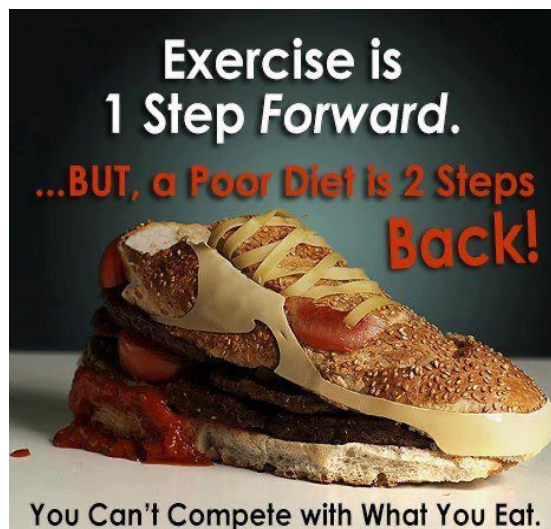


## You Can't Out Train a Bad Diet



1

## Group Discussion

Today's To Do:

- Eat
- Workout
- Be Awesome

- *Why* do you workout?
  - How do you feel when you workout?
  - How do you feel after you workout?
  - How do you feel when you don't workout?
- *What* is food?
- How do you feel when you eat a *well-balanced meal*?
- How do you feel when you have a *treat meal*?
- What is the most challenging aspect of your diet thus far? (*your limiting factor*)

2

## Food is:

### Physiological:

- Fuel, Energy, Calories
- Macronutrients: Fats, Carbohydrates, Proteins
- Micronutrients: Vitamins, Minerals
- Phytonutrients
- Zoochemicals
- Water

### Behavioral:

- Cultural
- Social
- Psychological
- Medicine
- Poison

3

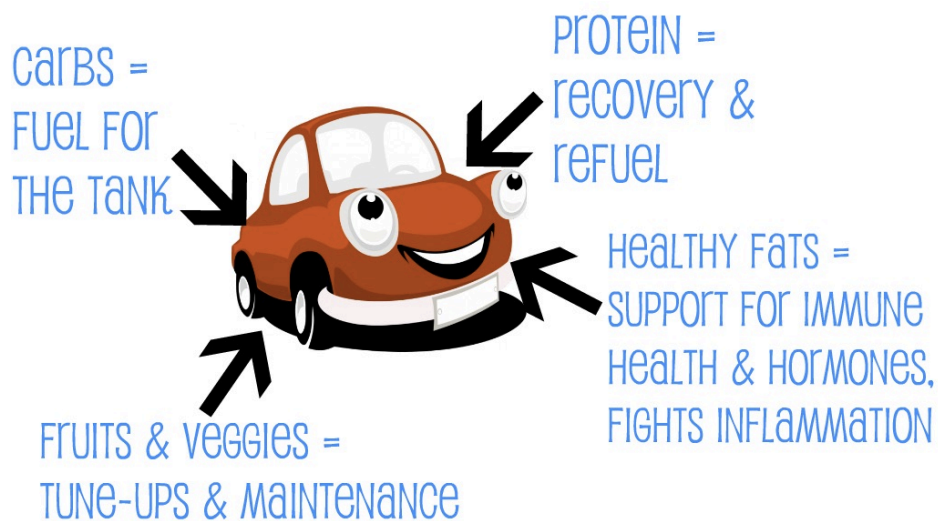
## Food as Fuel Analogy

*“The human body is like a high-performance race car. Not only does it need fuel to run, but you also have to choose only really high-quality fuel or else it will gunk up and break down.”*



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## Food as Fuel Analogy



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## Fuel: Carbohydrates

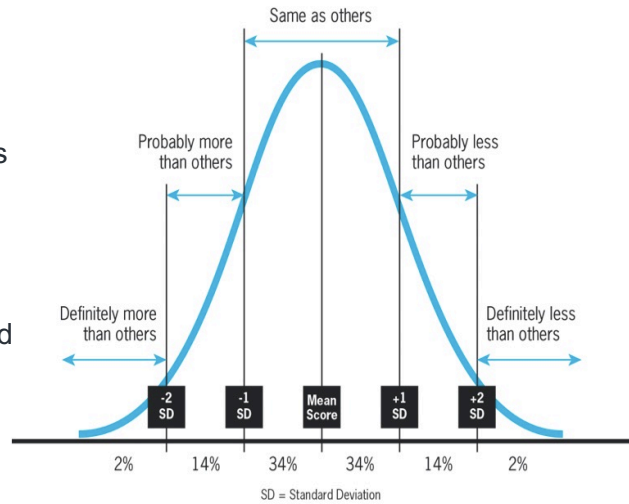


- Almost all carbohydrates, from sugar to starches, are all digested in the stomach and broken down into the same thing: **glucose**
- All of your cells – brain cells, muscle cells, cardiac cells – use glucose to survive and function.
- While you train, your muscles use stored energy from carbs (**glycogen** – stored glucose).
  - Because those stored carbs are a finite resource, the carbs you consume before and during your workout become a kind of energy that fuels your ability train hard.

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## Carb Control

- Your individual carb requirements depend on your:
  - Goals
    - Fat loss
    - Muscle gain
    - Maintenance
  - Genetics
    - Different body types
    - Medical conditions
  - Carb source
    - Refined
    - Minimally processed
  - Activity level
    - Sedentary
    - Weight-training
    - Endurance athlete



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## Carb Control

**EAT ALL THE CARBS**



- Carbohydrate daily **minimal** recommended intake: **130 grams per day** for the general population.
  - The amount of carbohydrate that should be consumed depends on body size and activity levels: bigger and/or more active people need more while smaller and more sedentary people require less.
  - Intake is also dependent on dietary fat and protein intake.
- Aim for a moderate carbohydrate consumption (~40% of diet)
- Consume mostly **fibrous & complex carbohydrates** (e.g., vegetables, fruits, legumes, & whole grains).

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## Fuel: Proteins



- Proteins are organic molecules that are made up of **amino acids** – the building blocks of life
  - Essential Amino Acids: Those the body can't manufacture, and thus we must consume in our diets
  - Nonessential Amino Acids: Those the body can make
- Digestion breaks down proteins into a pool of amino acids that circulates in the blood
- Cells need these amino acids to produce molecules such as: enzymes, hormones, neurotransmitters, & antibodies
- Muscle cells use protein to grow and maintain lean muscle mass

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## Fuel: Proteins



- During a workout, you create small microtears in your muscles as you push your body with more repetitions and heavier weights. This breakdown continues even after your last repetition
- To build muscle, you need to switch from a post-workout anabolic state (tearing down) to a catabolic state (building up).
- After exercise, amino acids, growth factors, and insulin prompt your muscles to rebuild with protein.
- By giving your body the nutrients it needs to repair these tears, your muscles will rebuild even stronger

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## Fuel & Communication: Proteins

Consuming protein can also increase levels of **glucagon** (hormone in pancreas)

- Glucagon can help to control body fat.
- Glucagon is released when blood sugar levels go down.
- This causes the liver to break down stored glycogen into glucose for the body.
- It can also help to **liberate free fatty acids** from adipose tissue – another way to get fuel for cells and make that body fat do something useful with itself instead of hanging lazily around your midsection!



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## Protein Portions

- Recommendation for **untrained, generally healthy adult: 0.8 grams per kilogram** (or around 0.36 g per pound) of body mass in untrained, generally healthy adults.
  - E.g., a 150 lb (68 kg) person would consume around 54 grams a day.
  - However, this amount is only to prevent protein *deficiency*. It's not necessarily *optimal*, particularly for people such as athletes who train regularly and hard.
- Recommendation for **active adults: 1.4-2.0 g/kg** (or around 0.64-0.9 g/lb) of body mass.
  - E.g., a 150 lb (68 kg) person would thus need about 95-135 g of protein per day.

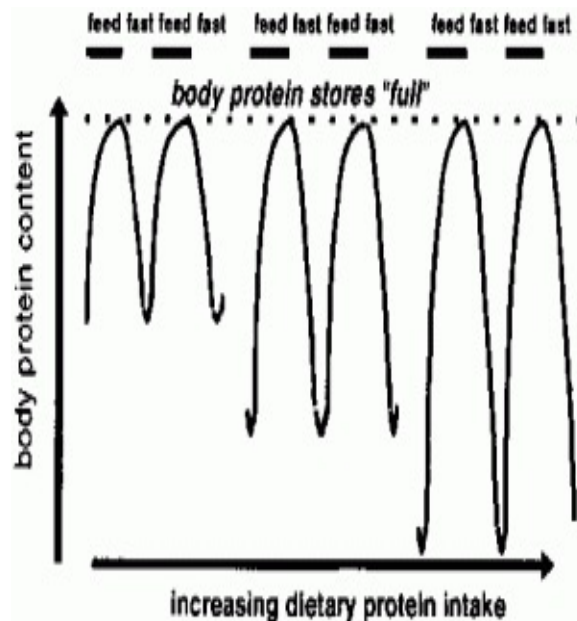
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## Protein Portions

- We need a small amount of protein to survive, but we need a lot more to thrive.
  - Beyond the basics of preventing deficiency and ensuring a baseline of protein synthesis, we may need even more protein in our diets for optimal functioning, including good immune function, metabolism, satiety, weight management and performance.
- We can only store so much protein at one time.

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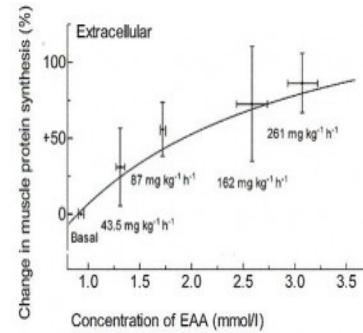
## Protein Portions



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## Protein Portions

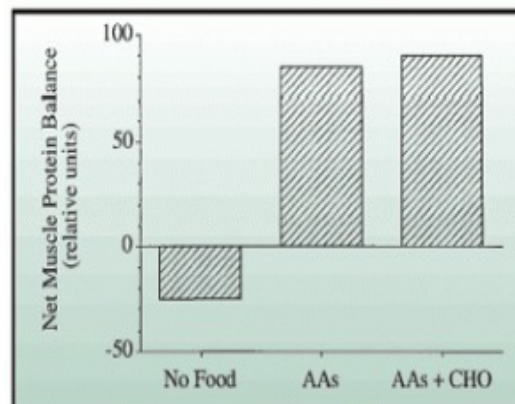
- When you eat protein matters
  - After resistance exercise, the body synthesizes proteins for up to 48 hours after training.
  - During & immediately after resistance exercise, protein breakdown is increased as well.
    - The body actually drops into a short-term wasting or catabolic state. However, taking in enough protein during the pre- and post-exercise period can offset catabolism.



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## Protein Portions

- What you pair protein with, also matters ... more on this later



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## Fuel: Fat

- Fat we digest is either used for energy, stored in adipose tissue (fat), or incorporated into other body tissues & organs.
- When it comes to energy, the body tends to break down carbs or fats for fuel & saves protein for other processes, like building muscle.
- During periods of inactivity, a small amount of glucose is converted into glycogen (stored energy; 2,000kcal) and stored in the muscle & liver, while the majority is converted into fat (25,000kcal)

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## Fuel: Fat

- Sourcing stored fat as fuel occurs during periods of increased energy demand (e.g., prolonged exercise, calorie-restriction, or fasting) or a fat-adapted athlete that has trained to rely less heavily on stored glycogen during exercise.
  - Adapt to using ketones (small lipid-derived molecules produced in the liver) & fatty acids instead of glucose as primary energy source

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## Fuel & Communication: Fats

- **Conjugated Linolic Acid (CLA):**  
Improves insulin sensitivity, increases lipoprotein lipase (enzyme that promotes fat metabolism)
- **OMEGA-3s:** Improve heart, brain, & joint function
- **Monounsaturated Fats:**  
Decrease blood pressure, increase HDL (good cholesterol), decrease triglycerides



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## Face the Fats

- There are 3 main types of dietary fat: saturated, monounsaturated, and polyunsaturated.
  - Healthy Fats: Monounsaturated, Polyunsaturated
  - Unhealthy Fats:
    - Trans- fatty acids (e.g., processed foods)
    - Hydrogenated fats (e.g., margarine - hydrogen is added to the fat chain to make a normally liquid & perishable fat into a solid & shelf-stable fat)
    - most shelf-stable cooking oils (e.g. safflower, soybean, corn oil, etc.)

Saturated	Monounsaturated	Polyunsaturated	
		Omega-3	Omega-6
Animal fats Tropical oils (e.g. coconut, palm, cacao)	Olive oil Avocados Peanuts & groundnuts Tree nuts	Flax Fish oil	Most seed oils (e.g. canola, safflower, sunflower)

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# Face the Fats

Type of fat	Food sources	Risks/Benefits
Monounsaturated fat	Olive oil, canola oil, macadamia nut oil, peanut oil, avocados, Macadamia nuts, herring	Aids appetite control, lowers harmful LDL cholesterol, reduces inflammation, promotes heart health
Polyunsaturated fat	Vegetable oils such as soybean, corn, safflower and sunflower.  Omega-3s: flaxseed oil, omega-3 eggs, deepwater fish and fish oil, walnuts and walnut oil.  Omega-6s: raw nuts, seeds, legumes, borage oil, grapeseed oil and primrose oil.	Can lower good HDL cholesterol if eaten in excess; can promote inflammation. Balance of omega-6 to omega-3 is very important. Allergies, eczema, inflammatory conditions (e.g., arthritis, colitis), constipation, attention deficit disorder and other learning disabilities have all been linked to a deficiency of this precious fat.
Saturated fat	Red meats (beef, pork and lamb), dairy products.  Note: coconut oil is a saturated fat, but it's good for you.	Raises harmful LDL cholesterol and increases inflammation when eaten in excess. Keep in mind <i>some</i> saturated fat is good for you, despite the bad rap it has.
Trans fatty acids (may appear on labels as "hydrogenated" or "partially hydrogenated" fats)	Margarines, snack foods, many packaged foods, microwave popcorn and fried foods	Increases bad LDL cholesterol and decreases good HDL cholesterol. There is no safe level of intake for trans fats!

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# Face the Fats

## fats/oils:

cleaning up your diet by using the right fats & oils is essential to improving your health from the inside out.

### WHICH TO EAT:

#### SATURATED FOR HOT USES

*non-animal fats, organic, unrefined forms are ideal*

- coconut
- palm
- animal fats, from pasture-raised/grass-fed & organic sources are ideal*
- butter
- ghee
- lard
- tallow
- schmaltz\* (chicken fat)
- lamb fat
- duck fat
- full fat dairy
- eggs, meat & seafood



\*higher in omega 6 fatty acids so they should be consumed in moderation

#### UNSATURATED FOR COLD USES

*organic, extra virgin and cold-pressed forms are ideal*

- olive oil
- sesame oil
- nut oils (walnut, pecan, macadamia)
- flaxseed oil\*\*
- avocado
- nuts & seeds (including nut & seed butters)



NOTE: unsaturated fats (typically liquid at 68 degrees room temperature) are easily damaged/oxidized when heat is applied to them, we do not want to consume damaged fats.

\*\*flaxseed oil is okay for moderate use but supplementing with it or doses of 1-2 teaspoons is NOT recommended as overall PUFA, polyunsaturated fatty acid intake should remain minimal.



### WHICH TO DITCH:

#### SATURATED

*man-made fats are never healthy, trans-fats are particularly harmful.*  
margarine  
hydrogenated or partially hydrogenated oils  
man made trans-fats often found in "buttery spreads" including oil blends like Earth Balance, Benecol and I Can't Believe It's Not Butter to name a few

#### UNSATURATED

*these oils are highly processed and oxidize easily via one or more of the following: light, air or heat. consuming oxidized oils is never healthy.*  
canola oil (also known as rapeseed oil)  
corn oil      safflower oil  
vegetable oil      rice bran oil  
soybean oil  
grapeseed oil  
sunflower oil

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## Food as Fuel Analogy

- True, **macronutrients** (proteins, carbs, fat) contain “energy” (fuel/calories)
  - They also do more than simply provide energy. They initiate a cascade of **messages** throughout the body
- Food also includes **micronutrients, phytochemicals, zoochemicals, water**, etc
  - These substances don't give us “energy”
  - Essential in our health & functioning



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## The Messages Food Delivers: Macronutrients

- Cells put protein components (peptides & amino acids) to work making hormones, enzymes, structural proteins, & build muscle
- Fat components (triglycerides & free fatty acids) are used to make hormones & become integrated into our cell membranes. They control inflammation pathways
- Carbohydrate components (glucose & fructose) are used to maintain proper hormone status (e.g., thyroid, testosterone, & leptin – the satiety hormone).

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## Micronutrients: Vitamins & Minerals

- We need vitamins & minerals in our diet. Without them, our bodies break down
- **Calcium:** Build bones, clot blood, regulate blood pressure, keep our muscles & heart pumping, maintain cell communication (& may be involved in muscle fatigue)

### A New Explanation of Muscle Fatigue

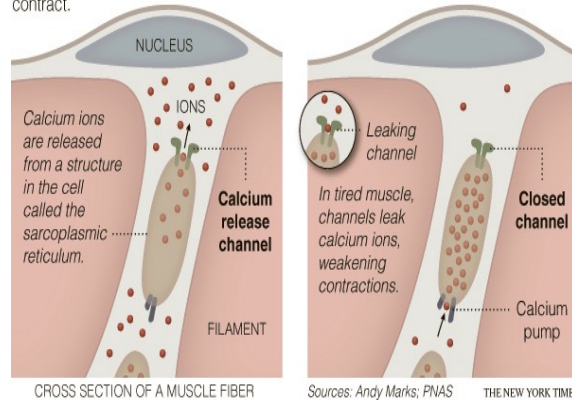
Muscle contraction and relaxation are controlled by the release and storage of calcium ions within muscle fibers. Scientists at Columbia University say that muscle fatigue, largely misunderstood for decades, is caused by calcium leaking into muscle cells.

#### MUSCLE CONTRACTION

Calcium ions are released into the cell, causing filaments in the muscle fiber to contract.

#### MUSCLE RELAXATION

Calcium ions are pumped into storage, allowing the muscle filaments to relax.



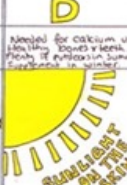






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## Micronutrients: Vitamins & Minerals

- **Folate (Vitamin B9):** Converts food into energy, assists with function of nervous system (including the brain), helps tissues grow, assists with red blood cell production
- **Magnesium:** Plays a role in more than 300 enzyme systems & helps with protein synthesis, muscle & nerve function, blood sugar control, blood pressure regulation, energy production, & transport of other minerals

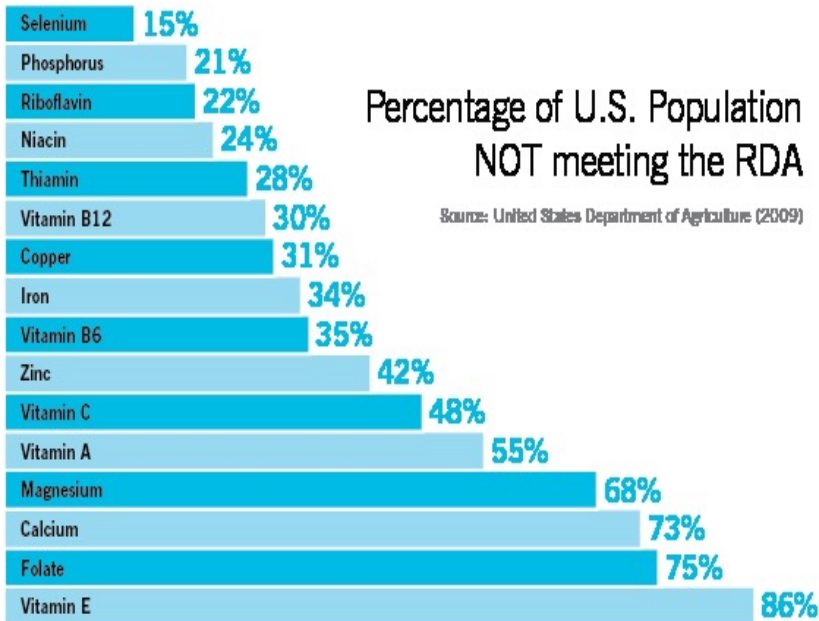
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# Micronutrients: Vitamins & Minerals

S			M		
D	E	K	IRON	CALCIUM	ZINC
<p>Needed for calcium use. Maintains bones &amp; teeth. Mostly 12 months in summer. Considered a vitamin.</p>  <p>SUNLIGHT ON THE SKIN</p> <p>Fortified: - cereals - soy milk - margarine (non-hydrogenated) Dz. is animal-free.</p> 	<p>Anti-oxidant. (2nd) protect against disease. Ripen. Wound. Skin health.</p> <p>Olive oil Tomatoes Avocado Apples Carrots Nuts &amp; Seeds Wholegrains</p> 	<p>Energy use. Fights infection. For blood clotting &amp; healthy bones. Great for fibrosis &amp; breast diet.</p> <p>Green Leafy vegetables Kelp (Kombu) Lettuce Broccoli Peas Lentils</p> 	<p>Used in production of red blood cells &amp; oxygen transportation. Give good diet for energy.</p> <p>Green leafy vegetables eg: Kale Cabbage Beans &amp; Lentils</p>  <p>Tofu Pumpkin seeds Millet Figs Dried apricots Dates</p> <p>best absorbed with Vitamin C. Avoid tea &amp; coffee around meals.</p>	<p>for teeth, bones &amp; muscles. Also for hormones &amp; blood clotting. Don't stress out your teeth!</p> <p>Almonds Green Leafy vegetables eg: Kale spinach watercress Broccoli Turnip Tofu (calcium set) Soy milk (fortified)</p> 	<p>Important for strong immune system and wound healing. Needs in varied balanced diet.</p> <p>Green Leafy vegetables Pumpkin seeds Sesame seeds Lentils Tofu Almonds Wholegrains</p> 

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# Micronutrients: Vitamins & Minerals



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# Micronutrients: Vitamins & Minerals

**Table 41.1 Vitamin Requirements of Humans: Fat-Soluble Vitamins**

Vitamin	Major Dietary Sources	Some Major Functions in the Body	Possible Symptoms of Deficiency or Extreme Excess
<b>Fat-Soluble Vitamins</b>			
Vitamin A (retinol)	Provitamin A (beta-carotene) in deep green and orange vegetables and fruits; retinol in dairy products	Component of visual pigments; needed for maintenance of epithelial tissues; antioxidant; helps prevent damage to lipids of cell membranes	Vision problems; dry, scaling skin Headache, irritability, vomiting, hair loss, blurred vision, liver and bone damage
Vitamin D	Dairy products, egg yolk (also made in human skin in presence of sunlight)	Aids in absorption and use of calcium and phosphorus; promotes bone growth	Rickets (bone deformities) in children, bone softening in adults Brain, cardiovascular, and kidney damage
Vitamin E (tocopherol)	Vegetable oils, nuts, seeds	Antioxidant; helps prevent damage to lipids of cell membranes	None well documented in humans; possibly anemia
Vitamin K (phyloquinone)	Green vegetables, tea (also made by colon bacteria)	Important in blood clotting	Defective blood clotting Liver damage and anemia

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# Micronutrients: Vitamins & Minerals

## Vitamin Requirements of Humans: Water-Soluble Vitamins

**Vitamins are organic molecules required in small amounts. Often coenzymes.**

**Table 41.1 Vitamin Requirements of Humans: Water-Soluble Vitamins**

Vitamin	Major Dietary Sources	Some Major Functions in the Body	Possible Symptoms of Deficiency or Extreme Excess
<b>Water-Soluble Vitamins</b>			
Vitamin B <sub>1</sub> (thiamine)	Pork, legumes, peanuts, whole grains	Coenzyme used in removing CO <sub>2</sub> from organic compounds	Beriberi (nerve disorders, emaciation, anemia)
Vitamin B <sub>2</sub> (riboflavin)	Dairy products, meats, enriched grains, vegetables	Component of coenzymes FAD and FMN	Skin lesions such as cracks at corners of mouth
Niacin	Nuts, meats, grains	Component of coenzymes NAD <sup>+</sup> and NADP <sup>+</sup>	Skin and gastrointestinal lesions, nervous disorders Flushing of face and hands, liver damage
Vitamin B <sub>6</sub> (pyridoxine)	Meats, vegetables, whole grains	Coenzyme used in amino acid metabolism	Irritability, convulsions, muscular twitching, anemia Unstable gait, numb feet, poor coordination
Pantothenic acid	Most foods: meats, dairy products, whole grains, etc.	Component of coenzyme A	Fatigue, numbness, tingling of hands and feet
Folic acid (folacin)	Green vegetables, oranges, nuts, legumes, whole grains (also made by colon bacteria)	Coenzyme in nucleic acid and amino acid metabolism	Anemia, gastrointestinal problems May mask deficiency of vitamin B <sub>12</sub>
Vitamin B <sub>12</sub>	Meats, eggs, dairy products	Coenzyme in nucleic acid metabolism; needed for maturation of red blood cells	Anemia, nervous system disorders
Biotin	Legumes, other vegetables, meats	Coenzyme in synthesis of fat, glycogen, and amino acids	Scaly skin inflammation, neuro-muscular disorders
Vitamin C (ascorbic acid)	Fruits and vegetables, especially citrus fruits, broccoli, cabbage, tomatoes, green peppers	Used in collagen synthesis (e.g., for bone, cartilage, gums); antioxidant; aids in detoxification; improves iron absorption	Scurvy (degeneration of skin, teeth, blood vessels), weakness, delayed wound healing, impaired immunity Gastrointestinal upset

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## Phytonutrients

- Nutrients in **plants** that protect plants from potential pathogens
- **Categories:**
  - Flavonoids
    - Anthocyanins (found in berries)
    - Isoflavones (found in soy)
    - Catechins (found in tea)
  - Phenolic Acids
    - Polyphenols
  - Stilbenes/Lignans
    - Lycopene (found in tomatoes)

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## Phytonutrients

- **These chemicals have been shown to:**
  - Protect DNA against free radicals
  - Protect against cancer
  - Decrease risk of heart disease/support cardiovascular health
  - Reduce overall mortality
  - Reduce inflammation
- **Best phytonutrient-rich foods:**
  - Vegetables & Sprouts
  - Fruits (especially berries)
  - Dark leafy greens
  - Nuts & Seeds (chia, hemp, flax, pecan, walnut, pomegranate)
  - Tumeric

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## Phytonutrients

Food	Phytochemical	Possible benefit
<b>Soy</b> (beans, milk, tofu, natto)	Isoflavones (genistein and daidzein)	Reduces blood pressure and increases vessel dilation
<b>Red/purple foods</b> (such as colorful berries, red/purple grapes, purple cabbage)	Anthocyanins	Improves vision, inhibits nitric oxide production, induces apoptosis, decreases platelet aggregation, and has neuroprotective effects
<b>Grapes &amp; grape products</b> (red wine, grape juice & extracts); <b>cocoa</b>	Proanthocyanidins and flavan-3-ols	Inhibits LDL oxidation, cellular oxygenases, and proinflammatory responses in the arterial wall
<b>Garlic, onions, leeks, olives, scallions</b>	Sulfides, thiols	Decreases LDL cholesterol
<b>Colorful fruits and vegetables</b> (such as yellow squash, tomatoes & tomato products, leafy greens, watermelon)	Carotenoids such as lycopene, beta-carotenes	Neutralizes free radicals that cause cell damage
<b>Broccoli and other cruciferous vegetables</b> (such as kale, cabbage and cauliflower)	Isothiocyanates (sulforaphane)	Neutralizes free radicals that cause cell damage; protects against some cancers; helps balance some hormones

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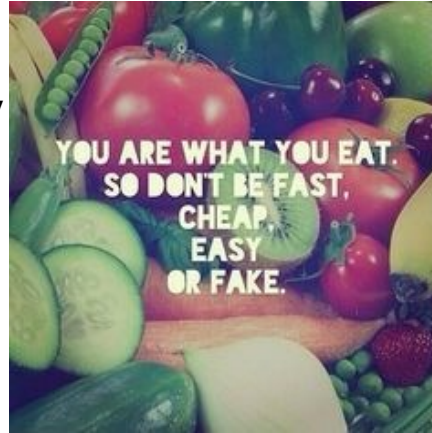
## Zoochemicals

Food	Zoochemical	Possible benefit
<b>Cold water fatty fish &amp; fish oil</b> (salmon, tuna, herring, mackerel, trout)	EPA (eicosapentaenoic acid)	Reduces inflammation & blood clotting; protects against heart disease; may reduce the risk of irregular heartbeat, type 2 diabetes, cancer, & Alzheimer's disease
<b>Cold water fatty fish, fortified milk and eggs, grass-fed animals, fish oil</b>	DHA (docosahexaenoic acid)	Reduces disorders such as schizophrenia, depression and attention deficit; vital for brain and eye development; may ease discomfort from rheumatoid arthritis
<b>Meat and dairy products</b> (especially grass-fed versions)	CLA (conjugated linoleic acid)	Suppresses cancer cell development; may help reduce risk of heart disease; boosts immune system; builds lean muscles; reduces body fat
<b>Egg yolks</b>	Lutein & zeaxanthin	Protects against macular degeneration and cataracts; shields the eyes from harmful blue light; improves eye health
<b>Beef, pork, herring, salmon, tuna</b>	Creatine	Replenishes ATP to provide cellular energy and support; benefits muscle, brain, bone and liver health
<b>Beef, poultry, pork, milk, eggs</b>	Carnosine	Antioxidant that scavenges alpha-beta unsaturated aldehydes formed from peroxidation of cell membranes; opposes glycation;

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## Food is More than Fuel

- All food isn't created equal
  - What we eat isn't necessarily what we absorb
- Every food decision we make sends a message throughout your body
  - Every food choice is an opportunity to direct, shape, & remake our health, body composition, performance, & well-being.



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## Food is More than Fuel



- Food is smart & so is your body
- Your body deserves a lot more honor & recognition
- Don't limit your health, fitness, or the expression of your own humanity

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## Big Picture: What Happens When We Eat

- Food is digested & broken down in the stomach
  - Carbs are broken down into glucose & released into blood stream
  - Proteins are broken down into a pool of amino acids in the stomach
  - Fats are broken down into lipids
- Some glucose is stored in muscle & liver as glycogen – which your body will use during exercise
- Excess glucose will be converted to fat (triglycerides) & stored in adipose tissue (fat)

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## Big Picture: What Happens When We Eat

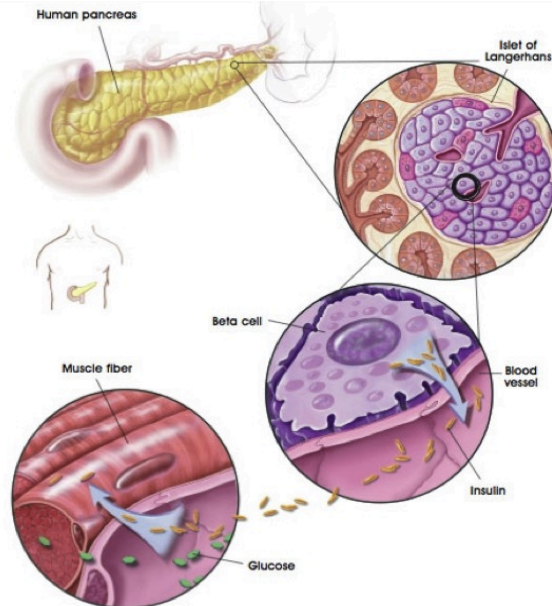
- **Cells use glucose** to create ATP (energy)
- **Cells use amino acids** to build & repair muscle tissue, create enzymes, hormones, neurotransmitters, & antibodies
- **Cells use fat** to adjust metabolism, produce hormones, improve immunity, absorb nutrients (e.g., vitamins A, D)
  - The fats we consume literally become part of our cells:
    - Brains made of fatty sheath that insulates our nervous system
    - Cell membranes are made of phospholipids

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## The Messages Food Delivers:

**Increase in Blood Glucose = Increase in Insulin**

- Presence of glucose in the stomach causes the stomach to release gastric inhibitory polypeptide (GIP) & glucagon-like peptide-1 (GLP-1)
- GIP & GLP-1 tell the pancreas to release the hormone insulin
- Pancreas also releases somatostatin & amylin to tell your brain that there's incoming food



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## The Messages Food Delivers:

**Increase in Blood Glucose = Increase in Insulin**

- Glucose is released into the blood stream & **alters blood-sugar levels**
  - After a meal: Increase in insulin secretion into blood as blood sugar rises
  - When blood sugar falls: Insulin secretion decreases
- **Insulin helps carry & remove excess glucose** (carbohydrates) from the blood by delivering it to cells to use as fuel (glycogen) or store as fat
  - Insulin will also shuttle amino acids & blood fats into cells
  - If nutrients are shuttled primarily into muscle cells: Muscles grow & body fat is managed.
  - If nutrients are shuttled primarily into fat cells: Muscle mass is unchanged & body fat is increased.

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## The Messages Food Delivers:

**Increase in Blood Glucose = Increase in Insulin**

- Insulin's main actions
  - **Rapid (seconds)**: Increases transport of glucose (carbs), amino acids (proteins), and potassium into insulin-sensitive cells
  - **Intermediate (minutes)**:
    - Stimulates protein synthesis (insulin increases the formation of new proteins)
    - Activates enzymes that store glycogen
    - Inhibits protein degradation
  - **Delayed (hours)**: Increases proteins and other enzymes for fat storage

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## The Messages Food Delivers:

**Increase in Blood Glucose = Increase in Insulin**

- Too much insulin:
  - **Increases levels of stress hormone cortisol**, preparing the body for fight or flight
    - Chronically elevated cortisol mobilizes triglycerides from storage & relocates them to visceral fat cells (under the muscle, deep in the abdomen)
    - Cortisol binds to hypothalamus receptors in the brain, modulating appetite
  - **Decreased sensitivity to leptin, the "satiety hormone"**
    - Normally, leptin levels are high between midnight & early morning, suppressing appetite during the night
    - Suppressed leptin response results in an inability to detect satiety despite high energy stores

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## The Messages Food Delivers: Increase in Blood Glucose = Increase in Insulin

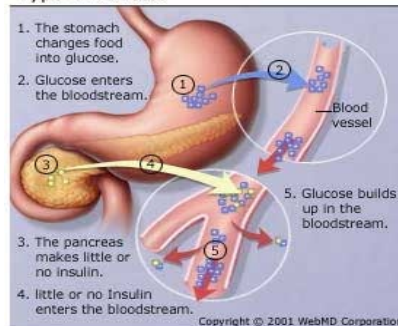
- Too much insulin
  - **Insulin resistance:** Body becomes unable to utilize insulin
    - Cells become starved of glucose because insulin can no longer transport it
    - Starved cells send hunger signals to the brain
    - Unused glucose floats around in blood or is stored as fat
    - Characteristic Symptoms: fatigue after meals, craving for sweets that don't go away when sweets are consumed, increased thirst, frequent urination

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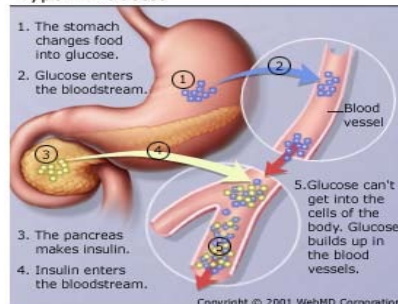
## Diabetes

- **Type I Diabetes:** Absolute insulin deficiency (i.e., autoimmune disorder where the pancreas can't produce insulin)
- **Type II Diabetes:** Insulin resistance (i.e., pancreas produces insulin, but cells can't use it properly). These individuals usually excess body fat; 80% of clients are obese at onset

Type 1 Diabetes

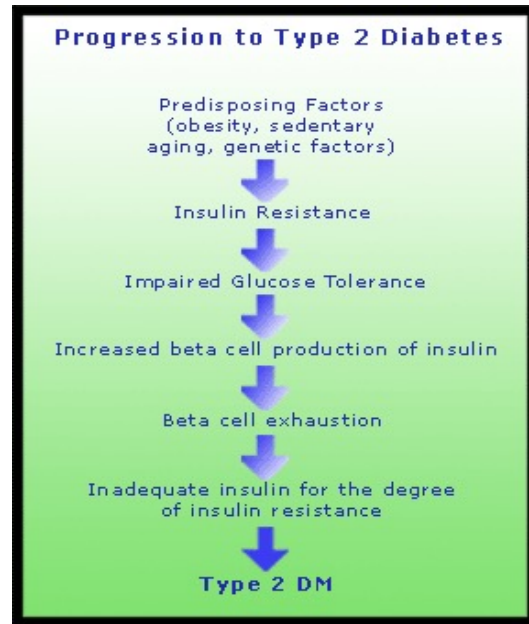


Type 2 Diabetes



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# Diabetes



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## The Messages Food Delivers: Increase in Insulin = Increase in Cortisol

- Normally, cortisol reduces inflammation in the body. However, chronic levels of cortisol **suppress the immune system**
  - Increased susceptibility to colds, illness, & risk of cancer
  - Disrupted sleep (“wired & tired”); crave caffeine & simple carbs
  - Tendency to develop food allergies
  - Increased risk of gastrointestinal issues (ulcers, IBS, colitis)
  - Cortisol restricts blood vessels, which increases blood pressure in order to enhance delivery of oxygenated blood.
    - Over time, vessel damage & plaque build-up (heart attack?)

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## The Messages Food Delivers:

Increase in Insulin = Increase in Cortisol

- Cortisol sends a signal to the pancreas to produce glucagon.
  - Glucagon signals the liver to convert glycogen into glucose & release it into the blood stream
    - Normally, your body uses this process during periods of low blood sugar.
    - However, chronic cortisol elevations creates a vicious cycle of unnecessary elevated blood glucose

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## The Messages Food Delivers:

Increase in Insulin = Increase in Cortisol

- **Hypoglycemia**: low (“hypo”) blood sugar (“glycemia”), but is really characterized by blood sugar *fluctuations* -- sometimes it’s high and sometimes it’s low.
  - **Symptoms**: lightheadedness, irritability, shakiness & fatigue between meals, which is often relieved after eating.
  - Individuals with this pattern and periods of low blood sugar will have surges of insulin, rather than chronically elevated levels.
  - Hypoglycemic people usually have low adrenal function and rely on adrenaline to elevate blood sugar between meals, which causes the shakiness and and lightheadedness between meals.

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## The Messages Food Delivers: Increase in Insulin = Increase in Cortisol

### HYPOGLYCEMIC TENDENCIES

Feels better after meals

Sugar cravings before meals

May have difficulty staying asleep at night

### INSULIN RESISTANT TENDENCIES

Feels tired after meals

Sugar cravings after meals

May have difficulty getting to sleep at night

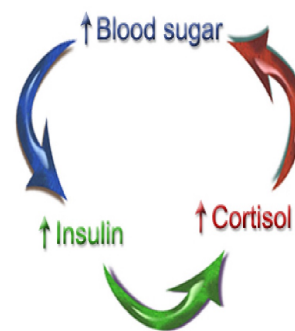
49

## The Messages Food Delivers: Increase in Insulin = Increase in Cortisol

### •2 ways to enter cycle:

1. **Improper eating.** Excess sugar or carbohydrates, excessively large meals or glycemicly imbalanced meals can excessively elevate blood sugar levels, causing this cycle to begin.

2. **Cortisol.** Anything that elevates cortisol (i.e. stress, parasitic infection, food allergies, inflammation, etc.) will also elevate blood sugar and therefore insulin levels.



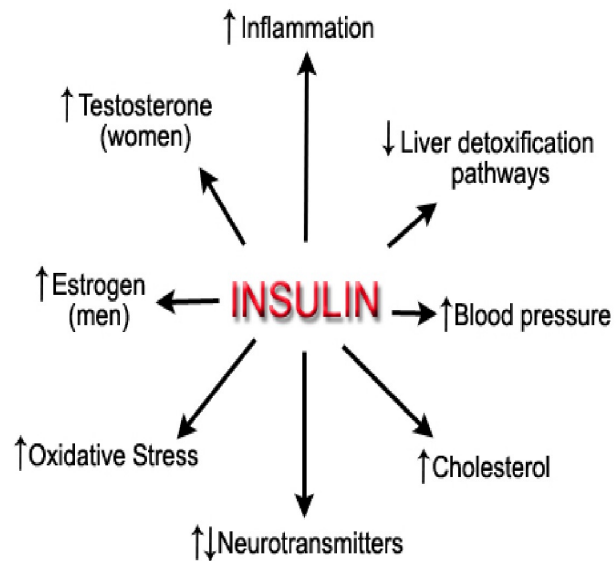
In other words, you could have a perfect diet and exercise program, but if you have elevated cortisol levels, you may also be increasing your blood sugar from the inside

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## The Messages Food Delivers:

Increase in Insulin = ....

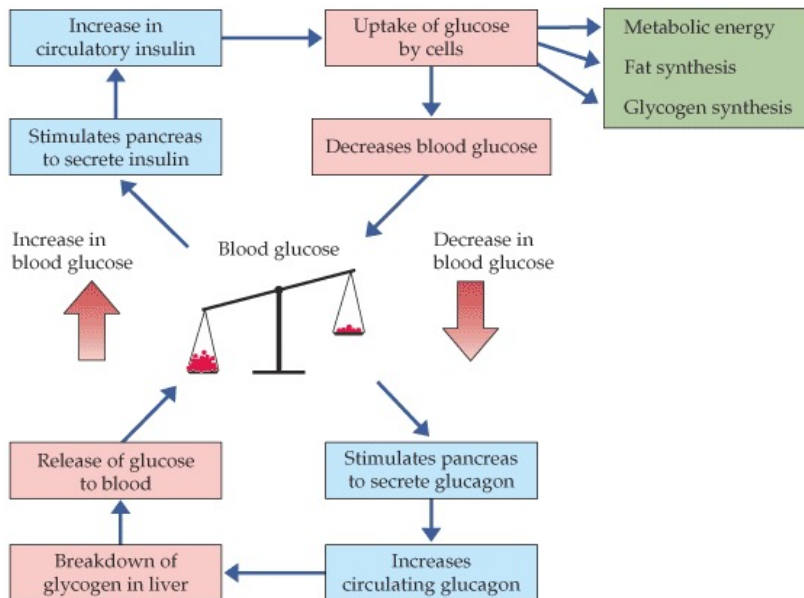
- Insulin is necessary for life. Without it, you'd be dead. But insulin should be balanced.
- In excess, elevated insulin levels have a host of negative consequences on the body.



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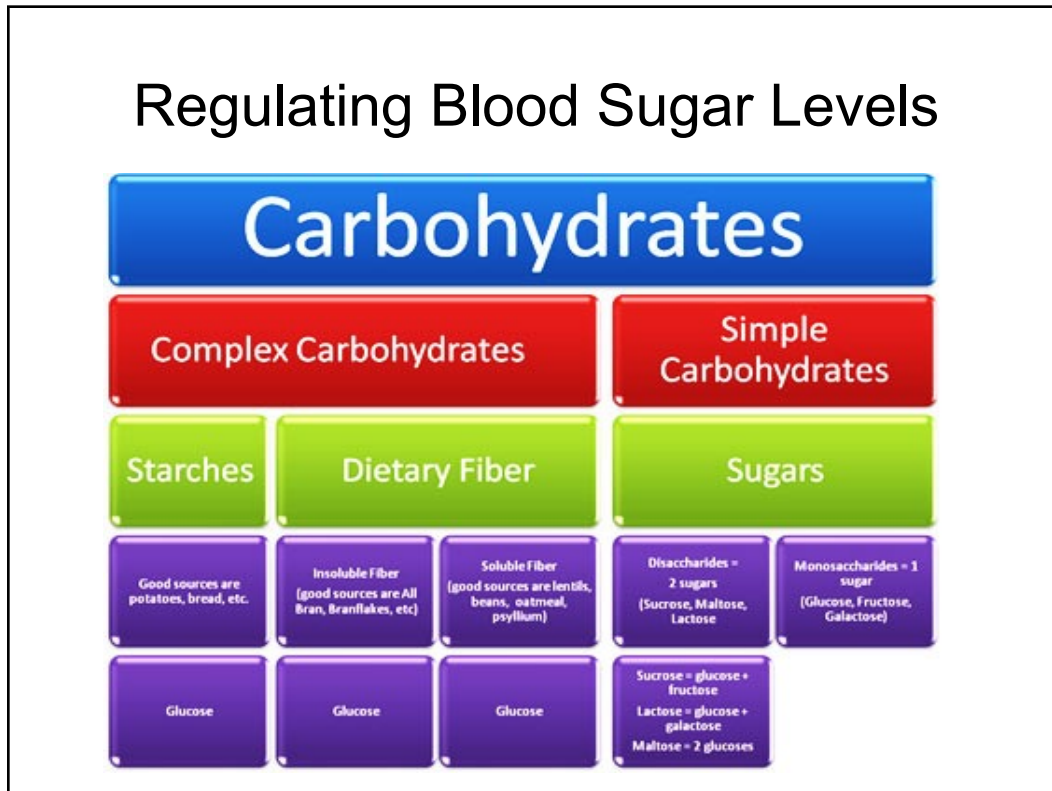
## The Messages Food Delivers:

Blood Glucose & Insulin Feedback Loop



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## Regulating Blood Sugar Levels



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## Regulating Blood Sugar Levels

- Consume fibrous carbohydrates (vegetables)
- Consume complex carbohydrates rather than simple carbohydrates
  - **Simple Carbs:** Body breaks down rapidly, resulting in elevations in blood triglyceride levels, bad cholesterol, and insulin.
  - **Complex Carbs:** Digested and absorbed slowly. Can help to control insulin response, energy levels and body composition. May reduce triglycerides, increased vitamin and mineral intake, increased fiber intake, enhanced satiety, and blood sugar control.

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## Regulating Blood Sugar Levels

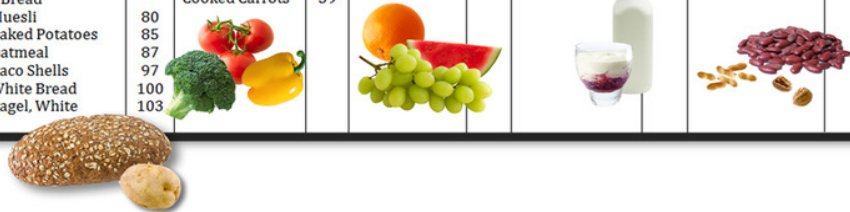
- Choose complex carbohydrates with a **lower glycemic index**
  - **Glycemic Index:** numerical Index that ranks carbohydrates based on their rate of glycemic response (i.e. their conversion to glucose within the human body).
  - Glycemic Index uses a scale of 0 to 100, with higher values given to foods that cause the most rapid rise in blood sugar.

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## Regulating Blood Sugar Levels Glycemic Index

Low GI (<55), Medium GI (56-69) and High GI (70>)

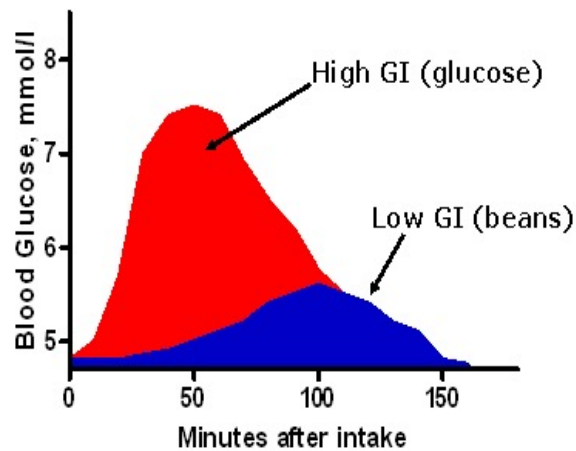
Grains / Starchs		Vegetables		Fruits		Dairy		Proteins	
Rice Bran	27	Asparagus	15	Grapefruit	25	Low-Fat Yogurt	14	Peanuts	21
Bran Cereal	42	Broccoli	15	Apple	38	Plain Yogurt	14	Beans, Dried	40
Spaghetti	42	Celery	15	Peach	42	Whole Milk	27	Lentils	41
Corn, sweet	54	Cucumber	15	Orange	44	Soy Milk	30	Kidney Beans	41
Wild Rice	57	Lettuce	15	Grape	46	Fat-Free Milk	32	Split Peas	45
Sweet Potatoes	61	Peppers	15	Banana	54	Skim Milk	32	Lima Beans	46
White Rice	64	Spinach	15	Mango	56	Chocolate Milk	35	Chickpeas	47
Cous Cous	65	Tomatoes	15	Pineapple	66	Fruit Yogurt	36	Pinto Beans	55
Whole Wheat Bread	71	Chickpeas	33	Watermelon	72	Ice Cream	61	Black-Eyed Beans	59
Muesli	80	Cooked Carrots	39						
Baked Potatoes	85								
Oatmeal	87								
Taco Shells	97								
White Bread	100								
Bagel, White	103								



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## Regulating Blood Sugar Levels

### Glycemic Index



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## Regulating Blood Sugar Levels

- Glycemic Index & Insulin Index
  - While the glycemic and insulin indices of many foods are similar, **some foods cause unexpected responses**.
    - Milk products have a lower glycemic index, but a very high insulin index.
    - Rice has a higher glycemic index, but a lower insulin index.
  - Keep in mind that a low glycemic diet can result in better fasted insulin and glucose, but results have been mixed.

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## The Carb Controversy

- Can low-carb diets really help you loose weight?
  - Yes! But, that doesn't make it the right choice. And, if you're exercising regularly, it's probably a bad idea.
- **What's wrong with restricting carbs?**
  - a sluggish metabolism
  - lower levels of muscle/strength-building hormones
  - higher levels of stress hormones.
- The result? You might find yourself feeling cranky, tired, weaker, or even sick. AND your weight loss will probably also stall.

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## The Carb Controversy

- Low Carb Diet & Decreased Thyroid Function
  - To maintain function & maintain an appropriate metabolism (BMR), the Thyroid produces T3.
  - T3 is the most active thyroid hormone and is important for blood glucose management and proper metabolic activity.
  - **When calorie intake or carb intake is too low, T3 levels drop**
  - If you're active, you need adequate energy & carb intake for a healthy thyroid

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## The Carb Controversy

- Low-Carbs = **Decreased Cortisol, Decrease Testosterone**
  - **Muscle Catabolism:** Decrease testosterone will decrease muscle mass & increase fat mass
    - Decreased carbs & decreased testosterone will reduce muscle mass, even if protein is held constant
  - Decreased cortisol could **effect sleep**. During sleep, adrenal glands (source of cortisol & norepinephrine) work to keep your body functioning by tapping into glucose stores.
    - If cortisol is low, especially at night, the body may employ norepinephrine (adrenalin) to pool glucose from storage
    - Result: Interrupted sleep, anxiety, hunger, inability to fall asleep

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## The Carb Controversy

- Low Carbs = **Impaired Mood & Cognitive Function**
  - Chronic fatigue & disrupted sleep
  - Anxiety, depression, & other mental health issues
- Low Carbs = **Suppressed Immune Function**
  - Chronic inflammation & worse chronic pain
- Low Carbs = **Hypothalamic Amenorrhea**
  - A stopped or irregular menstrual cycle
  - Lowered fertility
  - Hypoglycemia and blood sugar swings
  - More body fat (especially around the middle)
  - Loss of bone density

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## What Lowers Insulin Sensitivity?

- Low-carbohydrate, high-fat diets
- High processed carbohydrate diets
- Sedentary lifestyle
- Nicotine use
- Regular caffeine consumption
- Vitamin D deficiency
- Sporadic sleep patterns
- Alcohol consumption

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## What Increases Insulin Sensitivity?

- Resistance Training 4-5x/week
- Lots of muscle mass
- Higher intakes of vegetables, whole-grain foods, legumes, lean proteins, and nuts/seeds
- Supplements like omega-3 fatty acids, alpha-lipoic acid, and chromium
- Adequate vitamin D
- Limiting caffeine intake
- Regular tea consumption
- 7-9 hours of sleep per night

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## Put Your Food to Work For You

- **Protein + Carb:**
  - Raises **Insulin Sensitivity**
  - Carbs enhance the transport of amino acids into muscle cells
    - Together, they create an anabolic environment to synthesize new muscle tissue
  - Carbs **enhance tryptophan** (amino acid) into the brain, where it is manufactured into serotonin (the feel-good neurotransmitter)
- Eat small portions of fats at every meal, except around exercise
  - Fats slow stomach emptying & you'll want to feel like during your training

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## Exercise:

- Weight loss & muscle gain
- Builds strength, endurance, power
- Reduces stress
- Makes us feel good; Fun; Provides confidence
- Preparation
- Challenge; Pushes our comfort zone
- Dedication; Commitment
- Progress, action, improvement, change
- Gift
- Reveals character

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## Importance of Diet & Exercise

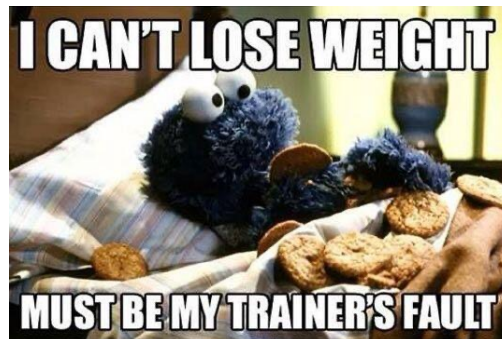


- Poor diet now generates more disease than physical inactivity, alcohol, and smoking COMBINED
- Exercise is preventative medicine: It boosts your metabolism, reduces inflammation, depression, diabetes, heart disease, dementia, & osteoporosis
- Exercise alone doesn't really work that well
  - Exercise vs No Exercise (no change in diet): limited (1%) or no change in body fat percentage

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## Can You Eat Whatever You Want and Expect To Burn it Off at the Gym?

- **No!**
- And, you can't stop the cascade of messages your body sends out based on the TYPE of food you feed it.



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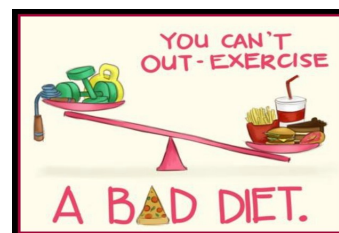
## Why You Can't Out Train a Bad Diet

1. You won't create a caloric deficit, which you'll need to loose weight
2. You won't be able to hit your peak performance if you consume the wrong foods
3. You won't have the energy to exercise
4. You won't want to exercise
5. You won't be able to tone your target areas
6. You could get sick, injured, or both
7. WHAT you eat signals hormones to store fat, boost or crash metabolism or breakdown muscle

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## 1. You won't create a caloric deficit

- If you consume fewer calories than used to sustain basal metabolism and daily activity level, you'll loose weight.
- Unhealthy, treat meals tend to be extremely high in: simple carbohydrates, fats, sodium, and calories.
- In most cases, it's extremely difficult to do enough exercise to simply 'undo' the calories in these foods, let alone 'undo' AND create a caloric deficit
  - The average human can only store about 2,000 kcals of energy as glycogen, but can store well over 25,000 kcals a fat.



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## 2. You won't hit your peak performance

- What & when you eat effects:
  - How you sleep
  - How your cells function
    - Production of energy (ATP)
    - Producing enzymes, hormones, neurotransmitters, & antibodies
  - How your heart functions
  - Stress
  - Muscular strength, endurance, & power



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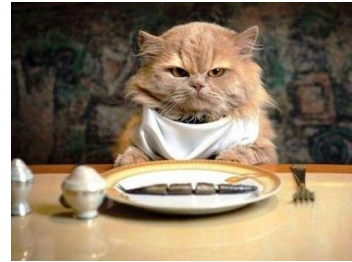
## 3. You won't have the energy to exercise

- Undereating = no energy because cells have no fuel
  - If cells don't have fuel from food, they'll break down muscle to get it
  - Chronic low fat diet lowers levels of hormones (e.g., insulin & testosterone), which are important for building lean muscle
  - Decreases ability of skeletal muscles to perform well
- Overeating = more energy devoted to digestion
- Micronutrient deficiencies
- Increased inflammation throughout body

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## 4. You won't want to exercise

- Unhealthy food choices make you feel slow & less driven to exercise
  - Lots of energy put into food digestion, instead
- When you eat well, you are motivated to move. When you move, you are motivated to eat better.
- With unhealthy food choices, you weaken training adaptations, hinder performance, making you less likely to want to exercise
- Severe caloric restrictions could make you feel hangry



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## 5. You won't be able to tone your target areas

- To tone, you'll need to build muscle and burn more calories than you're consuming.
  - Low calorie, nutrient-dense, high protein diet
- Exercise alone isn't enough to decrease weight or body-fat percentage
  - Exercise alone can increase strength and/or muscle mass, but muscle will still be covered in a layer of fat
- Restricted diet followed by treats or binges: Body stores excess glucose as fat in adipose tissue

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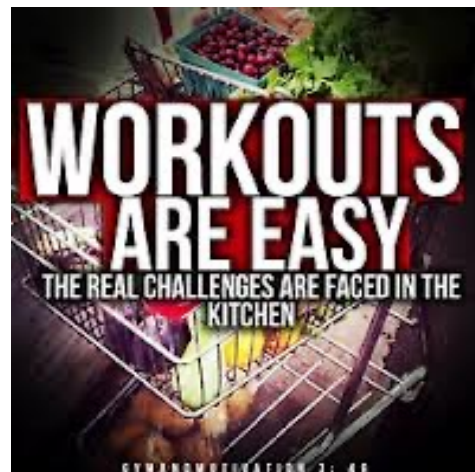
## 6. You could get sick, injured, or both

- Micronutrient deficiencies
- Low-fat diets: increased risk for overuse injuries (e.g., stress fractures, tendonitis)
- Impaired immunity

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## 7. WHAT you eat matters

- WHAT you eat signals hormones to store or burn fat, remain full or feel hungry, have cravings or not, boost or crash metabolism, build or break down muscle, & enjoy balanced energy or feel fatigued.
- Hormones give the body instructions about what to do with the information it is exposed to.



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## Strict Diets: “Comply or Die”

- Strict diets don't work
  - Don't take your nutrition to extremes — unless you have extreme goals.
  - Strategic moderation, as unsexy as that sounds, is the only sustainable method.
- Avoid the “What-the-Heck-Effect”
  - We use a single off-plan food choice as an opportunity to say, “What the hell, I've already messed this week up, might as well call it a wash, I'll start again on Monday!”
  - Eat for your goals but give yourself room to grow

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## Strict Diets: “Comply or Die”

- While diets will teach you *what* to do, they teach you very little about *why* you're doing it.
  - Learning the why behind your actions are what create sustainable long-term weight loss.
- Instead, Practice Mindfulness
  - Ask yourself whether you're actually hungry or: thirsty, bored, tired, stressed
  - Ask yourself whether the food you're about to eat will nourish your body & help you meet your goal
  - Begin to learn your triggers & create strategies to combat them

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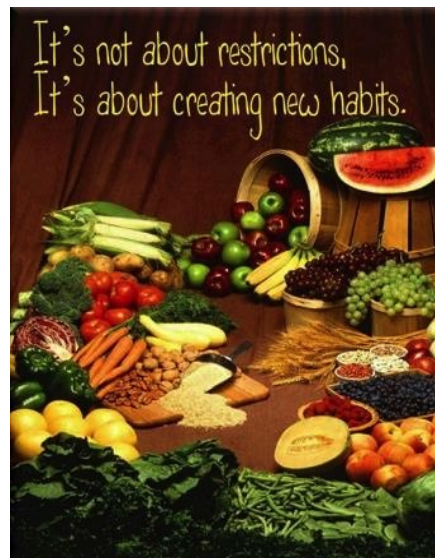
## Strict Diets: “Comply or Die”

- They don't hold you accountable
  - Because we never learned along the way about our own relationship with food, and about what works for our individual metabolism, we end up placing all of our faith in our diet. When that diet doesn't work, it's on to trying the next one.
- Instead, take control of your life and your nutrition
  - We must hold ourselves accountable for our actions if we want to succeed.
  - You can't reach your weight loss goals until you accept complete responsibility for your current lifestyle habits.

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## Strict Diets: “Comply or Die”

- Learn to be ok with moderation
  - This is the precise reason why we fail on diet after diet, because when we can't be perfect, we give up, whether that's in 2 hours, 2 days or 2 months. Perfection *isn't* possible, and perpetuating the lie that it *is* possible only keeps us struggling.



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## What Else Can You Do?

- Preparation!
  - Space your meals out & build them around your protein
    - Rather than thinking about 3 meals & 3 snacks per day, consider consuming 6 mini meals
    - Always pair your carbs with a protein
  - Keep key items on your grocery list
  - Prepare snacks & quick go-to's ahead of time
  - Have a meal prep day – see page 144 in your book



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## What Else Can You Do?

- Look ahead, anticipate 'food boredom'
  - Use the book to help you get new ideas
    - Healthy Food List + Snacks pg 37
    - Breakfast pg 50
    - Lunch pg 57
    - Dinner pg 64
  - Use the book to help you create a meal plan for the week pg 71
  - Use the book to pick a new fibrous vegetable or lean protein to try
    - Read Fuel For Fitness: 8 Key Nutrients pg 149
    - Read Top Foods for Peak Performance pg 159
    - Read Anti-Inflammatory Foods to Add to your Shopping Cart pg 171

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## Experiment & Have Fun

- Our recommendations let you be flexible, enjoy the high-quality foods you love, and adjust your intake to your own experience, goals, & unique needs.
  - Don't like rice? Fine. Try another carb source.
  - Don't like beef for your lean protein? How about eggs?
  - Need more carbs to support your athletic performance? Cool. Add another few servings and see how it goes.
  - Curious about balancing your blood sugar by dialing back the carbs just a little bit? Great — give it a go, monitor your glucose levels, and see how you feel.
- **YOU are unique. Your body is unique**

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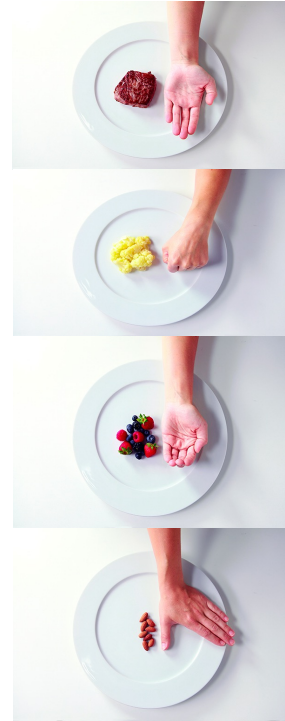
## Keep It Simple

- Variety is key
  - Enjoy a wide variety of minimally processed, whole and fresh foods.
- Observe how you look, feel, and perform
  - Decide what to do based on the data you collect about yourself, not on what you think you “should” do.
- The only “rules” come from *your* body and *your* experience. Don't follow a dietary prescription for anyone else's body.

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## Portion Control

- Do you need to count calories?
  - No. But, it helps
- Hand-size portion estimating:
  - Your **palm** = **protein** portions
  - Your **fist** = **veggie** portions
  - Your **cupped hand** = **carb** portions
  - Your **thumb** = **fat** portions



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## Meal Planning

### • Women:

- 1 palm of protein dense foods with each meal;
- 1 fist of vegetables with each meal;
- 1 cupped hand of carb dense foods with most meals;
- 1 entire thumb of fat dense foods with most meals.



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## Meal Planning

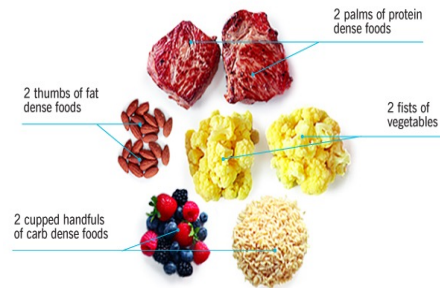
- Men

2 palms of protein dense foods with each meal;

2 fists of vegetables with each meal;

2 cupped hands of carb dense foods with most meals;

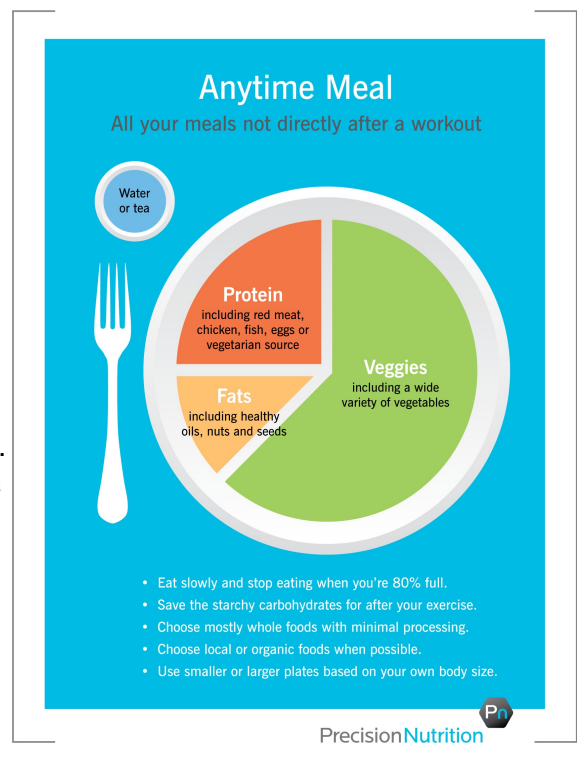
2 entire thumbs of fat dense foods with most meals



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## Build a Healthy Plate

- Most of the plate is full of nutrient-dense, high fiber, low-calorie vegetables.
- Protein helps with appetite control, maintaining lean mass, and optimizing the metabolism.
- Healthy fats offer myriad benefits.
- The drink of choice is water or tea
- Putting down the fork when you're 80% full, not when the plate is empty.



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## Build a Healthy Plate

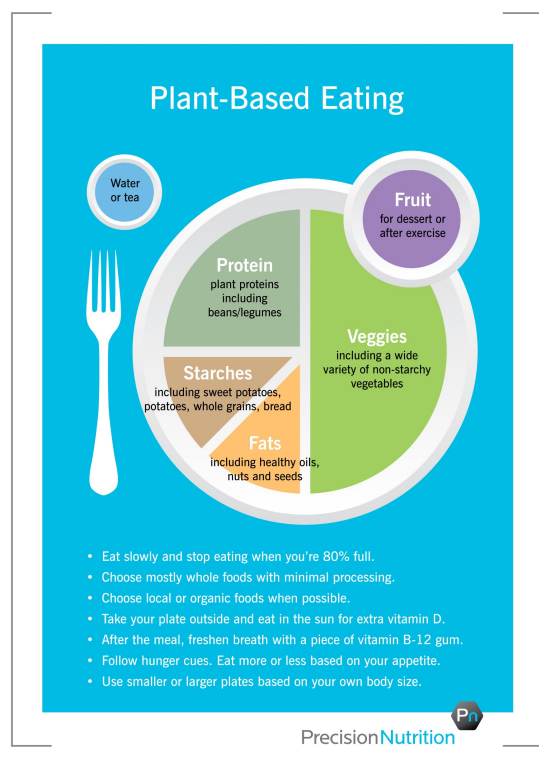
- Take advantage of the body's metabolic response to exercise: include starchy carbohydrates and protein, which are great during times of increased glucose tolerance (during the post-exercise period).
- Minimize added fat. A higher fat meal post-workout slows the digestion and the assimilation of protein and carbohydrate.
- Notice that the Post Workout portion is slightly larger, as we add a small side dish of starchy carbohydrates on top of a full plate of protein and fruits/veggies.



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## Build a Healthy Plate

- Include smaller amounts of minimally processed fruit and starches to meet energy needs.



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## Face the Fats

### fats/oils:

cleaning up your diet by using the right fats & oils is essential to improving your health from the inside out.

#### WHICH TO EAT:

##### SATURATED FOR HOT USES

*non-animal fats, organic, unrefined forms are ideal*

coconut  
palm

*animal fats, from pasture-raised/grass-fed & organic sources are ideal*

butter  
ghee  
lard  
tallow  
schmaltz\* (chicken fat)  
lamb fat  
duck fat  
full fat dairy  
eggs, meat & seafood



\*higher in omega-6 fatty acids so they should be consumed in moderation

##### UNSATURATED FOR COLD USES

*organic, extra virgin and cold-pressed forms are ideal*

olive oil  
sesame oil  
nut oils (walnut, pecan, macadamia)  
flaxseed oil\*\*  
avocado  
nuts & seeds  
(including nut & seed butters)



NOTE: unsaturated fats (typically liquid at 68 degrees room temperature) are easily damaged/oxidized when heat is applied to them. We do not want to consume damaged fats.

\*\*flaxseed oil is okay for moderate use but supplementing with it or doses of 1-2 tablespoons is NOT recommended as overall PUFA (polyunsaturated fatty acid) intake should remain minimal



#### WHICH TO DITCH:

##### SATURATED

*man-made fats are never healthy, trans-fats are particularly harmful.*

margarine  
hydrogenated or partially hydrogenated oils  
man made trans-fats often found in "buttery spreads" including oil blends like Earth Balance, Benecol and I Can't Believe It's Not Butter to name a few

##### UNSATURATED

*these oils are highly processed and oxidize easily via one or more of the following: light, air or heat. consuming oxidized oils is never healthy.*

canola oil (also known as rapeseed oil)  
corn oil      safflower oil  
vegetable oil      rice bran oil  
soybean oil  
grapeseed oil  
sunflower oil

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## Group Discussion

- What would you like food to be?
  - How does this affect the decisions you'll make every day toward improving your health & wellness?
- What would you like exercise to be?
  - How does this affect the decisions you'll make every day toward improving your health & wellness?
- Think back to your limiting factor. Why is this holding you back?
  - What is one SMART (specific, measureable, attainable, realistic, time-based) goal that you could set to improve?
    - Note, pick something you feel 100% confident you'd do on a daily, consistent basis

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## The Take Home

- Exercise because you love your body, not because you need to punish it for eating a treat
- Eat a well-balanced diet not to restrict calories, but to nourish your body & to honor this embodied gift
  - It's not merely about how much you eat, it's also about what you eat

