td>
<td>-</td>
<td>-</td>
<td>53300</td>
</tr>
</tbody>
</table>
Fat & Protein Content of Meats/Seafood (% of total calories)

<table>
<thead>
<tr>
<th>Meat &amp; Fish to Eat</th>
<th>% Protein</th>
<th>% Fat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef</td>
<td>22</td>
<td>30</td>
</tr>
<tr>
<td>Pork</td>
<td>19</td>
<td>56</td>
</tr>
<tr>
<td>Turkey</td>
<td>24</td>
<td>8</td>
</tr>
<tr>
<td>Chicken</td>
<td>32</td>
<td>10</td>
</tr>
<tr>
<td>Fish</td>
<td>20</td>
<td>55</td>
</tr>
<tr>
<td>Seafood</td>
<td>15</td>
<td>23</td>
</tr>
<tr>
<td>Eggs</td>
<td>18</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Meat &amp; Fat to Avoid</th>
<th>% Protein</th>
<th>% Fat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pork</td>
<td>20</td>
<td>55</td>
</tr>
<tr>
<td>Turkey</td>
<td>32</td>
<td>10</td>
</tr>
<tr>
<td>Chicken</td>
<td>32</td>
<td>10</td>
</tr>
<tr>
<td>Fish</td>
<td>22</td>
<td>30</td>
</tr>
<tr>
<td>Seafood</td>
<td>20</td>
<td>55</td>
</tr>
<tr>
<td>Eggs</td>
<td>18</td>
<td>5</td>
</tr>
</tbody>
</table>

Oil Processing

- Organic cold pressed (140-160 ºF)
- High volume expeller press (friction heat 162-183 ºF)
- Solvent extraction (300 ºF)
- Filter press bleaching (225 ºF)
- Deodorizing (450-520 ºF)

Best oil?
- Extra Virgin, expeller-expressed, cold pressed, stone ground, unfiltered/unrefined, organic
- Low acidity (0-0.8%)

Getting the Fatty Acid Balance Right

- If you choose to eat animal protein, choose fish high in omega-3:
  - Anchovies, herring, mackerel (Atlantic), salmon (wild), sardines, trout, tuna (albacore)
  - Eggs – organic, pasture fed
  - Meat – organic, pasture/grass fed or wild
  - Remember – 1 deck of cards sized flesh protein 4-5x/week maximum
  - Choose the right oils for cooking
Oil Usage at a Glance

- **Best for Baking**
  - Coconut oil
  - Palm oil
  - Safflower oil (high oleic)
  - Sunflower oil (high oleic)

- **Best for Frying**
  - Coconut oil
  - Avocado oil
  - Palm oil
  - Sesame oil

- **Best for Sautéing**
  - Canola oil
  - Coconut oil
  - Olive oil
  - Safflower oil (high oleic)
  - Sesame oil
  - Sunflower oil (high oleic)

- **Best for Dressing, Marinades, and Dipping**
  - Flax oil
  - Udo’s Oil
  - Hemp oil
  - Olive oil
  - Toasted sesame oil

- Olive, coconut, and flax/Udo’s
- Store oils in cool, dark place
- Do NOT heat flax or Udo’s oil – store in fridge
- Use a bit more flax than olive oil daily
- Do not use soybean (vegetable oil), wheat germ or peanut oils
- Contains lectins that can adversely affect GI, immune, and heart health

Nut \( \omega-6: \omega-3 \) ratio

<table>
<thead>
<tr>
<th>Nut</th>
<th>( \omega-6 )</th>
<th>( \omega-3 )</th>
<th>% MUFA</th>
<th>% PUFA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walnuts</td>
<td>4.2</td>
<td>23.8</td>
<td>69.7</td>
<td></td>
</tr>
<tr>
<td>Macadamia nuts</td>
<td>6.3</td>
<td>81.6</td>
<td>1.9</td>
<td></td>
</tr>
<tr>
<td>Pecans</td>
<td>20.9</td>
<td>59.5</td>
<td>11.5</td>
<td></td>
</tr>
<tr>
<td>Pine nuts</td>
<td>31.8</td>
<td>39.7</td>
<td>44.3</td>
<td></td>
</tr>
<tr>
<td>Cashews</td>
<td>47.8</td>
<td>61.8</td>
<td>17.6</td>
<td></td>
</tr>
<tr>
<td>Pistachios</td>
<td>51.9</td>
<td>55.2</td>
<td>31.8</td>
<td></td>
</tr>
<tr>
<td>Sesame seeds</td>
<td>58.2</td>
<td>39.5</td>
<td>45.9</td>
<td></td>
</tr>
<tr>
<td>Hazelnuts (filberts)</td>
<td>90</td>
<td>76.7</td>
<td>31.0</td>
<td></td>
</tr>
<tr>
<td>Pumpkin seeds</td>
<td>114.4</td>
<td>32.5</td>
<td>47.6</td>
<td></td>
</tr>
<tr>
<td>Brazil nuts</td>
<td>37.7</td>
<td>36.2</td>
<td>38.3</td>
<td></td>
</tr>
<tr>
<td>Sunflower seeds</td>
<td>47.2</td>
<td>20.0</td>
<td>69.0</td>
<td></td>
</tr>
<tr>
<td>Almonds</td>
<td>18</td>
<td>61.9</td>
<td>25.3</td>
<td></td>
</tr>
</tbody>
</table>

Eat raw if possible – preserves \( \omega-3 \)
- Soaking nuts improves digestion
  - Soak overnight, drain and store in fridge for up to a week
- Flaxseeds – grind in coffee grinder; eat ~1 tablespoon daily
- Enjoy nuts/seeds as a snack/side dish, not a main dish

Easy way to improve digestibility and nutritional value
- Put nuts or seeds in a bowl, cover with purified water and let sit overnight
- Drain water, rinse thoroughly with fresh water
- Store in refrigerator for up to a week
**Quality Fats**

- Saturated fat
  - Coconut oil
  - Ghee/organic butter

- Monounsaturated fat
  - Olive oil
  - Nuts & seeds

- Polyunsaturated fats
  - Flaxseed oil/flaxseeds
  - Avocados
  - Walnuts, hazelnuts, almonds, cashews

- Omega 3
  - Fish & fish oils
  - Omega-3 eggs

**EFA Deficiency**

- Standard American Diet
  - ~25:1 omega 6:omega 3 – should be ~2-4:1
  - Dry skin, hair, nails, follicular hyperkeratosis
  - Foggy brain, inability to concentrate, psychological disturbances
  - Compromised immune system
  - Neuropathy
  - Reduce visual acuity
  - High total cholesterol/HDL ratio
  - High triglycerides

**EPA:DHA Ratios**

<table>
<thead>
<tr>
<th>Ratio</th>
<th>Condition</th>
<th>Daily Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>6:1</td>
<td>Asthma, allergies</td>
<td>1-4 grams</td>
</tr>
<tr>
<td></td>
<td>Inflammation</td>
<td>2-7 grams</td>
</tr>
<tr>
<td>1:1/3:4</td>
<td>Cognitive dysfunction, pregnancy, nursing</td>
<td>2-10 grams</td>
</tr>
<tr>
<td>3:2</td>
<td>Maintenance, metabolic syndrome, CV, DM, or combination of above</td>
<td>2-4 grams</td>
</tr>
</tbody>
</table>
Quality Fats

- **Oils to use/store Cold**: flax oil, walnut oil, fish oils/cod liver oil, EPA-DHA, avocado
- **Oils to Heat**: Olive oil (low-medium), sesame oil, grape seed oil, butter (high), coconut oil (high)
- **Nuts and Seeds**: Raw only! Almonds, walnuts, hazelnuts, sunflower seeds, pumpkin seeds
- **Nut Butters**: Almond butter, cashew butter, peanut butter (Valencia best) – use PB in moderation only (can be inflammatory)

Fat Summary

- Fats are necessary for optimal health; it’s the type of fat that is important
- Saturated fats are found mainly in meat; they are pro-inflammatory – minimize these
- Monounsaturated fats are found mainly in olive, almond and canola oil; can be anti-inflammatory – eat these
- Polyunsaturated fats found mainly in fish, flaxseeds and vegetables;
  - Includes Omega-6 and Omega-3 essential fatty acids (EFAs); they are anti-inflammatory
  - Eat these a LOT

Fat Summary

- Avoid ALL trans fats and foods that have partially hydrogenated oils
- High heat cooking – Coconut oil
- Medium/low heat cooking – olive or canola (non-GMO) oil
- Salad dressings – Flaxseed oil
- Eat raw nuts and seeds, especially walnuts
- If you eat animal protein – choose wild caught fish or low saturated fat meats
- Get 1-2 Tbsp per day Flaxseed oil
- Get 2-10 grams EPA/DHA per day
Fat Resources

- Fats to Heal, Fats that Kill – Udo Erasmus
- Know Your Fats: The Complete Primer for Understanding the Nutrition of Fats, Oils and Cholesterol – Mary Enig, PhD

Proportions

Questions on Macronutrients??

Protein
- 4 calories/gram
- Made from amino acids
- Functions: energy, growth, repair, immune, enzymes, structures

Fat
- 9 calories/gram
- Made up of fatty acids
- Functions: energy, protection, thermal, cell membrane, lubricant, O2 transport

Carbohydrate
- 4 calories/g, 4 carb./gram
- Made up of C6H12O6, glucose
- Functions: energy
Your body is about 70% water. You lose water every day (through sweat, urine, normal metabolism and breathing); if you don’t replace it everyday, you will become dehydrated. Most people are dehydrated; in fact, we have found less than 1% of the people we’ve tested are properly hydrated. Nothing limits physical performance faster than dehydration. If you lose just 2.5% of your body weight from water loss, you will lose 25% of your mental and physical abilities.

Chad Oler, ND

Functions of Water in the Human Body

- Improves oxygen delivery to the cells
- Transports nutrients
- Enables cellular hydration
- Cushions and lubricates bones and joints
- Absorbs shocks to joints and organs
- Regulates body temperature
- Removes wastes and flushes toxins
- Improves cell-to-cell communications
- Maintains normal electrical properties of cells
- Allows immune system to function properly

Reduces Inflammation!

Chad Oler, ND

The Dehydration Epidemic

What America Drinks

<table>
<thead>
<tr>
<th>Servings per day in order of quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water – 4.6</td>
</tr>
<tr>
<td>Coffee – 1.8</td>
</tr>
<tr>
<td>Milk – 1.3</td>
</tr>
<tr>
<td>Juices – 1.4</td>
</tr>
<tr>
<td>Soda with caffeine – 1.3</td>
</tr>
<tr>
<td>Soda without caffeine – 0.6</td>
</tr>
<tr>
<td>Beer – 0.5</td>
</tr>
<tr>
<td>Wine or other alcoholic beverage – 0.3</td>
</tr>
</tbody>
</table>

- Coffee, soda, caffeinated beverages, and alcohol are all diuretics – which means they are dehydrating
- Net is that the average American consumes only ~3 eight (8) oz. servings of hydrating beverages daily!
Detrimental Effects of Dehydration

<table>
<thead>
<tr>
<th>Early Signs of Dehydration</th>
<th>Mature Signs of Dehydration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatigue</td>
<td>Heartburn</td>
</tr>
<tr>
<td>Anxiety</td>
<td>Joint and back pain</td>
</tr>
<tr>
<td>Irritability</td>
<td>Migraine headaches</td>
</tr>
<tr>
<td>Depression</td>
<td>Fibromyalgia</td>
</tr>
<tr>
<td>Cravings</td>
<td>Constipation/colitis</td>
</tr>
<tr>
<td>Cramps</td>
<td>Anginal pain</td>
</tr>
<tr>
<td>Headache</td>
<td>Asthma and allergies</td>
</tr>
<tr>
<td></td>
<td>Adult onset diabetes</td>
</tr>
<tr>
<td></td>
<td>Hypertension</td>
</tr>
<tr>
<td></td>
<td>Autoimmune disorders</td>
</tr>
<tr>
<td></td>
<td>Skin disorders</td>
</tr>
<tr>
<td></td>
<td>(psoriasis, eczema, etc.)</td>
</tr>
</tbody>
</table>

If my urine is clear, I am hydrated well.
FALSE
If your urine is clear, it simply means that you drank more water than your body could absorb and it is flushing it out. It has no bearing on your hydration status.

Chad Oler, ND

Hydration Myths

- Thirst response is a reliable indicator of when I need to drink water
- Thirst response is NOT a reliable gauge of hydration/need for water
  - Thirst response will decrease if ignored over time
  - Thirst response often mistaken for hunger
  - Thirst response decreases with age
Hydration Myths

- If I drink a lot of water at once, I am getting rehydrated.
  **FALSE**
- Your body's cells can only absorb so much water at once, no matter how much water you drink. While exceeding that capacity isn't harmful, you will be making more trips to the bathroom and you won't be any better hydrated.

Hydration Myths

- I drink plenty of other liquids during the day – including milk, black tea, coffee, soda and alcohol – that all counts as water.
- Tea (caffeinated), coffee, alcohol, soda and caloric beverages are NOT substitutes for water
  - They are all diuretics, which means they make you MORE dehydrated

Hydration Myths

- Dehydration isn't that big of a deal.
  **FALSE**
- If you lose just 2.5% of your body weight from water loss, you will lose 25% of your mental and physical abilities. That means if a 100 pound person loses just 2.5 pounds or a 200 pound person loses 5 pounds of water (which can easily be done in a 1 hour workout or game), you will already be operating at 75% maximum capacity! That is a VERY BIG DEAL!
We lose 2-3 quarts of water per day through normal perspiration, respiration, urination and metabolism. Can increase dramatically with exercise, changes in temperature, humidity, altitude, stress & body size.

You can get dehydrated in a couple hours, but it can take 2-3 weeks to become properly hydrated once you become dehydrated.

Drink ½ your body weight in ounces every day + water lost during excessive sweating.

Example: 150 lb person should drink ~75 oz. of water throughout the day + water lost through sweating.

Sweating:
- 2-3 hours yardwork can cause 2-3 lbs of water loss
- 1 hour hard workout/practice can cause 2-5 lbs water loss
- 2 lbs water loss = 1 quart extra water needed

Must drink in divided doses – 2-4 oz. every 20-30 minutes ideal, water lost from sweating should be replaced over next 12-18 hrs.

Drink the purest water available – distilled, reverse osmosis, filtered bottled water (glass or hard plastic), bottled spring water (glass or hard plastic).
"Tap water in 42 states is contaminated with more than 140 unregulated chemicals."

Chemicals are used to kill pathogens, but does not get rid of pharmaceuticals, hormones, or chemicals.

"A vast array of pharmaceuticals -- including antibiotics, anti-convulsants, mood stabilizers and sex hormones -- have been found in the drinking water supplies of at least 41 million Americans, an Associated Press investigation shows."

"Fish, apparently male, are developing female sex organs due to high estrogen levels in the water."
1% of the world's water is drinkable

Bacteria, parasites
- 1993 Cryptosporidium outbreak in Milwaukee left 400,000 sick and 100 dead
- 1996 Giardia outbreak in Penticton, BC, over 350 confirmed cases
- 2000 E. Coli Walkerton, ON killed 7, hundreds sick

Chlorine
- May form toxins called trihalomethanes (THMs)
- THMs have been linked to a wide range of human health maladies
- Organochlorines are known carcinogens and mutagens
- Ozone is a potential alternative currently being used in Las Vegas, Milwaukee, Santa Clara

Heavy metals
- Most commonly found - Lead, mercury, arsenic, copper
- Sources are household plumbing, household paint, urban runoff from urbanization and industrialization, coal burning plants, smelters, waste incinerators...

Fluoride
One study done in Texas, found a particular area with low incidence of dental caries and attributed this to high levels of fluoride in the water.

Sodium Fluoride, Fluorosilicic acid has been added to USA's drinking water since the 1960's

Following studies have not demonstrated this. In fact, 40,000 kids over 84 different geographical areas showed no difference in tooth decay in fluorinated areas versus non-fluorinated areas.
Well Water

- Microorganisms especially in shallow wells
- Runoff pollutants, fertilizers and pesticides, industrial products
- Natural elements and gas such as uranium, radium, and radon
- Nitrates and nitrites
- Heavy metals especially arsenic and lead and household plumbing metals (copper and lead)
- Fluoride

Bottled Water

- Regulated by the FDA according to standards of identity (for labeling purposes), quality and GMP.
- Standards of quality regulate acceptable levels of the water's turbidity, color and odor, according to sample analysis.
- Exemptions are made according to aesthetically-based allowable levels, and do not relate to health concerns.
Water

- Standards of identity include
  - Ground water
    - Water must not be under the influence of surface water
  - Mineral water
    - Must contain not less than 250 parts per million of total dissolved solids
  - Artesian water
    - Comes from a well tapping a confined aquifer in which the water level stands at some height above the top of the aquifer
  - Purified water
    - Produced by distillation, deionization, reverse osmosis or similar process
  - Sparkling water
    - Contains the same amount of carbon dioxide it had at emergence from the source although it may be replenished in treatment
  - Spring water
    - Derived from an underground formation from which water flows naturally to the earth’s surface

Purified Water

- Distilled
  - The process of heating water to its boiling point, capturing and then condensing the pure steam to form pure distilled water
  - Removes a few parts per million more of common minerals
  - Does not do a good job with volatile chemicals with low boiling points
  - Carbon
    - Takes out chemicals (herbicides, pesticides, chlorine)
    - Traps organic contaminants
    - Removes some heavy metals
    - Does not remove fluoride or microorganisms
  - Reverse osmosis with carbon filter
    - Takes out fluoride, chemicals, organic contaminants, pharmaceuticals, nitrates, and heavy metals
    - Does not take out chlorine without a carbon filter
  - UV light
    - Added to kill existing microorganisms

Home Test Kits

- Available on the internet or check “water analysis” in yellow pages, or ask local state health department for names of certified labs that can test your water
- Can test
  - Heavy metals (special testing for mercury)
  - Microorganisms
  - Hardness
  - Iron
  - Sediment
  - Radon
  - Pesticides
**Alkaline/Ionized water claims**
- Increased hydration
- Increases Ca, Mg, K
- Increased oxygen
- Increases toxin elimination
- Increases pH

**Proposed Mechanism of Action**
- Adds negatively charged hydroxyl ions to pair up with positively charged free radicals
- Restructuring of molecules during ionization, binds extra oxygen molecules to cluster for oxygen saturation
- Increases number of molecules per “cluster” from typical 5-8 to 11-16 therefore increasing absorption

---

**Alkaline Concentrate**
- Contains a special ratio of mineral ingredients to naturally alkalize your water

**Flavored Water**
- Splenda/Stevia
- Artificial flavor
- Natural fruit flavor

---

**Our Body’s Water Needs**
- **Drink ½ your body weight in ounces every day + water lost during excessive sweating**
  - Example: 150 lb person should drink ~75 oz. of water throughout the day + water lost through sweating
  - Sweating:
    - 2-3 hours yardwork can cause 2-3 lbs of water loss
    - 1 hour hard workout/practice can cause 2-5 lbs water loss
    - 2 lbs water loss = 1 quart extra water needed
  - Must drink in divided doses – 2-4 oz. every 20-30 minutes ideal; water lost from sweating should be replaced over next 22-18 hrs
  - Drink the purest water available – distilled, reverse osmosis, filtered bottled water (glass or hard plastic), bottled spring water (glass or hard plastic)
Questions on Water?

Organic Planet

Organic Food

Healthy Soil = Healthy Man

"So long as one feeds on food from unhealthy soil, the spirit will lack the stamina to free itself from the prison of the body." — Rudolph Steiner
Our Food Choices Affect Our World

• Main causes of death in the US stem from degenerative disease linked to all the saturated/trans fats, empty calories (anti-nutrient rich foods), pesticides and chemicals we ingest.
• Numerous studies show that a diet high in fresh vegetables, fruits, legumes and whole grains (nutrient-rich foods) prolongs both the length and quality of life.
• Buying organic decreases your exposure to toxins.
• Locally grown foods retain more nutrients & flavor.

Buying organic and locally improves your health and performance and increases your quality of life.

What is ‘Organic’?

• System of farming that:
  – Maintains and replenishes soil fertility without the use of toxic and persistent pesticides and fertilizers.
  – Does NOT use ANY antibiotics, synthetic hormones, genetic engineering drugs, sewage sludge, irradiation or cloning.
• Organic foods are minimally processed without artificial ingredients, preservatives, or irradiation to maintain the integrity of the food.
• Products labeled “100% Organic” and carrying the “USDA Organic” seal are just that – they contain all organically produced ingredients.

Organic vs. Conventional Foods

• Genetically Modified Organisms (GMOs)
• Antibiotics (means ‘anti-life’)
• Fertilizers
• Pesticides, herbicides and insecticides (‘-cides’ means ‘to kill’)
• Nutritional content
• Hormones
• Sustainability and Social Responsibility
• Environment
Genetically Modified Organisms

The genes of the organism are altered to resist pests and pesticides

Concerns

- Gene Mutation
- Allergic Reaction
- Increased Chemical Use
- Lack of Research
- Antibiotic Resistance
- Cross Pollination/Contamination
- Loss of Nutrition

"Researchers do not know if there are any long-term or unintended side effects from eating GE (genetically engineered) foods."

GMO’s As Of 2013

- Alfalfa (first planting 2011)
- Canola (approx. 90% of U.S. crop)
- Corn (approx. 88% of U.S. crop in 2011)
- Cotton (approx. 90% of U.S. crop in 2011)
- Papaya (most of Hawaiian crop; approximately 988 acres)
- Soy (approx. 94% of U.S. crop in 2011)
- Sugar Beets (approx. 95% of U.S. crop in 2010)

GMO Foods

- Foods that had received FDA approval as of 2002
Detecting GMO Foods

• **Price Look-Up codes**
  – Commonly called PLU number
  – The code is a four or five-digit number, currently in the 3000–4999 range
  – Organic produce is denoted by a five-digit number whose first digit is 9
  – An 8 prefix indicates genetically modified food

Organic – Non-GMO

• All organic is non-GMO (genetically modified organisms)
• GMO products often use more and/or more toxic pesticides due to adaptation by the bugs to previous pesticides
• Organic uses NO pesticides

Problems with GMOs

• GMOs disrupt natural evolution
• GMOs can release toxic chemicals into the environment
• GMOs can contribute the presence of antibiotic resistance ‘super-bugs’
• GMOs threaten native species
• GMOs may affect reproduction
• GMOs do NOT have to be labeled!
Experiment & Information on GMOs

- Fed mice either GM or non-GM corn & soy
  - GM-fed mice stopped playing with each other & withdrew; when students tried to pick them up, they ran around in apparent fear and tried to climb the walls; one mouse died
  - Non-GM fed mice were well behaved and allowed students to pick them up normally

- More information about GMOs:
  [www.seedsofdeception.com](http://www.seedsofdeception.com)

Jeffery Smith

Antibiotics in Agriculture

- Conventional farmers use a LOT of antibiotics
  - Promotes animal growth
  - 24.6 million pounds of antibiotics a year
  - 70% of all antibiotics made in the United States are used to fatten up livestock
  - Pollutes our water and tap water

- Promotes antibiotic-resistant ‘super-bugs’
  - The reason to avoid conventional meats is not because the antibiotics used are transferred to you, but because of how the antibiotics increase the number of antibiotic resistant bacteria IN you

References:
Why use Toxic Fertilizers

- http://www.youtube.com/watch?v=4Z1C8VKtLwY&feature=related – chemical fertilizers
- US costal waters receive 100-400% more nitrogen than natural systems would normally
- 90% of the nitrogen pollution that contributes to the ‘dead zone’ in the Gulf of Mexico is from farms & cities located north of St. Louis, MO
- http://www.youtube.com/watch?v=mjWnZUONzWI – corn boom - jimbo
- http://www.youtube.com/watch?v=YO3Gg3YfJ84&NR=1 – algae boom
- http://www.youtube.com/watch?v=-ABKbjopXeg – lawn people
- http://www.youtube.com/watch?v=D1iv37Yn8bg&NR=1 - dissolved O2 in water – pueget sound
- Chemical fertilizers contain heavy metals, including arsenic, lead, mercury, cadmium, chromium, and dioxin, among others often exceeding the limits set on wastes to landfills

Pesticides

- 2.5 million tons of pesticides used per YEAR
  - ~30% are classified by the U.S. Environmental Protection Agency as known or suspected carcinogens
  - Only 0.1% of applied pesticides reach target pests
  - 99.9% impact the environment
  - Environmental costs of pesticides in the US = $9 billion/yr
  - Contaminating groundwater on every continent
- Create resistance in nature:
  - In the past 50 years, more than 500 insect pests, 230 crop diseases, and 220 weeds have become resistant to pesticides and herbicides
  - Pesticides are now 10-100 times more potent that formulations used just 25 years ago.

Pesticides, herbicides, insecticides and YOU

- >90% of water and fish samples and about 50% of all sampled wells contain 1 or more pesticides
- US consumers average 70 daily exposures to residues of pesticides, herbicides and insecticides/day
  - Amount of fruit and veggies consumed by the average person in 1 year = 1 gallon pesticides
- These exposures have been linked to headache, depression, memory decline, fatigue, nausea mood swings, asthma, eczema, irritable bowel syndrome, rhinitis (nasal inflammation), Parkinson’s disease, cancer, immune suppression, nervous system disorders, reproductive changes and disruption of hormones
Pesticides, herbicides, insecticides and Children

- Pesticides are particularly harmful to kids:
  - More than 1,000,000 children ingest at least 15 pesticides/day from fruits and vegetables
  - More than 600,000 eat doses that the government considers unsafe
  - More than 61,000 eat doses that exceed unsafe levels by 10x or more
- Interfere with proper sexual differentiation, can cause birth defects, allergies, immunotoxicity, neurotoxicity and cancer in the individual AND that individual’s offspring
- Research also suggests that these chemicals may have an effect on aggression levels and learning disabilities in children

Pesticides, herbicides, insecticides and YOU

- All of these chemicals disrupt your normal metabolism and decrease cellular energy production
  - ↑ body fat, ↓ muscle mass, ↓ energy, ↑ pain
- All of these chemicals decrease your immune function
  - ↑ your chance of injury & illness
  - ↓ recovery, training volume and performance
- They will kill you over time

Organic Produce

Comparison of Organic vs. Conventionally Grown Plant Foods. Percentage of studies in which nutrients in organic crops are increased or remain the same

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>% Increased</th>
<th>% Remained</th>
<th>Same</th>
<th># of Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin C</td>
<td>58.3</td>
<td>33.3</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Beta-carotene</td>
<td>38.5</td>
<td>38.5</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Zinc</td>
<td>25.0</td>
<td>56.3</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>B vitamins</td>
<td>12.5</td>
<td>75.0</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Calcium</td>
<td>44.7</td>
<td>42.5</td>
<td>47</td>
<td></td>
</tr>
<tr>
<td>Protein</td>
<td>100</td>
<td>0</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Magnesium</td>
<td>37.7</td>
<td>53.3</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>Iron</td>
<td>42.9</td>
<td>40.0</td>
<td>35</td>
<td></td>
</tr>
</tbody>
</table>
Conventional Animal Products

**Research Shows**
- From 1930 to 2002 (conventionally raised food):
  - The mineral content of milk, cheese and beef declined 70%
  - Parmesan cheese had 70 percent less magnesium and calcium
  - Beef steaks contained 55 percent less iron
  - Chicken had 31 percent less calcium, 69 percent less iron
  - Milk showed a large drop in iron, 21 percent decline in magnesium.
  - Copper declined 60 percent in meats, 90 percent in dairy products.

Hormones

Average Milk Production Annually

<table>
<thead>
<tr>
<th>1950</th>
<th>Today</th>
</tr>
</thead>
<tbody>
<tr>
<td>5,300 pounds</td>
<td>18,000 pounds</td>
</tr>
</tbody>
</table>

Milk from bovine growth hormone (rBGH) treated cows contains higher levels of insulin like growth factor (IGF-1), which in humans has been linked to colon and breast cancer.

Meanwhile, both the European Union and Canada have banned rBGH due to safety concerns.

http://www.themeatrix.com/learnmore/rbgh.html

Global Impact

- Continued expansion of the industrial farming model for the next few decades has the potential to have massive, irreversible environmental impacts:
  - In 50 years there will be ~2.5 fold (250%) increase in oxygen depleted water
  - This will KILL anything in those waters
- Groundwater contamination is irreversible
Organic Planet

- Organic agriculture protects the health of people and the planet by reducing the overall exposure to toxic chemicals from synthetic pesticides that can end up in the ground, air, water and food supply, and that are associated with health consequences, from asthma to cancer. Because organic agriculture doesn't use toxic and persistent pesticides, choosing organic products is an easy way to help protect yourself and the planet.

Organic can change it

- Organic farming can help reduce ground and surface water contamination, and can safeguard drinking water supplies.
- Can reduce greenhouse gas emissions by locking more carbon in the soil (fertilizer).
- Uses 50% less energy than conventional.
- Crops grown under organic systems yield as well as, and sometimes better than, those grown conventionally.
- In Germany, several water utilities now pay farmers to switch to organic operations because such conversion costs less than removing farm chemicals used in conventional agriculture from water supplies.

Organic can change it

- Overall, organic foods have 25% more nutrients than conventional foods.
- Organic foods contain ~30% more antioxidants than conventional foods.
- Nutrients in organic foods are 3-10x more bioavailable than those in conventional foods.
- Organic foods have 85% less pesticide residues as conventionally grown counterparts.
- Organic foods have significantly less heavy metal and nitrate levels than conventionally grown produce.
- There are certain foods that have much higher pesticide residues and should ONLY be purchased organically.
Pesticides in Produce

- Dirty Dozen
  - Peaches
  - Apples
  - Bell Peppers
  - Celery
  - Nectarines
  - Strawberries
  - Cherries
  - Lettuce
  - Grapes (imported)
  - Pears
  - Spinach
  - Potatoes

http://www.foodnews.org/walletguide.php

Organic Standards

- "Organic" is a production claim
  - How your food is handled and produced
  - Renewable resources, no antibiotics, no growth hormone, produced without using most conventional pesticides/petroleum based fertilizers/sewage sludge, or food that comes from animals the eat grains treated with these, no GMO foods, or foods treated with ionizing radiation

Natural Standards

- "All Natural"
  - Not regulated and has no nutritional meaning
  - Is meant to indicate food has undergone no or minimal processing and contains no additives such as artificial coloring
  - Things labeled "natural" may still contain growth hormone, GMOs, pesticides, hydrolyzed vegetable protein, MSG…
Organic vs. “Natural”

**USDA Organic vs. Natural**

<table>
<thead>
<tr>
<th></th>
<th>Organic</th>
<th>Natural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic persistent pesticides</td>
<td>Not allowed</td>
<td>Allowed</td>
</tr>
<tr>
<td>GMOs</td>
<td>Not allowed</td>
<td>Allowed</td>
</tr>
<tr>
<td>Antibiotics</td>
<td>Not allowed</td>
<td>Allowed</td>
</tr>
<tr>
<td>Growth hormones</td>
<td>Not allowed</td>
<td>Allowed</td>
</tr>
<tr>
<td>Organic compared to irradiation</td>
<td>Not allowed</td>
<td>Allowed</td>
</tr>
<tr>
<td>Animal welfare requirements</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Cost required to be on pasture for pasture season</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Lower levels of environmental pollution</td>
<td>Yes</td>
<td>Not Necessarily</td>
</tr>
<tr>
<td>Audit performed from farm to table</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Certification required, including inspections</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Legal restrictions on allowable materials</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

Free Range Standards

- **“Free Range”, “Cage Free”**
  - Typically seen on eggs, chicken, turkey
  - Includes animals not locked in cages (yet may still be packed side by side in big sheds with access to the outdoors
  - No regulation on outdoor access quantity or quality of outdoor space
  - Does not regulate the animals diet (antibiotics, waste products)
  - The term “hormone free” is a misnomer as growth promoting hormones on chickens was banned decades ago.

Grass Fed Standards

- Grass and forage shall be the feed source consumed for the lifetime of the ruminant animal, with the exception of milk consumed prior to weaning. The diet shall be derived solely from forage consisting of grass (annual and perennial), forbs (e.g., legumes, Brassical, browse or cereal grain crops in the vegetative (pre-grain) state.
- Animals cannot be fed grain or grain byproducts and must have continuous access to pasture during the growing season.
- Growing season is defined as the time period extending from the average date of the last frost in spring to the average date of the first frost in the fall in the local area of production.
Grass Fed Standards

- Hay, without grain and other roughage sources may also be included as acceptable feed sources.
- Consumption of seeds naturally attached to forage is acceptable. However, crops normally harvested for grain (including but not limited to corn, soybean, rice, wheat and oats) are only eligible feed if they are foraged or harvested in the pre-grain state.
- Routine mineral and vitamin supplementation is okay.
- Upon request, verification of this claim will be accomplished through an audit of the production process.

Grass Fed Standards

- Department Of Agriculture Grass Fed Claims
  - Livestock producers may request that a grass feed claim be verified by the Department of Agriculture (USDA)
  - Effective date November 15, 2007

Your Choices Matter – Make them Informed

- “If people really understood the connection of environmental damage to their own lives, they would be much more motivated to preserve and protect the environment.”
Resources: Videos

- Store Wars
  - http://www.youtube.com/watch?v=MfTQergr29M&feature=related
- Organic Food (yahoo answers)
  - http://www.youtube.com/watch?v=FwQInhYotAw&feature=related
- Super Size Me – the Smoking Fry
  - http://www.youtube.com/watch?v=htnvzLU111o&feature=related
- The Bionic Burger
  - http://www.youtube.com/watch?v=mYvDXH1amic
- True Cost of Food - www.truecostoffood.org
  - http://content.sierraclub.org/creative-archive/video/2012/05/true-cost-food

Questions???