Eating Healthy in a Toxic World

Fred H. Williams, M.D.
Gateway Gastroenterology
Modern Scourges

- Toxicity
- Obesity
- Inflammation
- Stress
- Malnutrition
- Acidity
Congratulations!!!

- You are part of the largest scientific experiment ever undertaken
- Research Objective: To determine the effects of exposing humans to 100,000 synthetic chemicals while simultaneously radically altering their food supply and the environment in which they live
- There are no control subjects
Brave New World

“Chemicals have replaced bacteria and viruses as the main threat to human health... The diseases we’re beginning to see as the major causes of death in the latter part of this century and into the 21st century are diseases of chemical origin.”

- Rick Irvin
  Toxicologist
  Texas A&M University
Brave New World

- Since WWII 100,000 synthetic chemicals have been created and marketed
- 20,000 are under secret patents for “proprietary reasons”
- 1,000 chemical introduced each year
- 3,000 synthetic chemicals are added to food products
- In 1940 one billion pounds of synthetic chemicals were produced. It is now approaching one trillion pounds per year.
Brave New World

- More than 25,000 chemicals are used in the manufacturing of cosmetics
- Americans on average use nine personal care products per day containing over 100 synthetic chemicals
Brave New World

- Various studies of humans have shown that people have literally hundreds of fat soluble chemicals stored in their bodies.
- Umbilical cord blood has been shown to contain 200 synthetic chemicals.
- Chemicals that were banned in the 1970’s can still be found in the blood of older people.
Brave New World

- Tap water contains dozens of synthetic chemicals
- Animals on feed lots are given hormones and antibiotics and fed things such as corn, pet animal remains, and chicken feces
  - Cows are ruminants and not meant to eat corn
Brave New World

- Top GMO crops
  - Soy 93%
  - Cotton 91% (used for vegetable oil)
  - Canola 90%
  - Corn 88%
  - Sugar beets 54%
  - Alfalfa (GMO just introduced) (livestock feed)
    - As of yet there is no GMO wheat

- At least 70% of processed foods contain at least one genetically modified ingredient
Brave New World
Pharmageddon

- Antibiotic use has lead to increasing numbers of “super bugs” and altered gut flora
- Adverse drug reactions cause in excess of 100,000 hospital deaths per year
- Pharmaceuticals now kill more people than motor vehicle accidents
  - Mostly due to overdoses
- Sixty percent of streams in California have detectable levels of Prozac, Ritalin, and antibiotics
Brave New World

- Honeybee colonies around the country are collapsing felt in part to be due to pesticide use, Varroa mites, and loss of habitat
Brave New World

- Synthetic chemicals may have amplified negative synergistic effects
- May be biologically active when present in only a few parts per billion
- Once ingested may never be metabolized and excreted
Toxicity is potentially MUCH worse for fetuses and children

- The combination of the following was found to interfere *in vitro* with normal neuron development:
  - Aspartame
  - MSG
  - Quinoline yellow food dye
  - Brilliant blue food dye

- The combination studied was typical of what is found in a child’s bloodstream after a snack and a drink
  - Toxicological Sciences December 2005
Brave New World

“The mere detection of a chemical does not necessarily indicate a risk to health.”

The American Chemical Council
Brave New World

Lack of evidence of toxicity is not the same as evidence of lack of toxicity
Toxicity and Obesity
Toxicity and Obesity

- Obesogen: Dietary, industrial, or pharmaceutical compound that can alter metabolic processes and predispose people to weight gain
  - Can promote obesity by:
    - In utero promote differentiation of stem cells into fat cells and hence increase total number of fat cells in the body
    - Increasing size of fat cells
    - Altering appetite and satiety
    - Altering energy metabolism
Toxicity and Obesity

- In utero many obesogens activate the peroxisome proliferator-activated receptor gamma (PPARγ) which induces multipotent stromal cells to preferentially differentiate into fat cells.

- Obesogens can cause weight gain in adults
  - Rosiglitazone
Toxicity and Obesity

Molecular Mechanisms of Environmental Organotin Toxicity in Mammals

Yaichiro Kotake

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Received June 14, 2012

Organotins such as tributyltin are suspected of having multiple toxic effects in mammals, in addition to their endocrine-disrupting function. Endogenous organotin concentrations in human blood range from a few to a few hundred nM. In this review, we summarize recent findings on the mechanisms of toxicity of environmental organotins such as tributyltin (TBT) and triphenyltin (TPT) in mammals. TBT and TPT are potent inhibitors of mitochondrial ATP synthase, and a recent study suggests that TBT binds directly to ATP synthase. Organotins disturb steroid biosynthesis and degradation. TBT and TPT are dual agonists of retinoid X receptor (RXR) and peroxisome proliferator-activated receptor γ (PPARγ); they also induce the differentiation of adipocytes in vitro and in vivo, probably through PPARγ activation, suggesting that they may work as obesogens. Environmental organotins are also neurotoxic; they induce behavioral abnormality and are toxic to the developing central nervous system. In vitro studies have shown that organotins induce intracellular Ca²⁺ elevation and glutamate excitotoxicity. Recently, it was reported that endogenous levels of TBT decrease expression of 2-amino-3-[(5-methyl-3-oxo-1,2-oxazol-4-yl)propanoic acid (AMPA) receptor subunit GluR2, leading to neuronal vulnerability. Most of the experimental studies have employed organotins at concentrations of μM order, and it remains important to clarify the molecular mechanisms of events induced by endogenous levels of environmental organotins.
Toxicity and Obesity

<table>
<thead>
<tr>
<th>Known and Suspected Obesogens</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Diet</strong></td>
</tr>
<tr>
<td>- Fructose</td>
</tr>
<tr>
<td>- Genistein</td>
</tr>
<tr>
<td>- Monosodium Glutamate</td>
</tr>
<tr>
<td><strong>Smoking</strong></td>
</tr>
<tr>
<td>- Nicotine</td>
</tr>
<tr>
<td><strong>Pharmaceuticals</strong></td>
</tr>
<tr>
<td>- Diethylstilbestrol</td>
</tr>
<tr>
<td>- Estradiol</td>
</tr>
<tr>
<td><strong>Industrial Chemicals</strong></td>
</tr>
<tr>
<td>- Bisphenol A (BPA)</td>
</tr>
<tr>
<td>- Organotins</td>
</tr>
<tr>
<td>- Perfluorooctanoic Acid (PFOA)</td>
</tr>
<tr>
<td>- Phthalates</td>
</tr>
<tr>
<td>- Polybrominated Diphenyl Ethers (PBDEs)</td>
</tr>
<tr>
<td>- Polychlorinated Biphenyl Ethers (PCBs)</td>
</tr>
<tr>
<td><strong>Organophosphate Pesticides</strong></td>
</tr>
<tr>
<td>- Chlorpyrifos</td>
</tr>
<tr>
<td>- Diazinon</td>
</tr>
<tr>
<td>- Parathion</td>
</tr>
<tr>
<td><strong>Other Environmental Pollutants</strong></td>
</tr>
<tr>
<td>- Benzo[a]pyrene</td>
</tr>
<tr>
<td>- Fine Particulate Matter (PM_{2.5})</td>
</tr>
<tr>
<td>- Lead</td>
</tr>
</tbody>
</table>

* Cigarette smoke is also a source of exposure to benzo[a]pyrene and PM_{2.5}
Toxicity and Obesity

Obesity: a disease or a biological adaptation? An update.

Chaput JP, Doucet E, Tremblay A.

Source
Healthy Active Living and Obesity Research Group, Children's Hospital of Eastern Ontario Research Institute, Ottawa, ON, Canada. jpchapat@cheo.on.ca

Abstract
Obesity is characterized by the accumulation of excess body fat and can be conceptualized as the physical manifestation of chronic energy excess. An important challenge of today's world is that our so-called obesogenic environment is conducive to the consumption of energy and unfavourable to the expenditure of energy. The modern, computer-dependent, sleep-deprived, physically inactive humans live chronically stressed in a society of food abundance. From a physiological standpoint, the excess weight gain observed in prone individuals is perceived as a normal consequence to a changed environment rather than a pathological process. In other words, weight gain is a sign of our contemporary way of living or a 'collateral damage' in the physiological struggle against modernity. Additionally, substantial body fat loss can complicate appetite control, decrease energy expenditure to a greater extent than predicted, increase the proneness to hypoglycaemia and its related risk towards depressive symptoms, increase the plasma and tissue levels of persistent organic pollutants that promote hormone disruption and metabolic complications, all of which are adaptations that can increase the risk of weight regain. In contrast, body fat gain generally provides the opposite adaptations, emphasizing that obesity may realistically be perceived as an a priori biological adaptation for most individuals. Accordingly, prevention and treatment strategies for obesity should ideally target the main drivers or root causes of body fat gain in order to be able to improve the health of the population.
Figure 3: Increase in plasma organochlorine (OC) concentration with bariatric surgery-induced weight loss in morbidly obese men. The participants experienced a 388% increase in relative OC concentration for a 46.3% weight loss. Data are mean ± standard deviation. *P < 0.01 vs. baseline. Adapted from Hue et al. (91).
Toxicity and Obesity

Obesity may in part be a defensive mechanism.
Endocrine Disruptors

- **Definition:** An exogenous substance that causes adverse health effects in an intact organism secondary to changes in endocrine function.
- Often can have biological activity when present in just a few parts per billion.
Endocrine Disruptors

- There has been a dramatic decline in the age of onset of breast development in girls
  - 15% now begin at age 8
- Multiple studies in several different bodies of water have showed high rates of male (XY) fish and crustaceans with ambiguous genitalia
Endocrine Disruptors

Figure 1.4: Testicular Cancer (C61), European Age-Standardised Incidence Rates, Great Britain, 1975-2008

Average sperm count, 1930–1990

Sperm density (10^6/mL)

Year of sample collection

Endocrine Disruptors

- Phthalates (pronounced “thallets”)
  - Petroleum by-product used in plastic products, clothing, cosmetics, insecticides, solvents and drugs
  - Plasticizer that makes plastic more pliable
  - Five million metric tons annually produced
  - Has been linked to multiple endocrine abnormalities including:
    - Small testicles and penises in humans
    - Low sperm count
    - Low testosterone levels
  - May be particularly dangerous in utero
  - Only a few parts per billion needed to have effects
Endocrine Disruptors

- Some obesogens may have epigenetic effects—the ability to induce heritable modifications of DNA and histones that affect gene expression in progeny without altering the actual genetic code.
Malnutrition
Nutrient Depletion

- Plant breeding is done to improve:
  - Size
  - Growth rate
  - Shipping stability
  - Pest/cold/drought resistance
    - Rarely done to improve nutrition

- Agricultural practices deplete soil of:
  - Micronutrients
  - Beneficial bacteria
Nutrient Depletion

- Studied USDA data from 1950 and 1999 for 43 fruits and vegetables and found decreases in:
  - Protein
  - Calcium
  - Phosphorus
  - Iron
  - Riboflavin
  - Vitamin C
  - And probably magnesium, zinc, vitamin B6 and vitamin E
    - Good 1950 data not available
Malnutrition
Nutrient Depletion

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium</td>
<td>13.5mg</td>
<td>7.0mg</td>
<td>7.0mg</td>
<td>-48.15</td>
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<tr>
<td>Phosphorus</td>
<td>45.2mg</td>
<td>10.0mg</td>
<td>7.0mg</td>
<td>-84.51</td>
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<tr>
<td>Iron</td>
<td>4.6mg</td>
<td>0.3mg</td>
<td>0.18mg</td>
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<tr>
<td>Potassium</td>
<td>117.0mg</td>
<td>110.0mg</td>
<td>115.0mg</td>
<td>-1.71</td>
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<tr>
<td>Magnesium</td>
<td>28.9mg</td>
<td>8.0mg</td>
<td>5.0mg</td>
<td>-82.70</td>
</tr>
</tbody>
</table>

Source: Lindlaar, 1914; USDA, 1963 and 1997
Malnutrition
Nutrient Depletion

Average Mineral Content in Selected Vegetables, 1914 - 1997
Sums of averages of calcium, magnesium and iron in cabbage, lettuce, tomatoes and spinach

Malnutrition
Nutrient Depletion

Changes in Nutrient Content of Beef and Chicken
Per 100 Grams

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium</td>
<td>10.000mg</td>
<td>8.000mg</td>
<td>-20.00</td>
<td>12.000mg</td>
<td>10.000mg</td>
<td>-16.67</td>
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<tr>
<td>Iron</td>
<td>2.700mg</td>
<td>1.730mg</td>
<td>-35.93</td>
<td>1.300mg</td>
<td>1.030mg</td>
<td>-20.77</td>
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<tr>
<td>Magnesium</td>
<td>17.000mg</td>
<td>16.000mg</td>
<td>-5.88</td>
<td>23.000mg</td>
<td>23.000mg</td>
<td>0.00</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>156.000mg</td>
<td>130.000mg</td>
<td>-16.67</td>
<td>203.000mg</td>
<td>198.000mg</td>
<td>-2.46</td>
</tr>
<tr>
<td>Potassium</td>
<td>236.000mg</td>
<td>228.000mg</td>
<td>-3.39</td>
<td>285.000mg</td>
<td>238.000mg</td>
<td>-16.49</td>
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<tr>
<td>Vitamin A</td>
<td>40.000IU</td>
<td>0.000</td>
<td>-100.00</td>
<td>150.000IU</td>
<td>45.000IU</td>
<td>-70.00</td>
</tr>
<tr>
<td>Thiamine</td>
<td>0.080mg</td>
<td>0.038mg</td>
<td>-52.50</td>
<td>0.100mg</td>
<td>0.069mg</td>
<td>-31.00</td>
</tr>
<tr>
<td>Riboflavin</td>
<td>0.160mg</td>
<td>0.151mg</td>
<td>-5.63</td>
<td>0.120mg</td>
<td>0.134mg</td>
<td>+11.67</td>
</tr>
<tr>
<td>Niacin</td>
<td>4.300mg</td>
<td>4.480mg</td>
<td>+4.19</td>
<td>7.700mg</td>
<td>7.870mg</td>
<td>+2.21</td>
</tr>
</tbody>
</table>

Source: USDA, 1963 and 1997
Malnutrition
Nutrient Depletion

- The lack of nutrients may also impair metabolism of toxic synthetic compounds.
Inflammation
Stress

The Nation's #1 Killer

Medically Proven Stress Contributes to:

* Heart Disease
* Strokes
* High Blood Pressure
* Colitis
* Irritability
* Rheumatism
* Depression
* Migraines
* Diabetes
* Hardening of the Arteries

* Insomnia
* Fatigue
* Sex Problems
* Skin Diseases
* Allergies
* Overeating
* Asthma
* Kidney Disorders
* Ulcers
* Breathing Problems
* Increased Smoking

All Faith Self Help Center, Inc.
4440 E. Indian School Rd. Phoenix, AZ. 85018 (602) 957-4697
Acidity

- The primitive plant-based diet has been estimated to have been **6-9 times** more alkaline than the present Western diet.

- Highly acidic foods increase risk of osteoporosis as calcium salts from bones are used to neutralize acid:
  - Acidic foods:
    - Carbonated beverages
    - Animal proteins
    - Grains (gluten)
  - Alkaline foods:
    - Vegetables
    - Fruits

- Also, chronic inflammation is a risk factor for osteoporosis.
Modern Scourges

- Toxicity
- Obesity
- Inflammation
- Stress
- Malnutrition
- Acidity
Malnutrition → Inflammation

Obesity

Malnutrition ← Inflammation

Acidity

Malnutrition ← Inflammation ← Acidity

Toxicity

Malnutrition ← Inflammation ← Acidity ← Toxidity

Stress

Malnutrition ← Inflammation ← Acidity ← Toxidity ← Stress

Sleep Deprivation
Wheat

- In 1985 the National Lung and Blood Institute through its National Cholesterol Education Program recommended replacing fats and cholesterol with whole grains.
- Constitutes 20% of all calories consumed worldwide.
- Second to only corn in total acreage planted worldwide.
- Americans on average consume 133 pounds of wheat flour per year.
Wheat

- 25,000 wheat varieties
- Hybridized and crossbred to yield:
  - Drought, heat, cold, and pathogen resistance
  - Decreased production costs
  - Consistent product
  - Increase yield per acre
    - Yield/acre 10 X greater than a century ago
- Modern wheat varieties typically can’t survive without intensive farming techniques
- No human or animal studies performed to assess safety of new strains
Wheat

- Analysis of recent wheat hybrids
  - Five percent of proteins expressed were not found in either parent
- One hybrid was found to have fourteen new gluten proteins
- Comparison of modern wheat strains to ancient T. aestivum showed a higher quantity of gluten proteins associated with celiac disease
  - Theor Appl Genet 2010 Jul 28
- The incidence of celiac disease has increased four fold in the last 60 years
Wheat
Obesity

- **Modern wheat:**
  - 70 % carbohydrate
    - 75 % amylopectin A
      - Branch chain glucose polymer
    - 25 % amylose
      - Straight chain glucose polymer
    - Amylopectin A is much more efficiently digested by amylase and more rapidly absorbed
  - 10-15 % protein

- **Emmer wheat:**
  - 28 % protein
# Wheat Glycemic Index

<table>
<thead>
<tr>
<th>Food</th>
<th>Glycemic Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glucose</td>
<td>100</td>
</tr>
<tr>
<td>Whole Wheat Bread</td>
<td>72</td>
</tr>
<tr>
<td>Corn, Rice, Potato, etc. starches</td>
<td>70’s</td>
</tr>
<tr>
<td>White Bread</td>
<td>69</td>
</tr>
<tr>
<td>Mars Candy Bar</td>
<td>68</td>
</tr>
<tr>
<td>Shredded Wheat Cereal</td>
<td>67</td>
</tr>
<tr>
<td>Sucrose</td>
<td>59</td>
</tr>
<tr>
<td>Kidney Beans</td>
<td>51</td>
</tr>
<tr>
<td>Snickers Bar</td>
<td>41</td>
</tr>
<tr>
<td>Grapefruit</td>
<td>25</td>
</tr>
</tbody>
</table>

Decades ago a slice of bread might contain 100 mg of gluten. Today a similar slice of bread contains 2,500 mgs of gluten.
Wheat

- High glycemic load increases creation of glycation products
- Grains are acidic and may increase risk of osteoporosis
- Other wheat proteins besides gluten have been implicated in allergic reactions
- Fructans often cause gas and bloating
Gluten Exorphins

- *In vitro* gluten was degraded by pepsin and hydrochloric acid
- Polypeptides injected into rats
- Some crossed the blood-brain barrier
- Bound opiate receptors
- Blocked by naltrexone

Gluten

Exorphins

- Gluten may be somewhat addictive
  - Cravings
  - Euphoria
  - Withdrawal symptoms
- Also, amylopectin A induced sugar “high” and “crash” may contribute to addictive behaviors
Fructose

- High fructose corn syrup (HFCS), sucrose, and honey all contain glucose and fructose
  - HFCS is made by enzymatically converting corn syrup from 100% glucose to 50% glucose and 50% fructose
- Americans consume > 100 lbs. per year of HFCS, sucrose, and other sugars
- Fructose in fruits is much less problematic due to:
  - Lesser amount of fructose per serving
  - Associated plant fiber which slows intestinal absorption
Fructose metabolism is significantly different than glucose metabolism and excessive consumption is linked to:

- Development of the metabolic syndrome
  - Large waist circumference (increased visceral fat)
  - High triglycerides
  - Low HDL (good cholesterol)
  - Hypertension
  - Elevated fasting blood glucose
- Interference with leptin and ghrelin signaling pathways which alters normal hunger and satiety responses
- Marked rise in glycation products (much higher per gram than glucose)
Soy

- Low protein quality
  - Protein is frequently denatured in the production process
  - Most is GMO
- High levels of phytic acid in soy reduce assimilation of calcium, magnesium, copper, iron and zinc
- Decreased vitamin D and B12 absorption
- Phytoestrogens:
  - Infertility?
  - Breast cancer (increase or decrease?)
  - Increase bone density
  - Effects on children
  - Is an obesogen
Soy

- Thyroid suppression
- Trypsin inhibitors interfere with protein digestion
- Common to have soy allergies
- Excessive gas production

- Fermented soy products are good
  - Tofu is not fermented
We failed to identify a dose–response relationship between total isoflavones intake and risk of breast cancer incidence. Our study suggests soy isoflavones intake is associated with a significant reduced risk of breast cancer incidence in Asian populations, but not in Western populations.
Genetically Modified Organisms
GMO

Animals fed GMO food generally have been found to have normal:
- Weight game
- Organ size
- Blood tests
- Fertility
- Mortality
Genetically Modified Organisms (GMO)

- Conflicting evidence about microscopic organ damage
- Pesticide residues could be responsible for some of the abnormalities detected
- Overall, extensive studies and long term safety data are lacking

Lack of evidence of toxicity is not the same as evidence of lack of toxicity
What can you do?

- Move to Alaska
What can you do?

- Wait for the chemical, agricultural, and pharmaceutical industries in conjunction with the government to solve the problem.
"WE HAVE MET THE ENEMY AND HE IS US."

— POGO
What can you do?

- God, grant me the serenity to accept the things I cannot change,
  The courage to change the things I can,
  And the wisdom to know the difference.

- It is what it is.
Fruits and Vegetables

- Should be THE major food group in your diet
- Eat the rainbow
- Choose smaller fruits and vegetables as they tend to have denser nutrients
- Shop at the local farmer’s market
- Sign up for a food co-op
- Grow your own
- Choose frozen over canned if fresh isn’t available
Fruits and Vegetables

- Scrub in cold water
- Consume soon after buying
- Steaming is best cooking method
- Selectively choose organic
<table>
<thead>
<tr>
<th>The Clean 15</th>
<th>The Dirty Dozen</th>
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</thead>
<tbody>
<tr>
<td>On a budget, choose these conventionally. (Listed from lowest pesticide content)</td>
<td>Always buy these organic. (Listed from highest pesticide content to least)</td>
</tr>
<tr>
<td>1. Onions</td>
<td>1. Apples</td>
</tr>
<tr>
<td>2. Sweet Corn</td>
<td>2. Celery</td>
</tr>
<tr>
<td>3. Pineapple</td>
<td>3. Strawberries</td>
</tr>
<tr>
<td>4. Avocado</td>
<td>4. Peaches</td>
</tr>
<tr>
<td>5. Asparagus</td>
<td>5. Spinach</td>
</tr>
<tr>
<td>7. Mangoes</td>
<td>7. Grapes</td>
</tr>
<tr>
<td>8. Eggplant</td>
<td>8. Sweet Bell Peppers</td>
</tr>
<tr>
<td>11. Cabbage</td>
<td>11. Lettuce</td>
</tr>
<tr>
<td>13. Sweet Potatoes</td>
<td></td>
</tr>
<tr>
<td>14. Grapefruit</td>
<td></td>
</tr>
<tr>
<td>15. Mushrooms</td>
<td></td>
</tr>
</tbody>
</table>

Source: Environmental Working Group 2011
Protein
Livestock and chickens

- Consume animal products in moderation
- Grass/range fed animals that are not given antibiotics or hormones
- Look for:
  - USDA “organic” stamp which certifies that 95% of product produced is organic including what the animal is fed
  - “Animal Welfare Approved” which shows third party verified humane animal practices
Protein

Milk and Eggs

- Eggs from free range chickens
- Milk from free range cows that are not given hormones or antibiotics
  - Both are higher in omega 3’s
- Good milk alternatives are almond and coconut milk
- Avoid processed cheeses that come in a jar, can, etc.
Protein
Fish

- Wild caught better than farm raised
- Wild caught tend to have:
  - Lower levels of disease and environmental pollutants
  - Higher levels of omega 3 fatty acids
Protein
Fish

- Cleanest wild fish:
  - Salmon
  - Tuna
  - Halibut
  - Anchovies
  - Sardines

- Fish high in mercury:
  - Swordfish
  - Shark
  - Tilefish
  - King Mackerel
Protein

- Legumes are an excellent source of protein, complex carbohydrates, vitamins, and minerals.
- Whey is the best protein to use as a supplement.
  - Cold extracted and un-denatured.

The fiber in fruits, vegetables, and legumes slows sugar absorption and minimizes eating induced hyperglycemia.
Whey is Superior Protein

<table>
<thead>
<tr>
<th>Protein</th>
<th>Biological Value (BV)</th>
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<tbody>
<tr>
<td>Whey protein</td>
<td>104</td>
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<tr>
<td>Whole egg</td>
<td>100 (arbitrarily set)</td>
</tr>
<tr>
<td>Cows milk</td>
<td>91</td>
</tr>
<tr>
<td>Egg whites</td>
<td>88</td>
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<td>Fish</td>
<td>83</td>
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<td>Beef</td>
<td>80</td>
</tr>
<tr>
<td>Chicken</td>
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</tr>
<tr>
<td>Casein</td>
<td>77</td>
</tr>
<tr>
<td>Soy</td>
<td>74</td>
</tr>
<tr>
<td>Soy</td>
<td>74</td>
</tr>
<tr>
<td>Rice</td>
<td>59</td>
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<tr>
<td>Wheat</td>
<td>54</td>
</tr>
<tr>
<td>Beans</td>
<td>49</td>
</tr>
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</table>
Whey is Superior Protein

- Enhances thermogenesis and weight loss
- Maintains and build muscle mass
- Increases detoxification
- Improves glucose control in diabetics
- Improves lipid profile
- Increases satiety
Grains

- Minimize processed foods
  - Decrease soy and wheat
- Clean grains:
  - Brown rice
  - Quinoa
  - Oatmeal
  - Spaghetti squash
  - Egg plant or zucchini sliced lengthwise can be a good pasta substitute
Fats and Oils
Use in small amounts

- **Good fats and oils:**
  - Nuts and seeds
  - Butter
  - Olive oil
  - Coconut oil
  - Sesame seed oil
  - Flaxseed oil
  - Fish oil
  - Avocados

- **Bad fats and oils:**
  - Margarine
  - Canola oil
  - Corn oil
  - Soybean oil
  - Vegetable oil
  - All typically:
    - High in omega 6’s
    - Frequently contain trans-fats
    - Often GMO

Avoid any product that contains hydrogenated or partially hydrogenated oils
Pharmaceuticals

- Minimize pharmaceuticals
  - PPIs
  - NSAIDs
  - SSRIs
  - Antibiotics

“One of the first duties of the physician is to educate the masses not to take medicine.”

Sir William Osler, M.D.
(1849-1919)
Beverages and Sweeteners

- Drink filtered water
- Minimize soda
  - Both regular and diet
- Minimize fructose and artificial sweeteners
  - Honey in small amounts is OK
- Stevia is a safe non-caloric sweetener
Skin Absorption of Toxins

- Use natural makeup
- Minimize exposure to chemicals and solvents
Exercise

- Exercise
  - Aerobic activity
  - Resistance training
Your Home

- Use natural household cleaners
- Minimize yard pesticides and inorganic fertilizers
  - Have a yard and not a lawn
Summary

- Eat lots of vegetables, fruits, beans, seeds, and nuts
- Minimize processed food
- Consume animal products 0-3 times per week
- Use oils sparingly
- Consciously try to avoid environmental toxins
Sir William Osler, M.D.
(1849-1919)

“The philosophies of one age have become the absurdities of the next, and the foolishness of yesterday has become the wisdom of tomorrow.”