

# Nutrition Fact or Fiction?

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People are fed by the food industry,  
which pays no attention to health,  
and are treated by the medical industry,  
which pays no attention to food.

*Wendell Berry*

Without proper diet, medicine is of no use.  
With proper diet, medicine is of no need.

*Ayurvedic Proverb*

## COMPONENTS OF A HEALTHY LIFESTYLE

- Eat Healthy Foods

*Whole foods, not too much, mostly (at least 90%) whole plants.*

- Get Physical Exercise

*At least thirty minutes a day of moderate exercise.*

- Get Mental Exercise

*Solve puzzles, play games, read, learn something new.*

- Get Sufficient Sleep

*Between seven and nine hours each night.*

- Socialize

*Play group games, join a book club, eat dinner with friends.*

- Manage Stress

*Meditation, breathing exercises.*

- Avoid Toxins

## NUTRITION FACT OR FICTION?

Much of your health depends on the genes you inherited from your parents.

Everything we place in our body and our mind directly effects the expression of our genes.

*Sunil Pai, **The Inflammation Nation**, Page 53*

## HUMAN GENETIC FACTS

- ✓ A gene is the template or pattern that is used to assemble an amino acid string that forms the structure of a protein.
- ✓ Human DNA contains about 23,000 genes that are inherited from parents.
- ✓ Some human genes are "**dictator genes**" and their function can not be changed easily (at least not yet).
  - Some "dictator genes" determine your physical characteristics such as hair color, skin color or eye color.*
- ✓ Some "dictator genes" can have a direct effect on health.
  - For example: Down Syndrome, Cystic Fibrosis, and Sickle Cell Anemia.*
- ✓ Many human genes are "**committee genes**" and their function can be turned on or off depending on "lifestyle votes."

## HUMAN GENETIC FACTS

- ✓ A "committee gene" can increase or decrease the risk of getting a disease if it is turned on. For example, the APOE4 gene has been associated with the risk of developing Alzheimer's disease.
  - *If you have no APOE4 genes you have a standard 50 percent risk of developing Alzheimer's by age eighty-five.*
  - *If you have one copy of the APOE4 gene you have a standard 50 percent risk of developing Alzheimer's by age seventy-five.*
  - *If you have two copies of the APOE4 gene you have a standard 50 percent risk of developing Alzheimer's by age sixty-five.*

"If you don't implement healthy lifestyle practices, you'll have only a 50 percent chance of someday developing Alzheimer's. And for the great majority, roughly 90 percent of us, adopting a brain-healthy lifestyle can completely eliminate the risk."

## EPIGENETIC FACTS

- ✓ Genetic changes affect the DNA gene sequence and can alter which protein is made.  
*Genetic changes can be caused by radiation, toxins, and other environmental factors.*
- ✓ **Epigenetics** is the study of how cells control gene activity.
- ✓ Gene expression refers to how often or when proteins are created from the instructions within your genes.
- ✓ Epigenetic changes effect gene expression by turning genes "on" or "off" but they do not alter the DNA gene sequence.
- ✓ Scientific research indicates that lifestyle habits have a great effect on the gene expression of "committee genes."

## GUT MICROBIOME FACTS

- ✓ Your gut is host to about 40 trillion bacteria from 500-1,000 different bacterial species.
- ✓ Your gut bacteria must "eat" to live and procreate. They are fed by the undigested food, like fiber, resistant starch and polyphenols, that passes through your small intestine without being digested and absorbed.
- ✓ The types and population sizes of the bacterial species depends to a large extent on which undigested foods arrive in your colon because each bacteria species has a unique set of food preferences.
- ✓ Other lifestyle factors, notably exercise and sleep, also have an impact on bacterial populations.



## GUT MICROBIOME GENETIC FACTS

- ✓ Your gut **microbiome** is the collection of genes in the bacteria in your gut.
- ✓ The number of different bacterial genes in your gut is estimated at about 2,000,000 or more than 100 times as many as your human genes.
- ✓ Some bacteria species have genes that produce metabolites, like short chain fatty acids, that are beneficial to health and some species have genes that produce metabolites, like TMA, that are detrimental to your health.

**You can not (yet) easily change the human genes you inherited but you can change the genes in your microbiome by changing your diet to either promote beneficial bacteria or promote detrimental bacteria.**

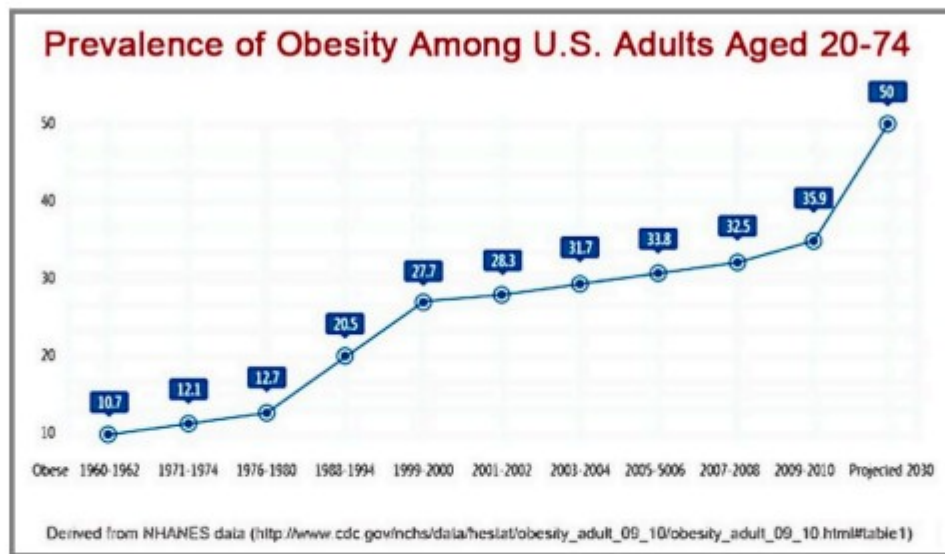
## LIFESTYLE TRUMPS GENES



During WW2, the Germans invaded Norway and confiscated the animals to feed their troops. The Norwegians were forced to adopt a mostly plant based diet because animal flesh was scarce. As a result, deaths from circulatory disease dropped significantly.

**The human genes did not change but health changed as the diet component of lifestyle changed.**

## LIFESTYLE TRUMPS GENES



Fast food restaurants were developed in the fifties and their number grew at a faster rate starting in the sixties. At the same time junk foods (cookies, chips, pretzels, soda, etc) became readily available.

**The human genes did not change but the prevalence of obesity changed as the diet component of lifestyle changed.**

## LIFESTYLE TRUMPS GENES

- ✓ When healthy people from a country with low rates of obesity, heart disease, and diabetes move to the United States and replace their native diet with the the **Standard American Diet**, they start to gain weight and begin to develop heart disease, diabetes, and other diseases.
- ✓ When historically healthy countries are invaded by fast food restaurants and high salt, high sugar manufactured foods and snacks that are part of the **Standard American Diet**, the incidence of obesity, heart disease and diabetes increases.

*Japan and China are examples of this.*

**The human genes did not change but health changed as the diet component of lifestyle changed.**

## NUTRITION FACT OR FICTION?

Much of your health depends on the genes you inherited from your parents.

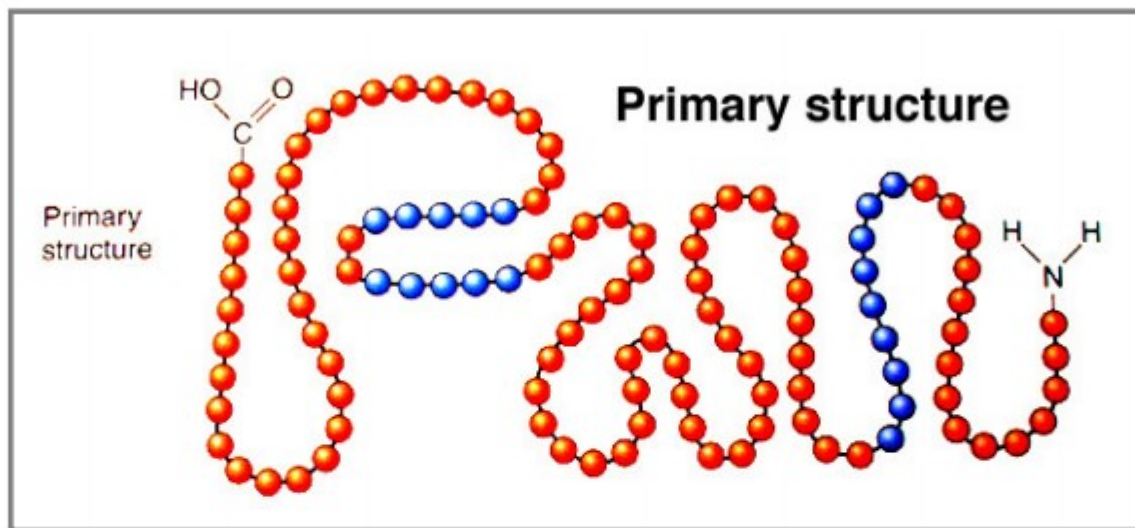


Your genes load the gun.  
Your lifestyle pulls the trigger!

## NUTRITION FACT OR FICTION?

You must eat meet, poultry, eggs or dairy to get enough "high quality" protein.

## PROTEIN FACTS



- ✓ **Proteins** are long strings of molecules called **Amino Acids**.
- ✓ A typical small protein amino acid chain contains 40 to 300 amino acids. Large proteins can have several times that number.
- ✓ Human protein amino acid chains are combinations of 21 different amino acids.

# 21 Amino Acids in Human Proteins

ESSENTIAL			CONDITIONAL			NON-ESSENTIAL		
NAME	ABBREV		NAME	ABBREV		NAME	ABBREV	
Histidine	HIS	H	Arginine	ARG	R	Alanine	ALA	A
Isoleucine (BCAA)	ILE	I	Cysteine (SULFUR)	CYS	C	Asparagine	ASN	N
Leucine (BCAA)	LEU	L	Glutamine	GLN	Q	Aspartic Acid	ASP	D
Lysine	LYS	K	Glycine	GLY	G	Glutamic Acid	GLU	E
Methionine (SULF)	MET	M	Proline	PRO	P	Serine	SER	S
Phenylalanine	PHE	F	Tyrosine	TYR	Y	Selenocysteine	SEL	-
Threonine	THR	T	<div style="border: 1px solid black; padding: 5px;"> <p><i>Essential:</i> Your body can not make</p> <p><i>Conditional:</i> Your healthy body can make</p> <p><i>Non-essential:</i> Your body can make</p> </div>					
Tryptophan	TRP	W						
Valine (BCAA)	VAL	V						

There are 300 different amino acids found in nature.  
But only 21 different amino acids are found in the human body.



## HUMAN PROTEIN

**You make all of your proteins from amino acids by following instructions contained in the genetic code from your DNA.**

Your proteins are not the same as the proteins created by the genetic code from the DNA of a cow, a chicken, a pig, wheat, corn, or rice.

**You can not make direct use of the protein from any other organism.**

## PLANT EATER PROTEIN SYNTHESIS

- ✓ A plant uses water, carbon dioxide, nitrogen and sulfur from the soil and energy from sunshine to make fat, carbohydrates, and amino acids to build plant proteins.
- ✓ A plant eater consumes the plant and their digestive track breaks the plant proteins apart to get amino acids that are then absorbed into their bloodstream.
- ✓ The plant eater's cells use the amino acids and genetic codes from their cell's DNA to create the proteins they need to build structure or control biological processes.

## ANIMAL EATER PROTEIN SYNTHESIS

- ✓ An animal eater consumes a plant eating animal and their digestive process breaks down the animal proteins into amino acids that are then absorbed into their bloodstream.
- ✓ The animal eater's cells use the amino acids and genetic codes from their cell's DNA to create the proteins they need to build structure or control biological processes.

**All of the essential amino acids originally come from plants!**

## WHOLE PLANT FOODS

Lower Fat  
Higher Carbohydrates  
Lower Protein  
Fiber  
Vitamin C  
No Cholesterol  
**No Vitamin B12**  
Phytonutrients  
No Animal Hormones  
No Antibiotics  
No Neu5gc  
Lower Choline  
No Methane  
No Insulin Growth Factor

3x to 7x

## ANIMAL FOODS

Higher Fat  
Lower Carbohydrates  
Higher Protein  
**No Fiber**  
**No Vitamin C**  
**Cholesterol**  
Some Vitamin B12  
**No Phytonutrients**  
**Animal Hormones**  
**Some Antibiotics**  
**Neu5gc (Inflammation)**  
**Higher Choline (TMAO)**  
**Methane (Global Warm)**  
**Insulin Growth Factor**

HUMANS

Every real food that you eat  
originally came from plants!

Animal foods are just  
highly processed plant Foods!!!

## DAILY PROTEIN REQUIREMENT

AGE	PROTEIN g/kg Body Weight	% OF CALORIES
Infants	1.0 g/kg	5%
Toddlers	1.2 g/kg	6%
Kids	1.0 g/kg	7%
Puberty	1.2 g/kg	10%
Teen Athlete	1.5 g/kg	14%
<b>Adults</b>	<b>0.8 g/kg</b>	<b>9%</b>
Seniors	1.0 g/kg	10%

1 kilogram (kg) = 1,000 grams (g)

1 kilogram (kg) = 2.2 pounds (lb)

1 pound (lb) = 0.45 kilograms (kg)

## DAILY PROTEIN REQUIREMENT

SENIOR PROTEIN RDA = 1.0 g/kg BODY WEIGHT

IDEAL BODY WEIGHT		PROTEIN RDA g	PERCENT OF CALORIES			
POUNDS	KILOGRAMS		1,800 cal	2,000 cal	2,200 cal	2,400 cal
120 lb	54.4 kg	54 g	12 %	11 %	10 %	9 %
130 lb	59.0 kg	59 g	13 %	12 %	11 %	10 %
140 lb	63.5 kg	64 g	14 %	13 %	12 %	11 %
150 lb	68.0 kg	68 g	15 %	14 %	12 %	11 %
160 lb	72.6 kg	73 g	16 %	15 %	13 %	12 %
170 lb	77.1 kg	77 g	17 %	15 %	14 %	13 %

1 pound (lb) = 0.45 kilograms (kg)

1 gram (g) protein = 4 calories (cal)

## PROTEIN MYTH 1

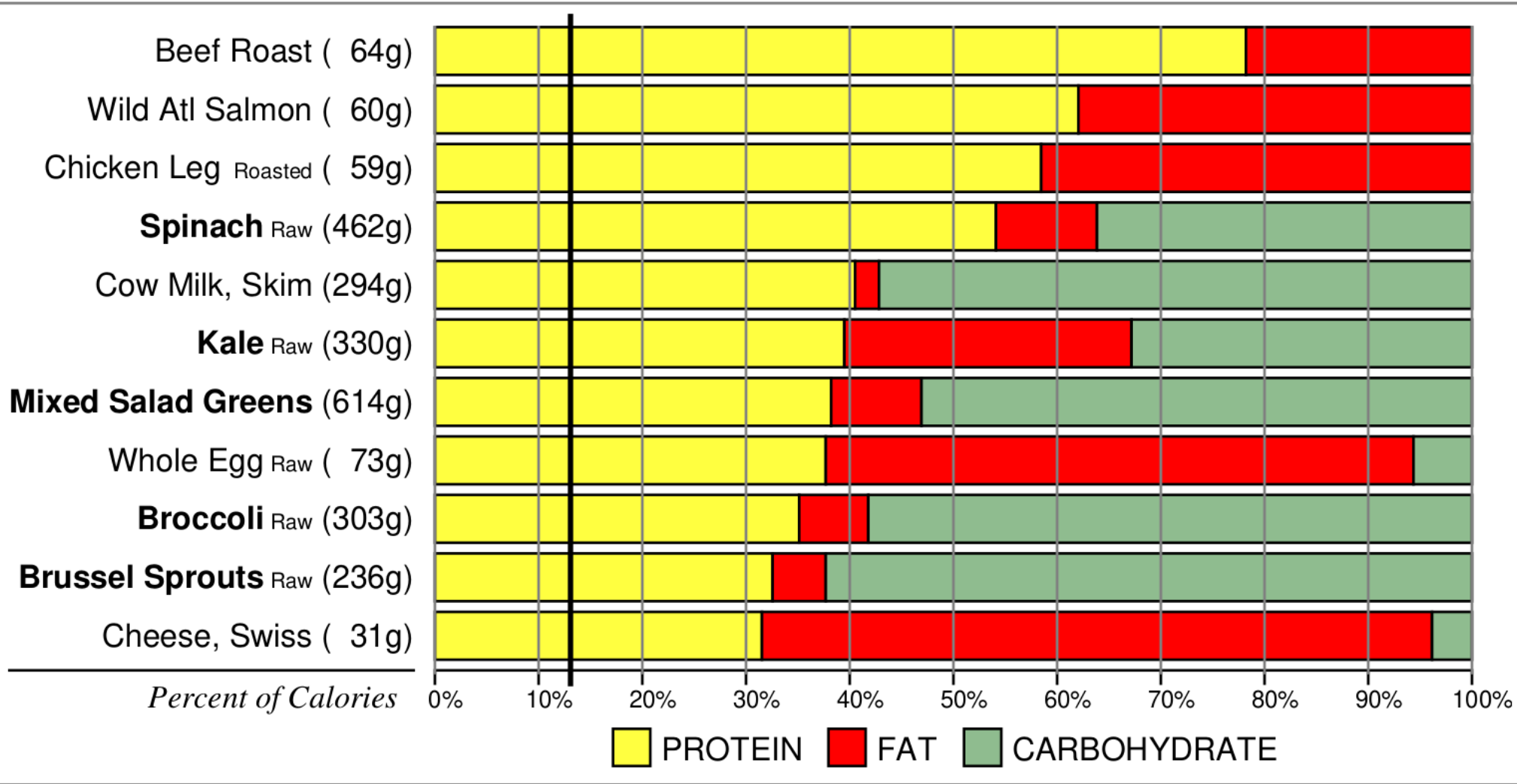
**Eating a diet of whole plant foods does not provide enough protein to meet the daily protein requirements.**

*The following charts illustrate the fact that many whole plant foods contain more than 13% of their calories from protein and in some cases contain more protein than some animal foods.*

Additional charts can be found in the slides for my protein talk located on the internet at:  
[web4dmarch.com/nutrition/protSlide.pdf](http://web4dmarch.com/nutrition/protSlide.pdf)

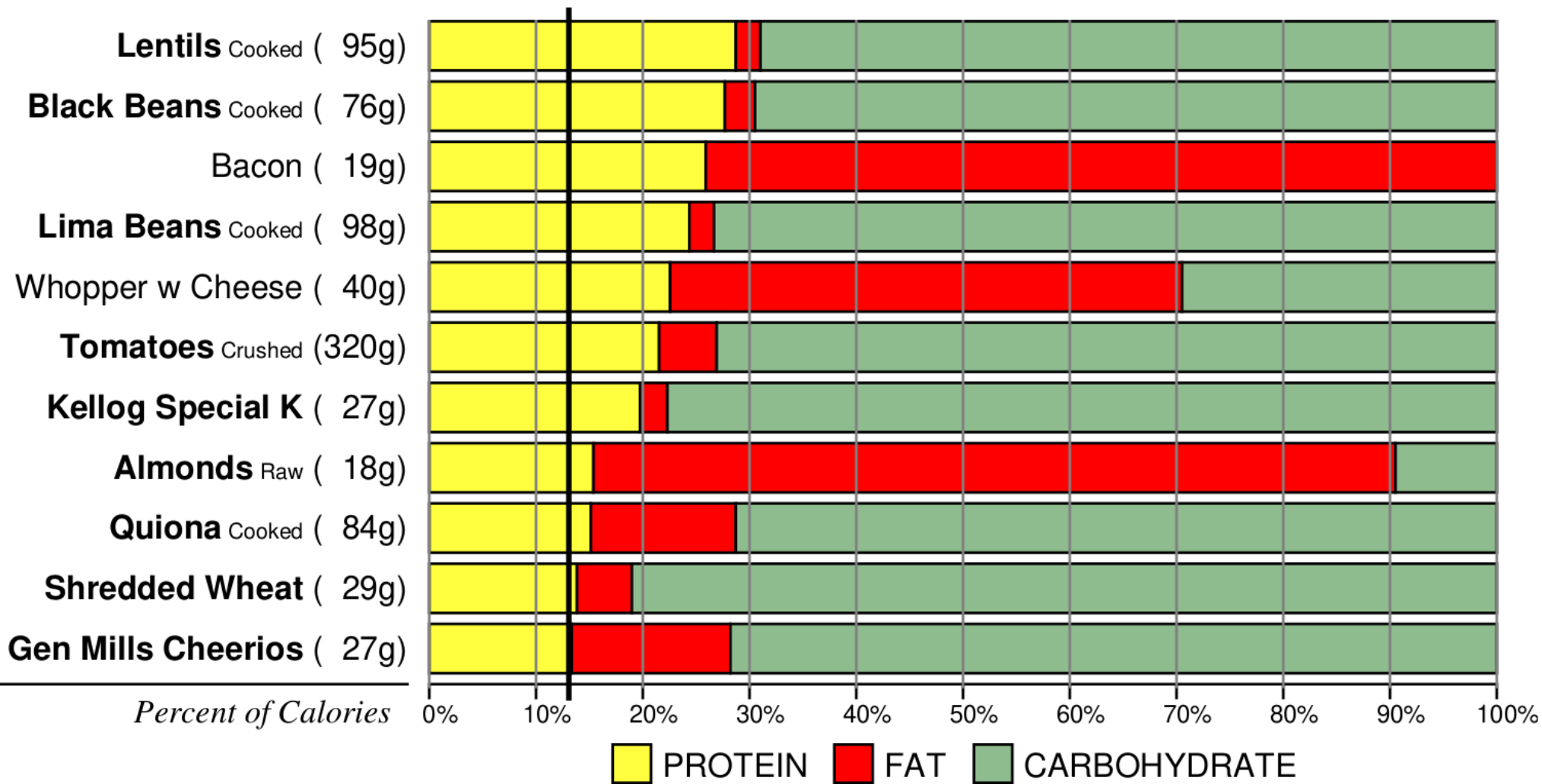


# 100 CALORIE SERVING

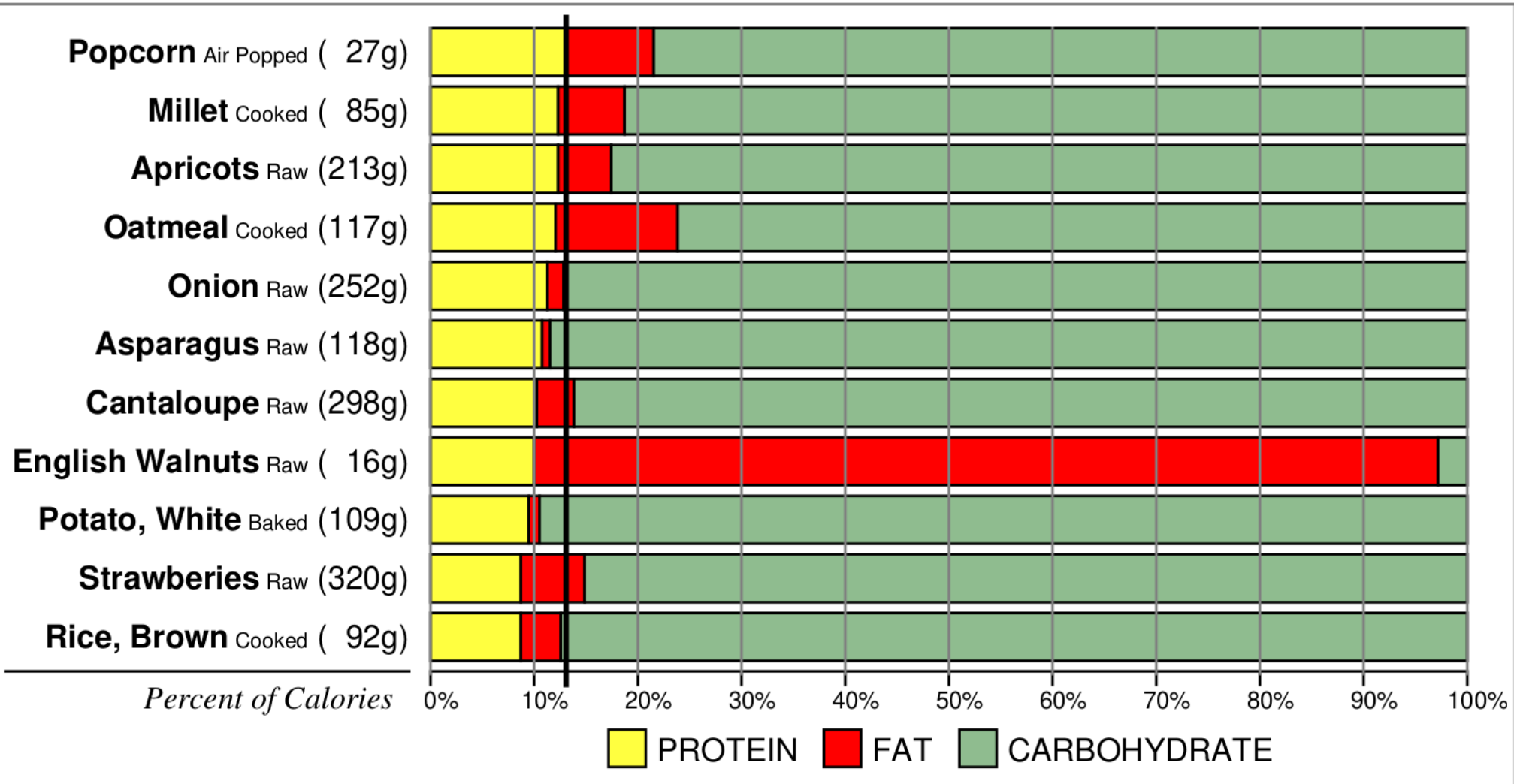


Data Source: USDA Food Central Legacy Database

# 100 CALORIE SERVING



# 100 CALORIE SERVING



Data Source: USDA Food Central Legacy Database

# 100 CALORIE SERVING

**Carrots** Raw (249g)

**Kellog Corn Flakes** ( 28g)

**Watermelon** Raw (338g)

**Orange** (222g)

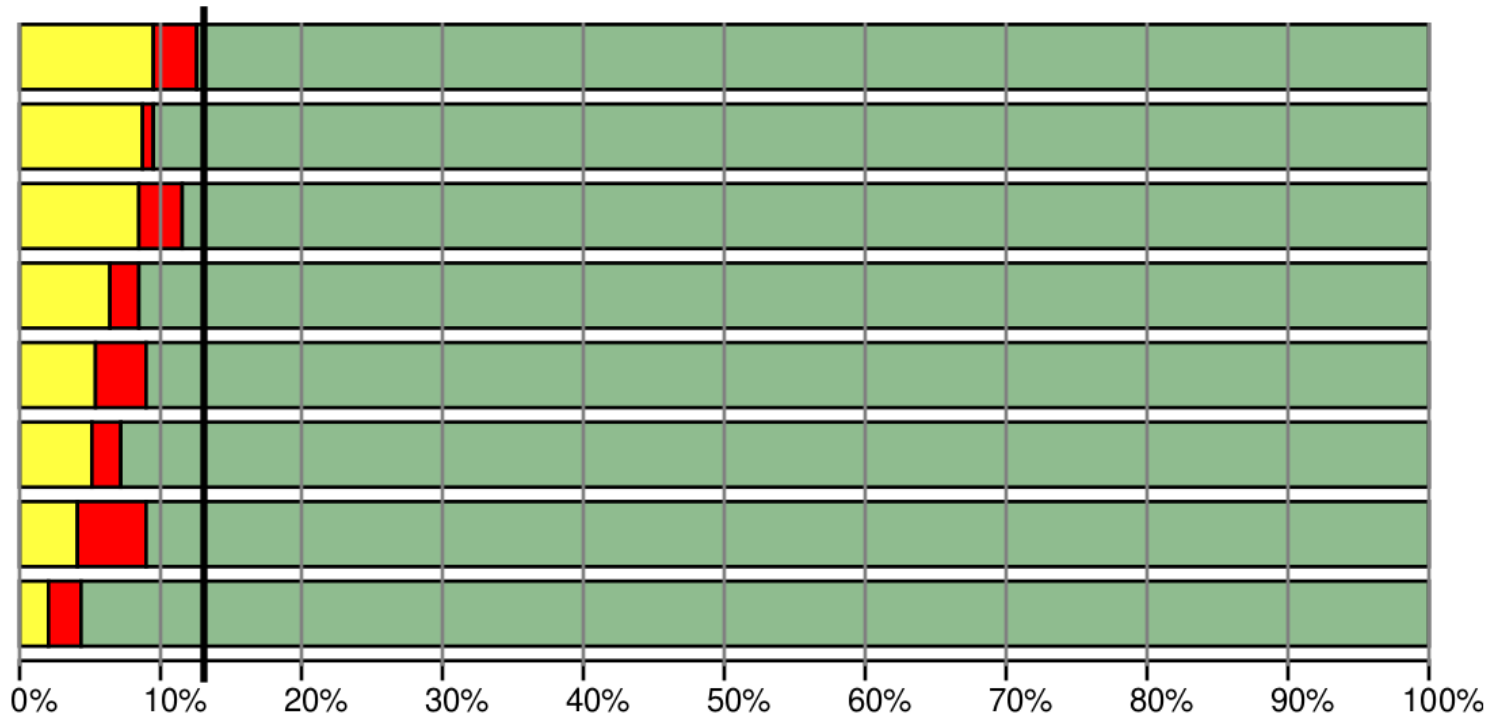
**Blueberries** (178g)

**Banana** Ripe (114g)

**Buckwheat** Cooked (110g)

**Apple, Gold Del** Raw (175g)

*Percent of Calories*



Data Source: USDA Food Central Legacy Database

## PROTEIN MYTH 2

**Many whole plant food proteins do not contain all nine of the essential amino acids and are therefore not complete proteins.**

*The following table shows the amount of each of the essential amino acids in various foods.*

***Note that there are no zeros in any of the tables!***

*All of the plant foods contain some amount of each of the essential amino acids.*

Additional tables can be found in the slides for my protein talk located on the internet at:  
[web4dmarch.com/nutrition/protSlide.pdf](http://web4dmarch.com/nutrition/protSlide.pdf)

FOOD ITEM	PROT	GRAMS OF ESSENTIAL AMINO ACID								
		HIS	ILE BCAA	LEU BCAA	LYS	M+C SULFUR	P+T	THR	TRP	VAL BCAA
100 GRAMS = 3.5 OUNCES	TOTAL									
Beef Chuck Roast	27.0	0.891	1.183	2.236	2.431	1.076	2.011	1.224	0.310	1.250
Chicken Leg <small>Roasted</small>	24.0	0.712	1.149	2.000	2.215	0.965	1.836	1.114	0.270	1.166
Whole Egg <small>Raw</small>	12.6	0.309	0.671	1.086	0.912	0.652	1.179	0.556	0.167	0.858
Broccoli <small>Raw</small>	2.8	0.059	0.079	0.129	0.135	0.066	0.167	0.088	0.033	0.125
Kale <small>Raw</small>	2.9	0.172	0.175	0.205	0.175	0.067	0.253	0.131	0.035	0.159
Cow Milk, 1%	3.4	0.101	0.174	0.319	0.282	0.108	0.344	0.143	0.043	0.220
Lentils <small>Cooked</small>	7.4	0.208	0.320	0.537	0.517	0.163	0.563	0.265	0.066	0.367
Black Beans <small>Cooked</small>	8.9	0.247	0.391	0.708	0.608	0.229	0.729	0.373	0.105	0.464
Almonds <small>Raw</small>	21.2	0.539	0.751	1.473	0.568	0.372	1.582	0.601	0.211	0.855
Popcorn <small>Air Popped</small>	12.0	0.367	0.431	1.473	0.338	0.469	1.078	0.452	0.085	0.607
Potato, White <small>Baked</small>	2.1	0.035	0.068	0.100	0.109	0.057	0.132	0.068	0.021	0.105
Rice, White <small>Cooked</small>	2.4	0.056	0.103	0.197	0.086	0.105	0.207	0.085	0.028	0.145
Banana <small>Raw</small>	1.1	0.077	0.028	0.068	0.050	0.017	0.058	0.028	0.009	0.047

Data Source: USDA Food Central Legacy Database

### PROTEIN MYTH 3

**Many whole plant food proteins do not contain the recommended daily requirement for one or more of the essential amino acids.**

*The following table shows the percent of the recommended daily amount (RDA) for each of the essential amino acids that is consumed by a 140 pound person who gets all 50.8 grams of their (RDA) for protein by eating just one food.*

***Note that the RDA can be exceeded by combining whole plant foods that have less than 100% with whole plant foods that have more than 100% of the essential amino acids.***

Additional tables can be found in the slides for my protein talk located on the internet at:  
[web4dmarch.com/nutrition/protSlide.pdf](http://web4dmarch.com/nutrition/protSlide.pdf)

FOOD ITEM		ESSENTIAL AMINO ACID PERCENT OF RDA FOR A 140 LB BODY WEIGHT								
50.8 GRAMS PROTEIN	CAL	HIS	ILE BCAA	LEU BCAA	LYS	M+C SULFUR	P+T	THR	TRP	VAL BCAA
Beef Chuck Roast	323	264 %	175 %	170 %	240 %	212 %	238 %	242 %	229 %	142 %
Chicken Leg Roasted	389	237 %	191 %	171 %	246 %	214 %	244 %	247 %	225 %	149 %
Whole Egg Raw	578	197 %	214 %	177 %	194 %	277 %	300 %	236 %	266 %	210 %
Broccoli Raw	613	167 %	112 %	<b>94</b> %	128 %	125 %	190 %	166 %	234 %	136 %
Kale Raw	609	471 %	240 %	144 %	160 %	122 %	277 %	239 %	240 %	168 %
Cow Milk, 1%	633	240 %	207 %	194 %	223 %	171 %	327 %	226 %	255 %	201 %
Lentils Cooked	498	225 %	173 %	149 %	186 %	117 %	243 %	191 %	179 %	153 %
Black Beans Cooked	757	223 %	177 %	164 %	183 %	138 %	263 %	225 %	237 %	161 %
Almonds Raw	1,391	204 %	142 %	143 %	<b>72</b> %	<b>94</b> %	239 %	152 %	200 %	124 %
Popcorn Air Popped	1,617	245 %	144 %	252 %	<b>75</b> %	208 %	287 %	201 %	142 %	156 %
Potato, White Baked	2,226	133 %	130 %	<b>98</b> %	138 %	145 %	201 %	173 %	200 %	154 %
Rice, White Cooked	2,775	188 %	173 %	170 %	<b>96</b> %	235 %	278 %	190 %	235 %	187 %
Banana Raw	4,148	565 %	103 %	128 %	122 %	<b>83</b> %	170 %	137 %	165 %	133 %

Data Source: USDA Food Central Legacy Database



## PROTEIN FACT SUMMARY

- ✓ Most whole plant foods contain the recommended daily allowance of calories from protein, but a few do not.

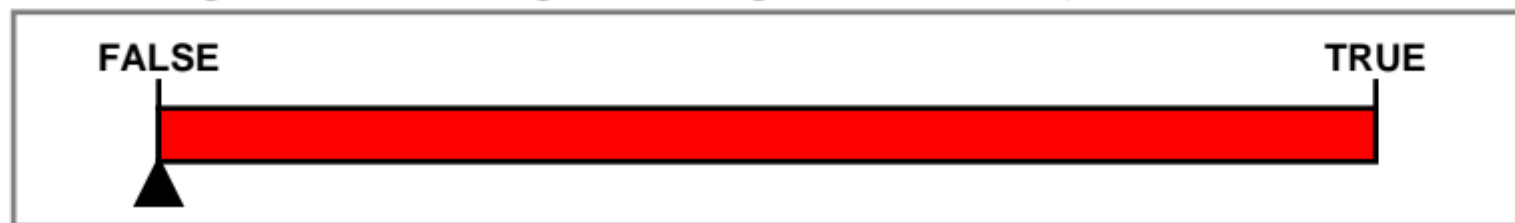
***Eating a variety of whole plant foods each day does provide the recommended daily allowance of calories from protein.***

- ✓ All whole plant foods contain all nine of the essential amino acids that are required to define a "complete protein."
- ✓ Most whole plant foods contain the recommended daily allowance of all nine essential amino acids that are required to define a "high quality protein" but a few do not for one or more of the essential amino acids.

***Eating a variety of whole plant foods each day does provide the recommended daily allowance of all nine essential amino acids.***

## NUTRITION FACT OR FICTION?

You must eat meat, poultry, eggs or dairy to get enough "high quality" protein.



As long as you are eating enough calories from a **variety of whole plant foods** you will get more than enough high quality protein to satisfy the daily requirement.

## NUTRITION FACT OR FICTION?

Soy foods contain estrogens that promote breast cancer.

## ESTROGENS AND PHYTOESTROGENS

- ✓ **Estrogens** are steroid hormones that regulate the growth, development, and physiology of the human reproductive system. They also influence neuroendocrine, skeletal, adipose, and cardiovascular systems. Estrogen is an important sex hormone produced primarily by the ovaries in females and testes in males.
- ✓ **Phytoestrogens** are plant-based compounds that mimic estrogen in the body. They are a subset of isoflavones that are found almost exclusively in beans, like soybeans. Isoflavones have a number of health benefits including:
  - Lowering cholesterol
  - Strengthening bones
  - Treating menopausal symptoms
  - Lowering risk of coronary heart disease
  - Reducing risk of prostate, colon, breast, and ovarian cancer

## SOY AND BREAST CANCER

- ✓ The Shanghai Womens's Health Study with 73,224 Chinese women who consumed soy showed a **59% reduction** in premenopausal breast cancer.

*American Journal of Clinical Nutrition* 89, no. 6 (2009)

- ✓ American Asian women with childhood intake of 1.5 soy servings per week had a **58% lower** risk of adult-onset breast cancer.

*Cancer Epidemiology and Prevention Biomarkers* 5, no. 1 (1996)

- ✓ An in-depth analysis of combined evidence from cohort studies of US and Chinese women that included 9,514 breast cancer survivors showed that those who consumed the most soy products had a **30% reduction** in cancer recurrence compared with women who avoided soy,

*American Journal of Clinical Nutrition*, 96 (2012)

## SOY AND BREAST CANCER

- ✓ 55,795 North American women, including 27.9% black, followed for 7.9 years had **32% less** breast cancer for median intakes of soy milk compared to dairy milk.

*International Journal of Epidemiology* 49, no. 5 (2020)

- ✓ 6,200 multiethnic breast cancer survivors followed for 9.4 years. Those who consumed soy had:
  - **21% fewer** deaths from all-cause mortality.
  - **32% fewer** deaths from Estrogen Receptor-Positive cancers.
  - **51% fewer** deaths from Estrogen Receptor-Negative cancers.

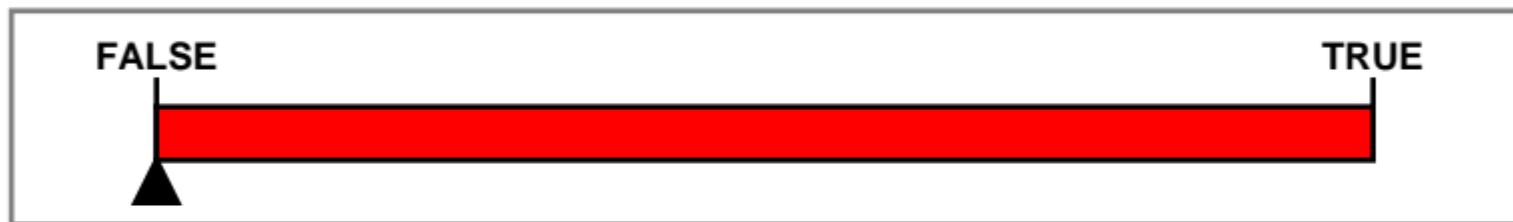
*Cancer* 123, no. 11 (2017)

## SOY CAUTIONS

- ✓ Most of the soy grown in the US is used for animal feed and has been genetically modified so that it can survive application of the broad-spectrum systemic herbicide glyphosate.  
*Buy organic soy products or soy products with a "Non GMO" label to limit your exposure to this weed killer that has been linked to cancer.*
- ✓ Allergic reactions to soy in adults are rare. The prevalence of soybean allergy in adults has been estimated to be less than one half of one percent of the general population.

## NUTRITION FACT OR FICTION?

Soy foods contain estrogens that promote breast cancer.



The science clearly shows that phytoestrogens in soy do not promote breast cancer. They reduce the risk of getting breast cancer and increase longevity in those that have breast cancer.



## NUTRITION FACT OR FICTION?

You must eat plenty of protein  
to maintain muscle mass.

## TOTAL REQUIRED DAILY PROTEIN

The total daily protein intake required to supply the body with the necessary amino acids is the sum of:

- ✓ the protein required to maintain healthy tissues, enzymes, and transport materials,

*This is less than or equal to the RDA of 0.8-1.2 gr/kg of body weight.*

- ✓ **plus** additional protein required to repair and restore tissue damage caused by accidents or medical procedures,

*This is zero for healthy people.*

- ✓ **plus** additional protein required for someone who is doing extra exercises that are designed to build new muscle tissue.

*This is zero for most people.*

Any protein intake above this total is **extra protein**.

## DISPOSITION OF EXCESS MACRO NUTRIENTS

- ✓ The body can store some excess fat in the liver and muscle cells and an unlimited amount of fat in fat cells.
- ✓ The body can store a day or two of excess glucose (carbohydrate) in the liver and muscle cells if they are not filled with fat.
- ✓ The body does not have any way to store more than a small reserve of the amino acids obtained from excess protein.

Each amino acid is a short molecule made of nitrogen, carbon, oxygen, and hydrogen. Some amino acids also include sulfur.

- the nitrogen from excess amino acids is removed and the liver incorporates the nitrogen into urea which passes through the kidneys and is excreted in the urine.
- the remaining molecules from excess amino acids are converted to glucose, fatty acids, ketones or biological intermediates.

## BLOOD UREA NITROGEN (BUN)

- ✓ Healthy kidneys filter the urea from the bloodstream and flush it through the urine.
- ✓ Filtering large amounts of urea over extended periods of time can add stress to the kidneys and contribute to the cause of kidney disease.
- ✓ A common blood test, the Blood Urea Nitrogen (BUN) test reveals information about how well your kidneys are working.
- ✓ High values for BUN can be caused by high amounts of excess protein or by a decline in kidney function.

Patients with kidney disease are told to reduce their protein intake, especially animal protein that contains higher amounts of sulfur containing amino acids that put an additional load on the body.

## DAILY PROTEIN REQUIREMENT

SENIOR PROTEIN RDA = 1.0 g/kg BODY WEIGHT

IDEAL BODY WEIGHT		PROTEIN RDA g	PERCENT OF CALORIES			
POUNDS	KILOGRAMS		1,600 cal	1,800 cal	2,000 cal	2,200 cal
120 lb	54.4 kg	54 g	14 %	12 %	11 %	10 %
130 lb	59.0 kg	59 g	15 %	13 %	12 %	11 %
140 lb	63.5 kg	64 g	16 %	14 %	13 %	12 %
150 lb	68.0 kg	68 g	17 %	15 %	14 %	12 %
160 lb	72.6 kg	73 g	18 %	16 %	15 %	13 %
170 lb	77.1 kg	77 g	19 %	17 %	15 %	14 %

1 pound (lb) = 0.45 kilograms (kg)

1 gram (g) protein = 4 calories (cal)

## Use it or lose it!

- ✓ **Eat enough calories.** If you do not eat enough calories to maintain your ideal body weight you will lose muscle and probably also lose bone. If your calories come from a wide variety of **whole foods** you will get enough protein to maintain your muscle mass.
- ✓ **Develop a strength training routine.** Develop a set of stretching and weight lifting exercises that will preserve existing muscle mass.  
*If you are a "couch potato" consult your physician and/or a physical therapist to make sure you perform these exercises properly!*
- ✓ **Walk several times a day.** Walking shortly after meals is beneficial to your insulin response which helps with muscle repair.

## MAINTAINING MUSCLE MASS AS YOU AGE

- ✓ **Check your vitamin D levels.** Vitamin D helps with muscle protein synthesis which helps build muscle strength.

*Sun exposure is the best source of vitamin D but if you do not get enough sun exposure and your level is low, consult your physician about taking a supplement.*

- ✓ **Eat an anti-inflammatory diet.** Inflammation causes muscles to break down.

*A whole plant food eating plan is loaded with antioxidants and other nutrients that fight inflammation.*

- ✓ **Get restful relaxation and sleep.** Restful sleep is a time when hormones can set about rebuilding and repairing your body.

## NUTRITION FACT OR FICTION?

You must eat plenty of protein to maintain muscle mass.



You must get enough protein **and** enough strength exercises to maintain muscle mass.



## NUTRITION FACT OR FICTION?

You must consume dairy to get all of the calcium you need to build and maintain strong bones.

Bone requires many nutrients to develop and remain healthy including:  
calcium, phosphorus, zinc, manganese, copper, protein and vitamins D, K, C, and A.

## RECOMMENDED DAILY CALCIUM REQUIREMENTS

AGE	MALE	FEMALE
14–18 years	1,300 mg	1,300 mg
19–50 years	1,000 mg	1,000 mg
51–70 years	1,000 mg	1,200 mg
71+ years	1,200 mg	1,200 mg

The recommendation for 1,000 to 1,200 mg/day for adults is far from universal:

- Britain's National Health Service recommends 700 mg/day.
- A European Food Safety Authority report recommended 950 mg/day.
- A World Health Organization's report on diet, nutrition, and the prevention of chronic disease concluded that, "In countries with a high fracture incidence, a minimum of 400 mg to 500 mg of calcium intake is required to prevent osteoporosis."

*Today's Geriatric Medicine* 9, No 4 (2016)

## CALCIUM SOURCE

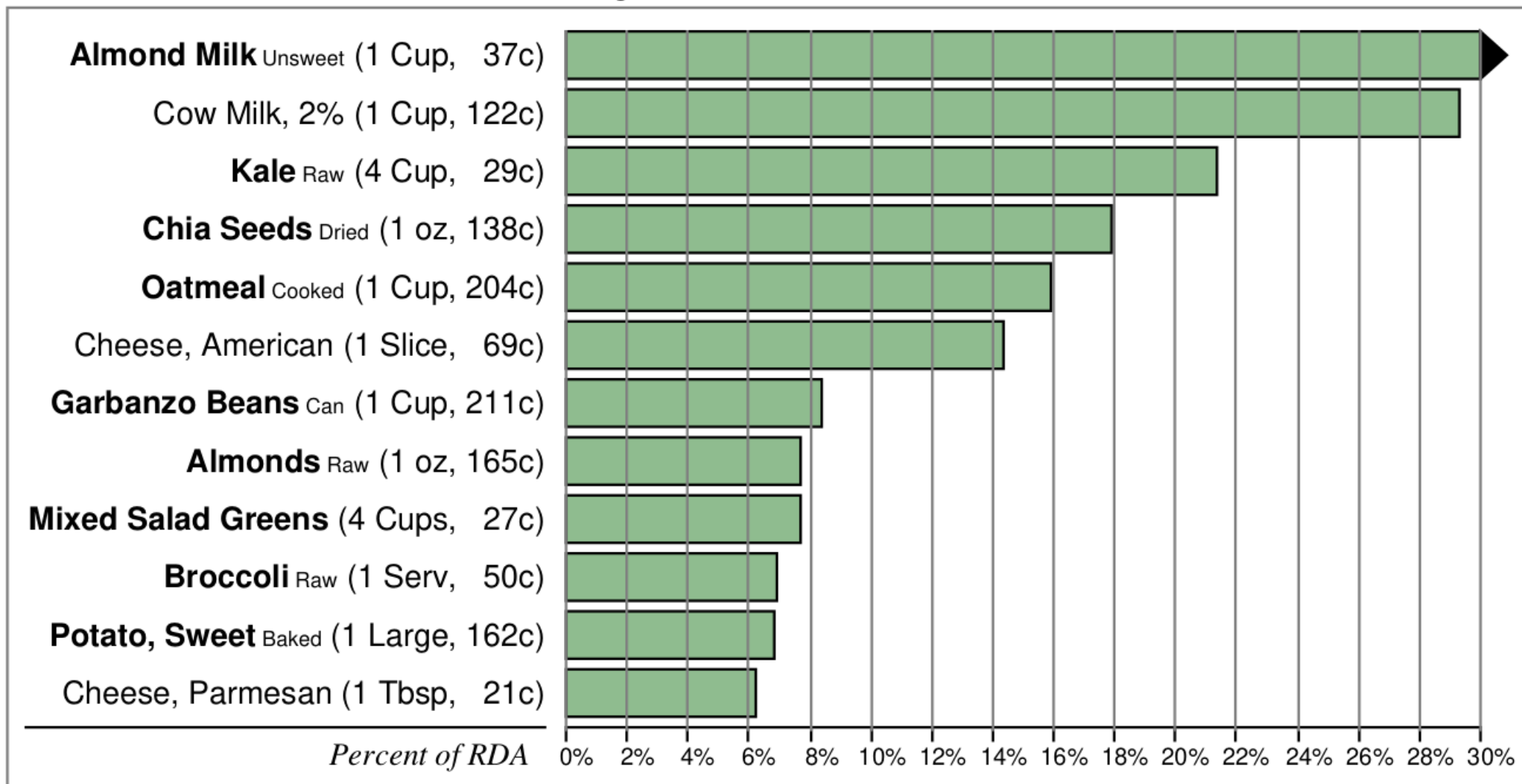
- ✓ Calcium is a mineral that is found in the soil.
- ✓ Plants absorb calcium through their roots and incorporate it into their structures.
- ✓ Plant eating animals eat and digest the plants which releases the calcium so that it can be absorbed into the blood stream.
- ✓ Calcium is a large mineral and is not so easy to breakdown in the gut. The amount of calcium that is actually absorbed is called the **calcium bioavailability**.

*The RDAs were established with an understanding of calcium bioavailability in food. Also keep in mind that the exact amount of calcium absorbed in the body will vary among individuals based on their metabolism and what other foods are eaten at the same meal.*

## CALCIUM BIOAVAILABILITY

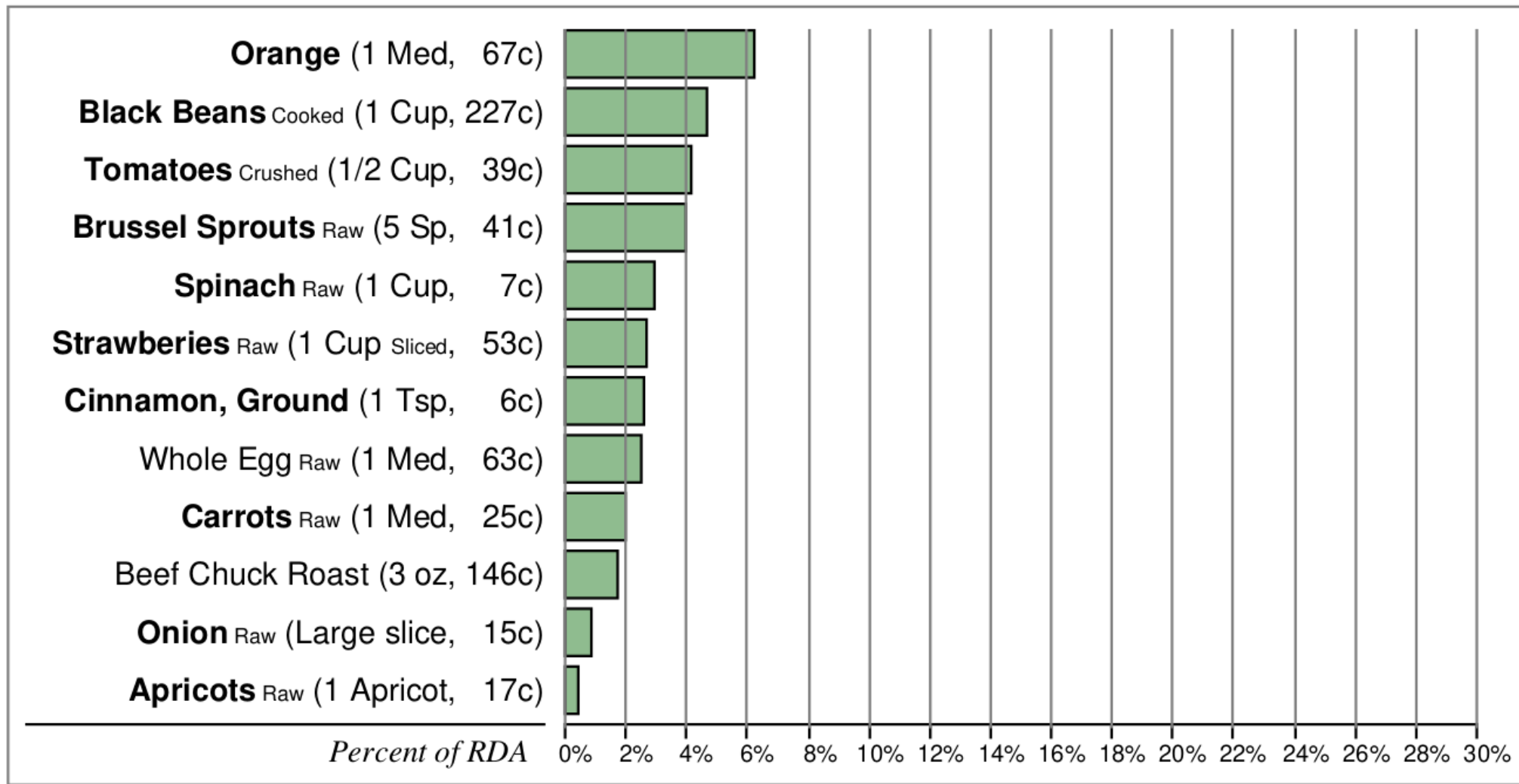
Food Item	Serving Size	Calcium Content	Absorption Percent	Estimated Calcium Absorbed	Servings To Equal Milk
Cow's Milk	240 g	300 mg	32.1 %	96.3 mg	1.0
Bok Choy	85 g	79 mg	53.8 %	42.5 mg	2.3
Broccoli	71 g	35 mg	61.3 %	21.5 mg	4.5
Brussel Sprouts	78 g	19 mg	63.8 %	12.1 mg	7.9
Cauliflower	62 g	17 mg	68.6 %	11.7 mg	8.3
Kale	85 g	61 mg	49.3 %	30.1 mg	3.2
Soy Milk Calcium Fortified	240 g	300 mg	21.1 %	63.3 mg	1.5
Spinach	85 g	115 mg	5.1 %	5.9 mg	16.4
Sweet Potatoes	164 g	44 mg	22.2 %	9.8 mg	9.9
Tofu Calcium Fortified	72 g	258 mg	31.0 %	80.0 mg	1.2

# PERCENT OF 1000mg RDA OF CALCIUM IN ONE SERVING



Data Source: USDA Food Central Legacy Database

# PERCENT OF 1000mg RDA OF CALCIUM IN ONE SERVING



Data Source: USDA Food Central Legacy Database

## MILK INTAKE AND BONE HEALTH

- ✓ Penn State researchers followed eighty adolescent girls from age twelve to twenty years that covered a range of calcium intake from 500 to 1,900 milligrams a day. Milk did not make their bones stronger or less likely to break. What mattered more than calcium intake was those who exercised more had better bone integrity.

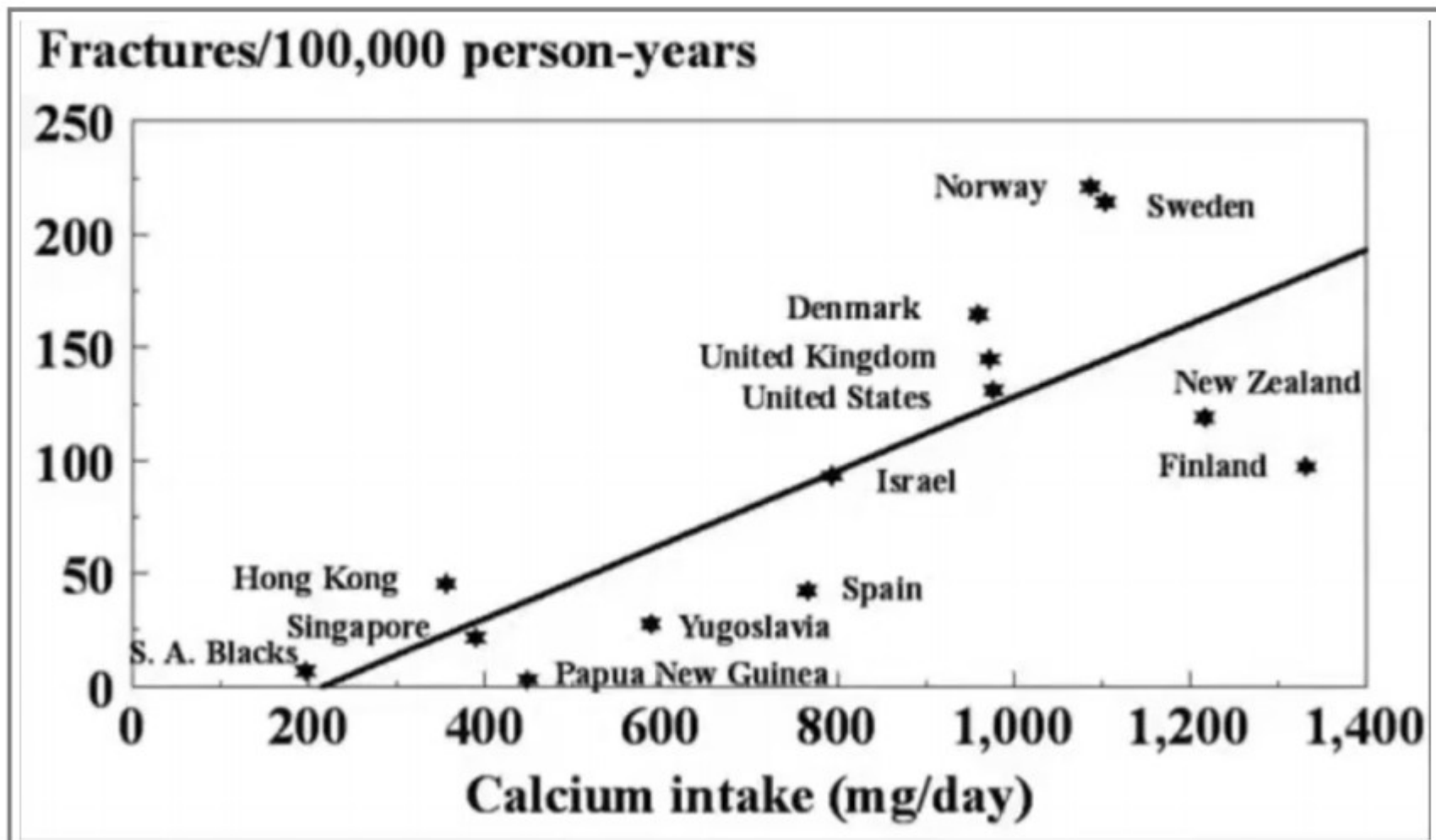
*Journal of Pediatrics* 144, 6 (2004)

- ✓ The Harvard Nurses's Health Study that followed 72,337 women over an eighteen-year period found that those who drank milk everyday had no protection from hip fractures.

*American Journal of Clinical Nutrition* 77, 2 (2003)

- ✓ The Harvard team also looked to see if how much milk they drank when they were young improved bone strength in later life. Milk consumption during adolescence had no effect on the women's hip fracture risk in older age.

## MILK INTAKE AND BONE HEALTH





## MAINTAINING STRONG BONES

- ✓ Get most of your calcium and protein from plants.  
*Calcium from dairy products is accompanied by animal protein, lactose sugar, animal growth factors, and occasional drugs and contaminants.*
- ✓ Exercise including weight bearing and resistance exercises.  
*Active people tend to keep calcium in their bones because stress on the bones encourages bone remodeling.*
- ✓ Get Vitamin D from the sun or, if needed, from supplements.  
*Vitamin D controls your body's use of calcium.*
- ✓ Reduce calcium losses by avoiding excess salt.  
*Sodium in foods can greatly increase the loss of calcium in the urine that passes through the kidneys.*

## MAINTAINING STRONG BONES

- ✓ Avoid alcohol.

*Consuming more than two to three ounces of alcohol per day is associated with a greater risk of bone fractures.*

- ✓ Don't smoke.

*Smoking affects the body's ability to absorb calcium, leading to lower bone density and weaker bones and nicotine slows the production of the bone-forming cells that are so crucial to healing.*

- ✓ Be aware of certain medications.

*Medications including corticosteroids, anti-androgens, anticonvulsants, loop diuretics and anti-estrogens can interfere with bone growth.*

## NUTRITION FACT OR FICTION?

You must consume dairy to get all of the calcium you need to build and maintain strong bones.



The "milk builds strong bones" idea has been promoted for commercial reasons and has been memorized by parents and children for generations .... but it is a myth.

*Dr. Neal Barnard, **The Cheese Trap**, Page 151*

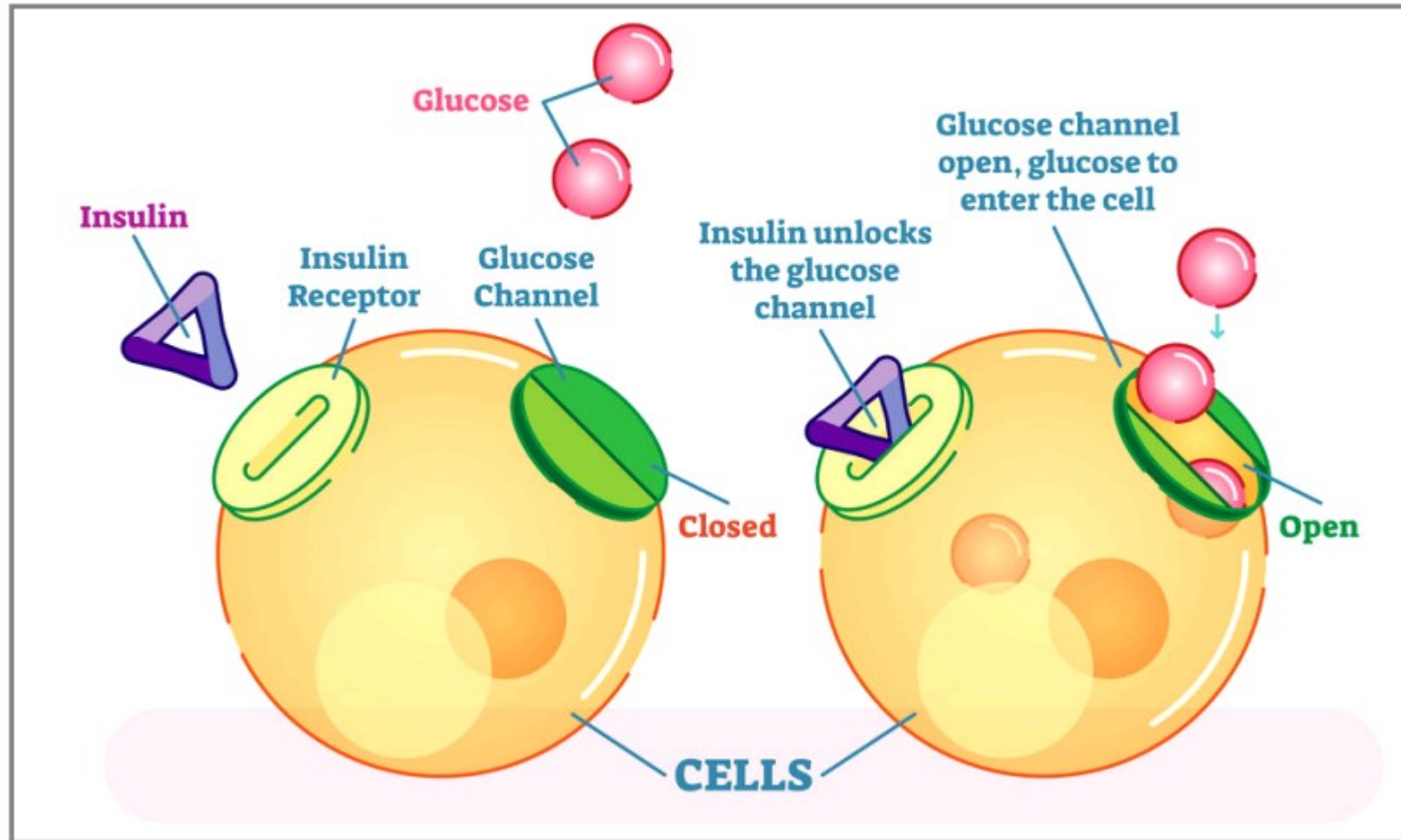
## NUTRITION FACT OR FICTION?

High carbohydrate diets are the primary cause of diabetes.

## BLOOD GLUCOSE REGULATION - INSULIN

- ✓ Our bodies work hard to maintain a blood glucose level in the range of 80-120 mg/dL.
- ✓ Muscle cells can store excess glucose to provide energy when blood glucose is low.
- ✓ Liver cells can store excess glucose that can be released back into the blood stream when blood glucose is low.
- ✓ These cells have insulin receptors and glucose channels that can be open or closed.
- ✓ As blood glucose levels rise, pancreatic beta cells sense the rise and produce the hormone insulin.
- ✓ Insulin signals cells to open their glucose channels to import glucose and use it for energy or store it as glycogen for later use.

# INSULIN UNLOCKS THE GLUCOSE CHANNEL



## INSULIN RESISTANCE

- ✓ If the insulin receptor of a cell is blocked, the cell is **resistant to insulin** and it does not receive the signal to open its glucose channels and import glucose.

*Insulin acts like a key that is inserted into a door lock to open the door for glucose to enter. But if lock is filled with gum to prevent inserting the key into the lock, the door can not be opened to admit the glucose.*

- ✓ Muscle cells normally store a tiny amount of fat to provide extra energy when the muscle is more active than usual.
- ✓ Muscle cells that store too much fat become **insulin resistant** because that fat acts like the gum that blocks a insulin key from opening the glucose channel door.

## THEORY BEHIND LOW CARBOHYDRATE DIETS

"Until now, diabetes diets have not been designed to alter what goes on inside the cells. Instead, they have been designed to compensate for the problem, so to speak. Because your cells can not handle glucose - that is, insulin has trouble getting glucose into them - the diets limit sugars and foods that contain carbohydrate, because when carbohydrate is digested, it releases sugars. But what if a change in diet could actually alter the fat buildup in the cells and reverse the trend toward gradually worsening insulin resistance?"

*Dr. Neal Barnard, Program for Reversing Diabetes, Page 25*



## STRATEGY TO REVERSE INSULIN RESISTANCE

A diet that is known to reverse insulin resistance:

✓ **Avoids animal products.**

Animal products contain a higher percent of calories from fat including a higher percentage of saturated fat. Omit meat, dairy products, and eggs.

✓ **Keeps vegetable oils to a minimum.**

Oil is one hundred percent fat. Some oils (coconut and palm) are very high in saturated fat.

✓ **Favors foods with a low glycemic index.**

High glycemic foods cause a rapid rise in blood glucose than low glycemic foods.

## GLYCEMIC INDEX OF FOODS

Category	Low GI (0-55)	Med GI (55-69)	High GI (70-100)
Cereals	All Bran, Steel Cut Oats, Oat Bran	Shredded Wheat, Quick Oats	Rice Krispies, Corn Flakes, Cheerios, Raisin Bran
Breads	Stoneground Whole Wheat, Pumpernickel	Whole Wheat, Rye, Sourdough	White Bread, White Bagel, Kaiser Roll
Grains & Pasta	Pasta (cooked al dente)	Basmati Rice, Brown Rice, Couscous	Instant Rice
Starchy Vegetable	Sweet Potatoes, Green Peas, Yams	Raw Carrots, Baked Potato, Corn	Mashed Potato, Parsnip, Winter Squash
Fruit	Apple, Orange, Peach, Strawberry, Cherries, Grapes	Raisins, Apricots, Cantaloupe	Watermelon, Dates
Legumes	Lentils, Kidney Beans, Chick Peas, Black Beans		

## NUTRITION FACT OR FICTION?

High carbohydrate diets are the primary cause of diabetes.



Type 1 diabetes is caused by the destruction of the beta cells in the pancreas that normally produce insulin.

Type 2 diabetes is caused by "insulin resistance" that results from fat accumulation in liver and muscle cells.

## NUTRITION FACT OR FICTION?

Sugar causes tooth decay.



Tooth decay is caused by bacteria that feed on sugar and starches to produce acids that erode the tooth structure.

## NUTRITION FACT OR FICTION?

The Mediterranean Diet is a very healthy diet.

*Any diet that reduces saturated fat and reduces or eliminates sugar and other refined carbohydrates will be healthier than the typical **Standard American Diet.***

## COMPONENTS OF THE MEDITERRANEAN DIET

- ✓ Legumes (peas, beans, lentils)
- ✓ Whole grains (oat groats, barley, wheat, bulgar, buckwheat, etc)
- ✓ A variety of fruits and vegetables
- ✓ Healthy fats like (cold pressed extra virgin) olive oil and nuts
- ✓ A moderate amount of seafood
- ✓ A moderate amount of red wine
- ✓ Low amounts of red meat, dairy, and sweets.

A healthy Mediterranean-style diet plan is at least 90% whole plant foods with limited amounts of meats and sweets.



## WHAT IS NOT ALLOWED ON A MEDITERRANEAN DIET

- ✓ Processed red meats (bacon, hot dogs, sausage, etc)
- ✓ Heavily processed foods
- ✓ Refined grains (flour)
- ✓ Alcohol
- ✓ Butter
- ✓ Refined, processed, or hydrogenated oils



## ANATOMY OF HEALTH EFFECTS OF A MEDITERRANEAN DIET

In a Greek EPIC prospective cohort study that followed 23,349 healthy men and women with a mean follow-up of 8.5 years:

*"higher adherence to a Mediterranean diet was associated with a statistically significant reduction in total mortality"*

The contributions of the individual components of the diet were:

- Moderate ethanol consumption 23.5%
- Low consumption of meat and meat products 16.6%
- High vegetable consumption 16.2%
- High fruit and nut consumption 11.2%
- High monosaturated to saturated lipid ratio 10.6%
- High legume consumption 9.7%

The contributions of high cereal consumption and low dairy consumption were minimal, whereas the contributions of high fish and seafood consumption was associated with a slight increase in mortality ratio.

## SUSTAINABLE DIET FOR MOST PEOPLE AND THE PLANET

"To be clear: Eating a whole-food, plant-based diet (or nearly so with animal products seen as a treat or a garnish rather than a staple) is the most realistic, beneficial, fair, sustainable diet for most people and the planet.

Not, coincidentally, it's not that different from the Mediterranean diet.

*Mark Bittman and David L. Katz, **How to Eat**, Page 42*

## NUTRITION FACT OR FICTION?

The Mediterranean Diet is a very healthy diet.



Compared to many eating plans, a traditional Mediterranean eating plan is a healthy diet.

But there is some nutrition research that suggests a mostly or completely whole plant food eating plan is healthier.

## NUTRITION FACT OR FICTION?

You must count calories and limit the amount of food you eat in order to lose weight.

If you try to lose weight by eating less food and exercising to burn more calories you will eventually fail.

### **WHAT IS CALORIE DENSITY?**

The number of calories in a given weight of food.

### **WHAT IS NUTRIENT DENSITY?**

The number of nutrients in a food including vitamins, minerals, phytonutrients and other antioxidants.

### **WHAT IS SATIATION?**

The physical feeling of fullness you get after eating that allows you to stop eating for awhile.

### **WHAT IS SATIETY?**

A physical feeling of fullness over a longer period of time when you get all of the nutrients that you require.

## CALORIE DENSITY

# CALORIE DENSITY

# WHAT 500 CALORIES LOOK LIKE

OIL



CHEESE



MEAT



POTATOES,  
RICE, BEANS



FRUITS &  
VEGGIES



*...and why whole plant-based foods will help keep you lean and satisfied.*

[forksoverknives.com](http://forksoverknives.com)

## CALORIE DENSITY

FOOD	CALORIES PER	
	GRAM	POUND
Mixed Salad Greens	0.17	77
Broccoli <small>Raw</small>	0.34	154
Apricots <small>Raw</small>	0.48	218
Cow Milk, 2%	0.50	227
Blueberries	0.57	259
Oatmeal <small>Cooked</small>	0.87	395
Potato, Sweet <small>Baked</small>	0.90	408
Lentils <small>Cooked</small>	1.06	480
Rice, Brown <small>Cooked</small>	1.12	508
Quiona <small>Cooked</small>	1.20	544
Black Beans <small>Cooked</small>	1.32	599

FOOD	CALORIES PER	
	GRAM	POUND
Whole Egg <small>Raw</small>	1.43	649
Beef Chuck Roast	1.72	780
Wild Atl Salmon	1.82	826
Chicken Leg <small>Roasted</small>	1.84	835
Whopper w Cheese	2.68	1216
Cheese, American	3.30	1497
Cheese, Swiss	3.34	1515
Kellog Frost Flakes	3.69	1674
Bacon	5.56	2522
English Walnuts <small>Raw</small>	6.54	2966
Olive Oil	8.82	4001

## CALORIE DENSITY SCALE

CALORIES PER POUND	FOODS	
60 - 195	Most vegetables	<b>EAT MORE</b>
140 - 420	Most Fruits	
320 - 630	Potatoes, Pasta, Rice, Barley, Corn, Hot Cereals	
310 - 780	Beans, Peas, Cooked Lentils	
920 - 1360	Breads, Bagels, Fat-free Muffins, Dried Fruit	<b>EAT LESS</b>
1000 - 1800	Fatty Protein (Meats and Cheeses)	
1200 - 1800	Sugars (Sugar, Honey, Agave, Corn Syrup, etc)	
1480 - 1760	Dry Cereals, Baked Chips, Crackers, Pretzels	
2400 - 3200	Nuts and Seeds	
4000	Oils	



## CHARACTERISTICS OF FILLING FOODS

- ✓ **Contain Protein:** Protein changes the level of several satiety hormones including ghrelin.
- ✓ **High in Fiber:** Fiber provides bulk and helps you feel full for longer. It may also slow stomach emptying and increase digestion time.
- ✓ **High in Volume:** High volume foods fill and stretch the stomach which provides a physical sense of being full.
- ✓ **Low in Calorie Density:** Foods with low calorie density are very filling because they usually contain a lot of water and fiber but are low in fat.

## SATIETY INDEX AND NUTRIENT DENSITY

FOOD	CALORIES PER		SATIETY INDEX	NUTRIENT DENSITY
	GRAM	POUND		
Broccoli Raw	0.34	154		340
Kale Raw	0.35	159		1000
Grapes	0.67	304	162 %	119
Apples	0.53	239	197 %	53
Bananas	0.89	404	118 %	30
Potato, White Baked	0.92	417	330 %	28
Lentils Cooked	1.06	481	133 %	
Beef Chuck Roast	1.59	721	176 %	
Bread, White	2.70	1225	100 %	27
Walnuts	6.54	2966		30
Olive Oil	8.82	4001		10

## FACTORS THAT EFFECT CALORIE DENSITY

### Factors That Decrease Calorie Density

- ✓ High Water Content
- ✓ High Fiber Content
- ✓ High Volume (Bulk)

### Factors That Increase Calorie Density

- ✓ High Fat Content
- ✓ High Sugar Content
- ✓ High Refined Carb Content

## FACTORS THAT EFFECT SATIETY

### Factors That Decrease Calorie Density

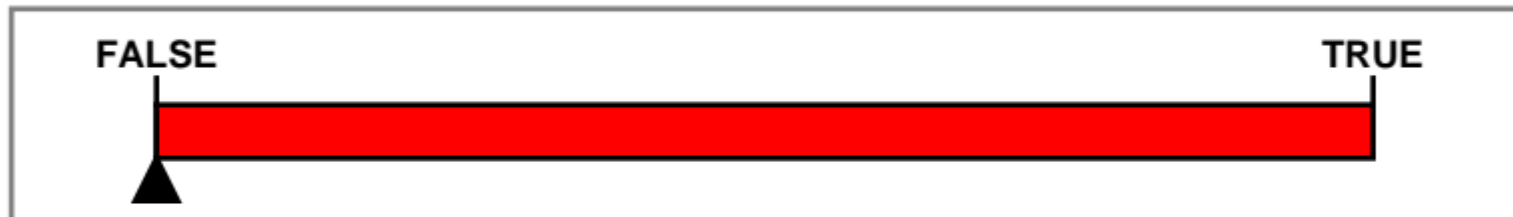
- ✓ High Water Content
- ✓ High Fiber Content
- ✓ High Volume (Bulk)

### Factors That Increase Satiety

- ✓ High Water Content
- ✓ High Fiber Content
- ✓ High Volume (Bulk)

## NUTRITION FACT OR FICTION?

You must count calories and limit the amount of food you eat in order to lose weight.



The key to long term healthy weight loss is eating more low calorie density, high satiety, nutrient dense foods.

## NUTRITION FACT OR FICTION?

Olive oil is healthy.

Compared to what?

Any fat, like olive oil, that is liquid at room temperature will be healthier than a fat, like butter, that is solid at room temperature.

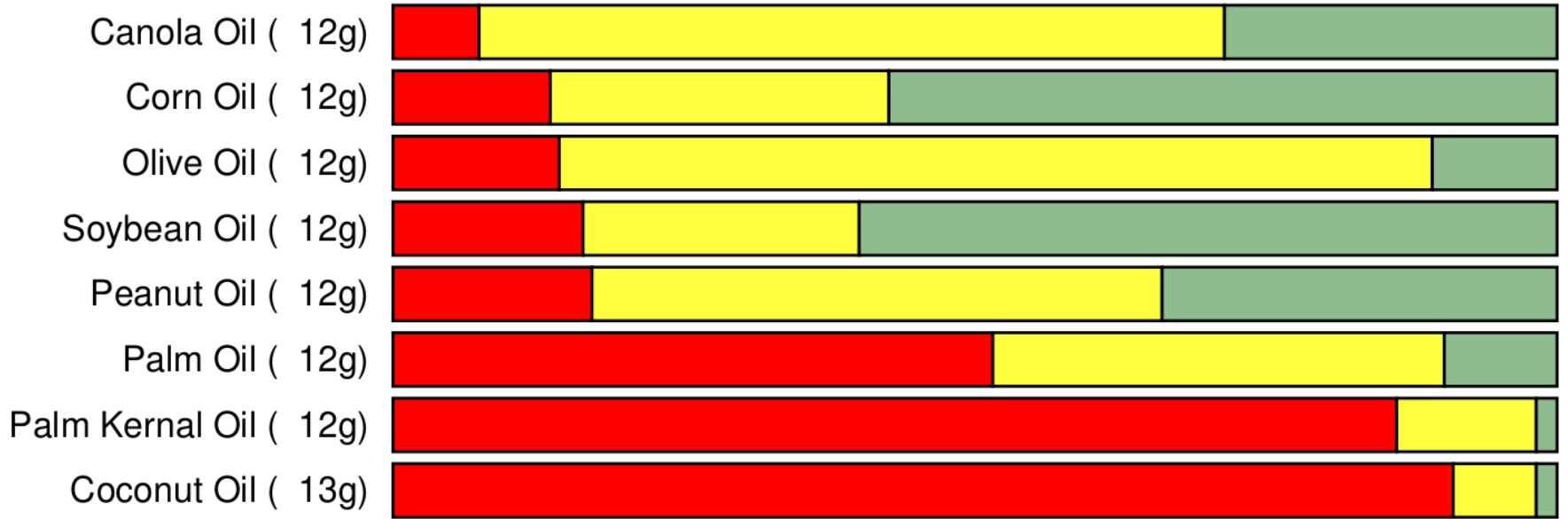
## OLIVE OIL FACTS

- ✓ Olive oil, like all oils, is 100% fat.
  - 14% is saturated fat
  - 11% is polyunsaturated fat
  - 73% is monounsaturated fat
- ✓ One tablespoon of olive oil has 120 calories.
- ✓ Olive oil will oxidize if exposed to light and air.

*Olive oil goes rancid after 18–24 months, or 12–18 months if it's extra virgin olive oil. Store it in a cool, dark place and, ideally, in a dark glass or tin container that's well sealed.*
- ✓ Some olive oils sold in stores that are labeled "Extra Virgin Olive Oil" may be adulterated with refined olive oil or mixed with cheaper oils (for example sunflower, canola, hazelnut, etc).

# 100 CALORIE SERVING

## VEGETABLE OILS



## COMPARE TO



*Percent of Calories*

0% 5% 10% 15% 20% 25% 30% 35% 40% 45% 50% 55% 60% 65% 70% 75% 80% 85% 90% 95% 100%

**SATURATED** **MONO UNSAT** **POLY UNSAT** **TRANS**

## TYPES OF OLIVE OIL

### ✓ **Extra Virgin Olive Oil**

It's made only via mechanical methods (olives are pressed, the oil is separated from the pulp via centrifugation, and then the oil is filtered to remove any remaining solids), and never exposed to chemicals or high heat.

### ✓ **Pure or Regular Olive Oil**

Pure or regular olive oil is a combination of refined olive oil and 15%-25% virgin olive oil. The refined oil component is treated with some heat and chemicals to remove flavor defects.

### ✓ **Light or Extra Light Olive Oil**

Light and extra light olive oils are a combination of refined olive oil and 5%-10% virgin olive oil. The refined oil component is treated with some heat and chemicals to remove flavor defects.



## OLIVE OIL HEALTH BENEFITS

- ✓ Olive oil contains a variety of polyphenol compounds, which have antioxidant properties.
- ✓ Thanks to its polyphenols and healthy fats, olive oil has been associated with reduced inflammation, improved heart, brain, and gut health, and more.
- ✓ It primarily consists of healthy monounsaturated fats, including anti-inflammatory oleic acid. It has a small percentage of omega-3s.
- ✓ Olive oil contains phytosterols, which are bioactive compounds associated with reduced cholesterol and even reduced risk for certain types of cancer.

Extra virgin olive has the highest concentration of the health promoting compounds. The refined component of the other types of olive oil reduces their concentration of health promoting compounds.

## OLIVE OIL VS ENGLISH WALNUTS

### MACRO NUTRIENTS IN 120 CALORIES

NUTRIENT	1 TSP OLIVE OIL	3 WHOLE WALNUTS	UNIT
Water	0.00	0.75	gr
Total Fat	13.57	11.97	gr
Saturated Fat	1.87	1.12	gr
Monounsaturated Fat	9.90	1.64	gr
Polyunsaturated Fat	1.43	8.66	gr
Omega 6 to Omega 3	9.0 : 1	4.2 : 1	ratio
Carbohydrate	0.00	2.52	gr
Fiber	0.00	1.23	gr
Sugars	0.00	0.48	gr
Protein	0.00	2.79	gr

## OLIVE OIL VS ENGLISH WALNUTS

### VITAMINS & MINERALS IN 120 CALORIES

NUTRIENT	1 TSP OLIVE OIL	3 WHOLE WALNUTS	UNIT
Vitamin A	0.00	3.67	IU
Vitamin C	0.00	0.24	mg
Vitamin E	1.95	0.13	mg
Vitamin K	8.17	0.50	ug
Calcium	0.14	17.98	mg
Iron	0.08	0.53	mg
Magnesium	0.00	28.99	mg
Potassium	0.14	80.92	mg
Sodium	0.27	0.37	mg
Zinc	0.00	0.57	mg


## NUTRITION FACT OR FICTION?

Olive oil is healthy.



A moderate amount of cold pressed extra virgin olive can be a healthy part of a healthy person's diet.

Someone who is overweight, diabetic or has coronary artery disease should limit or avoid adding extra fat from any source, including olive oil.



*Eat Food  
Not Too Much  
Mostly Plants*

MICHAEL POLLAN



## Nutrition Website

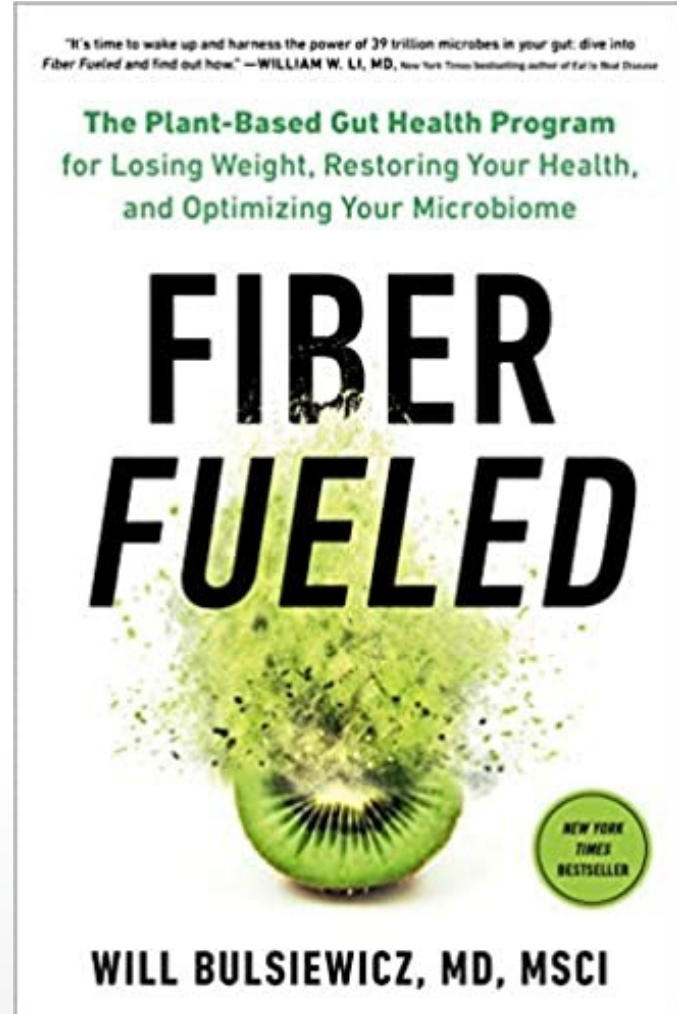
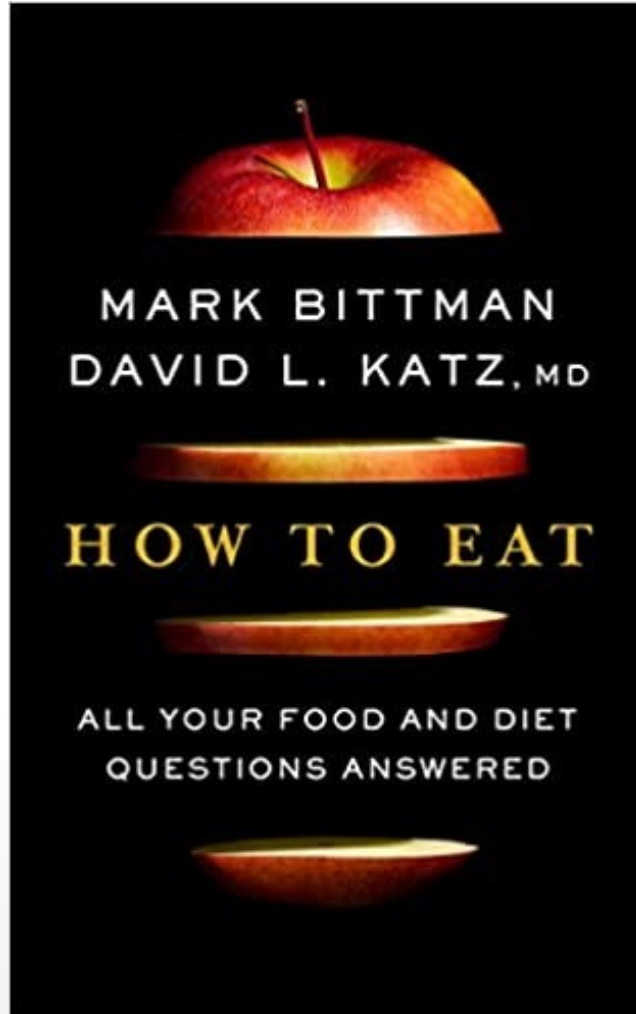
The complete set of slides and the links to some Youtube videos that support this presentation are available at

**[web4dmarch.com/nutrition](http://web4dmarch.com/nutrition)**

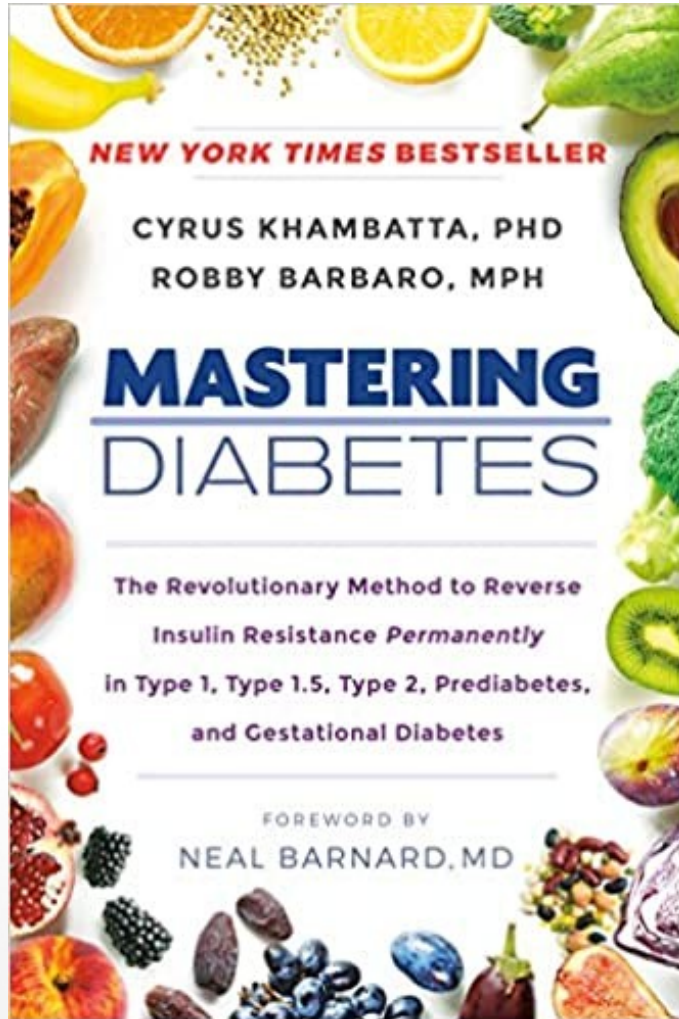
Email comments and suggestions to

**[nutrition@web4dmarch.com](mailto:nutrition@web4dmarch.com)**

## Recommended Books



## Recommended Books



The Groundbreaking Science of Healthy,  
Permanent Weight Loss

# HOW NOT TO DIET

MICHAEL GREGER, M.D., FACLM  
*NEW YORK TIMES* BESTSELLING AUTHOR OF *HOW NOT TO DIE*  
AND FOUNDER OF NUTRITIONFACTS.ORG

FEATURING DR. GREGER'S TWENTY-ONE TWEAKS  
TO ACCELERATE WEIGHT LOSS