

Week 4



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2nd R - Replace

- Those things necessary for proper digestion and absorption
 - Stomach acid - HCL (Betaine HCL)
 - Digestive Enzymes

3rd R - Reinoculate

- Probiotics/prebiotics - healthy microbiome

But first - a little more lesson on the GI tract and function

Digestion

The digestive process seems simple on the surface.

- Eat - Digest - Eliminate
- In reality - digestion is a complex process that can be easily sidelined by a number of factors:
 - Not chewing your food enough
 - Lacking enzymes, stomach acid, or the right balance of microbes to properly digest your food and absorb its nutrients.

GI System Functions

- Break food into nutrients
 - Then absorbed to give us energy
- Serve as a barrier
 - Protects against foreign substances from getting into the body

Oral Cavity

- Digestion of carbohydrates starts in the mouth!
 - Amylase helps break this down
 - Saliva also has immune substances that can assist in fighting microorganisms
- So chewing is very important!
- Can make a big difference in digestion – especially of carbohydrates.
- SO CHEW WELL!!! Take your time. Enjoy your food. Make it mindful!!

Oral health

- Good oral hygiene
- Affects the bacteria in the gut
- Affects infections allowed into the body
- Affects overall health
- Consider a biological dentist
- Brush and take care of your teeth/tongue
- Support microbiome - no mouthwashes, or harsh chemicals

Esophagus and Stomach

- Esophagus – transports food to stomach
 - Very sensitive to acid
- Stomach:
 - Short-term storage of food
 - Mechanical breakdown of food
 - Chemical digestion of food via stomach acid and enzymes
 - Killing of microorganisms that we swallow
 - Absorption of some substances like alcohol
- From stomach, chyme, sludge-like substance of food mixed with stomach acid and enzymes

Stomach



Small Intestine

- 18 feet
- Performs the majority of the digestion and absorption of nutrients
- Duodenum – mixing function
 - Enzymes from pancreas and bile salts made by the liver and stored in the gallbladder with chyme
- Jejunum – most digestion and absorption occurs
- Ileum – longest.
- Why bacterial overgrowth here can be such an issue!

Small Intestine



Large Intestine

- Appendix, cecum, ascending, transverse, descending and sigmoid colon and rectum
- 4.5 feet
- Function
 - Accumulation of undigested food to form feces
 - The digestion of some food by bacteria
 - Reabsorption of water, salts, carbs, and vitamins

Large Intestine



Liver



Liver

- Main role in digestion is production of bile and metabolism of nutrients
- All nutrients absorbed by the gut pass through the liver and are processed there
- Bile is produced → SI--> bile salts break down fats into smaller particles that can be acted on by pancreatic enzymes

Gallbladder



Gallbladder

- Storage and concentration of bile produced by the liver (bile helps digest fat)
- Bile is released in response to hormonal signals from the duodenum, signaled by the presence of food

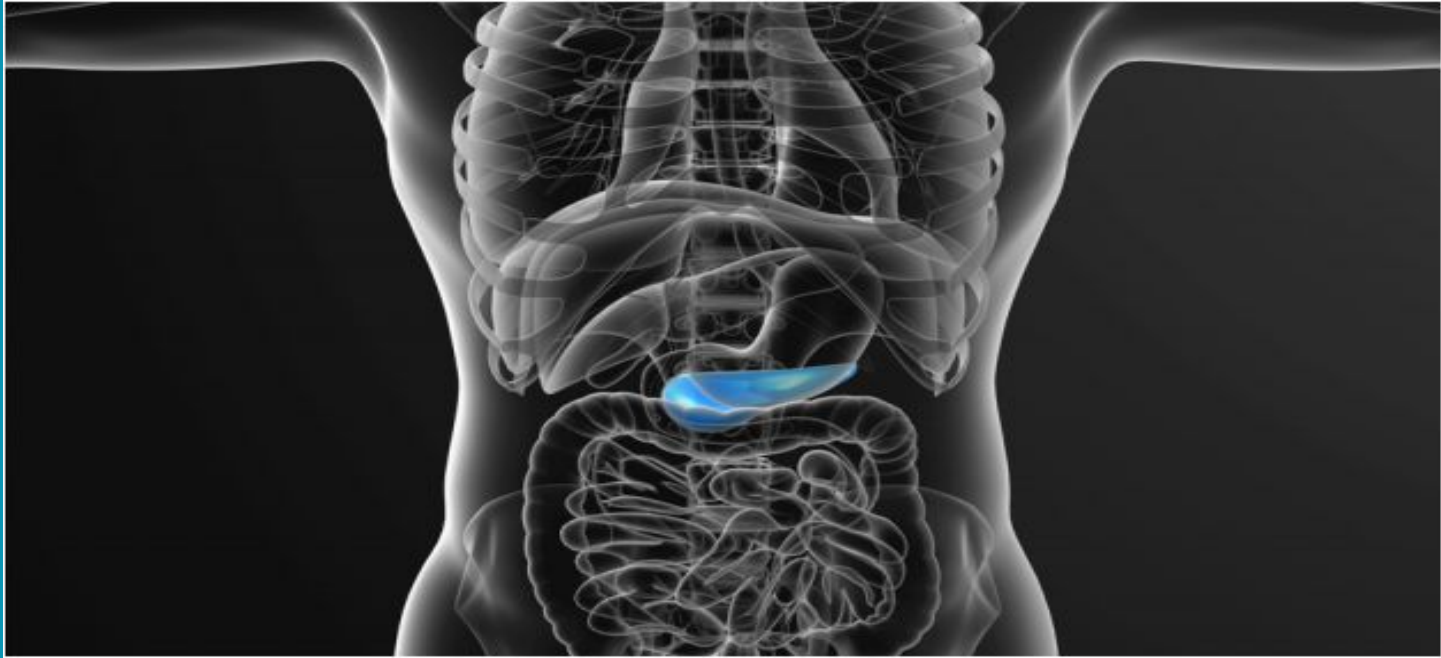
Bile insufficiency causes

- Impaired liver function
- Gallbladder problems
- Gluten
- Intestinal dysbiosis
- GI pathology

Bile insufficiency symptoms

- S/S: poor fat digestion (fish oil burps)
- Bitter metallic taste
- Itchy skin
- Clay-colored stool
- Stools that float
- Hx of gallstones
- Fecal elastase

Pancreas



Pancreas

- Produces enzymes to break down food
 - Carbohydrases – break down carbs
 - Lipases – break down fat
 - Nucleases – break down nucleic acids
 - Proteolytic enzymes – break down protein
- Secreted in the inactive form – activated in the duodenum

Pancreatic Enzymes and bile

- Break down proteins, fats, carbs
- So decreases will lead to malabsorption of proteins, fats, carbs into nutrients

Pancreatic Enzyme deficiency

- Low stomach acid
- Celiac disease
- Chronic pancreatitis
- Excess alcohol intake
- Autoimmune

Pancreatic enzyme deficiency symptoms

- Bloating
- Flatulence
- Diarrhea
- Abdominal pain after eating - RUQ
- Stools that are fatty, pale, bad smelling, and difficult to flush, float - steatorrhea
- Weight loss
- Vitamin and mineral deficiency

GERD and heartburn

- GERD= most common GI d/o
- Drugs for this – 2003 - \$13 million
- SE: Pain and discomfort
- SE: scarring, constriction, ulceration, and cancer of the esophagus
- Can relate and ? Cause irritable bowel
- IBS is second leading cause of missed work!
 - 1st common cold

What is GERD?

- Low stomach acid
- GERD goes up with age, and stomach acid goes down.
- Stomach acid measured in those with GERD – almost always low!
 - 90% of people had inadequate acid production
 - Treated with HCL – almost all cured

GERD

- Why do antacids help then?
- Any acid in the esophagus is going to cause pain!
- Does not mean there is too much acid....it means it got into the esophagus.
- Because the antacid helps the symptom.....does not mean it treated the cause.
- This is why people become “addicted” to these.

PPI's

- They do not treat the actual cause of GERD
- Make it worse – requiring lifelong use
- Often worse after they quit than when they started.
- Study – given PPIs
 - 10 fold increase in IgE allergies
 - Those with allergies – they got worse
 - No allergies when they started – developed some
- SE: Decreases absorption of iron and other minerals, increase bone loss, Mg, B12, dementia, kidney disease, CAD, bacterial overgrowth, infections,

So what causes GERD?

- Caused by a dysfunction of the muscular valve (sphincter) that separates the lower end of the esophagus and the stomach. (LES)
- This opens to swallow and belch. This should be the only time.
- If the LES is working – the amount of acid in the stomach does not matter!!
- If the LES is not working - even the smallest amount of acid will cause symptoms and damage

Stomach



The real question....

- What is causing the LES to malfunction??
- All science points to the LES as the cause.....not acid!!!!

Intrabdominal Pressure

- Low stomach acid -> bacterial overgrowth
 - Normally bacteria cannot grow in acid
 - pH<3 is normal. pH>5 allows growth
 - Prilosec reduces the secretion of HCL to near 0
- Low stomach acid -> maldigested carbs
 - HCL supports digestion and absorption of carbs by stimulating pancreatic enzymes into the small intestine.
 - If the pH is too high – the enzymes aren't secreted and carbs aren't broken down

Bacterial overgrowth + Maldigested carbs

- Equals gas and bloating!!!
- Microbes can metabolize protein and fat – but prefer carbs.
- The fermentation of carbs that haven't been digested properly produces gas!
- Gas causes increased intra-abdominal pressure.
- One study shows 30g carbs could produce 10 liters of gas.

GERD

- Causes: weight, overgrowth of bad bacteria in the stomach, inflammation, medications
- Take offending medications out
- Decrease alcohol
- Apple cider vinegar
- Essential oils: peppermint, Digize
- You can overcome and then start to eat foods you used to enjoy

GERD

- Address your diet - intolerances
- Balance gut flora
- Add acid
 - 3 tsp raw organic apple cider vinegar in 6-8 ounces water before every meal
- Ginger root tea
- Avoid tight fitting clothes
- Maintain a healthy weight
- Avoid triggers
- Coconut oil 1 tsp-3 tbsp daily (bacteria overgrowth)

GERD

- Avoid acid producing foods:
- Alcohol – carbonated beverages, caffeine
- Chocolate
- Citrus fruits/fruit juices
- High fat meals
- Onion/garlic
- Peppermint
- Tomatoes

GERD

- Eat small meals
- Low carbs (processed)
- Sleep:
 - Left decubitus position, elevate head of bed (not pillows)
 - NO meals within 3 hours bed
 - 7-8 hours for healing
- Exercise – moderate – not strenuous
- Restoration: Mindfulness, breathing, imagery, relaxation

GERD

- Foods – fermented, good quality vegetables
- Low acid: High quality sea salt (provides Cl)
 - Cabbage or sauerkraut before meals
- Betaine, astaxanthin (40mg)
- Baking soda – ½ - 1 tsp in 8 ounces water (prn)
- Aloe juice – ½ cup before meals
- Vit D
- Slippery elm
- Glutamine
- B vitamins
- DGL, Zinc, antioxidants

Low stomach acid

- Best research – long term PPI – can bring acid to 0
 1. Increased bacterial overgrowth of the SI
 2. Impaired nutrient absorption
 3. Decreased resistance to infection
 4. Increased risk of cancer and other diseases

Stomach Acid

- Stomach acid:
 - Chemical breakdown of food
 - Absorption of nutrients
 - Protection against pathogens
- If issues here – bile – pancreatic -> affect the GI tract all the way down
- We have to think about digestive issues!!

Low Acid - Hypochlorhydria

- PPIs or other acid suppressing drugs
- Chronic stress
- Bacterial overgrowth (cause and effect)
- Vegetarian diets (low protein = less acid)
- H. Pylori
- Genetic factors/IL1 – inflammation
- Food poisoning
- Food intolerances

What happens

- Low stomach acid ->
- Chyme will be too acidic ->
- Pancreas won't release enzymes ->
- Undigested food, esp. carbs ->
- SIBO.....GERD.....

Low acid – Pernicious anemia

- Autoimmune attack on the parietal cells of the stomach or intrinsic factor
- These produce acid

Test for acid

- There is a test – but not really available
- HCL challenge
- Increase the dose until you feel burning
- Back off to the dose before.
- Symptoms: protein malabsorption, fullness in the stomach, belching, signs of indigestion

Bottom Line - replace

- If you have s/s of the above - or vague GI symptoms - or no gallbladder
 - Consider enzyme replacement
 - Consider Betaine
- Enzyme supplement (often has betaine in it)
 - Take with meals
- Bitters (food or supplement)
 - Stimulates natural bile
- Acid/food with a meal to aid digestion

Gut Microbiome

- Over 100 trillion microorganisms from a thousand different species
- We have 10 times more microbes in our body than human cells
- Microbes have a hundred times more genes that we have in our genome
- Critical to health!!

Gut Microbiome

- Promote normal GI function
- Protect against infection
- Regulate metabolism
- Home to the majority of the immune cells
- Abnormalities linked to almost every chronic inflammatory disease

Gut Microbiome

- Starts in utero
- Mostly via birth “first inoculation”
- C-section very different than vaginal
 - Much higher risk of asthma, obesity, type 1 diabetes, and a number of other conditions
- Feeding type “second inoculation via colostrum”
- Mother’s diet while nursing
- Evidence what both mom and dad eat affect child’s microbiome

Gut Microbiome - Adults

- Diet (can change our microbiota within days)
 - Amount, type, and balance of proteins
 - Fats
 - Carbs and fiber
 - Fermentable carbs
- Medications
 - Antibiotics (“against life”)
 - NSAIDs
- Chronic stress
- Chronic infections
- Physical inactivity

Affects microbiome

- Increased use OTC products
 - Mouthwashes
 - Aspirin
 - Antacids
 - Painkillers
 - Laxatives
 - NSAIDs
- Increased use of antibacterial soaps as well as other cleansers
- Chlorinated drinking water

Microbiome

- Sterilized foods
 - Pasteurization
- Artificial food coloring
 - Antibacterial and antifungal properties

Microbiome

- Altered fats in food products
 - Fats are necessary cell walls
 - Fats are the barrier
 - Diet in artificial or poor-quality fats leads to permeable cell walls – leaky gut
- Anti-cholesterol drugs
 - Cholesterol is key to nerve insulation and cell walls
- Vaccinations ??
- Pesticides and herbicides
- Processed foods and carbs

Microbiome

- As a result, each successive generation in the developed world has been losing an increasing number of microbial species.
- This scenario may help explain why we are seeing dramatic increases in diseases that were once considered rare, and why diseases that historically were only present in older adults are now routinely showing up in childhood.

Partial list of **conditions associated with disrupted gut microbiome**

Acne	Diabetes
Antibiotic-associated diarrhea	Eczema
Asthma/allergies	Fibromyalgia
Autism spectrum disorders	Gastric ulcers
Autoimmune disease	Heart disease
Cancer	Inflammatory bowel disease
Dementia	Neurological disorders
Dental cavities	Parkinson's disease
Depression and anxiety	

Gut Microbiome

- 3 main functions
- Metabolic
- Structural
- Protective

Metabolic

- So diverse and important!
- Breaks down compounds that otherwise might cause cancer
- Synthesize vitamins like biotin, folate and vit K
- Convert non-digestible carbs to short-chain fatty acids like butyrate
- Provides energy
- Absorption minerals like Ca, Fe, and Mg
- How we process and store the food we eat

Structural

- Gut microbes break down carbohydrates and other compounds.
- Helps cells in the gut lining – protecting or causing cancer
- Makes chemicals that keep the gut intact – or others that create gaps – “leaky gut”

Protective

- Barrier designed to let certain things like nutrients in and keep other things out like pathogens/toxins
- Surface of the gut – 100 times larger than skin surface
- One layer thick separates external and internal
- 70-80% immune in the gut
 - (sterile guts—infection!)

Gut Barrier

- Gatekeeper!
- Permeable to the right substances
- Leaky gut....
 - Permeability to the wrong substances
 - The wrong times
- Autoimmune response

How do we fix the ratio

- Cut out most processed foods
- Avoid antibiotics/OTC meds unless necessary
- Use natural soaps
- Drink filtered water
- Reseed body with good bacteria from time to time with probiotics or fermented foods if tolerated
 - Kefir, lassir, fermented vegetables

Probiotics and Prebiotics

- Probiotics:
- Buttermilk
- Aged Cheeses, cottage
- Fermented meats and vegetables
- Kefirs
- Kimchi
- Kombucha
- Miso
- Natto
- Pickled vegetables
- Sauerkraut
- Sour cream
- Yogurt (plain from organic milk)

- Prebiotics:
- Asparagus
- Banana
- Dandelion greens
- Eggplant
- Endive
- Garlic
- Honey
- Jicama
- Kefir
- Leeks
- Legumes
- Onions
- Peas
- Yogurt

Probiotics

- The best way to support digestive health is first to add more probiotic foods such as yogurt, sauerkraut, and kefir to your daily diet. But if you can't eat those foods every day—or don't care for their taste—then your best option is to take a probiotic supplement.

Length of Treatment

- This depends on other factors in your life.
- How critical is your intestinal permeability
- How well are you managing stress or a healthy diet in your life
- Do you have any other gut concerns such as Candida overgrowth?
- However, as a general rule, probiotics are taken long-term for at least one month, if not two years before seeing improvement.

Amount of Probiotic

- A good amount is between 15-50 billion
 - Start at the lower end
 - Once they are in your gut, they will regenerate themselves with a healthy diet.
- More does not necessarily mean better.
- We don't want to overload our body with either probiotics or enzymes.
- Consider taking a multivitamin or amino acid supplement to make up for poor absorption - liquid may be better (or food source)
- A good probiotic and enzyme will help increase absorption overtime, but trying to rush the process will only cause more distress than relief.

Probiotics

- **If I have leaky gut and I take probiotics can it possibly cause acne or burping?**
 - Acne or burping may be a side effect of bacteria or other harmful pathogens escaping the body.
 - These symptoms should clear up after a couple of weeks. If burping continues, try taking the probiotic with a meal.
- **Should I take probiotics alone or I need a probiotic enzyme?**
 - Enzymes play an important role to increase nutrient absorption and break down food.
 - They work together with probiotics to prevent inflammation and support digestion.

Skin reactions

- **If I take probiotics for my leaky gut can it cause eczema?**
- If you have a yeast infection, probiotics help kill off the overgrowth.
- When yeast dies, it releases toxins in what's called a 'die-off' effect.
 - This can irritate the body. Yeast and other pathogens may try to escape the body, which turns into inflammatory, eczema-like reactions.
 - If these reactions are strong, consider taking a supplement to support detoxification.
- Another reason for skin irritations could be an allergen in your probiotic.
- Some ingredients, either in strains or the capsule, may be derived from dairy, wheat, or corn, which are common allergens.
- Even synthetic ingredients in small amounts may irritate the gut or cause allergic responses.

Probiotics

- **Can Probiotics Make Leaky Gut Worse?**

- With the exception of SIBO, some people may experience more bloating, cramping, or diarrhea when first taking probiotics.
- With smaller strains and billions, the body may be readjusting itself.
- The bacteria is moving into the gut, and this requires a lot of home repair and construction.
- Things may feel rough at first, however within two weeks, the symptoms should clear up and you will feel better than ever.

What if they aren't working?

- Look at the other aspects of your life that may be preventing you from healing.
 - Stress
 - NSAIDs (aspirin, Advil, etc)
 - Antibiotics
 - Poor diet
 - Inflammation
 - Candida overgrowth or parasites
- While beneficial bacteria are critical, they are not a cure in and of themselves.
- Even if you are taking the correct steps, the healing process can sometimes take up to two years.

What if they aren't working?

- The strains may be too small
- The label may be misleading (sometimes companies say there is a certain billion, however that amount is on the date of manufacturing, which means that by the time it gets to your home, many of the bacteria have died and will be ineffective)
- The blend may not work together synergistically, and so the strains fight and kill each other off.

4 criteria for probiotics

- The specific probiotic strains included
- The product's packaging and delivery system
- Product expiration dates
- Money-back guarantee

Probiotics

- It's not the total number of bacteria in a product that is most important; **it's the *number of different strains of bacteria it includes.***
- Different strains of probiotic bacteria have slightly different functions and are concentrated in various places along the digestive tract.
- Probiotic supplements that contain multiple strains tend to be more effective overall than products containing an extremely high concentration of just one or two strains.

Probiotic Strains

- The best probiotic supplements will include at least these three most important strains:
- ***L. acidophilus***—This is the most important strain of the *Lactobacillus* species and, it readily colonizes on the walls of the small intestine. It supports nutrient absorption and helps with the digestion of dairy foods.
- ***B. longum***—Like *L. acidophilus*, *B. Longum* is one of the most common bacteria found in the digestive tracts of adults, and it helps maintain the integrity of the gut wall. It is particularly active as a scavenger of toxins. People low in longum are more susceptible to allergies and diarrhea. It oversees the production of biotin, a b vitamin with the ability to stop *Candida* from transforming into more complex forms that are harder to eradicate from the body.
- ***B. bifidum***—This strain, found in both the small and large intestine, is critical for the healthy digestion of dairy products. This is especially important as you grow older and your natural ability to digest dairy declines. *B. bifidum* also is important for its ability to break down complex carbohydrates, fat, and protein into small components that the body can use more efficiently. Also good for vagina. B-vitamin production. Discourages histamine production

Probiotic strains

- Secondarily:
- ***L. rhamnosus***—Known as the premier "travel probiotic," this strain can help prevent occasional traveler's diarrhea.
- ***L. fermentum***—This *Lactobacillus* strain helps neutralize some of the byproducts of digestion and promote a healthy level of gut bacteria.
- **Lactobacillus casei:** reduces intestinal permeability, and supports acidophilus to flourish in the gut.
- **Lactobacillus rhamnosus:** survives acidic environments, including in the intestines, this strain supports healthy immune function by stimulating the production of antibodies and assisting white blood cells to more efficiently fight against invasive bacteria.

Delivery system

- Understanding the different ways that manufacturers package and deliver probiotic supplements is perhaps the most important factor in choosing one, and that's because it won't matter which product you select if its delivery system doesn't work.
- The form in which the product is created and how that form enables the bacteria both to remain alive and healthy while on store shelves, and to reach the areas in your gut where they'll be most effective.
- **A probiotic supplement full of dead bacteria—or bacteria that die in a sea of stomach acid—is a waste of money.**

Delivery systems

- The best probiotic supplements will use delivery systems that ensure a significantly high percentage of bacteria will reach your intestines alive.
- Look for details on the product's packaging .
 - A company that is willing to explain how their product works most likely has a product that will work.
- Also look closely at how the product is packaged.
 - Because probiotic bacteria are living organisms, their health can be affected by their environment.
 - So buying probiotics from Amazon with non-temperature controlled warehouses - not good idea
- New delivery systems have mostly done away with needing refrigeration, **but you still need to protect the bacteria from too much exposure to light, heat, and moisture.**
- Look for packaging that ensures these elements will have minimal impact. Thick, opaque bottles with desiccant pouches are most preferred, but there are some new styles of blister packs that also work well.

Expiration Date

- A stated expiration date on a probiotic supplement is the manufacturer's promise that the bacteria in the product will remain active and potent—at the levels specified on the label—until that date.
- Usually the expiration date is based on formulation and stability testing data, which means a company is paying attention to those matters.
- The best probiotic supplements will display clearly labeled expiration dates. **If you don't see an expiration date on a product label, it should raise questions.**

Other

- Money-Back Guarantee
- Finally, always insist on this for any supplement you take, including your probiotic. Companies that truly believe in their products will stand by them.
- Consider studies based on your current concerns



1
THE RIGHT
BACTERIA STRAINS

2
SMART
PACKAGING



3
VISIBLE
EXPIRATION DATES

4
MONEY-BACK
GUARANTEE



Specific Brands

- Douglas Labs – Multi-Probiotic Female
 - 30 billion
 - NutraFlora – SCFA
 - B. Lactis, L. acidophilus, L. bulgaricus, L. casei, L. plantarum, L. rhamnosus, Strep thermophilus
- Metagenics Ultraflora IB
 - 60 billion
 - L. acidophilus, B. lactis
- Probiotic Synergy
 - 5 billion
 - 8 strains
- Spore probiotics - 1-5 spores
 - Megaspore biotic

Yogurt

- Yogurt has been used for centuries to cure bowel troubles and diarrhea.
- In addition, regular yogurt (not the low-fat kind) contains the hormone-like substance called prostaglandin E2, which can prevent ulcers.
- "Active cultures."
- *L.acidophilus* bacteria cultures. They will have the greatest benefits. Most yogurts are now made using *L.bulgricus* or *S thermophilus*.
- Avoid yogurts containing sugar.
- Add your own fruit.
 - Bananas give yogurt a sweet taste and counteract the sourness.
 - For a more consistent sweetness, try blending the banana into the yogurt in the blender.
- You can also make your own
 - Less sugar, less processed, many kinds of milks

Cottage Cheese, Whey, Kefir

- The traditional fermented food cottage cheese is an excellent source of protein, calcium, and to a lesser degree, beneficial bacteria.
- Whey is the liquid remaining after the curds and cream have been removed from clabbered milk.
- You can use it in soups, add it to steamed vegetables, or mix it into fruit juice or blender drinks for extra zip.
- Kefir is an excellent milk-based beverage that you can make by adding kefir grains to milk.

Prebiotic

- For something to be considered a prebiotic, it has to meet three criteria. It must:
- Not be broken down by stomach acid or enzymes in the body and absorbed into the body;
- Be able to be fermented by the microflora in the gut; and
- Be a food source **only** for the beneficial members of the gut microbial community and not those that are pathogenic.

Prebiotics

- For the most part, prebiotics are soluble fiber and non-digestible sugars... non-digestible by humans - our gut bacteria can digest them.
- As you recall, there are two types of fiber—insoluble and soluble. Soluble fiber dissolves in water and insoluble fiber does not.

Insoluble Fiber

- Neither humans nor microorganisms can digest insoluble fiber.
- It's mainly found in whole grains and vegetables.
- It acts like a broom that scrubs the digestive tract, creating a laxative effect.
- It's actually an irritant that causes contractions and triggers the release of natural lubricants to move food and waste material through the digestive tract.

Soluble Fibers

- Soluble fiber mixes with water and becomes gel-like.
- It slows down digestion, which gives a feeling of fullness and helps reduce rapid rises in blood sugar and the resulting insulin release.
- This water-soluble fiber (a form of carbohydrate) moves through the digestive tract until it reaches the good bacteria in the colon.
- The bacteria ferment and feed on the fiber.
- During the fermentation process, soluble fiber is converted to short-chain fatty acids like butyric acid.
- Butyric acid stimulates more good bacterial growth.
- It also improves mineral and fat absorption, and prevents inflammation and cancer formation.
- Its anti-inflammatory action can be extremely helpful in calming conditions like ulcerative colitis and inflammatory bowel disease.

Butyric acid

- BodyBio is an enterically coated tablet of butyric acid can be very effective.
- kombucha tea also contains relatively high levels of butyric acid.
- Ghee also contains butyric acid.
- However the supplemental use of butyric acid products are a temporary solution.
- **Once you get the proper balance of gut flora and supply it with soluble fiber, butyric acid production can be restored to the area naturally.**

Prebiotics

- The two most-widely accepted prebiotics are FOS (fructooligosaccharides, which includes inulin) and GOS (galactooligosaccharides).
- There are lots of other prebiotics, but there isn't as much research as there is with these.

Prebiotic

- **If your diet is right, I don't think taking a prebiotic supplement is necessary.**
- Some more advanced probiotic supplements include prebiotics to help keep the bacteria alive and extend the potency, which makes sense.

Prebiotic Foods (vs supplement)

- Eat a variety of produce and you can forgo the cost of a prebiotic supplement.
- This includes vegetables like asparagus, leeks, artichokes, garlic, carrots, peas, beans, onions, chicory, jicama, broccoli, tomatoes, cauliflower, spinach, kale, and chard.
- Cooking these vegetables doesn't negatively affect the prebiotic fiber content materially. So you can eat them raw or cooked.

Prebiotic Fruit

- Fresh or frozen bananas, cherries, apples, pears, oranges, strawberries, cranberries, kiwi, and berries are good sources.
- Nuts are also a prebiotic source.
- Pectin, gum arabic, and inulin are soluble fibers that are often added to yogurts, jams, jellies, milk-based desserts, nutrition bars, drinks, and other products to improve texture and thickness and enhance the satiating power.

Prebiotic shake

- A little banana (and/or flaxseed, chia seed, berries, etc.) in the shake doesn't just add flavor; it also furnishes prebiotics and helps provide satiety for hours.
- The lecithin granules in the shake aren't just there to improve and protect nerve function, preserve memory, improve cholesterol levels, clear arteries, and protect you from liver damage.
- Lecithin is a prebiotic.

Prebiotics

- Understand that **prebiotics will initially cause excess gas and intestinal problems when the pH of the bowel is abnormal.**
- Excess gas formation is one of the primary symptoms indicating the need to reestablish the growth of beneficial bacteria in the gut.
- Probiotics are obviously needed and in most cases will solve the problem. However, if the pH of the colon is abnormal, it can make the probiotics less effective and the gas and abdominal discomfort will continue.

SE's

- When someone starts taking a probiotic or a prebiotic supplement (or eats a prebiotic food), the beneficial microorganisms begin to increase in number.
- These good bacteria start to ferment more soluble fiber into beneficial products like butyric acid, acetic acid, lactic acid, and propionic acid.
- These acids provide energy, improve mineral, vitamin, and fat absorption, and help prevent inflammation and cancer. The extra acid also starts to lower the pH in the colon.

pH

- As the pH passes through the gas-producing range, some individuals start to experience the side effects **mentioned**.
- If the pH never drops low enough to get out of the gas-producing range, eating that particular food becomes an ongoing problem.
- Most of the time, continuing to take quality probiotics will eventually move the pH down to a point where these problems are overcome. In some individuals, however, it requires an additional step.

Prebiotic SE

- Lactic Acid Yeast by Standard Process Laboratories.
- **Lactic acid yeast is a modified form of brewer's yeast that works in your intestines to produce significant amounts of lactic acid.**
- The additional acid stops the growth of harmful bacteria while allowing beneficial bacteria to flourish. It works rather quickly, and when followed up with probiotics, the results can be amazing.

Lactic Acid

- Chew one lactic acid yeast wafer with each meal. In most cases, it will only be needed for five to seven days.
- During this time, continue taking a probiotic. It's one of the easiest and quickest ways to allow your body to adapt to any of the prebiotic foods listed.
- Lactic acid yeast wafers are also a godsend for stopping chronic diarrhea. By making the gut's environment hostile to pathogenic bacteria and helping to increase anti-inflammatory fatty acids like butyric acid, these wafers provide a one-two punch against diarrhea. (Half a ground-up wafer works wonders for kids with diarrhea, too.)

Lactic Acid Wafers

- Lactic acid yeast wafers work the same way lactic acid-fermented foods do, in that they help re-establish the bacterial flora of the lower bowel.
- If you begin to include traditional fermented foods in your diet, you probably won't need the wafers.
- During travel, especially internationally or to third-world countries, you tend to encounter a wide range of organisms your body may not be used to dealing with. If the bacteria in your lower bowel can't deal with the new organisms, your body proceeds to flush them out as a safety mechanism, bringing on diarrhea. For adults with diarrhea, two lactic acid yeast wafers with each meal will stop diarrhea, often within the same day.

Other Prebiotics

- Sauerkraut
- Pickled cucumbers
- Pickled garlic
- Pickled beets
- Pickled radish
- Pickled corn relish
- Korean kimchi
- Natto
- Miso
- Tempeh
- Soy sauce
- Fermented tofu
- Naturally fermented and unpasteurized beers

Summary

- Remove offending foods, yeast, bacteria
 - OAT testing, other testing if needed
- Replace
 - Pancreatic enzymes
 - Bile acid - bile salts or stimulating bile
 - Stomach acid
 - Microbiome - prebiotics and probiotics
- More with food the better!
- Use as needed - for harder to digest meals, etc..