

# Your Gut Microbiome: Friend or Enemy?

David L. March, BS, MA, EdD

Plant Based Nutrition Certificate, Completed January 2020  
T. Colin Campbell Center for Nutrition Studies and eCornell



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*

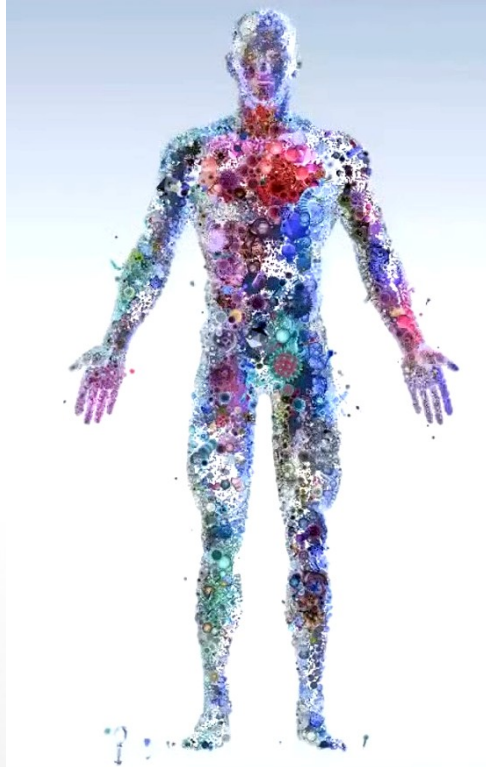
***“All disease begins in the gut”***

-Hippocrates

# **What is the “microbiota” and the “microbiome”?**

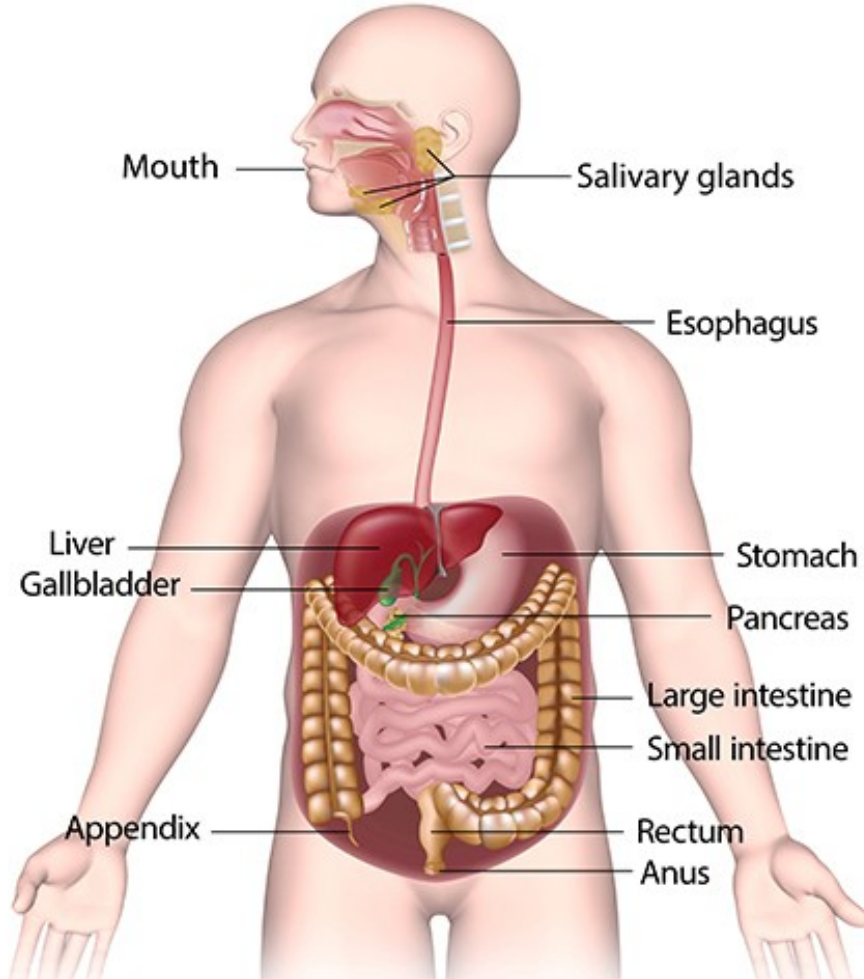
## The Human Host

You are the host to trillions of diverse microbes that live on and in your body:



- There are more microbes on your hand than there are people on the entire planet!
- Your lips, teeth, gums and tongue normally contain millions of microbes!
- Your colon contains thirty-nine trillion microbes, most of them bacteria.

# The Digestive System

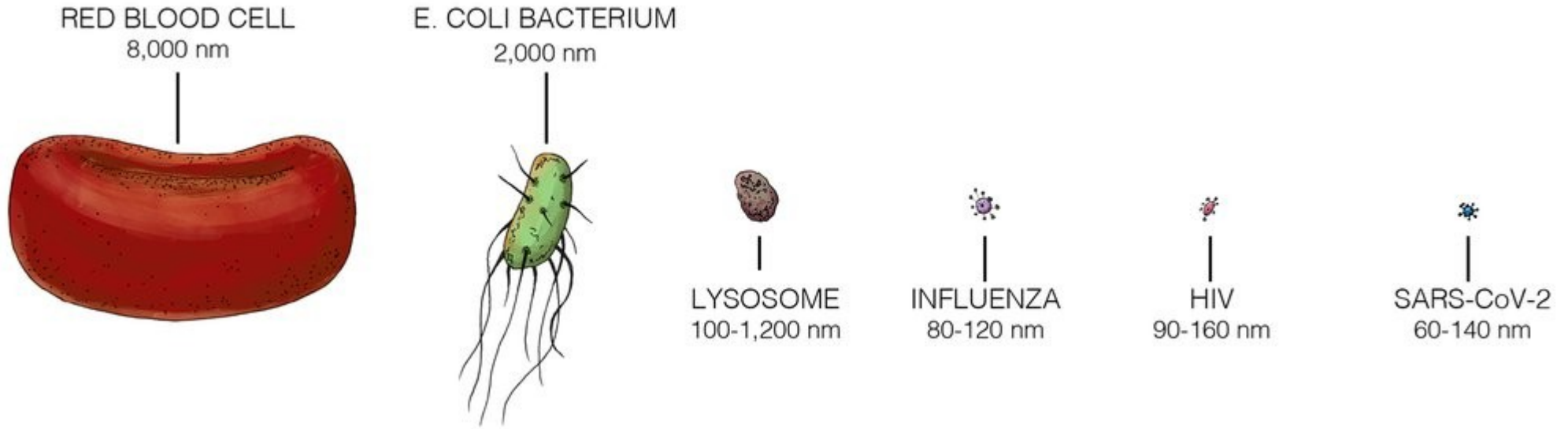


The length of the human digestive tube from mouth to anus is about 30 feet.

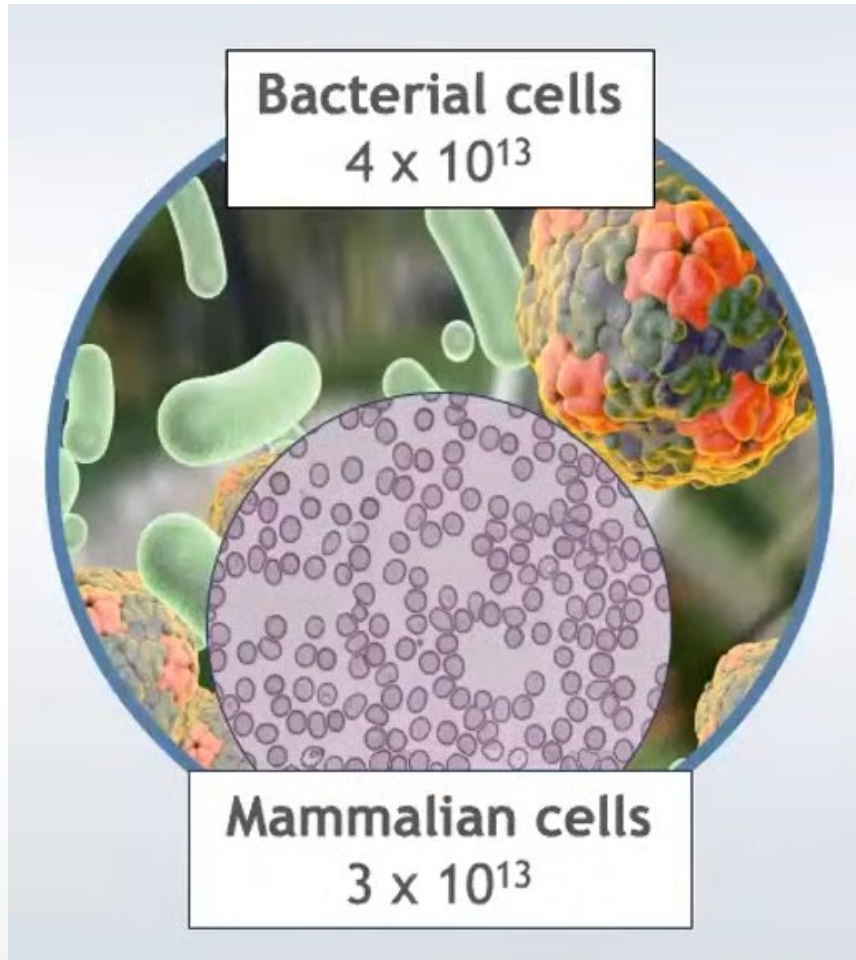
The intestinal wall is only one cell thick.

About 70% of the immune system lives along the human side of the intestinal wall.

# Microbial Size Comparison



## What Is The Gut Microbiota?



Your gut **microbiota** is the collection of microbes that live in your intestines.

40 Trillion Bacterial Cells  
30 Trillion Human Cells

70 Trillion Total Cells

***Your body is only about 43% human based on cell count.***





## What Is The Gut Microbiota?

The microbiota that lives in your gut includes:

- Bacteria
- Viruses
- Fungi
- Yeasts

Your gut may also harbor intestinal parasites like tapeworms and trichinella. Intestinal parasites are not common in developed countries with good sanitation and well cooked meats.

## Colon

$10^{14}$  cells/gram

*Bacteroides*

*Prevotella*

*Faecalibacterium*

*Ruminococcus*

*Roseburia*

*Clostridium*

*Bifidobacteria*

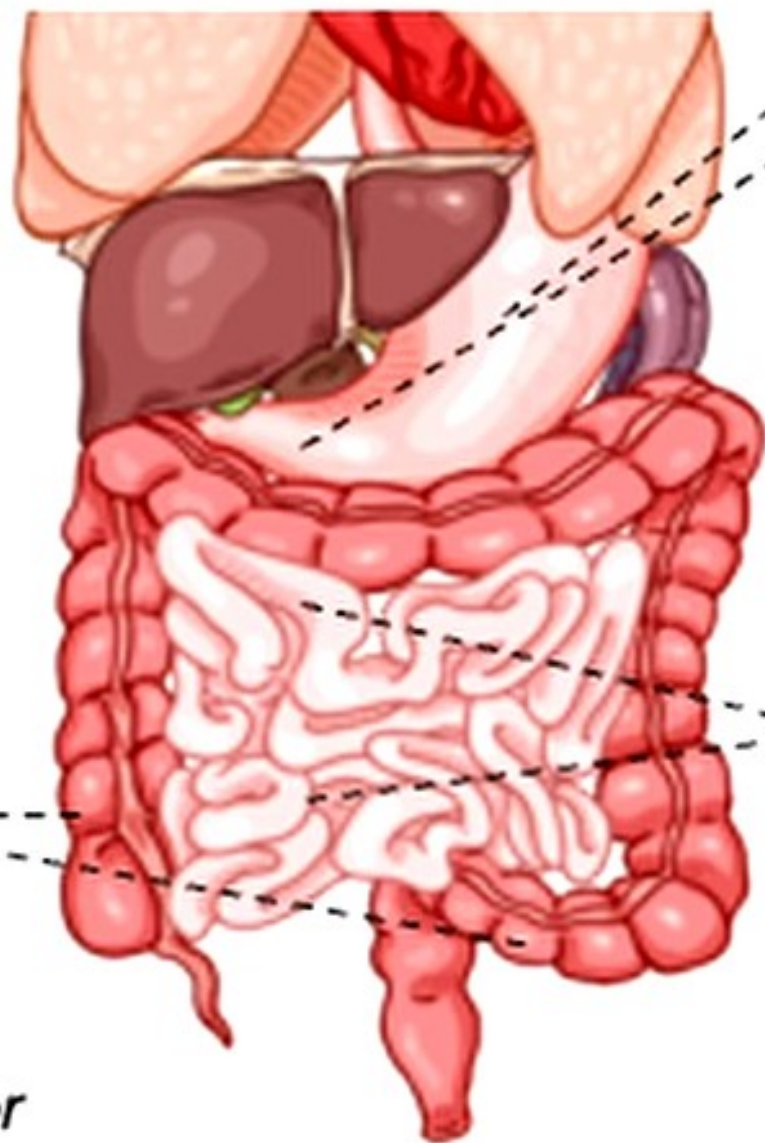
*Collinsella*

*Desulfovibrio*

*Bilophila*

*Akkermansia*

*Methanobrevibacter*



## Stomach & Duodenum

$10^7$  cells/gram

*Helicobacter*

*Streptococcus*

## Jejunum & Ileum

$10^7 - 10^{11}$  cells/gram

*Bacteroides*

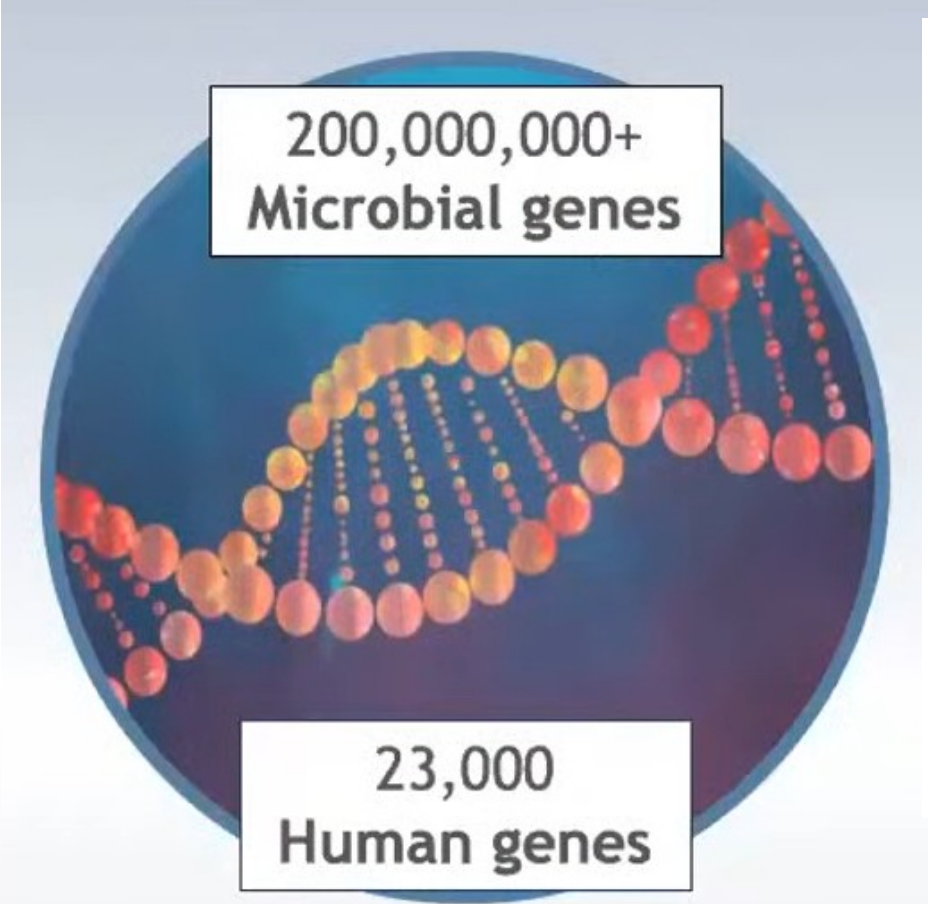
*Streptococcus*

*Lactobacilli*

*Bifidobacteria*

*Fusobacteria*

## What Is The Gut Microbiome?



200,000,000+  
Microbial genes

23,000  
Human genes

Your gut **microbiome** is the collection of genes in your gut microbiota.

***Your body is only about 1% human based on gene count.***



## Interesting Facts

- ✓ About 33% of the gut microbiota is the same for most humans while about 67% is unique to each individual.
- ✓ Analysis of the human genome predicts obesity with about 53 percent accuracy while analysis of the gut microbiome predicts obesity with 90% accuracy.
- ✓ The composition of the microbiome predicts severe respiratory systems and death from COVID-19 with 92% accuracy.

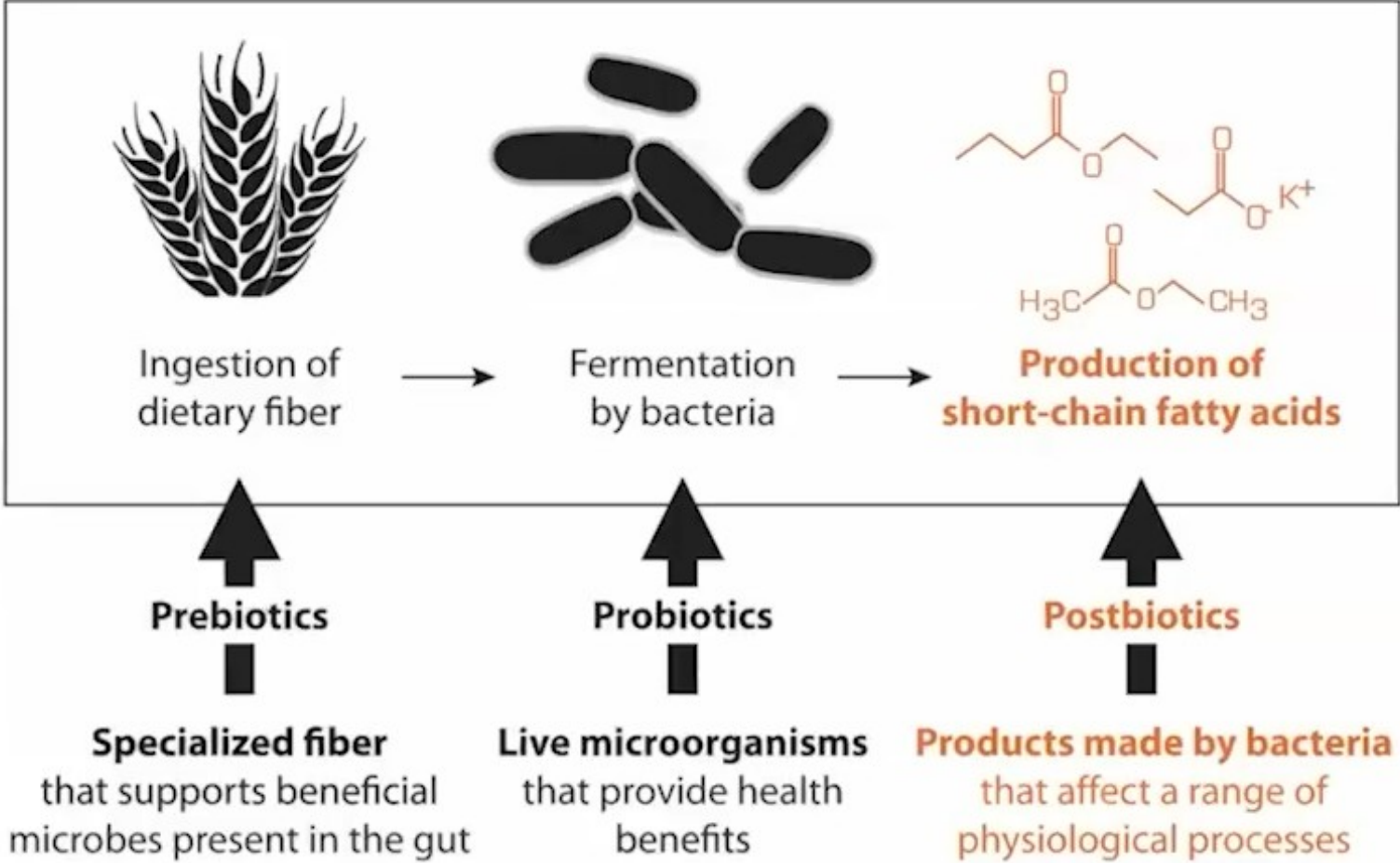


## What Is The Metabolome?

Your **metabolome** is the functional properties of your gut microbiota.

- Enhancing food metabolism including harvest of otherwise inaccessible nutrients and synthesis of vitamins.
- Supporting the gut barrier defense against pathogens.
- Renewal of gut epithelial cells that line the intestine.
- Providing the host with essential metabolites.

# The Biotic Pathway



Prebiotics include fiber, resistant starch and polyphenols.



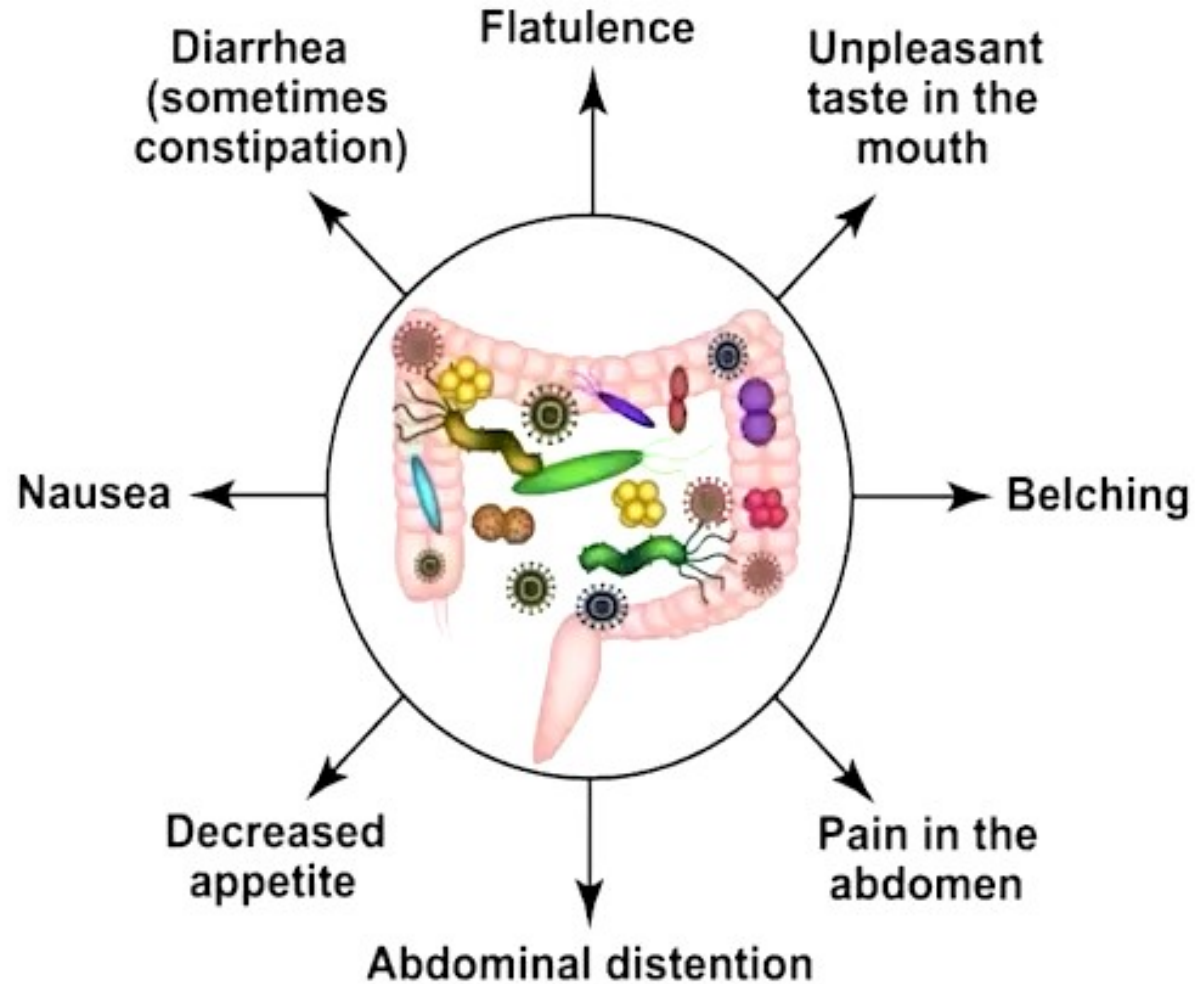
## What Is Dysbiosis?

**Dysbiosis** typically occurs when the bacteria in your stomach and intestines become unbalanced. Some typical causes are:

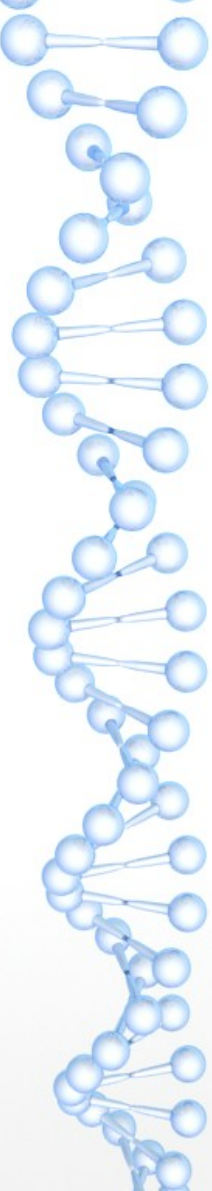
Antibiotics	Artificial sweeteners
Proton pump inhibitors / antacids	Too much sugar and fat
NSAIDS*	Not enough fiber
Birth control pills / hormones	Alcohol
Steroids	Stress
Chemotherapy	Infections

- \* NSAIDS are nonsteroidal anti-inflammatory drugs including
- ibuprofen, naproxen, diclofenac, celecoxib, high-dose aspirin

# Symptoms of Dysbiosis







## Conditions Associated With Dysbiosis

### Some Metabolic Conditions Associated With Dysbiosis

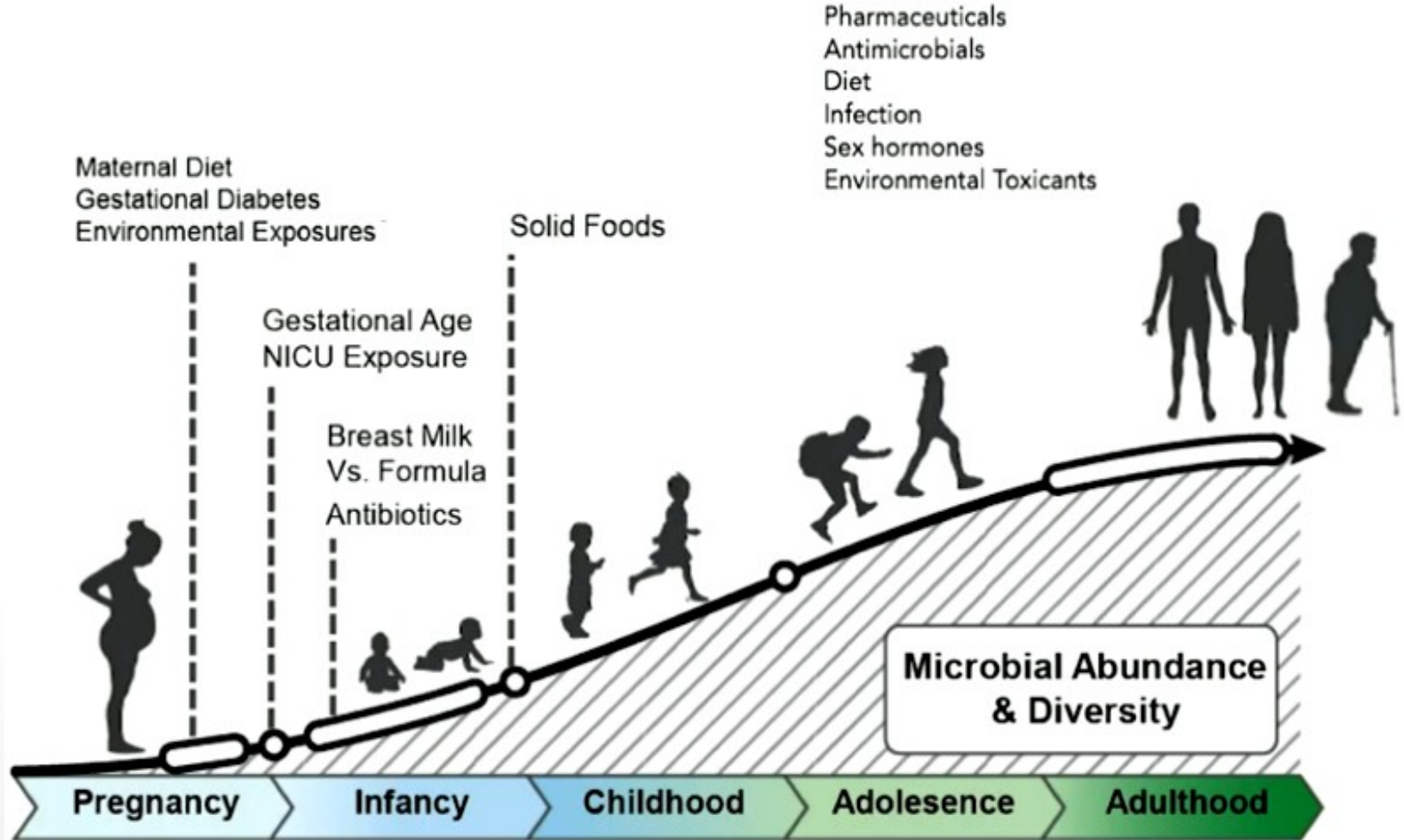
- |  |   |
|--|---|
| <ul style="list-style-type: none"><li>• Obesity</li><li>• Type 2 diabetes</li><li>• Coronary artery disease</li><li>• Chronic kidney disease</li></ul> | <ul style="list-style-type: none"><li>• Gout</li><li>• Nonalcoholic fatty liver disease</li><li>• Acute alcoholic hepatitis</li><li>• Alcoholic cirrhosis</li></ul> |
|--|---|

### Some Neuropsychiatric Conditions Associated With Dysbiosis

- |   |   |
|---|---|
| <ul style="list-style-type: none"><li>• Alzheimer's disease</li><li>• Parkinson's disease</li><li>• Schizophrenia</li><li>• ADHD</li><li>• Chronic fatigue syndrome</li><li>• Restless leg syndrome</li></ul> | <ul style="list-style-type: none"><li>• Anxiety</li><li>• Depression</li><li>• Autism spectrum disorders</li><li>• Bipolar disorder</li><li>• Migraine headaches</li><li>• Fibromyalgia</li></ul> |
|---|---|

# How is the gut microbiota created?

# Changes to Microbiome Over Lifespan





## Effect of Birth Method

**Birth  
Method**

---

	C-section	Vaginal
Allergies	↑	↓
Asthma	↑	↓
Autoimmune	↑	↓
Obesity	↑	↓

# **How does diet effect the gut microbiota?**



## Diet Cohort Study

- ✓ **European children consuming a Western diet:**
  - Greater abundance of *Firmucutes* (gram-positive).
  - Lower species diversity and microbial richness.
  - Higher prevalence of pathogenic strains.
- ✓ **African children consuming a high fiber, vegetarian diet:**
  - Greater abundance of *Bacteroidetes*.
  - High species diversity and microbial richness.
  - Lower prevalence of pathogenic strains.
  - High levels of short chain fatty acids.



## Harvard Extreme Diet Study

*Nature, 2014, Jan 23*

### Diet rapidly and reproducibly alters the human microbiome.

Nine volunteers' were put on two extreme diets for five days each:

1. A high-fat, low-fiber regimen with lots of animal protein that included brisket, salami, and an assortment of cheeses.
2. A low-fat, high-fiber regimen that included jasmine rice, onions, tomatoes, squash, peas, lentils and garlic with bananas and mangoes for snacks.

The volunteers' microbiomes were analyzed before, during, and after each diet.

- ✓ "The relative numbers of various gut bacteria started to shift within a day."



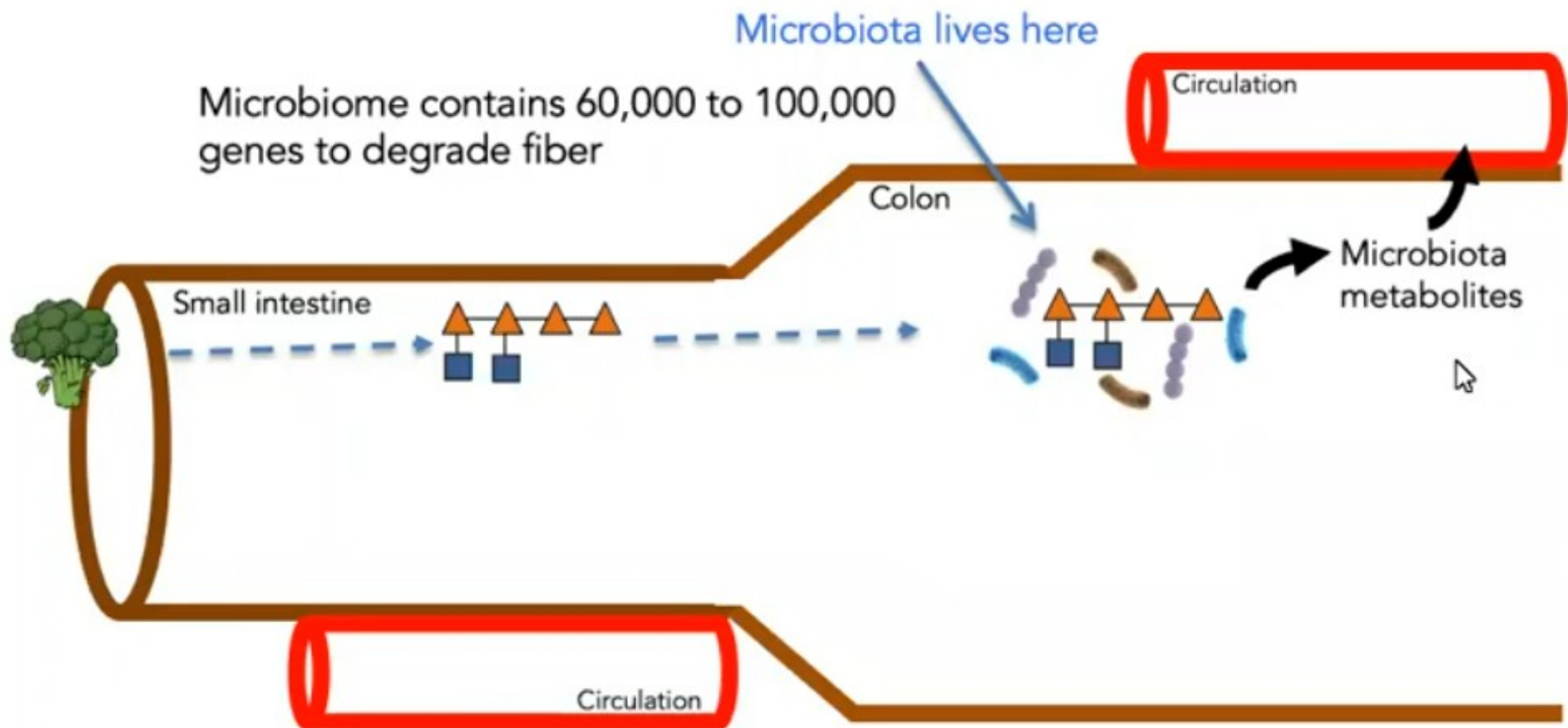
## Harvard Study Results Continued

- ✓ "Foodborne microbes from both diets transiently colonized the gut, including bacteria, fungi and even viruses."
- ✓ "Microbial activity mirrored differences between herbivorous and carnivorous mammals, reflecting trade-offs between carbohydrate and protein fermentation."
- ✓ "Increases in the abundance and activity of *Bilophila wadsworthia* on the animal-based diet support a link between dietary fat, bile acids and the outgrowth of microorganisms capable of triggering inflammatory bowel disease."

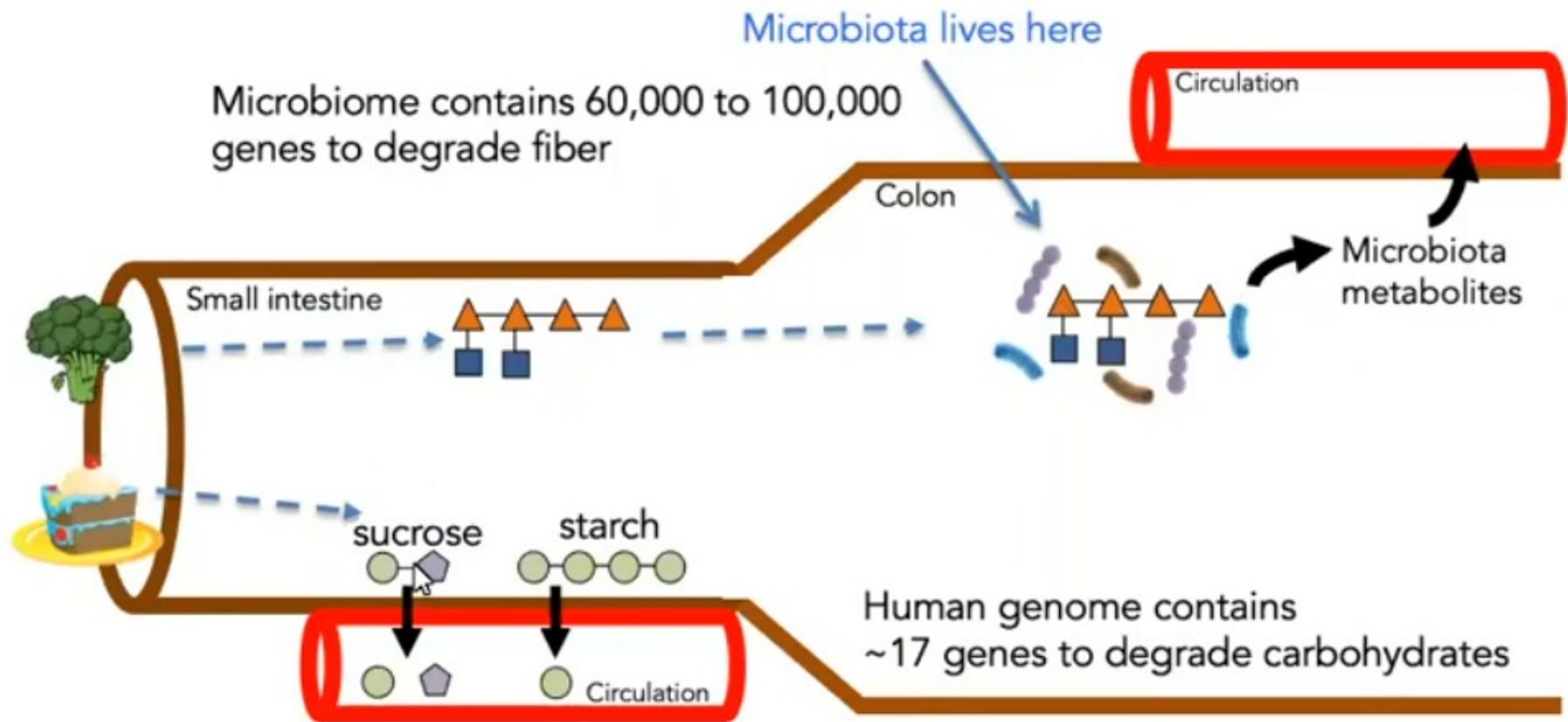
"... these results demonstrate that the gut microbiome can rapidly respond to altered diet, potentially facilitating the diversity of human dietary lifestyles."



# Dietary fiber fuels the gut microbiota



# Simple carbs starve your microbiota





## Dietary Factors With Negative Effects

### ✓ **Western diet**

- Potential extinction of beneficial microbes with long term consumption

### ✓ **Animal-base protein**

- Decrease in beneficial butyrate producing bacterial groups.
- Increase in potential detrimental gut microbes.

### ✓ **Saturated fatty acids**

- Decrease in total bacterial abundance.
- Decrease in microbial diversity and richness.



## Dietary Factors With Negative Effects

### ✓ **Sweeteners**

- Ambiguous findings dependent on the type of sweetener.

### ✓ **Emulsifiers**

- Microbial changes induced by emulsifiers could contribute to inflammatory bowel diseases.



## Dietary Factors With Positive Effects

### ✓ **Mediterranean diet**

- Increase in microbial diversity.
- Increase in health-promoting bacteria.

### ✓ **Plant-based diet**

- Increase in microbial diversity and richness.
- Growth of beneficial bacterial.

### ✓ **Fruits and vegetables**

- Increase in microbial diversity and function.
- Growth of beneficial bacterial.
- Decrease in potentially harmful bacteria.



## Dietary Factors With Positive Effects

### ✓ **Fermented foods**

- Positive effects through ingestion of microbes and microbial metabolites.
- Increase in beneficial microbes.

### ✓ **Dietary fiber**

- Increase in bacterial diversity.
- Increase in abundance of beneficial microbes.
- Decrease in potentially pathogenic bacteria.

### ✓ **Polyphenols**

- Decrease in potential pathogens.



## Dietary Effect Summary

### ANIMAL-BASED, PROCESSED FOOD DIET

Decrease in health promoting bacteria.  
Increase in harmful bacteria.  
Lower microbial diversity.

### PLANT-BASED, WHOLE FOOD DIET

Increase in health promoting bacteria.  
Decrease in harmful bacteria.  
Higher microbial diversity.

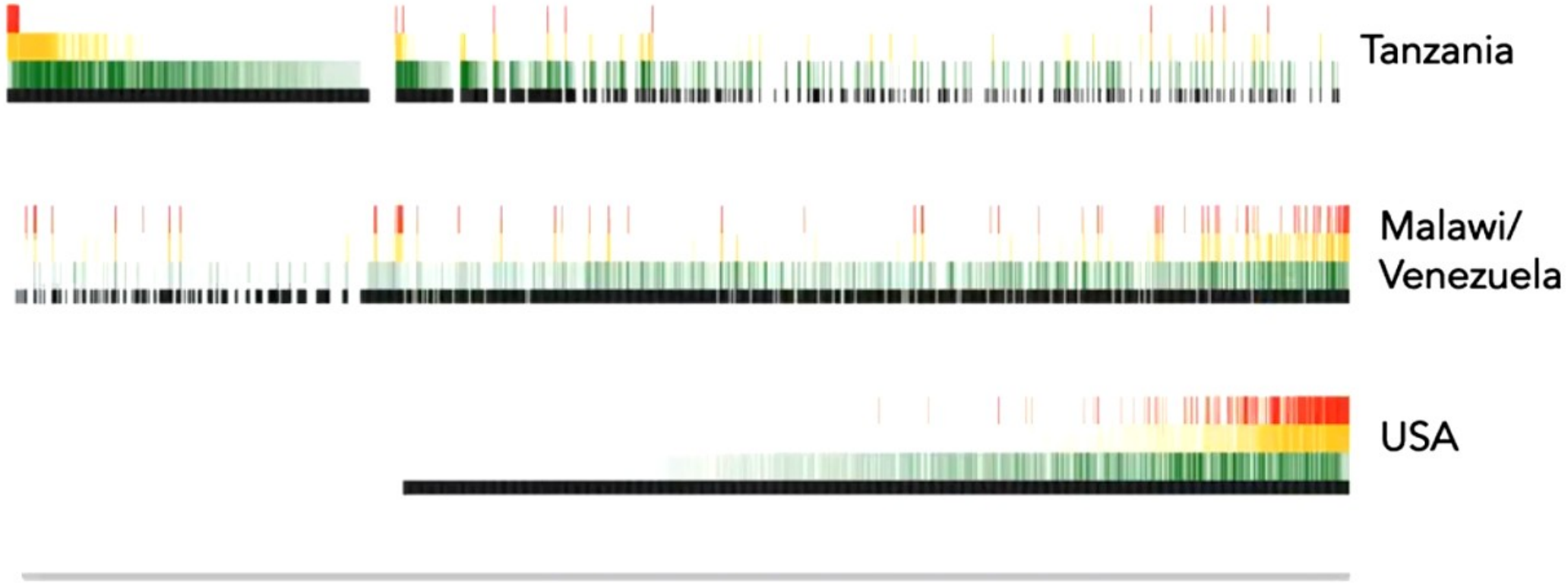
# Mediterranean Diet Pyramid





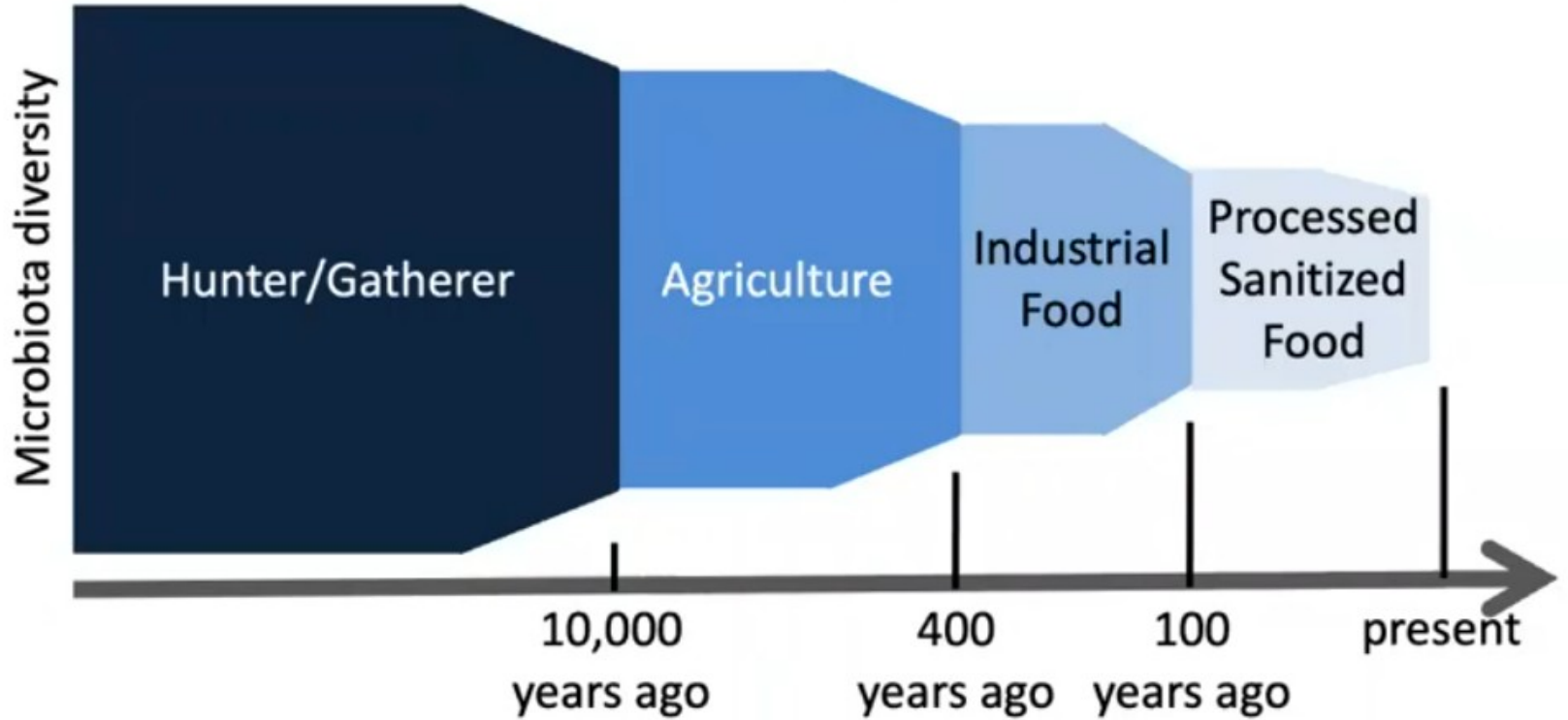
# Microbial Diversity

Diversity is the only consistent marker of a 'healthy' gut microbiome.



Bacterial Species in the Gut Microbiota

## Decrease in Microbial Diversity





## Multiple Hit Hypothesis

Western microbiota deterioration may be related to increases in:

- C-section births.
- Baby formula instead of human breast milk.
- Diets high in animal protein and processed foods.
- Use of sanitizers.
- Vaccinations.
- Antibiotics.

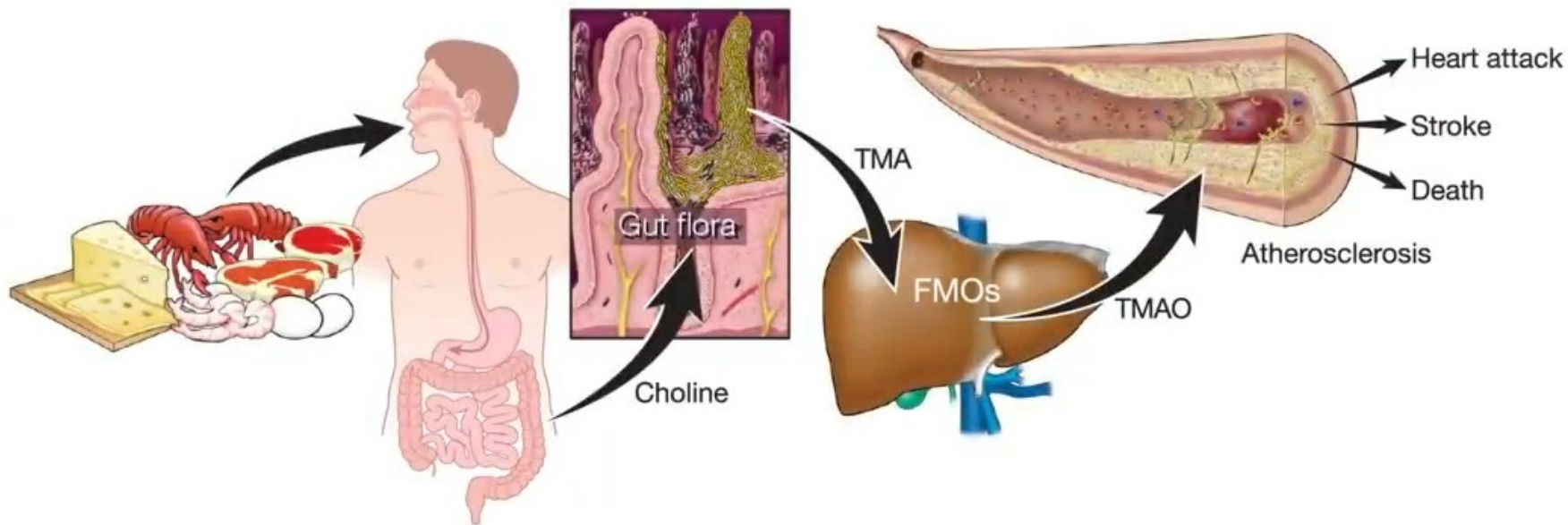
# **How does the gut microbiota effect physical health?**



## Dysbiosis May Be Root Cause

Food cravings	Bloating
Weight gain	Yeast overgrowth
Irritable bowel syndrome (IBS)	Leaky gut
Inflammatory bowel disease (IBD)	Celiac / gluten sensitivities
Food allergies and sensitivities	Vaginosis
Chronic fatigue syndrome (CFS)	Depression

# Low Fiber Animal Based Diet



Choline / Carnitine



## Foods That Contain Choline and/or Carnitine

### FOODS THAT CONTAIN HIGH AMOUNTS OF CHOLINE

Food Source	Serving	Choline
Liver / Kidneys	3 oz	240 mg
Soy Beans	1 Cup	214 mg
Fish	3 oz	187 mg

Food Source	Serving	Choline
Whole Eggs	1 Egg	147 mg
Shitake Mush.	1 Cup	145 mg
Beef	3 oz	115 mg

### FOODS THAT CONTAIN HIGH AMOUNTS OF CARNITINE

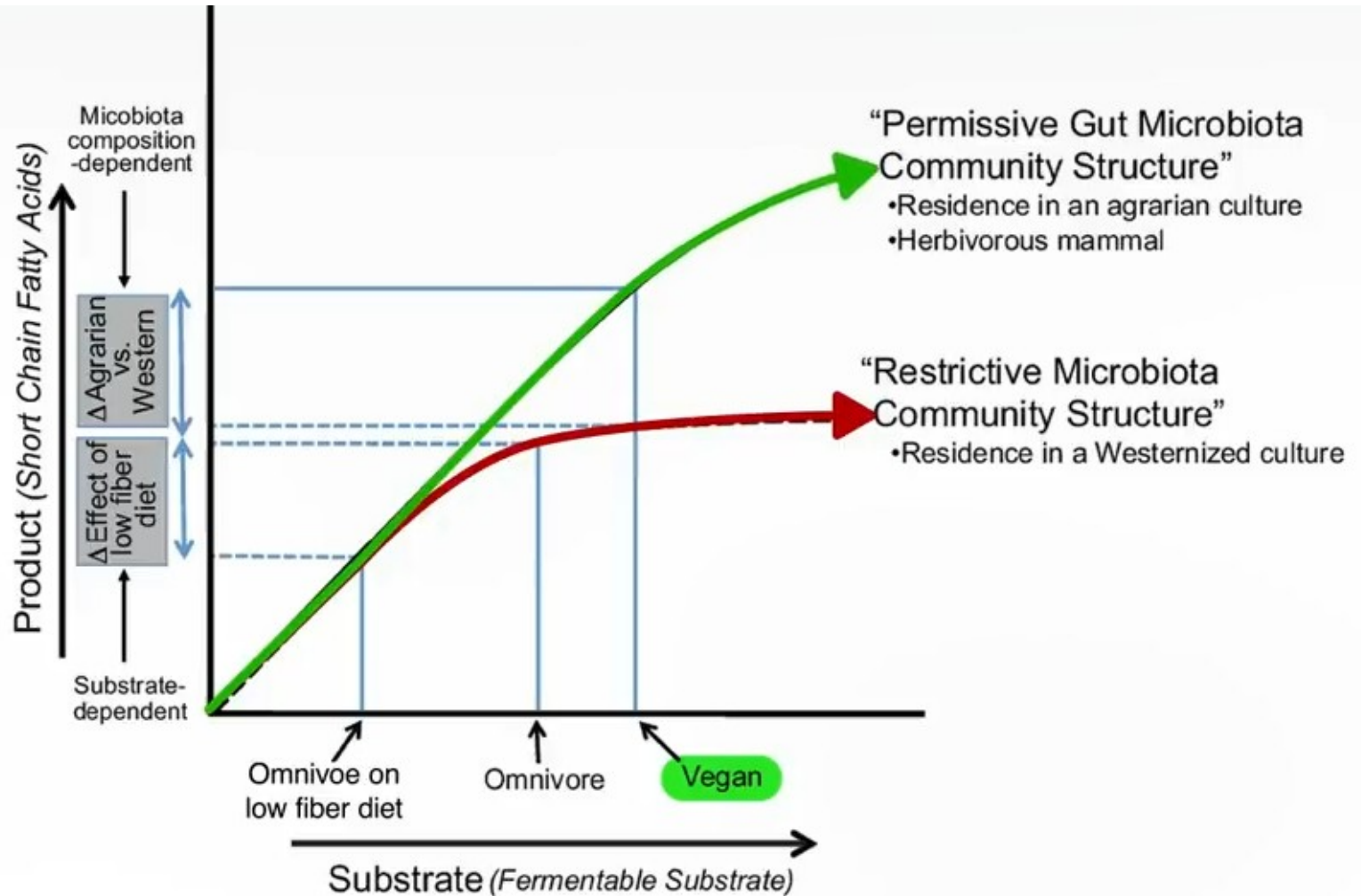
Food Source	Serving	Carnitine
Beef Steak	4 oz	105 mg
Ground Beef	4 oz	95 mg
Milk, Whole	1 Cup	8 mg

Food Source	Serving	Carnitine
Codfish	4 oz	6 mg
Ice Cream	1 Cup	6 mg
Chicken Breast	4 oz	4 mg





# Short Chain Fatty Acid Production

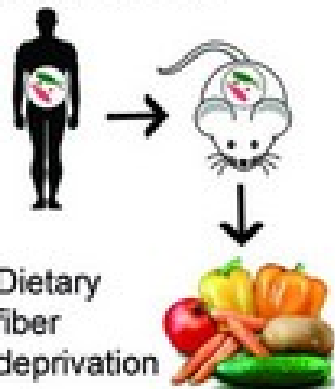




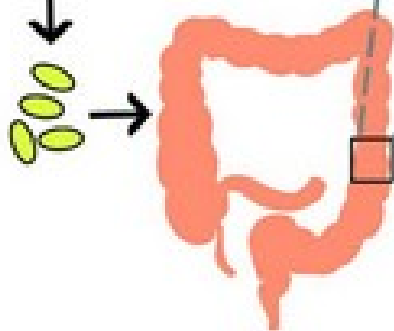
## Benefits of Short Chain Fatty Acids

- Lowers the pH in the colon which limits the growth of some harmful bacteria that can not live in an acid environment.
- **Acetate** is important for energy production and synthesis of lipids.
- **Propionate** is mainly involved in producing glucose in the liver and small intestine.
- **Butyrate** is the preferred energy source for the cells that line the colon.
- Stimulate and help regulate the immune system.

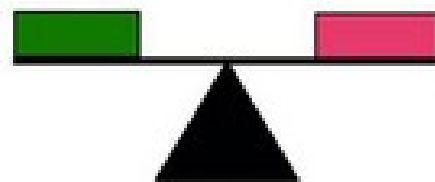
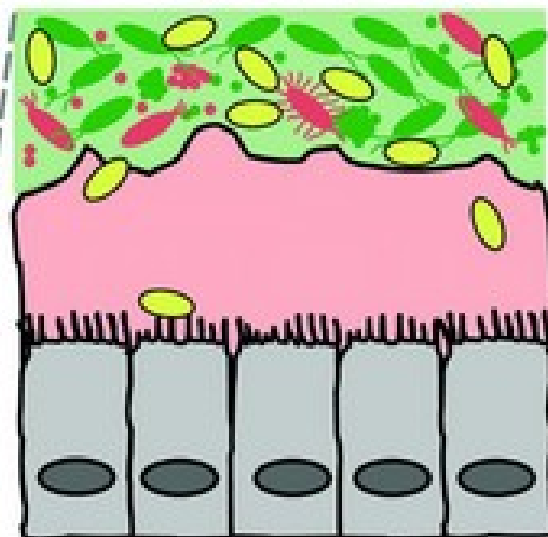
Gnotobiotic mice with characterized human gut microbiota



Infection with enteric pathogen

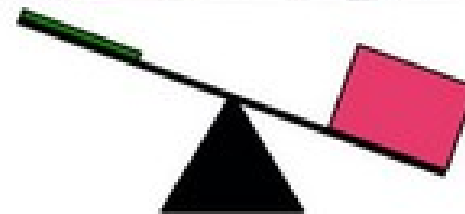
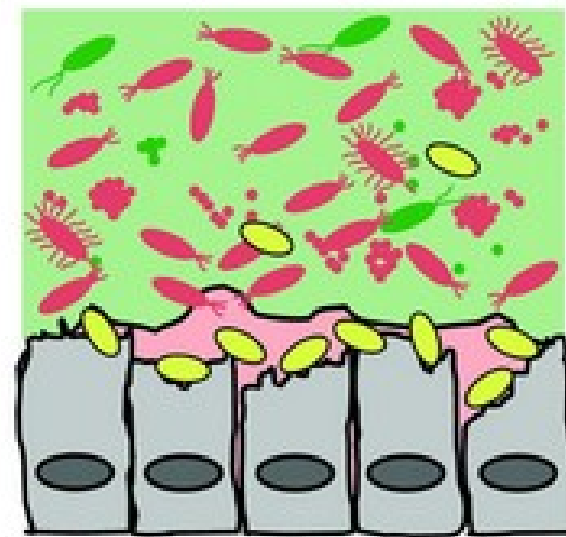


Fiber-rich (FR) diet



Mature mucus layer:  
intact barrier function

Fiber-free (FF) diet





Microbiota eroded mucus  
layer: barrier dysfunction

 Fiber-degrading microbiota

 Mucus-degrading microbiota

 Mucosal pathogen

 Bacterial dietary fiber degradation

 Bacterial host-secreted mucus degradation

I've heard people say that  
"your genes load the gun and  
your lifestyle pulls the trigger."

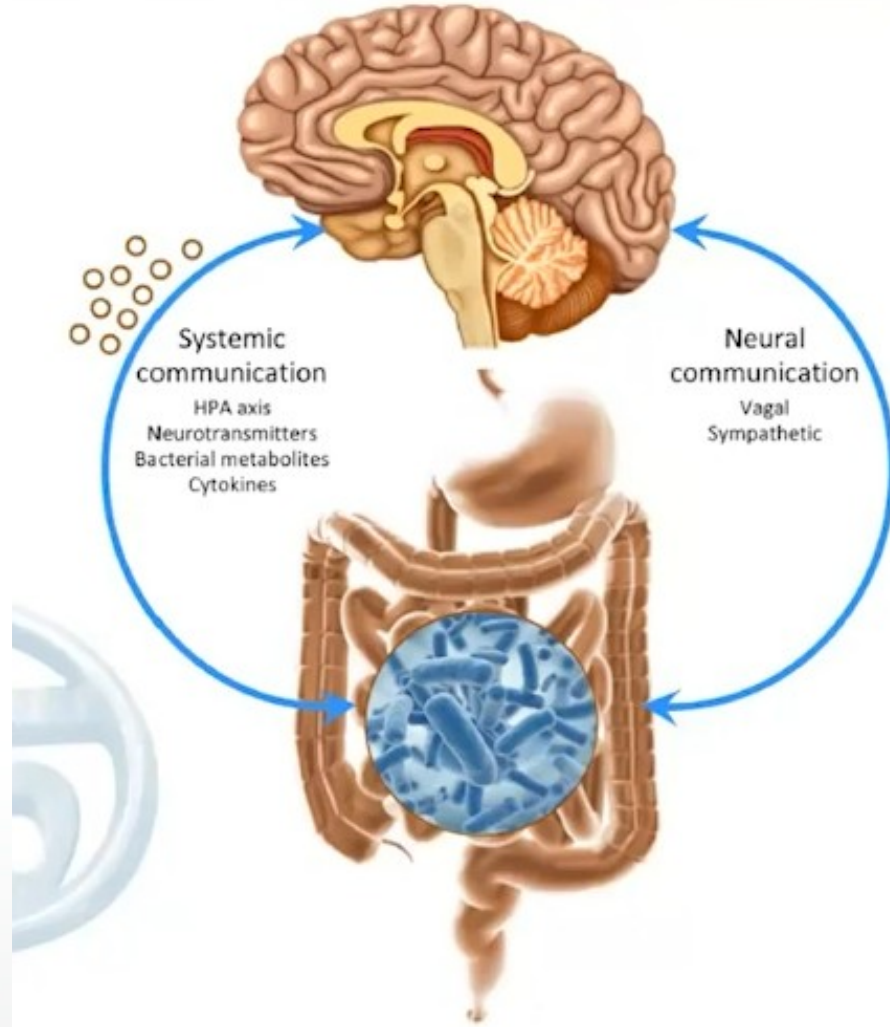
If that's the case, then  
SCFAs disarm the gun and  
take it out of your hand.

*Will Bulsiewicz, MD*

From *Fiber Fueled*, Page 61

# **How does the gut microbiota effect mental health?**

# Gut-Brain Axis





## Two-Way Communication Between Gut and Brain

There are over five hundred million nerves in your intestines that are in two way communication with the brain through the vagus nerve. This "**enteric nervous system:**"

- ✓ Monitors the daily sensations from the stomach and intestines to ensure optimal functioning of the digestive system twenty-four hours a day.
- ✓ Communicates gut sensations upward to the brain via the vagus nerve.
- ✓ Reacts to signals conveyed through the vagus nerve from the brain to the gut.

*Ninety percent of the signals conveyed through the vagus nerve travel from the gut to the brain while just ten percent travel from the brain to the gut.*



## Some Functions of the Enteric Nervous System

The enteric nervous system ( or "**second brain**"):

- ✓ Generates the most appropriate patterns of contractions to speed or slow the transit of digested food.
- ✓ Gathers information about the amount of food in the stomach and the chemical composition of the ingested meal.
- ✓ Senses the presence and activity of your microbiota.
- ✓ Detects the presence of parasites, viruses, and toxins as well as the gut's inflammatory response.

*Acute gut inflammation will make many of the sensors more sensitive to normal stimuli and events.*





## One Way Highway From Gut To Brain

Gut microbes communicate with the brain using the immune system and by the release of neurotransmitters, hormones, and signaling molecules:

- ✓ Healthy gut microbes produce more than thirty neurotransmitters.

*90% of serotonin and 50% of dopamine are actually produced in the gut.*

- ✓ Healthy gut microbes produce precursors of serotonin and dopamine that are able to cross the blood-brain barrier to improve mood and keep the mind sharp.
- ✓ Short chain fatty acids produced by healthy gut microbes can also cross the blood-brain barrier and:
  - Improve learning and memory.
  - Interfere with the formation of amyloid plaques associated with Alzheimer's disease.
  - .....

# **How do antibiotics effect the gut microbiota?**

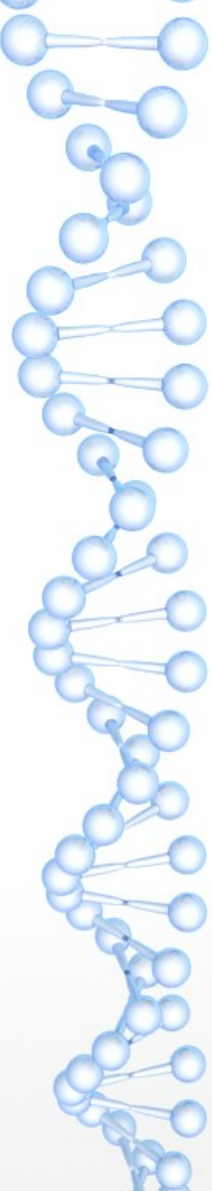


## Antibiotic Effect on Microbiome

### "Antibiotic" Literally Means "Against Life"

CIPRO is a widely prescribed broad-spectrum antibiotic. One research study showed that:

- After starting CIPRO microbial abundance and diversity plummeted.
- The microbiota was reorganized with bacterial species that collectively made up 25% to 50% of the total gut microbes almost completely wiped out.



## Recovering Your Microbiome

Researchers from Israel convincingly showed that probiotics after antibiotics impaired the microbiota's ability to stabilize and return to normal.

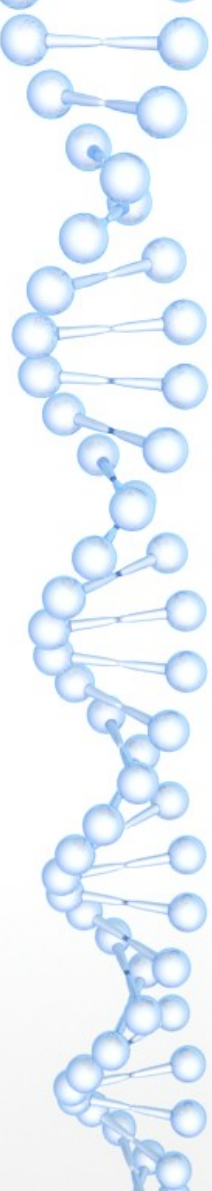
To recover during and after an antibiotic regimen:

- Maximize whole food plant based prebiotics to feed the remaining good bacteria.

*Feed the remaining good bacteria so they thrive and crowd out the remaining bad bacteria.*

- Avoid food chemicals, pesticides, saturated fat and alcohol.
- Exercise daily.
- Get at least eight hours sleep.

**How can you improve the  
composition of your gut microbiota?**



## Improving Your Microbiome

### ✓ Eat a wide variety of whole plant foods:

- Whole plant foods contain the fiber, resistant starch and inulin that feeds the bacteria that produce beneficial short chain fatty acids and other beneficial metabolites.
- Include a mix of fruits, vegetables, whole grains, and legumes.
- Aim for about 30 different whole plant foods each week.

Food High in Resistant Starch	Foods High in Inulin
<ul style="list-style-type: none"><li>• Green bananas</li><li>• Green banana powder</li><li>• Green peas</li><li>• Lentils</li><li>• Uncooked rolled oats</li><li>• White beans</li><li>• Chilled cooked potatoes</li></ul>	<ul style="list-style-type: none"><li>• Artichokes</li><li>• Asparagus</li><li>• Bananas</li><li>• Chickory root</li><li>• Dandelion root</li><li>• Garlic</li><li>• Leeks</li><li>• Onions</li></ul>



## Improving Your Microbiome

### ✓ **Add fermented foods to your diet:**

- Unpasteurized fermented foods provide prebiotic fiber and probiotic living organisms.
- Fermented foods include yogurt, kefir, tempeh, natto, kombucha, miso, kimchi, sauerkraut.

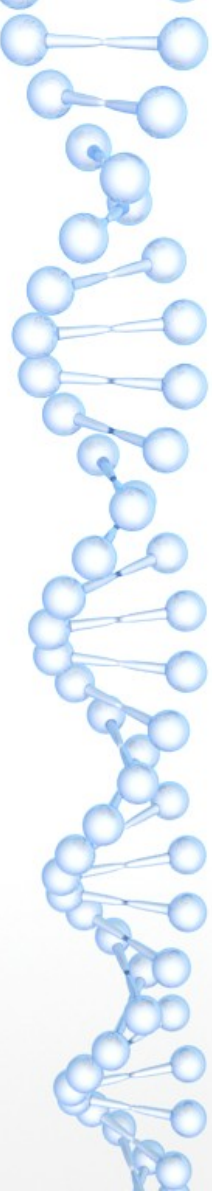
### ✓ **Eat some raw fruits and vegetables:**

- All living things have a microbiome but cooking destroys the the microbes in the plant.

*A raw apple contains about a thousand different kinds of microbes.*

### ✓ **Choose your carbohydrates wisely:**

- Avoid simple sugars and other refined carbohydrates found in soda, baked goods, white bread, and other processed grains.



## Improving Your Microbiome

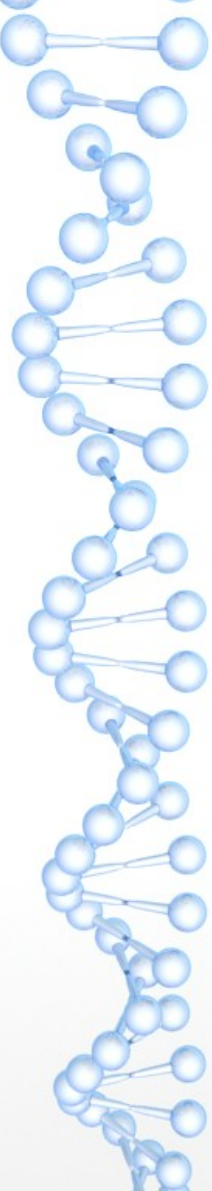
### ✓ **Manage your meat intake:**

- Think of plant foods as the main course and meat as a condiment.
- Make sure your eating the best-quality, grass-fed meat available that is raised without antibiotics.
- Eating too much meat can often lead to eating too little fiber.

### ✓ **Avoid Franken foods and their cousins that are created in a factory.**

- Do not buy if you do not understand all of the listed ingredients.
- Many manufactured foods are created by discarding the fiber in the main ingredients.
- Most manufactured foods have added sugar and salt to activate the pleasure trap to cause you to eat more.





## Improving Your Microbiome

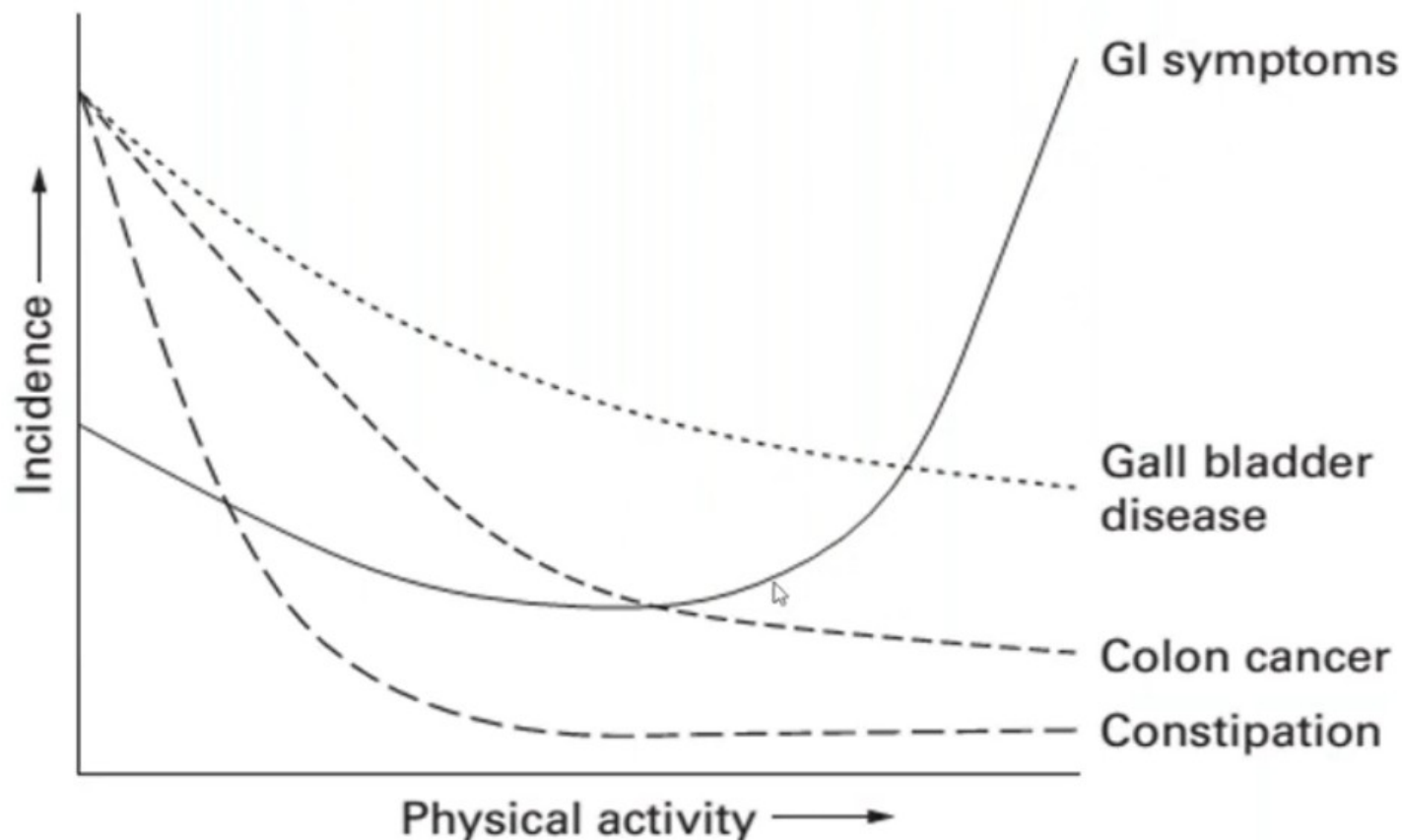
### ✓ **Exercise daily.**

- Lab animals that exercise have differences in their microbiota compared to sedentary animals when fed the same diet.

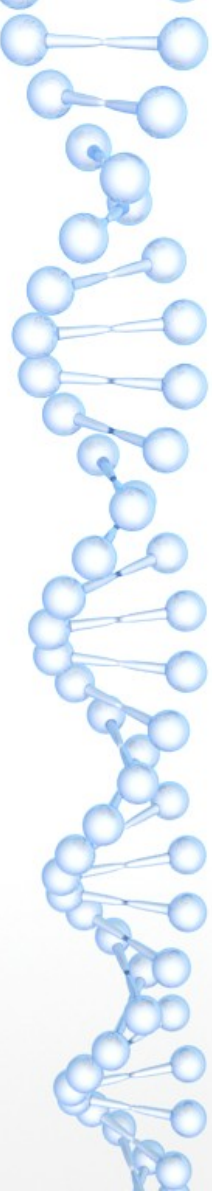
*Exercising mice had more short chain fatty acid production and improved intestinal integrity.*

- A human experiment showed that adding exercise improved the microbial community but when the exercise was stopped the microbiota reverted back to its former state.
- Exercise improves transit time through the gut. This influences metabolism and alters immune function which is known to affect the microbiota.

# Exercise and Gut Health



*Figure 1 Putative relationship between the incidence of some gastrointestinal diseases/symptoms and amount of physical activity,*



## Improving Your Microbiome

### ✓ **Limit alcohol consumption.**

- Studies show that just one drink per day in women and two in men can induce dysbiosis and bacterial overgrowth.
- Alcohol reduces the level of good bacteria while levels of potential pathogens rise causing levels of toxins and other chemicals that cause inflammation.
- Just one drink per day increases your risk for high blood pressure and stroke.
- A half drink per day is associated with an increased risk of cancer.



## Improving Your Microbiome

- ✓ **Manage stress.**
- ✓ **Get seven to eight hours of sleep:**
  - Sleep is rest for the entire body including the gut.
- ✓ **If possible, avoid causes of dysbiosis:**
  - Artificial sweeteners.
  - Proton pump inhibitors / antacids.
  - Nonsteroidal anti-inflammatory drugs including ibuprofen, naproxen, diclofenac, celecoxib, high-dose aspirin.
  - Steroids.



## Daily Fiber Requirements

All whole plant foods contain fiber.

No natural animal food contains fiber.

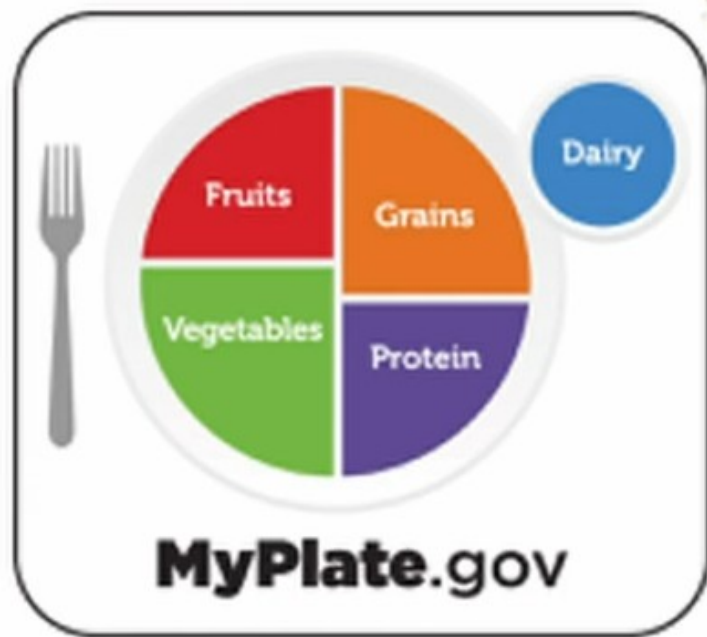
The recommended daily adequate intake for fiber is 14 grams per 1,000 calories:

- ✓ 25 grams for women (about 1,800 calories)
- ✓ 38 grams for men (about 2,700 calories)

In the United States the average dietary fiber intake is between 15 and 18 grams per day:

- 90% of women fail to meet the recommendation.
- 97% of men fail to meet the recommendation.

*3-5 g of fiber per serving*



# Willow Valley Frankenfood

Home -Style Chicken Pot Pie

Close

## Nutrition Information

1 Servings per container

Serving Size 6 oz (262g)

Amount Per Serving

**Calories 190**

% Daily Value\*

Total Fat 3.5g 5%

Saturated Fat 1g 6%

Trans Fat NA

Cholesterol 35mg 12%

Sodium 570mg 24%

Total Carbohydrate 23g 8%

Dietary Fiber 2g 6%

Total Sugars < 1g

Include NA Added Sugars

Protein 13g

**Ingredients:** Water, Noodle, Dumpling, Flat, P/C(Water, Enriched Wheat Flour (Wheat Flour, Malted Barley Flour, Niacin, Ferrous Sulfate, Thiamine Mononitrate, Riboflavin, Folic Acid), Eggs, Salt, Baking Powder (Sodium Acid Pyrophosphate, Sodium Bicarbonate, Cornstarch, Monocalcium Phosphate), Wheat Gluten, Oleoresin Turmeric, Natural Flavor), Potatoes, Diced Raw - Kegels, Chicken, Ckd,Pull(Boneless, Skinless Chicken, Water, Rice Starch, Vinegar, Seasoning (Maltodextrin, Yeast Extract, Chicken Stock, Salt and Flavors)), Diced Chicken Meat, Peas, Frozen, L/S Gluten Free Chicken Base(Chicken Meat and Natural Chicken Juices, Maltodextrin, Autolyzed Yeast Extract, Flavors, Salt, Cornstarch, 2% or less of Corn Oil, Disodium Inosinate/Disodium Guanylate, Dried Chicken Broth, Chicken Fat, Potato Starch, Natural Extractives of Turmeric and Annatto, Citric Acid, Dried Chicken, Chicken Skin, Papain, Natural Extractives of Paprika, Rosemary Extract, Lactic Acid), Diced Celery, Fresh Coin Cut Carrots, Onions - Diced 3/8", Butter, Unsalted(Pasteurized Cream (Milk), Lactic Acid, Culture Distillates), All Purpose Flour(Bleached Wheat Flour, Malted Barley Flour, Niacin, Iron, Thiamine, Riboflavin, Folic Acid.), Dried Parsley  
**Contains:** Eggs, Gluten, Milk, Onion

# Willow Valley Frankenfood

Red Wine Braised Short Ribs

Close

## Nutrition Information

1 Servings per container

Serving Size 6 oz (295g)

Amount Per Serving  
**Calories 340**

% Daily Value\*

Total Fat 18g 28%

Saturated Fat 7g 36%

Trans Fat 1g

Cholesterol 115mg 38%

Sodium 270mg 11%

Total Carbohydrate 8g 3%

Dietary Fiber 2g 7%

Total Sugars 3g

Include NA Added Sugars

Protein 31g

**Ingredients:** Beef, Chunk, Flap Sel, Hot Water, Whole Large Onion, Red Wine, Dry Merlot, Celery Stalk, Tomato Paste(Tomatoes, Citric Acid), Fresh Carrots, Salad Oil, Canola - Salad, Bake, Fry(Canola Oil), Low Sodium Beef Base(Roasted Beef and Concentrated Beef Stock, Maltodextrin, Autolyzed Yeast Extract, Cornstarch, Hydrolyzed Corn Protein, Carrot Puree, Natural Flavors, 2% or less of Disodium Inosinate/Disodium Guanylate, Caramel Color, Salt, Corn Oil, Spices and Coloring, Potato Starch, Dextrose, Lactic Acid), Rosemary - Fresh, Thyme - Fresh, Kosher Salt, Cracked Blacked Peppercorn, Black Pepper

**Contains:** Onion



# Willow Valley Frankenfood

Black Bean Burger on Roll

Close

## Nutrition Information

1 Servings per container

Serving Size **wh (147g)**

Amount Per Serving  
**Calories 310**

% Daily Value\*

Total Fat 8g **12%**

Saturated Fat 1.5g **7%**

Trans Fat NA

Cholesterol 0mg **0%**

Sodium 730mg **30%**

Total Carbohydrate 45g **15%**

Dietary Fiber 7g **28%**

Total Sugars 5g

Include 3 g Added Sugars

Protein 19g

**Ingredients:** Spicy Black Bean Burger(Water, Cooked Black Beans (Black Beans, Water), Cooked Brown Rice (Water, Brown Rice), Onion, Whole Kernel Corn, Corn Oil, Soy Protein Concentrate, Wheat Gluten, Egg Whites, Diced Tomatoes, Bulgur Wheat, Green Chiles, Calcium Caseinate, Cornstarch, Contains 2% or less of: Onion Powder, Spices, Tomato Juice, Yeast Extract, Tomato Powder, Dextrose, Salt, Garlic Powder, Hydrolyzed Vegetable Protein (Corn Gluten, Wheat Gluten, Soy Protein), Soy Sauce (Soybeans, Wheat, Salt), Natural and Artificial Flavors, Paprika, Jalapeno Pepper, Citric Acid, Xanthan Gum, Disodium Inosinate, Thiamin Hydrochloride, Caramel Color, Lactic Acid), Hamburger Roll

**Contains:** Eggs, Garlic, Gluten, Onion, Soy

# Willow Valley Frankenfood

Beyond Vegan Burger on Roll

Close

## Nutrition Information

1 Servings per container

Serving Size whl (167g)

Amount Per Serving

**Calories 410**

% Daily Value\*

**Total Fat** 20g 31%

Saturated Fat 5g 25%

Trans Fat 0g

**Cholesterol** 0mg 0%

**Sodium** 640mg 27%

**Total Carbohydrate** 35g 12%

Dietary Fiber 3g 12%

Total Sugars 4g

Include NA Added Sugars

**Protein** 25g

**Ingredients:** PBD, Burger, Beyond Burger, Vegan(Water, Pea Protein, Expeller-pressed Canola Oil, Refined Coconut Oil, Rice Protein, Natural Flavors, Expeller-pressed Canola Oil, Refined Coconut Oil, Rice Protein, Natural Flavors, Cocoa Butter, Mung Bean Protein, Methylcellulose, Potato Starch, Apple Extract, Pomegranate Extract, Salt, Potassium Chloride, Vinegar, Lemon Juice Concentrate, Sunflower Lecithin, Beet Juice Extract (for color \*\*Purchase Product\*\*), Hamburger Roll(Enriched Flour (Wheat Flour, Malted Barley Flour, Niacin, Reduced Iron, Thiamin Mononitrate, Riboflavin, Folic Acid), Water, High Fructose Corn Syrup, Yeast, Soybean Oil, Contains 2% or less of the following: Salt, Calcium Sulfate, Sodium Stearoyl Lactylate, Calcium Propionate (A Preservative), Monocalcium Phosphate, Ethoxylated Mono and Diglycerides, Calcium Carbonate, Fermented Potato Flour, Ammonium Sulfate, Ascorbic Acid (Dough Conditioner), Enzymes, Azodicarbonamide, Datem, Calcium Peroxide, Mono and Diglycerides)

**Contains:** Gluten, Soy, Tree Nuts

# Commercial Frankenfood



Serving Size 2.00

patties(68g)

Serving Per Container 4

Amount Per Serving		
<b>Calories</b>		280
Calories from Fat		240
%DV		
<b>Total Fat</b>	27g	42%
Saturated Fat	9g	45%
Trans Fat	0g	
<b>Cholesterol</b>	50mg	17%
<b>Sodium</b>	490mg	20%
<b>Total Carbohydrate</b>	1g	0%
Dietary Fiber	0g	0%
Sugars	1g	
<b>Protein</b>	8g	16%

Pork, Water, Contains 2% or Less: Potassium Lactate, Salt, Spices, Sugar, Sodium Phosphates, Dextrose, Monosodium Glutamate, Sodium Diacetate, Caramel Color.

# Commercial Frankenfood

## Fruit Loops

# Nutrition Facts

Serving Size 1 cup

Calories 118

Calories from Fat - - -

\*Percent Daily Values (DV) are based on a 2,000 calorie diet.

Amount/Serving	%DV*	Amount/Serving	%DV*
<b>Total Fat</b> 1.1g	<b>2%</b>	<b>Tot. Carb.</b> 28g	<b>22%</b>
Sat. Fat 0.5g	<b>3%</b>	Dietary Fiber 3.2g	<b>8%</b>
Trans Fat 0g		Sugars 12.9g	
<b>Cholesterol</b> 0mg	<b>0%</b>	<b>Protein</b> 1.1g	
<b>Sodium</b> - - - mg			
Vitamin A - IU 18%	• Vitamin C 18%	• Calcium 0%	• Iron 27%
Fat 2%	• Saturated Fat 3%		

**INGREDIENTS:** KELLOGG'S FROOT LOOPS (Sugar, corn flour blend (whole grain yellow corn flour, degerminated yellow corn flour), wheat flour, whole grain oat flour, oat fiber, soluble corn fiber, contains 2% or less of partially hydrogenated vegetable oil (coconut, soybean and/or cottonseed), salt, red 40, natural flavor, blue 2, turmeric color, yellow 6, annatto color, blue 1, BHT for freshness. Vitamins and Minerals: Vitamin C (sodium ascorbate and ascorbic acid), niacinamide, reduced iron, zinc oxide, vitamin B6 (pyridoxine hydrochloride), vitamin B2 (riboflavin), vitamin B1 (thiamin hydrochloride), vitamin A palmitate, folic acid, vitamin D, vitamin B12.)


# Final Notes

What you eat has a more profound impact on your microbiome than anything else you do.

The good news is that microbial health is based on the sum total of what you eat and not on any one ingredient or food group.

*Robynne Chutkan, MD*

From *The Microbiome Solution*, Page 137



*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

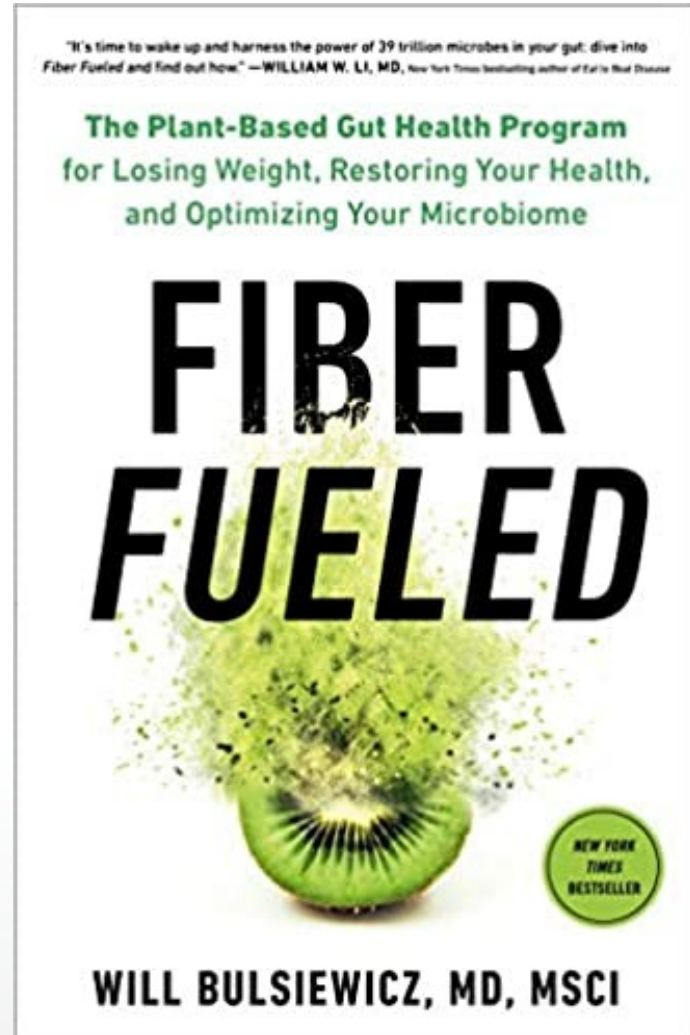
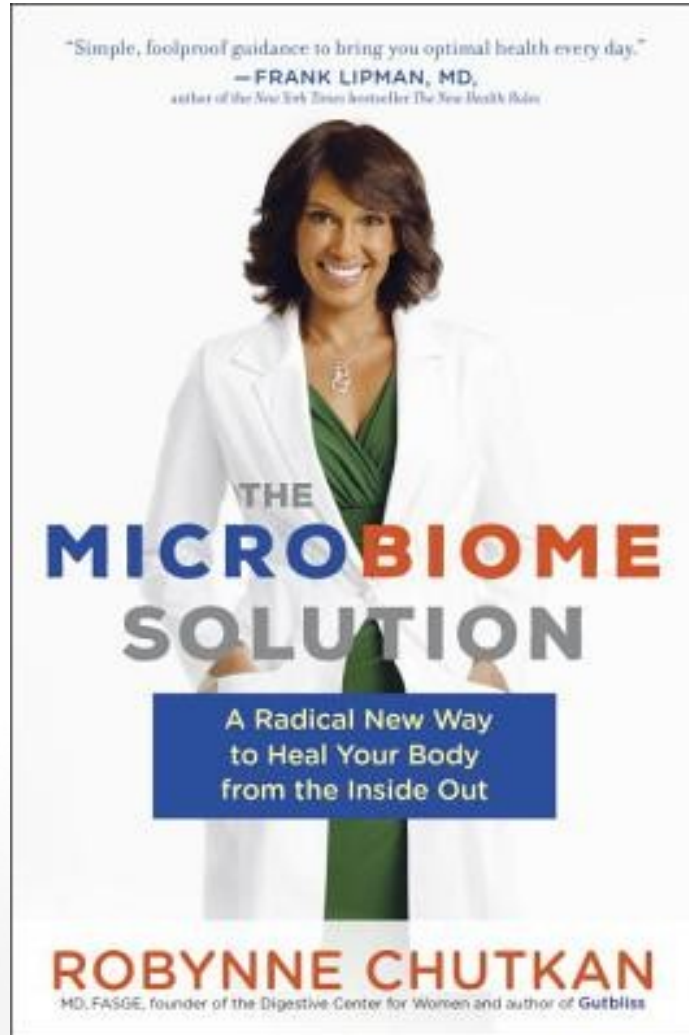
**[web4dmarch.com/nutrition](http://web4dmarch.com/nutrition)**

Email comments and suggestions to

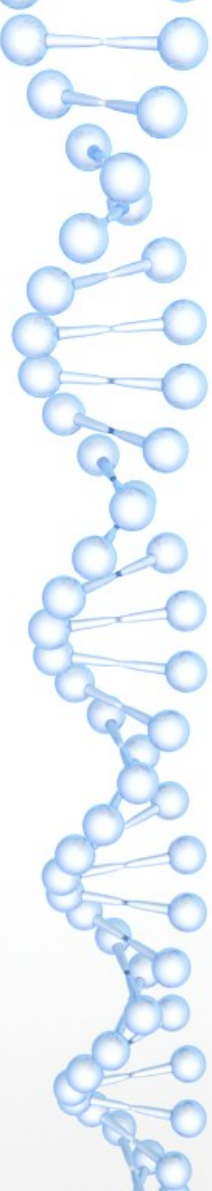
**[nutrition@web4dmarch.com](mailto:nutrition@web4dmarch.com)**



## Recommended Books



## Recommended Books



# THE WHOLE-BODY MICROBIOME

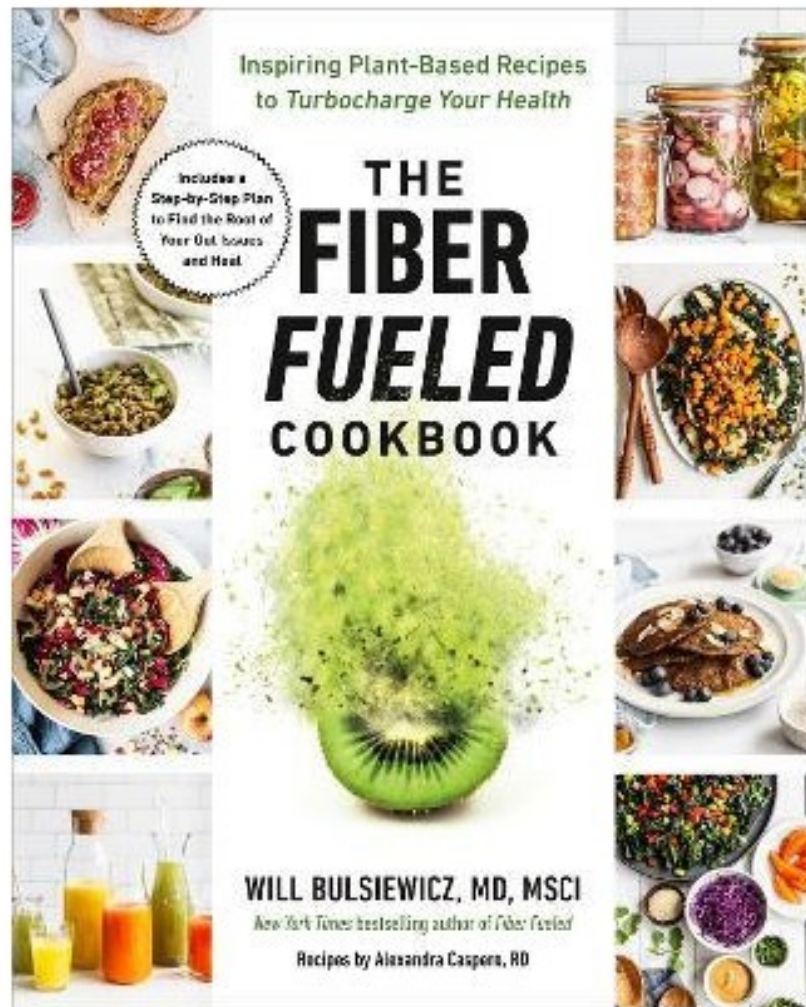
How to Harness Microbes—  
Inside and Out—for Lifelong Health

A NEW DEFENSE AGAINST CANCER, HEART DISEASE, OBESITY & MORE

B. BRETT FINLAY, PhD

coauthor of *Let Them Eat Dirt: How Microbes Can Make Your Child Healthier*

JESSICA M. FINLAY, PhD



**What does Dave March eat?**



## Dave March's Diet

- Mostly **whole plant foods** and some minimally processed whole plant foods with little or no added sugar, oil, or salt. (*SOS Free*)
- About 10-15% fat, 10-15% protein, 70-80% carbs.
- A large variety of whole plant foods each week.
- Vitamin D3 (a hormone), vitamin B-12 and iodine supplements.

*It is a high complex carbohydrate (starch) diet.  
It is a very low refined carbohydrate diet.*



## Dave March's Weekly Food List

- oranges, bananas, blueberries, strawberries, raspberries, black berries, pineapple, grapes, watermelon
- oatmeal, buckwheat, bulgar, millet, brown rice, quinoa, air-popped popcorn
- sweet potatoes, white potatoes, green lentils, split peas, peas, black beans, garbanzo beans (chick peas), red lentil pasta
- mixed soup vegetables, broccoli, Brussels sprouts, spring mix salads, beets, onions, tomatoes, bell peppers, mushrooms
- low sodium vegetable juice, green tea, orange spice herbal tea, cacao powder
- apple cider vinegar, balsamic vinegar, ground flax seeds, nutritional yeast, various spices.