Intestinal Health

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Note: This presentation is for educational purposes, not a substitute for qualified medical care.

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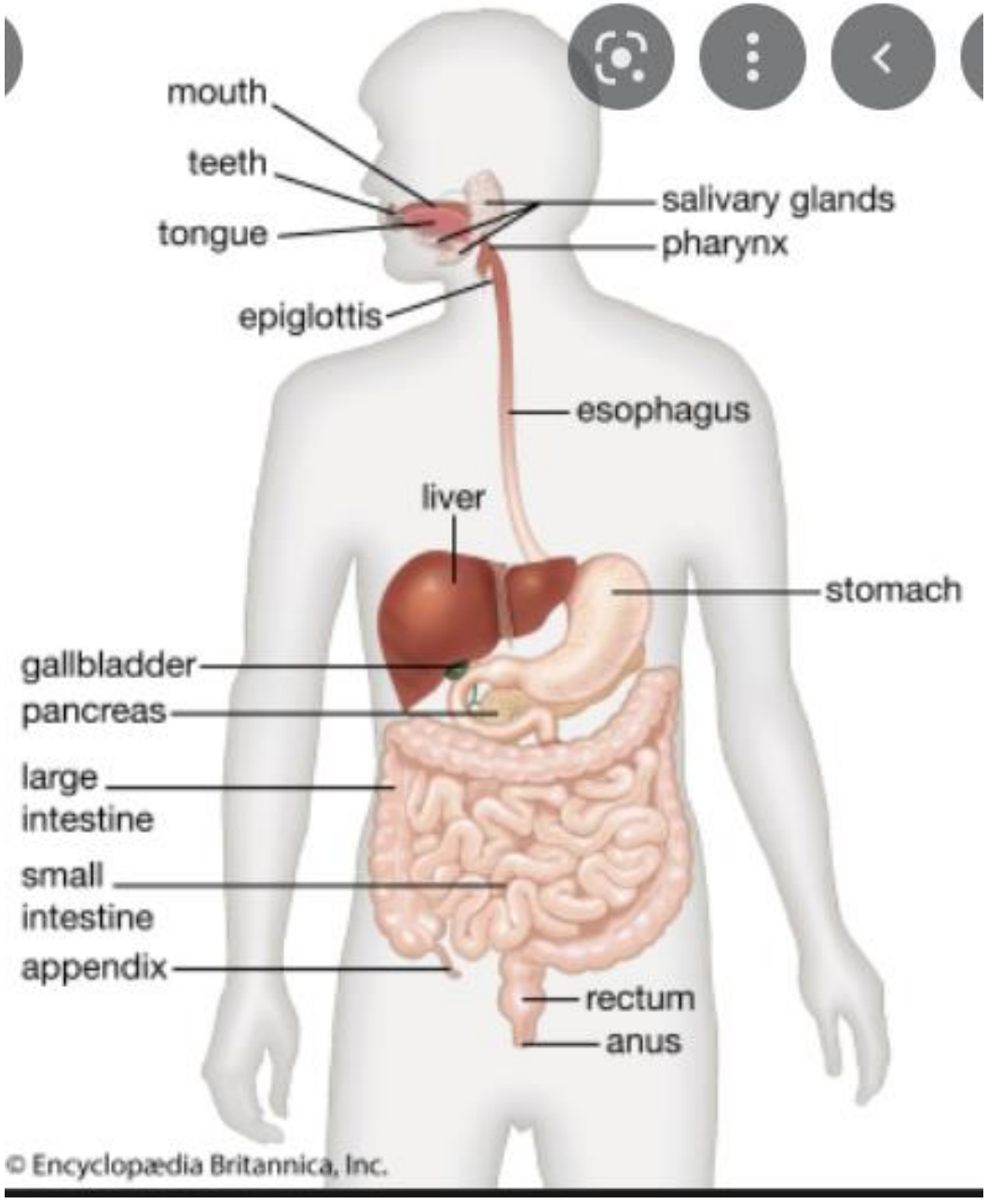
Opening

- “ALL DISEASE BEGINS IN THE GUT ” – HIPPOCRATES.
- Research over the past two decades has revealed that gut health is critical to overall health, and that an unhealthy gut contributes to a wide range of diseases including diabetes, obesity, rheumatoid arthritis, autism spectrum disorder, depression and chronic fatigue syndrome.
- If you are experiencing health issues, and you are having problems getting them resolved, start with your gut.
- In this situation, we are talking about the small and large intestine.

Basic Information About the Digestive System



Basic Information About the Gut

Source:
https://www.bmj.com/content/bmj/361/bmj.k2179.full.pdf

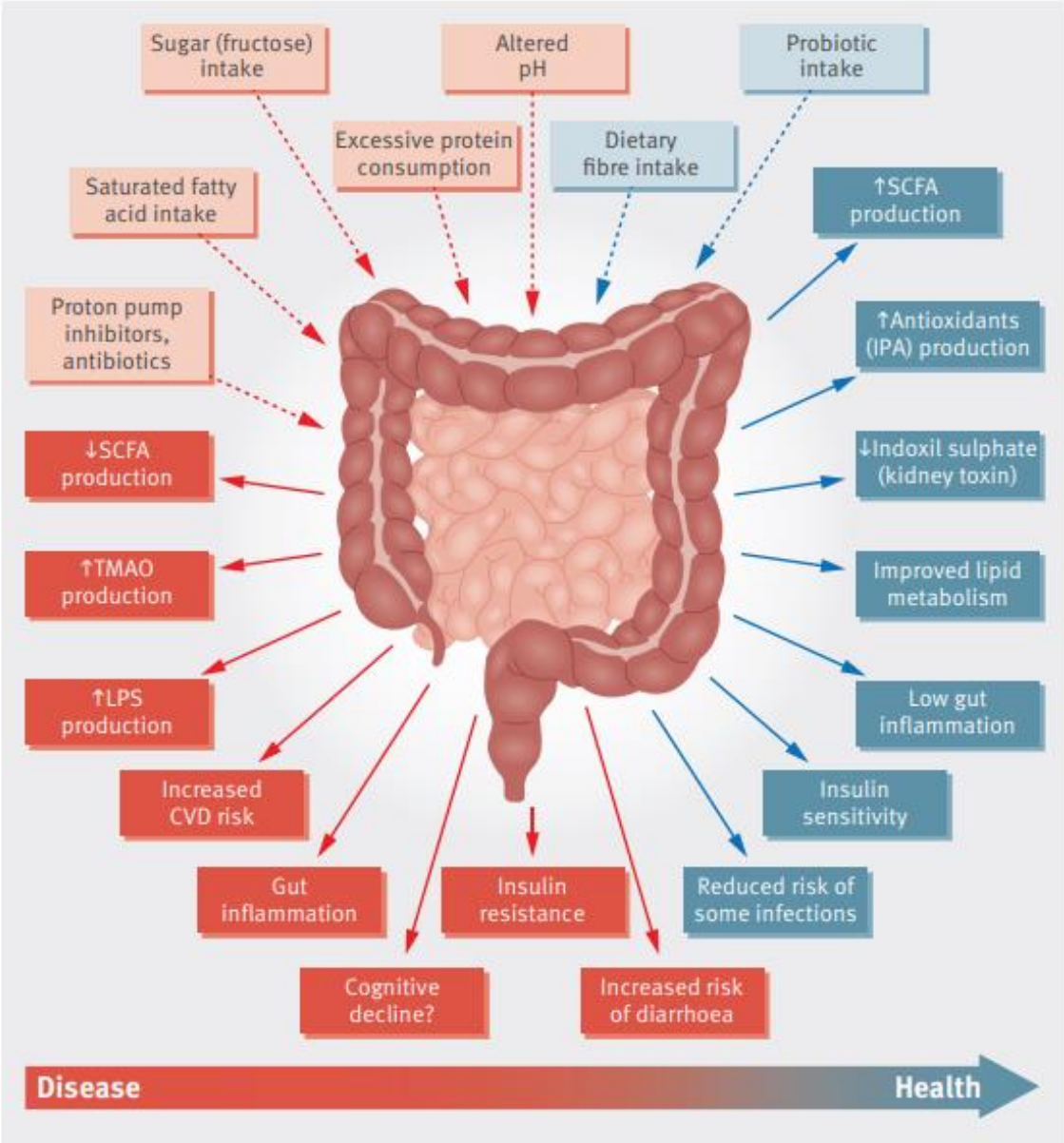


Fig 1 | Schematic representation of the role of the gut microbiota in health and disease giving some examples of inputs and outputs. CVD=cardiovascular disease; IPA=indolepropionic acid; LPS=lipopolysaccharide; SCFA=short chain fatty acids; TMAO=trimethylamine N-oxide

Basic Terms to Understand in Improving Gut Health

- Dysbiois – This has to do with an imbalance with the bacteria in your gut. It can lead to a number of health problems.
- Fermented Foods – Such foods eaten on a regular basis can go a longer way towards a healthy microbiota. These foods have been out in room temperature, allowing healthy bacteria to flourish.
- Fiber – With the standard American Diet (SAD) diet that most Americans eat, this type of diet is low in fiber. Having enough fiber in your diet plays a key role in gut health.
- Leaky gut – This is also known as intestinal permeability. This means that substances in the food now chyme can leak into the blood stream, causing problems for the immune system.
- Prebiotics – This is a fairly new term. It is food for the probiotics and the bacteria in your gut.
- Probiotics – There are many different kinds of probiotics and a number of them have unique and beneficial properties.
- Microbiota - This applies to the food in the intestines after it has gone through the mouth and stomach.

Four Points of View

- In the next series of slides, we have four different perspectives by doctors and nutritional experts discussing digestive health, especially when it comes to the gut and the microbiome.
- Dr. Christopher Vasey, ND is a naturopathic physician who practices in Switzerland.
- Dr. Peter Osborne is a doctor of chiropractic, doctor of pastoral science, an expert in functional nutrition, and is Board Certified with The American Clinical Board of Nutrition. He seeks to find the causes behind our health issues.
- Dr. Steven Gundry, MD covers in detail the role of lectins in our digestive health.
- Dr. Bill Bulsiewicz, MD, MSCI is a gastroenterologist and he covers in detail issues pertaining to our digestive system.

Dr. Christopher Vasey, ND

- There are a number of concepts one needs to know to understand intestinal health.
- One is microbiota. The flora in our gut (in the small and large intestines) two types of bacteria. One is fermentation and the other is putrefaction.
- Microbiota contains:
  - Archaea
  - Bacteria
  - Fungi
  - Viruses

Dr. Christopher Vasey, ND continued

- Our gut also produces nutrients, besides what is eaten. They are:
  - B vitamins (B1, B6, B9 (folic acid), B12)
  - Vitamin PP (niacin)
  - Vitamin K
  - Various amino acids
- Dysbiosis – Means that there is an imbalance between fermentation (85%) and putrefaction (15%). Such an imbalance can result in a number of health conditions.
- Fiber – Dietary intake of fiber is essential to having a healthy gut. Also, eating fermented foods is beneficial to the microbiota.

Dr. Christopher Vasey,ND continued

- Probiotics can be used to help improve the microbiota. However, it is best done with diet, fiber, prebiotics. The diet includes eating a high plant based diet, with fiber and fermented foods.
- As for antibiotics, while they do save lives, there is a downside to antibiotics. While it can remove the harmful bacteria in our gut, it can also remove the good bacteria in our gut. It can take three to six months for the gut to become balanced and normal (and even longer in some cases).
- Animals that are given antibiotics, these antibiotics do end up in the meat tissues. It is better to eat pastured raised chickens, grass-fed meats, and wild caught fish.

Dr. Peter Osborne

- Dr. Peter Osborne has done extensive research on the role of gluten on sensitive individuals as well as the role of nutrition when it comes to human health.
- There is genetic testing available to assess gluten sensitivity from the https://www.glutenfreesociety.org/.
- Gluten is found not only in grains such as , it is found in personal care products, nutritional supplements, and in processed foods. These grains are a form of lectins, a topic covered in more detail by Dr. Steven Grundy, MD. Exposure to gluten can result in damage to the intestinal lining.
- Dr. Osborne runs a program via YouTube. He is the author of a book called No grain, No Pain.
- Another issue is the role of glyphosate in wheat. It can cause problems to the intestinal lining, resulting in leaky gut issues.
- Gluten types of foods can be quite addictive, and hard to wean yourself off them.
- Yeast overgrowth can produce a protein that mimics gluten.
- Gluten can alter bacteria in the gut, gluten sensitivity can cause reflux.
- Casein (in dairy) can mimic gluten.

Dr. Osborne – Listing of Various Gluten Grains

- Barley - Hordein
- Corn - Zein (Corn also contains fumonism, a problem for people with type 2 diabetes and heart disease.)
- Millet - Panicin
- Oats - Avenin
- Rice - Oryzenin (As rice is grown in water, it has been found to be contaminated with heavy metals.)
- Rye - Sesalin
- Sorghum - Kafirin
- Teff - Penniseiten
- Wheat - Gliadin

The following are pseudo-grains, they are vegetables that have gluten-like proteins:

- Amaranth
- Buckwheat
- Quinoa

Dr. Osborne – Gluten Sensitivity Issues

1. Gluten sensitivity causes inflammation (systematic)
2. Grain consumption leads to vitamin and mineral deficiencies. It can lead to a breakdown in muscles, joints, bones, and other body tissues.
3. Grain consumption causes leaky gut, which is a precursor to autoimmune diseases
4. Grain is extremely difficult for the body to digest. Proteins in the grains are resistant to enzyme activity and breakdown.
5. Gluten sensitivity affects the following areas of the body:
    1. gut (intestines)
    2. head (migraines)
    3. joints
    4. muscles (pain and weakness)
    5. nerves (restless leg syndrome)
6. There are over 140 autoimmune diseases that can be triggered by eating grains.

Dr. Osborne – Gluten Sensitivity Issues continued

7. Gluten sensitivity can play a major role in a number of mental health conditions as well as being a neurotoxin (chemical that harms the brain):

1. ADHD
2. Bipolar syndrome
3. Depression
4. Multiple Sclerosis (MS)
5. Peripheral neuropathy
6. Restless Leg syndrome (bacterial overgrowth in the intestines linked to gluten sensitivity)
7. Schizophrenia
8. Vertigo (dizziness)

Note #1: Chronic pain annual costs in the United States runs between $560 billion to $635 billion a year. The author covers in detail issues with the use of prescription drugs. Prescription drugs are the fourth leading cause of death in the United States.

Note #2: Milk has a protein called casein and it looks "like" gluten. It can cause the same reactions as found in gluten sensitivity.

Note #3: Some of the key principles in functional medicine is that each one of us is biochemically unique.

Dr. Osborne: Two Types of Brains

- Our bodies have two types of brains. One is the actual brain and the second one is our gut brain. The gut brain plays a role in producing dopamine and serotonin. If their production is reduced, pain levels increases.

  The actual brain has the blood brain barrier, to keep the toxins out of the brain. If this is breached, it can result in:
  - ADD/ADHD
  - autism
  - bipolar depression
  - depression
  - facial palsies (Bell's palsy)
  - leaky gut syndrome
  - schizophrenia
  - seizure disorders (Epilepsy)

Dr. Osborne – Nutritional supplementation

- This is a partial listing of nutrients, these block inflammation:
  - high dose curcumin
  - omega 3 essential fatty acids
  - glucosamine
  - MSM (methylsulfonylmethane)

- Note #1: The immune system can respond two different ways:
  - One, one type of immune response affects the immune system.
  - Two, the second type of response is the inability to digest a specific food.

Dr. Osborne's Issues with Gluten Sensitivity

- Gluten sensitivity can lead to:
  - Asthma
  - Bone loss
  - Carpal tunnel
  - Dizziness and loss of balance
  - Eczema
  - Fertility issues
  - Fibromyalgia
  - Mental Health Issues
  - Muscle stiffness
  - Osteoarthritic changes in your joints
  - Pericarditis
  - Thyroid issues

Dr. Osborne - Foods to be aware of

- Additives
- Casein and Dairy can mimic gluten
- Corn maltodextrin
- Cornstarch
- Dextrose
- Dyes
- Glyphosate (in Roundup)
- GMOs
- Heavy metals
- Hydrogenated oils
- Hydrolyzed soy protein
- Large quantities of sugar
- Leaky gut results in leaky brain
- Meat glue – microbial transglutaminase
- Mycotoxins – mold contamination
- Pesticides
- Preservatives
- Soy flour
- Water – residues of prescription drugs, antibiotics, and other substances like chlorine and fluoride

Dr. Osborne - Terms

- Air Quality – What is in our air affects our health. Residues of heavy metals can be in the atmosphere. Declining levels of oxygen in the atmosphere is another concern. Chem trails are not good for anyone of us, either.
- Dental health – gluten can destroy the enamel
- Difficult to digest foods – It includes GMOs, pesticides, and it can affect your gut health
- Gluten sensitivity – can play a role in over 100 diseases. Gluten can act as an opioid. Opioid is a type of pain killer. You can eat gluten for years and have no symptoms. All of sudden, symptoms rise up.
- Gluten sensitivity can affect and cause leaky gut two ways.
  - One, when you don't digest gluten, that leads to the production of immune system antibodies and inflammatory chemicals.
  - Two, non-digested particles can lead to leaky gut, causing tissue damage and disease.
- Glyphosate – It can disrupt the microbiome and affect the shikimate pathway (which is an amino acid pathway that helps the body to produce thyroid hormones and serotonin).

Dr. Osborne - Terms continued

- Hyphal wall protein – produced by candida, mimics gluten
- Inflammation – It is chronic inflammation that can cause problems
- Medications – Some medications can cause nutritional deficiencies and interfere with the gastrointestinal tract function
- Molecular mimicry – toxins in your tissue mimic your own tissue, generating an attack on your own tissues by your immune system
- Vaccines – They can cause autoimmune diseases.
- Water Quality-A number of substances are in our water. Municipal water systems add fluoride (industrial waste) and chlorine to the water. There can be residues of prescription drugs in water. Various chemicals can also be in water. Fracking can also pollute the ground water.
- Zonulin – It is a protein. It is an anchor that holds your gut cells together. Gluten can disrupt the zonlulin.

Dr. Steven Gundry, MD

- When we think that we have found the ultimate answer with gluten sensitivity, we learn that lectins exists in a number of plant foods.
- Dr. Steven Gundry, MD has written a book covering this topic, called the Plant Paradox. It turns out that plants in order to protect themselves from predators have built in properties that can repel anyone interested in eating them.
- Grain can be described as a lectin, a substance that can cause holes in the intestinal lining. There are vegetables that can cause these problems, as well.
- If you happen to be allergic to a specific food even it is on Dr. Gundry's list, then obviously, you don't want to eat it.

Dr. Steven Gundry, MD: What Lectins can do

- What can lectins do? They can disrupt cellular communication. This is done by blocking and mimicking hormonal signals. Lectins can bind to an important docking port, resulting in reduced muscle mass, and starved brain and nerve cells.
- They can cause gaps in the intestinal wall barrier, producing zonulin.
- Lectins are large proteins.
- They target and attach themselves to sugar molecules as well as mimic insulin.
- They can confuse the immune system with molecular mimicry. Lectins can be indistinguishable from the body's proteins and by doing so, fooling the immune system.
- There are a number of health problems that stem from eating lectins.

Lectins are classified primarily into five specificity groups, according to the monosaccharide for which they exhibit the highest affinity: mannose, galactose/N-acetylgalactosamine, N-acetylglucosamine, fucose, and N-acetylneuraminic acid (sugars are of the d-configuration except for fucose which is l).

Dr. Steven Gundry, MD: Foods high in Lectins

- Foods other than grains and beans that are high in lectins:
  - Bell peppers
  - Cashews
  - Chia
  - Goji berries
  - Peanuts
  - Sunflower seeds
  - Tomatoes
  - Zucchini

Dr. Steven Gundry, MD: Other Substances that can breach the Intestinal Wall

- Dr. Gundry discusses seven disruptors in considerable detail to our digestive system and ultimately, our health. They include:
  - Artificial Sweeteners
  - Broad spectrum antibiotics
  - Constant Exposure to Blue Light
  - Endocrine Disruptors
  - Genetically Modified Foods
  - Lipopolysaccharides (LPS) - A binding agent used in ground beef and fake crab meat. It can cross the blood/brain barrier and is a neurotransmitter disruptor. It can cause ataxia, which is similar to Parkinson's.
  - Nonsteroidal Anti-inflammatory Drugs (NSAIDS)
  - Over the counter painkillers
  - Stomach Acid Blockers
- Note #1: Endocrine disruptors are playing a role in accelerated sexual development in children.
  Note #2: GMOs increase gluten sensitivity.
  Note #3: Blue light comes from TVs, cell phones, tablets, and other electronic devices. Blue light suppresses melatonin and stimulates ghrelin and cortisol.

Dr. Steven Gundry, MD: WGA - Wheat Germ Agglutinin

- Dr. Gundry talks about WGA. It is found in wheat and it can do the following:
  - It behaves like insulin.
  - It blocks sugar from getting into muscle cells.
  - It interferes with protein digestion.
  - It promotes free radicals.
  - It reacts with other proteins.
  - It has an affinity for attacking our joints.
- Note #1: It also does a number of other things not good for our bodies.

Dr. Steven Gundry, MD:

- For the next several slides are foods that will not cause problems from the perspective of not facilitating leaky gut issues.
- Note: We skipped the dairy section, bars, and pasta alternatives.
- This is not a life long diet; but to give the gut time to heal. Then, slowly, you can introduce one item at a time to see how you react.

Dr. Gundry's Listing of Acceptable Foods

- Cruciferous Vegetables
- Other Vegetables
- Leafy Greens
- Pastured Poultry
- Meat
- Seafood
- Fruit
- Beverages
- Acceptable Fats
- Herbs, Seasonings, and Condiments
- Flours

Dr. Gundry's List of Acceptable Foods

CRUCIFEROUS VEGETABLES

- arugula
- bok choy
- broccoli
- Brussels sprouts
- cabbage (green and red)
- cauliflower
- collards
- kale
- kimchi
- kohlrabi
- napa cabbage
- radicchio
- sauerkraut (raw)
- swiss chard
- watercress

Dr. Gundry's List of Acceptable Foods

OTHER VEGETABLES

- artichokes
- asparagus
- bamboo shoots
- beets (raw)
- carrot greens
- carrots (raw)
- celery
- chicory
- chives
- daikon radish
- fiddlehead ferns
- garlic
- garlic scapes
- ginger
- hearts of palm
- horseradish
- Jerusalem artichokes (sunchokes)
- leeks
- lemongrass
- mushrooms
- nopales (cactus; available online)
- okra
- onions
- parsnips
- puntarella
- radishes
- rutabaga
- scallions
- shallots
- water chestnuts

Dr. Gundry's List of Acceptable Foods

LEAFY GREENS

- algae
- basil
- butter lettuce
- cilantro
- dandelion greens
- endive
- escarole
- fennel
- mesclun (baby greens)
- mint
- mizuna
- mustard greens
- parsley
- perilla
- purslane
- red and green leaf lettuces
- romaine lettuce
- sea vegetables
- seaweed
- spinach

Dr. Gundry's List of Acceptable Foods

PASTURED POULTRY

(4 ounces per day)

- chicken
- duck
- game birds (pheasant, grouse, dove, quail)
- goose
- ostrich
- pastured or omega-3 eggs (up to 4 daily)
- turkey

Note: Pastured poultry are chickens and turkeys that have been allowed to roam the fields, not fed a diet of corn or cooped up in buildings.

MEAT

(100 percent grass-fed and grass-finished,

4 ounces per day)

- beef
- bison
- boar
- elk
- grass-fed jerky (low-sugar versions)
- lamb
- pork (humanely raised, including prosciutto, Iberico ham, 5J ham), Canadian bacon, ham
- venison
- wild game

Dr. Gundry's List of Acceptable Foods

SEAFOOD

(Any wild-caught, 4 ounces per day)

- Alaskan salmon
- anchovies
- calamari/squid
- clams
- cod
- crab
- freshwater bass
- halibut
- Hawaiian fish, including mahi-mahi, ono, and opah
- lobster
- mussels
- oysters
- sardines
- scallops
- shrimp (wild only)
- tuna (canned)
- whitefish

Dr. Gundry's List of Acceptable Foods

FRUITS

(Limit to one small serving on weekends and only when that fruit is in season)

- (Best options are pomegranate and passion fruit seeds, followed by raspberries, blackberries, strawberries, then blueberries)

- apples
- apricots
- blackberries
- blueberries
- cherries
- citrus (no juices)
- crispy pears (Anjou, Bosc, Comice)
- kiwis
- nectarines
- passion fruit
- peaches
- plums
- pomegranates
- raspberries
- strawberries

Dr. Gundry's List of Acceptable Foods

BEVERAGES

- Champagne (6 ounces per day)
- coffee
- dark spirits (1 ounce per day)
- hydrogen water
- KeVita brand low-sugar kombucha (such as coconut and coconut Mojito)
- Pellegrino or Panna water
- red wine (6 ounces per day)
- tea (all types)

ACCEPTABLE FATS

- Avocado oil
- Ghee
- Macadamia nut oil
- MCT Oil
- Perilla Oil
- Thrive Algae oil
- Walnut oil

Dr. Gundry's List of Acceptable Foods

HERBS, SEASONINGS, AND CONDIMENTS

- avocado mayonnaise
- coconut aminos
- fish sauce (no sugar added)
- herbs and spices (all except chile flakes)
- miso
- mustard
- nutritional yeast
- sea salt (ideally iodized)
- tahini
- vanilla extract (pure)
- vinegars (any without added sugar)
- wasabi

FLOURS

- almond (blanched)
- arrowroot
- cassava
- chestnut
- coconut
- coffee fruit
- grape seed
- green banana
- hazelnut
- millet
- sesame (and seeds)
- sorghum flour
- sweet potato
- tiger nut

Dr. Will Bulsiewicz, MD, MSCI

- Background: Dr. Will Bulsiewicz, MD, MSCI is a gastroenterologist and in his book called Fiber Fueled, he covers gut health and the role of the gut flora.

Dr. Will Bulsiewicz, MD

- What is in the gut microbiota? It contains:
  - Bacteria (most are beneficial)
  - Yeasts (tiny particles made of DNA or RNA)
  - Parasites (nature's thieves)
  - Viruses
  - Archaea (ancient organisms)
  - Fungi (similar to bacteria, they are multi cellular organism. They have a nucleus and other organelles.)
- We have 39 trillion microorganisms in our gut. It helps to have diversity.

Dr. Will Bulsiewicz, MD - Dysbiosis

- Dysbiosis means that there is a loss of harmony and balance in the gut.
  - It can mean an balance with more of the bad bacteria harming the intestinal lining.
  - It can lead to leaky gut issues, gut inflammation, and:
    - Life threatening sepsis
    - Shock
    - Multi-organ failure
    - Diseases such as:
      - Alcoholic hepatitis
      - Alzheimer’s
      - Autoimmunity
      - Congestive heart failure
      - Coronary artery disease
      - Nonalcoholic fatty liver
      - Obesity
      - Osteoarthritis
      - Type 2 diabetes

Dr. Will Bulsiewicz,MD – Fermented Foods

- Before refrigeration, food was fermented. Fermentation makes the food healthier. It does the following:
  - Breeds new microbes
  - Transforms fiber
  - Generates bioactive peptides and polyphenols.
  - It can remove lectins
- Fermentation causes:
  - It causes the release of acids that lower pH. This alters the balance of bacteria.
  - These acids have health promoting properties.
  - It can produce lactic acid and reduce inflammation.
  - The acid environment helps create the right microbes.

Source: Fiber Fueled, pg 124

Dr. Will Bulsiewicz – Fermented Foods

- Examples of Fermented Foods:
  - Fermented pickles
  - Kimchi
  - Miso (keep the water temperature warm, not hot)
  - Sauerkraut
  - Sourdough Bread
  - Tempeh
  - Yogurt
  - Note: Kombucha does not have a high level of probiotics.

Source: Fiber Fueled, pg 132

Dr. Will Bulsiewicz – FODMAPS

- FODMAPs are simple or short-chain carbs in plant foods. They are fermentable and poorly absorbed. There are five categories of FODMAPS.
  - Lactose
  - Fructose
  - Fructans
  - Galacto-oligosaccharides (GOS)
  - Polyols
- Note: This diet is not meant to be permanent, use it for 2 to 6 weeks avoiding the sugars that you are sensitive. They do have beneficial properties.
  - Source: Fiber Fueled, pgs. 112-115

Dr. Will Bulsiewicz – Items that are Not Good for the Gut

- Artificial sweeteners changes the gut microbiome. It can:
  - Promote inflammation
  - Insulin resistance
  - Injure the liver
- Food additives – There are over 10,000 food additives in our food supply
- Trehalose – Added to the food supply, promotes the growth of *Clostridioides difficile* infection and more people are coming down with this infection
- Unhealthy Fats:
  - Trans fats
  - Saturated fats

Dr. Will Bulsiewicz,MD – Probiotics Overview

- There are different types of probiotics. They include:
  - Prebiotics – Food for healthy gut microbes
  - Probiotics – Microbes with beneficial qualities
  - Postbiotics – Compounds produced by gut microbes

Source: Fiber Fueled, pg. 55

Dr. Will Bulsiewicz,MD - Prebiotics

- Prebiotics have a number of beneficial properties:
  - Address both constipation and diarrhea (improve)
  - Decrease colon pH, inhibiting the growth of pathogenic bacteria
  - Facilitates blood sugar control
  - Improve dysbiosis
  - Lower cholesterol
  - Promote growth of healthy gut microbes
  - Protects against colorectal cancer
  - Release of postbiotic SCFA

- Note: Start with a low dosage

Source: Fiber Fueled, pg. 140

Dr. Will Bulsiewicz, MD – Probiotics

- Probiotics are live microorganisms with a number of beneficial properties. They are:
  - Correct the leaky gut
  - Inhibit growth of pathogenic bacteria
  - May even improve mood
  - Optimize the immune system
  - Reduce inflammation
  - Re-establish intestinal motility (movement of the food through the intestines)
  - Restore gut barrier integrity
- Probiotics can help with digestive symptoms (especially ulcerative colotis (UC) and pouchitis, not Crohns)

Source: Fiber Fueled, pg. 144

Dr. Will Bulsiewicz, MD – Probiotics vs Fermented Foods

- Probiotics:
  - Highly concentrated version of bacterial strains
  - Limited number of bacterial strains
  - Need to continue taking the probiotic supplement
  - They last only for a short period of time

- Fermented Foods:
  - Are a living food
  - Have a wider variety of microorganisms, but at lower levels
  - Have a wider range of benefits such as:
    - Bioactive peptides
    - Exopolysaccharides prebiotics
    - Healthy acids
    - Polyphenols
    - Vitamins
  - Need to eat these foods on a regular basis

Source: Fiber Fueled, pg 142

Dr. Will Bulsiewicz, MD - Protein

We have two types of protein: plant and animal protein.

Plant protein can:

Increase growth of anti-inflammatory species of Bifidobacterium and Lactobacillus, and suppress destructive ones like Bacteroides fragilis and Clostridium perfringens. It helps with leaky gut.

Animal protein can:

Increase growth of inflammatory microbes. This results in more toxins like amines, sulfides, and secondary bile salts as well as more intestinal impermeability also known as leaky gut.

Source: Fiber Fueled, pg. 44

Dr. Will Bulsiewicz, MD - Terms

- Antibiotics – While they can be life saving, they are harm the good bacteria in the gut. CIPRO, an antibiotic, can wipe out a third of your gut flora.
- Emulsifiers – Two types, carboxymethylcellulose and polysorbate 80, reduces microbial diversity, induce inflammation, and promote obesity and colitis in mice. (pg. 39)
- Fecal Transplant (used in ancient China) – Fecal matter sample is taken from a healthy individual and transferred to a sick individual, changing the microbiota in the sick person.
- Fiber – Fiber is part of the cellular plant structure and quite beneficial to our microbiota. Microbes helps us to digest fiber. Fiber increases specific bacteria. It helps to diversify the gut. It can:
  - Decrease weight and body mass
  - Lower blood sugar
  - Prevent diabetes
- Immune system – 70% of the immune system is in your gut.
- Microbiota – It also affects the endocrine system.

Note: Root of anxiety and depression can be a gastrointestinal issue.

Source: Fiber Fueled, pg 23

Dr. Will Bulsiewicz, MD – Terms continued

- Neurotransmitters produced in the gut (produces more than 30) neurotransmitters:
  - Serotonin (90%)
  - Dopamine (50%)
  - GABA
  - Norepinephrine Stool – 60% of the weight in your stool is bacteria
- Resistant Starch - Most of the carbohydrates in your diet are starches. Starches are long chains of glucose that are found in grains, potatoes and various foods. But not all of the starch you eat gets digested. Sometimes a small part of it passes through your digestive tract unchanged. In other words, it is resistant to digestion. This type of starch is called resistant starch, which functions kind of like soluble fiber. Many studies in humans show that resistant starch can have powerful health benefits.

Dr. Will Bulsiewicz, MD – Terms continued

- Short Chain Fatty Acids – there are three kinds and they work together
  - Acetate
  - Propionate
  - Butyrate
  - Short chain fatty acids (SCFAs) are the products of colonic bacterial degradation of unabsorbed starch and non-starch polysaccharide (fibre). They are important anions in the colonic lumen, affecting both colonocyte morphology and function.
- TMAO (Trimethylamine N-oxide) – This facilitates cardiovascular disease and a number of other health conditions. It comes from eating a high meat diet. (pg. 44)
- Weight – the composition of the microbiota affects your weight.

Dr. Will Bulsiewicz, MD – Diet Recommendations

- Eat a diversity of foods especially whole foods.
  - F: Fruit and Fermented
  - G: Greens and Grains
  - O: Omega-3 Super Seeds
  - A: Aromatics (onions and garlic)
  - L: Legumes
  - S: Sulforaphane (broccoli, sprouts, and other cruciferous vegetables)

- Note: If you are gluten sensitive, obviously, you avoid foods that causes problems. Dr. Bulsiewicz covers the benefits of these foods in more detail

Source: Fiber Fueled, pg 151

Appendix

- Bibliography
- Glossary
- Leaky Gut
- Testing
- Understanding Probiotics

Appendix: Bibliography

- Fiber Fueled by Will Bulsiewicz, MD. (2020) (Publisher: Avery)
- https://www.bmj.com/content/bmj/361/bmj.k2179.full.pdf
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- Glutenology: the masterclass for your gluten free journey by Dr. Peter Osborne (an online class with ten modules)
- Plant Paradox by Dr. Steven Gundry. (2017) (Publisher: Harper Wave)
- Restoring Intestinal Health by Dr. Christopher Vasey, ND (2019, 2021) (Publisher: Healing Arts Press)
- Powerpoint from Slideshare.net-Title: Bacteria and Our Health (18 slides), author not specified, date not specified

Note: Dr. Osborne and Dr. Bulsiewicz do presentations on YouTube Premium.

Appendix: Bibliography continued

- The Leaky Gut Diet and Treatment Plan, Including Top Gut Foods by Dr. Josh Axe, DC, DNM, CN, Source: https://draxe.com/health/leaky-gut-diet-treatment/
- Slideshare powerpoints
    - Aeration and Agitation
    - Bacteria and Our Health
    - Prebiotics and Probiotics by Dr. Soumya, Junior Resident
    - Probiotics, Dr. T.V. Rao, MD

Appendix: Glossary

- Fermentation - Fermentation is an anaerobic process in which energy can be released from glucose even if oxygen is not available. It supposed to increase healthy probiotics in the food found in sauerkraut, kimchi, fermented pickles, and etc.
- Fiber – Fiber in food sources are found to be beneficial to the microbiome. Two types of fiber, soluble and insoluble.
- Leaky Gut – It occurs where there are gaps/holes in the intestinal lining and matter escapes into the blood stream.
- Lectins – Substances in food that are found to cause gaps/holes in the intestinal lining.
- Prebiotics – Basically food for the gut bacteria
- Probiotics-Various strains that are beneficial to the gut flora
- Postbiotics-The benefits and outcomes of healthy gut bacteria

Appendix: Glossary continued

- SCFA – Short Chain Fatty Acids - Short-chain fatty acids are produced when dietary fiber is metabolized by “good” bacteria in the colon. Colorectal cancer is the third most common cause of cancer death in the world. By eating fiber and feeding the bacteria that create butyrate, one of the most beneficial short-chain fatty acids, we may lower our risk of this cancer.
- Short-chain fatty acids, like acetate and butyrate, may also suppress inflammation in the body. Butyrate is the primary fuel feeding the intestinal epithelium, the layer of cells that forms the lining of both the small and large intestines. Short-chain fatty acids inhibit the growth of bad bacteria, increase the absorption of minerals like calcium, and help control appetite by binding to and activating cell receptors that alter metabolism.
- Synbiotics – When prebiotics are combined with probiotics
- TMAO - Trimethylamine N-oxide (TMAO) is a small organic compound whose concentration in blood increases after ingesting dietary l-carnitine and phosphatidylcholine. Studies have shown that elevated serum levels of TMAO are linked to heart disease, type 2 diabetes, kidney disease, and even all-cause mortality.

Appendix: Leaky Gut

- Super foods to repair and heal the leaky gut:
  - Bone Broth
  - Raw Cultured Dairy
  - Fermented Foods
  - Coconut Products
  - Sprouted Seeds
  - Healthy Fats
  - Omega-3 Fats
  - Fruit

Source: Dr. Josh Axe, DC, DNM, CN, Title: The Leaky Gut Diet and Treatment Plan, Including Top Gut Foods

Note #1: If you are allergic to a specific food, by all means, do not eat it.

Appendix: Testing

- Genetic Testing for Gluten Sensitivity: Glutenfreesociety.org has a test for genetic testing to gluten sensitivity.
- Comprehensive Stool Analysis Testing: Doctors Lab has a test that can provide a lot of information on what is in your stool.
- Leaky Gut: Doctors Lab has a test that can measure leaky gut issues.

Appendix: Understanding Probiotics and Prebiotics

- Probiotics have names, strains, and number of CFU units. See the next slide.
- Research is underway on the benefits of probiotics. It is noted that babies that are breastfed have a better microbiota. It is on the breast fed vs formula fed babies slide. (Note: I understand that some babies need formula.)
- It appears that specific bacteria have specific benefits.
- What is important to realize is that you want the good bacteria to outweigh the bad bacteria. When the bad bacteria outweighs the good bacteria, then we are in trouble. See the slide following the one on babies. Another slide shows some of the health issues that exist due to an imbalanced microbiome.
- Prebiotics provides food to the probiotics.

PROBIOTICS ARE PART OF THE INTESTINAL TRACT

- Probiotics are bacteria that help maintain the natural balance of organisms (microflora) in the intestines camera. The normal human digestive tract contains about 400 types of probiotic bacteria that reduce the growth of harmful bacteria and promote a healthy digestive system. The largest group of probiotic bacteria in the intestine is lactic acid bacteria, of which Lactobacillus acidophilus, found in yogurt with live cultures, is the best known. Yeast is also a probiotic substance. Probiotics are also available as dietary supplements

PROBIOTICS

Dr.T.V.Rao MD

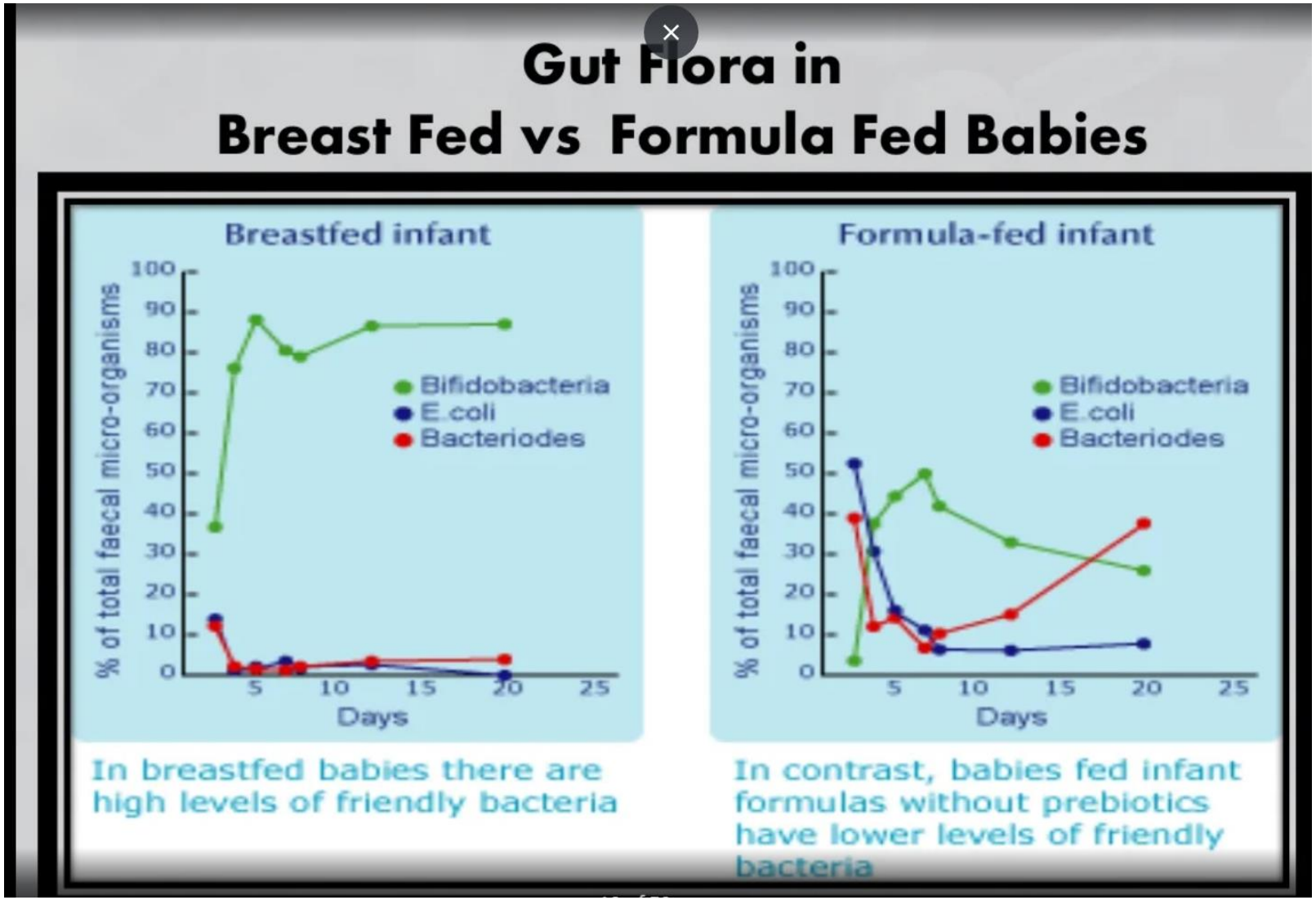
LIST OF PROBIOTIC CANDIDATE:-

Microorganisms	Genus	Species
Bacteria	*Lactobacillus*	*L.acidophilus, L.brevis, L.reuteri, L.casei, L.rhamnosum, L.bulgaricus, L.cellobiosus, L.delbrueckii, L. fermentum.*
	Bifidobacterium	*B.thermophilus, B.infantis, B .longum, B.bifidum, B.animalis.*
	Streptococcus	*S.lactis, S.thermophilus, S.cremonis, S.alivarius.*
	Bacillus	*B.Coagulans*
	Pediococcus	*P.acidilactici*
	Leuconostoc	*L.mesenteroides*
	Enterobacter	*E.faecium, E.faecalis.*
Fungi	*Aspergillus*	*A.niger, A.oryzae.*
Yeast	*Saccharomyces*	*S.boulardii, S.cerevisiae, S.carlsbergensis.*

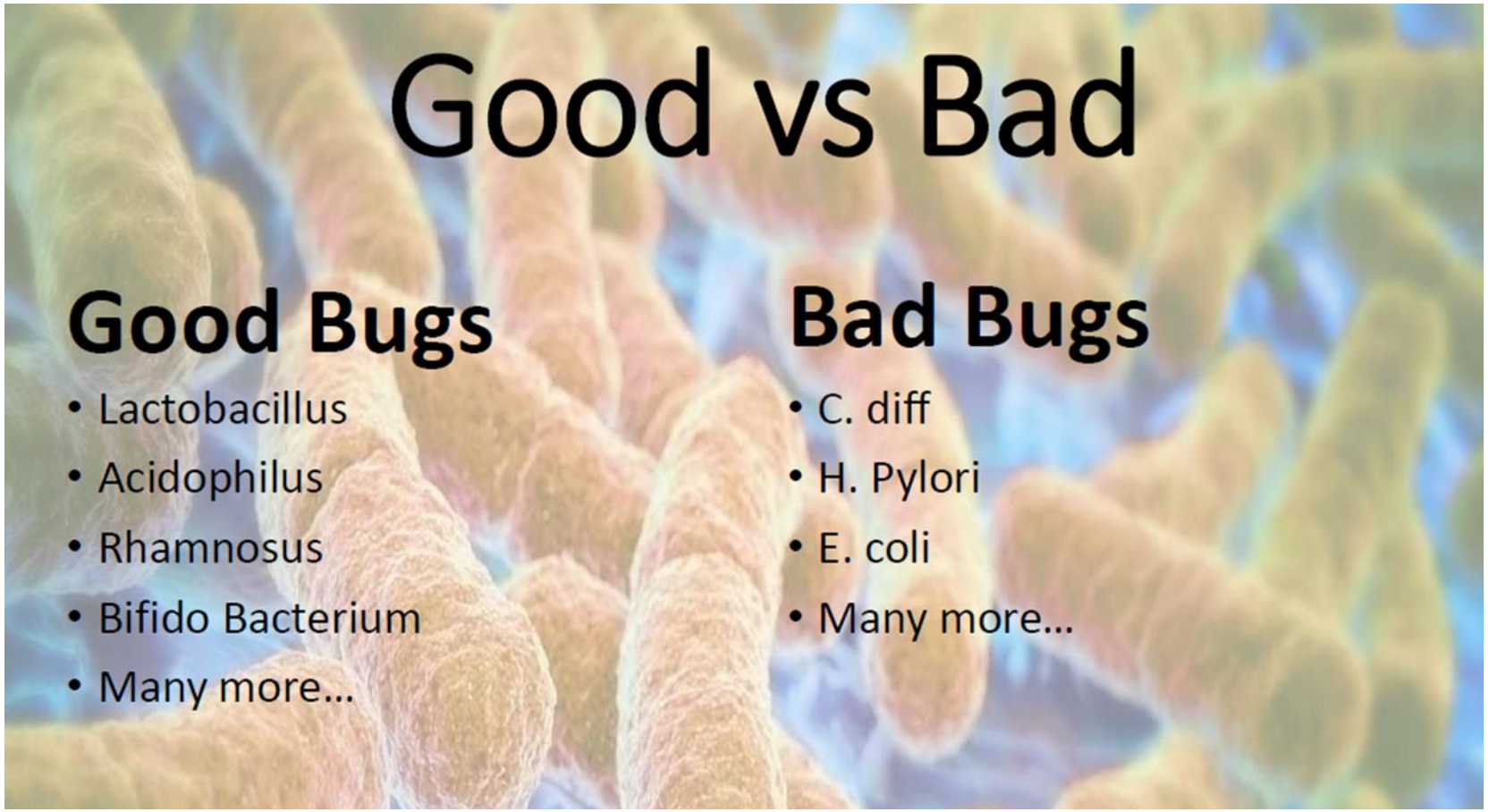
Source:
Slideshare
Aeration and
Agitation
Slide 8

This is an example of some of the information on our bacteria, type of bacteria, genus, and species.

There is research that specific probiotics have specific beneficial properties.



Slideshare:
Prebiotics and Probiotics
By Dr. Soumya, Junior Resident



Slideshare:
Prebiotics and Probiotics
By Dr. Soumya, Junior Resident

Health Problems Caused by Imbalanced Microbiome

Slideshare:
Bacteria and Our Health

- Autoimmune diseases (RA, Lupus, Psoriasis, MS, others)
- Cancer
- Diabetes
- Depression, mental health
- Weight/obesity
- Heart health
- Skin health
- Digestive disorders:
  - Crohn's
  - IBS
  - Ulcerative Colitis
  - Constipation/diarrhea
- Headaches/migraines

PREBIOTICS DIFFERS FROM PROBIOTICS

- A prebiotic is a nondigestible component which beneficially affects the host by selectively stimulating the growth and/or activity of one or a limited number of colonic bacteria, thereby improving the health of the host

  , ***prebiotics*** *are nutrients that the bacteria use as a fuel source; these include dietary fiber and carbohydrates*

PROBIOTICS

Dr.T.V.Rao MD

Food Sources that contain prebiotics:

Prebiotics- examples

- Garlic, Onions
- Chicory root
- Asparagus
- Wheat
- Rye , Barley
- breast milk
- tomatoes, berries
- bananas

Established prebiotics

Name	Obtained from/manufactured by
Inulin	Extraction from chicory root, ***Wheat, banana, onions, garlic, leek***
Fructo-oligosaccharides	Tranfructosylation from sucrose, or hydrolysis of chicory inulin
Galacto-oligosaccharides	Produced from lactose by b-galactosidase, milk
SOS (soy-oligosaccharides)	Extracted from soya bean whey
XOS (xylo-oligosaccharides)	Enzymic hydrolysis of xylan
IMO (isomalto oligosaccharides)	Transgalactosylation of maltose
Pyrodextrins	Pyrolysis of potato or maize starch

Breast Milk oligosaccharides→ **They represent the third largest component of Human Milk 20 - 23 gm/l in colostrum & 12- 14 gm/l in mature milk**

Slideshare:
Prebiotics and Probiotics
Dr. Soumya
Slide 29

Health Benefits Prebiotic

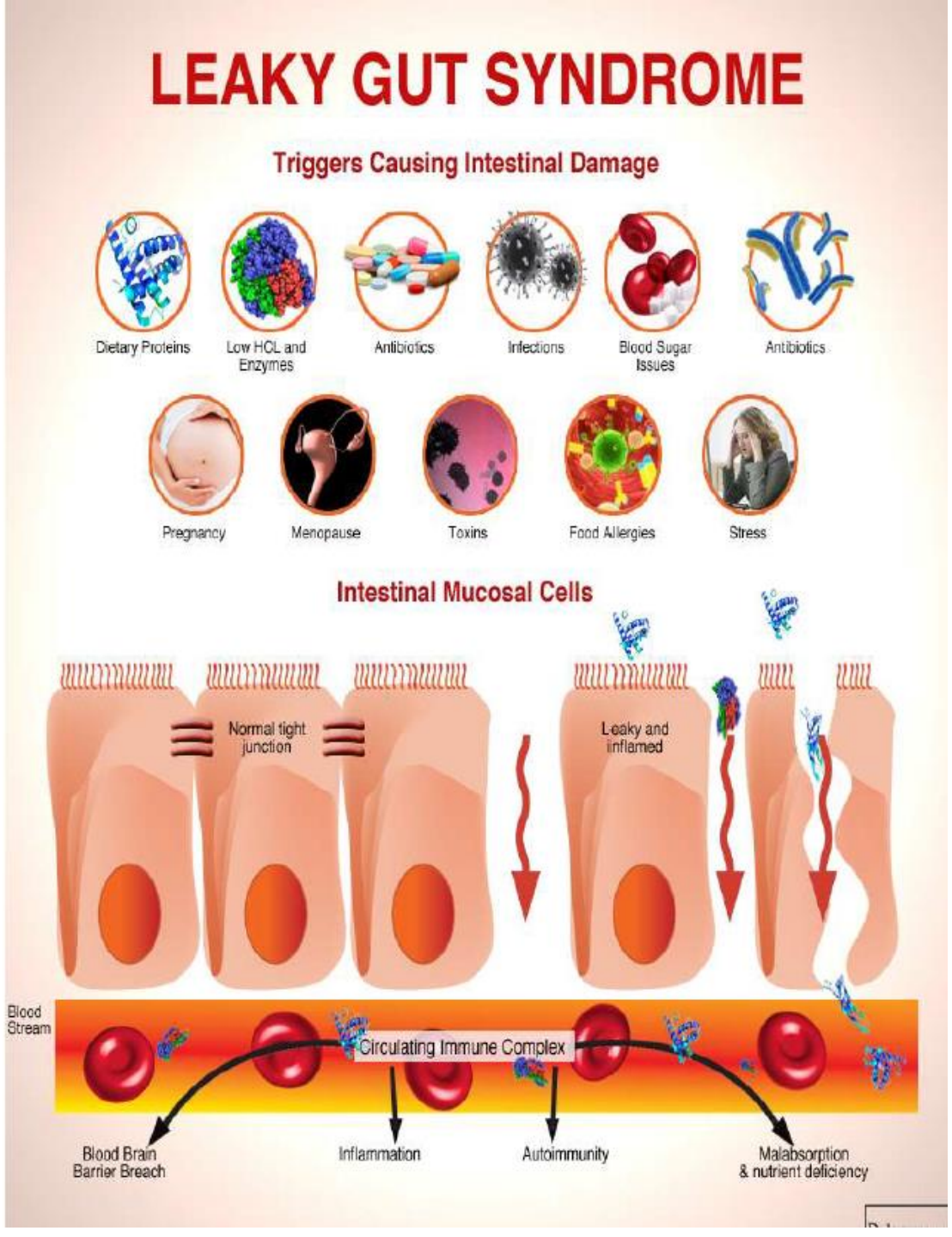
- **Immune System Strength:** Prebiotic fiber promotes the growth and colonization of beneficial bacteria in the gut. These bacteria aid the immune system in fighting illness-causing bacteria and viruses.
- **Normal Bowel Function:** Irritable bowel syndrome, which is characterized by bloating, gas, stomach pain, cramping, bouts of constipation and diarrhea, is caused by food being digested improperly. , prebiotic fiber causes foods to be digested normally, over a normal period of time, not too quickly or too slowly.
- **Cancer Prevention:**Bifidobacteria digests inulin in the gut flora and produces short chain fatty-acids: acetic acid, propionic acid, and butyric acid. Within the intestine, it is believed that these acids can help prevent certain forms of cancer.
- **Colon cancer**: The insoluble fiber from prebiotics, some experts believe, are actually doing a part in preventing colon cancer by sweeping up carcinogens and other dangerous toxins before they can be absorbed into the bloodstream where they can do damage.

Slideshare:
Aeration and agitation
Slide 47

Source:
Slideshare
Bacteria and Our Health

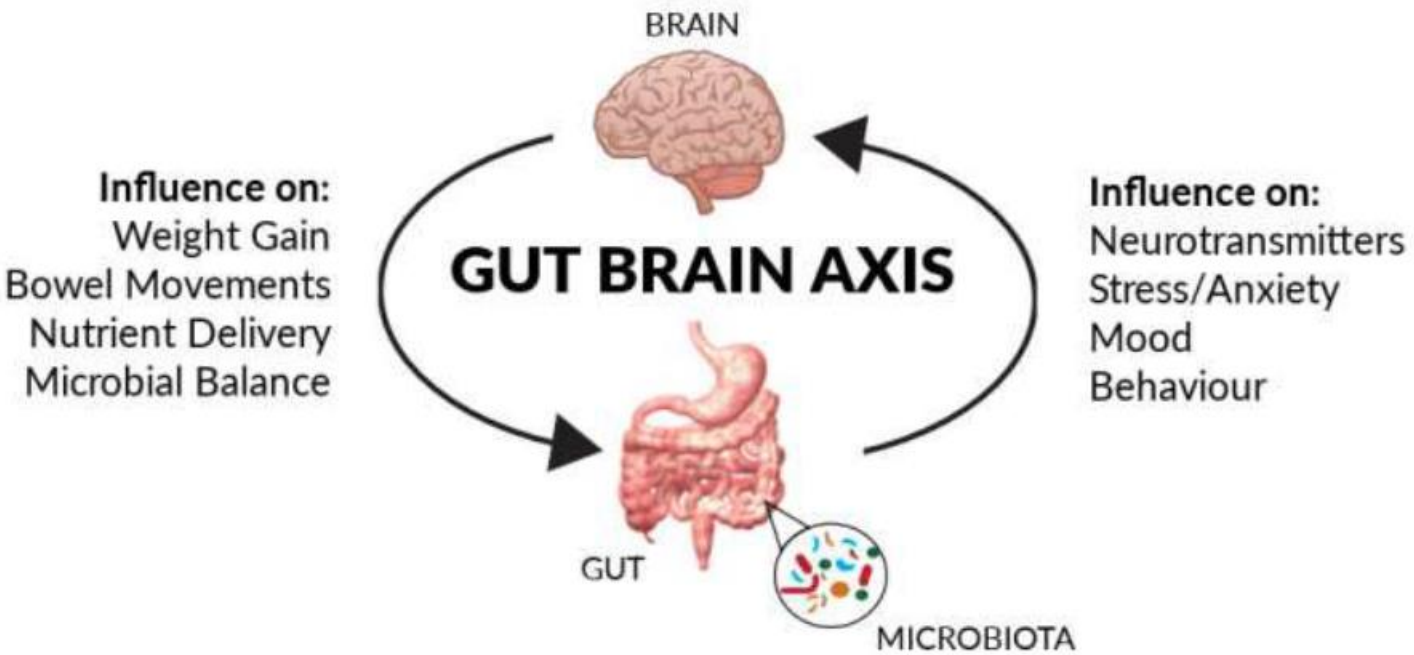
Reinoculate and Repair Gut Wall

- Probiotics
- Prebiotics
- Carnosine, Zinc
- DGL
- Glutamine
- Marshmallow
- Quercetin
- Butyrate



Source:
Slideshare
Bacteria and Our Gut

This shows the relationship between the gut and the brain.



Much of the microbiota (organisms in the mircobiome) reside in the intestines. Studies are showing the micro- biome communicates with the rest of the body and controls many functions. It has been dubbed “the second brain”.

PROBIOTIC RESEARCH

- **Allergies** - certain probiotics have an impact on the mucosal barrier function of the intestinal tract. This effects allergens entering the body and the activity of inflammation producing cells
- **Cholesterol** – regular consumption of certain probiotic dairy products may have an impact on cholesterol level and may affect the levels of "good" HDL in the blood
- **Colon Cancer** – Certain probiotics may help prevent colon cancer by preventing the breakdown of enzymes that contribute to the growth of cancer causing agents

PROBIOTICS

Dr.T.V.Rao MD

PROBIOTIC RESEARCH

Continued clinical research to study the benefits of probiotics in the areas of :

- **Obesity and Weight Management** (exopolysaccharide producing probiotic strains)
- **Prevention of osteoporosis** (improved bioavailability and absorption of nutrients)
- **Growth development in children** (improved bioavailability and absorption of nutrients)
- **Treating and preventing respiratory infections, specially in children** (boost immune system)

PROBIOTICS

Dr.T.V.Rao MD

Clinical application of probiotics and prebiotics

Holds Promise

- Allergic rhinitis
- Asthma
- Colic
- Colon cancer prevention
- Obesity
- Hypertension
- In elderly
- Cystic fibrosis
- Dyslipidemia/ Cardiovascular diseases
- Rheumatoid arthritis
- Traveller's diarrhea / bacterial enteritis
- Genitourinary tract infections

Dr Soumya
Junior Resident

Slide 31

Conclusion

- After listening/reading to this powerpoint, two questions need to be addressed whenever you enter a doctor's office, especially a gastrointestinal doctor
  - One, what is your diet like?
  - Two, what is your nutritional status like and your gut health like?
- Unfortunately, our current health care system generally doesn't address these issues. It is a health care system that is controlled by the health insurance industry and some medical professionals.
- A healthy and functioning gut helps the overall health and will go a long way towards prevent the onset of diseases affecting Americans in high numbers, especially colon cancer.
- Another suggestion is doing a detailed stool analysis test before doing a colonoscopy?