Module 2:

Gut Health 101

Rebel health

Build Your Resilient Gut

MICROBIOME & BEYOND

with
Kiran Krishnan

Current Situation:
A Gut Health Disaster!

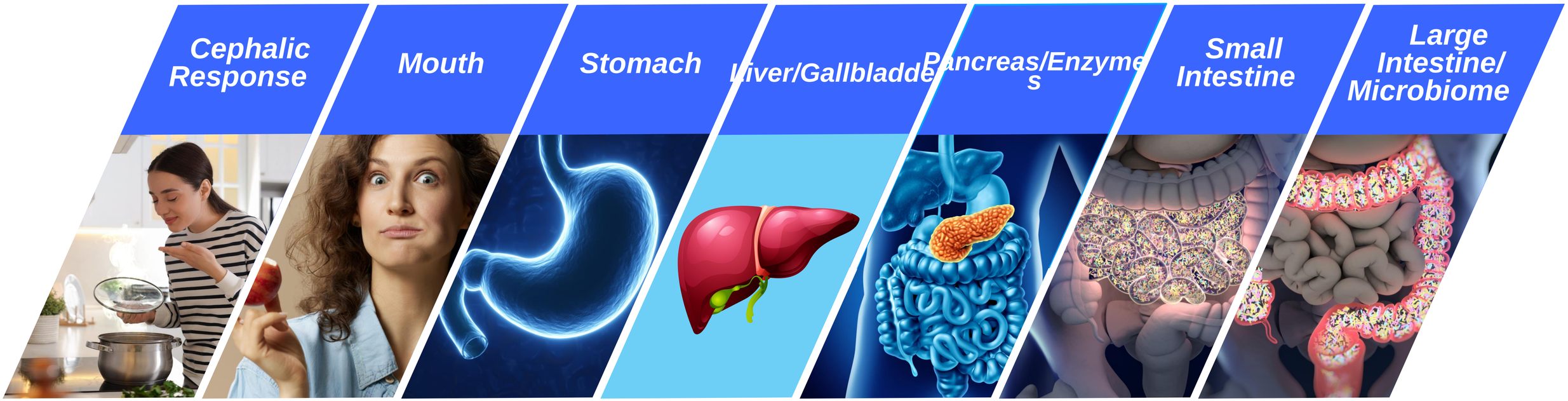
- Between 10-15% of the US population suffers from some form of IBS
- Approximately 20% of the US population experiences some level of GERD/reflux annually
- Gastritis and pep\otic ulcers impact *millions* of Americans every year
- Around 20 *million* Americans have some level of gallbladder disease - over 600,000 removals every year!
- Inflammatory Bowel Disease (like Crohn's, ulcerative colitis, etc…) affects approximately 1.6 *Million* Americans
- Estimated annual spending in the US for GI issues is $136 *Billion* - including OTC medications

Reminder: Almost *ALL* Chronic Disease Starts in the Gut!

Build Your Resilient Gut
MICROBIOME & BEYOND

- Almost all neurological conditions/symptoms (anxiety, depression, ASD, Alzheimer's, Parkinson's, etc…) have gut/microbiome connection
- Immune dysregulation/inflammation in the gut contributes to the development of autoimmunity (rheumatoid arthritis, Hashimoto's, Lupus, and *dozens* more…)
- Endotoxemia (discussed in detail in Module 3) contributes to cancer, insomnia, acne, and virtually *every* form of chronic disease
- The health of the gut and microbiome play a significant role in metabolism, weight loss/gain, blood sugar regulation, and all aspects of metabolism
- Vitamin and mineral deficiencies, anemia, and other forms of malnutrition are often linked to digestion & absorption problems in the gut (it's not what you eat, it's what you break down and absorb!)
- Dysbiosis and GI inflammation can contribute to many symptoms and conditions related to hormone imbalance

The Digestive System in Harmony



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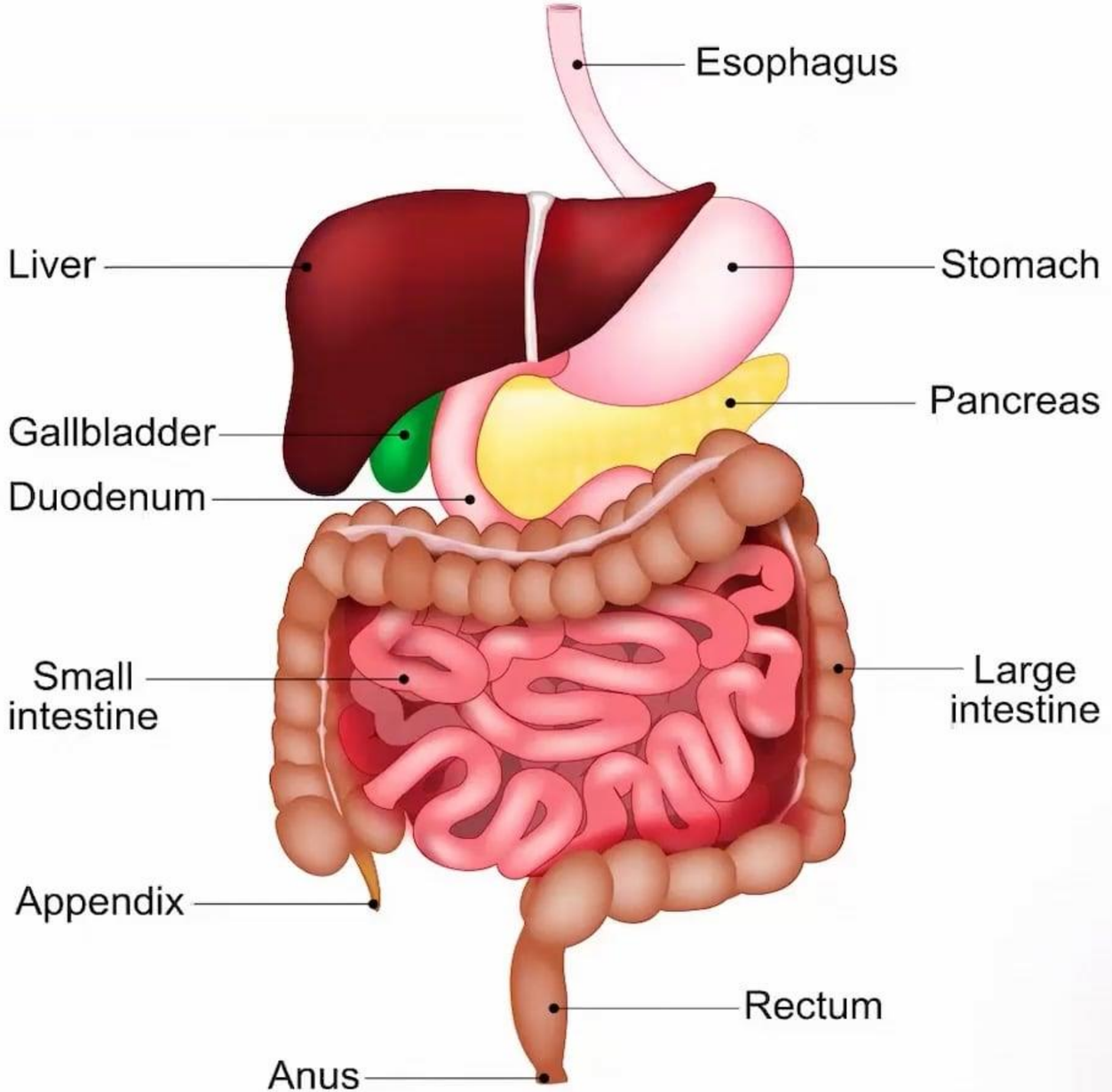
GI Transit Time

It's important to understand how long it takes food to move through the digestive tract, to help you better understand what might be taking place when you experience symptoms.

- **Stomach** - 1 to 4 hours
- **Small Intestine** - 3 to 6 hours
- **Large Intestine** - 10 to 60 hours
- **Total Transit Time** - 14 to 48 hours from mouth to toilet in a healthy person - up to 72 in some



Factors that Determine GI Transit Time

May Speed Up Transit Time

- High fiber intake (especially insoluble fiber)
- Adequate hydration
- Regular physical activity
- Healthy gut motility (peristalsis & MMC)
- Healthy microbiome producing SCFAs
- Low to moderate fat in meals
- Supporting healthy/adequate stomach acid, bile, and digestive enzymes

May Slow Down Transit Time

- Low fiber intake (processed foods, refined carbs)
- Dehydration
- High fat meals (delays stomach emptying)
- Sedentary lifestyle
- Stress & anxiety (inhibits motility)
- Medications (opioids, antidepressants, antacids, etc…)
- Gut dysbiosis
- Hypothyroidism
- Overeating

Digestion Starts Before You Eat

Smelling, seeing, handling, cooking, or even *thinking* about food triggers…

- The activation of salivary glands - increasing saliva production
- The vagus nerve to stimulate the stomach to produce hydrochloric acid (HCl)
- The pancreas to begin to release digestive enzymes and **insulin**
- The gallbladder to prepare for the release of bile
- The release of hormones such as gastrin - which increases HCl production & motility
- This also triggers a dopamine response, which is a very important aspect of our relationship with food!

This is *very* important, because…

- It prepares the body for efficient digestion - reducing the chance of symptoms such as bloating or indigestion
- It sets up optimal nutrient absorption further down the GI tract
- It may play a role in preventing overeating by involving the brain in the anticipatory aspects of eating

Meal Hygiene Matters
Set Yourself Up for Success!

- Get into a parasympathetic state - Slow down, breathe, meditate, etc…
  - See Michael’s Bonus Module!
- Don’t watch, read, or do stressful things while eating
  (News, Netflix, or arguments!)
- Avoid Eating “On the Go” - No car, desk, or multitasking!
- Appreciate your food and the experience of eating - Taste, texture, and smells!
- Avoid excessive liquid consumption during meals - hydrate 30 min before or after
- Maintain consistent meal timing - help your body predict digestion needs!
- Finish eating before you feel completely full (Try 80%)

Before We Go Further…

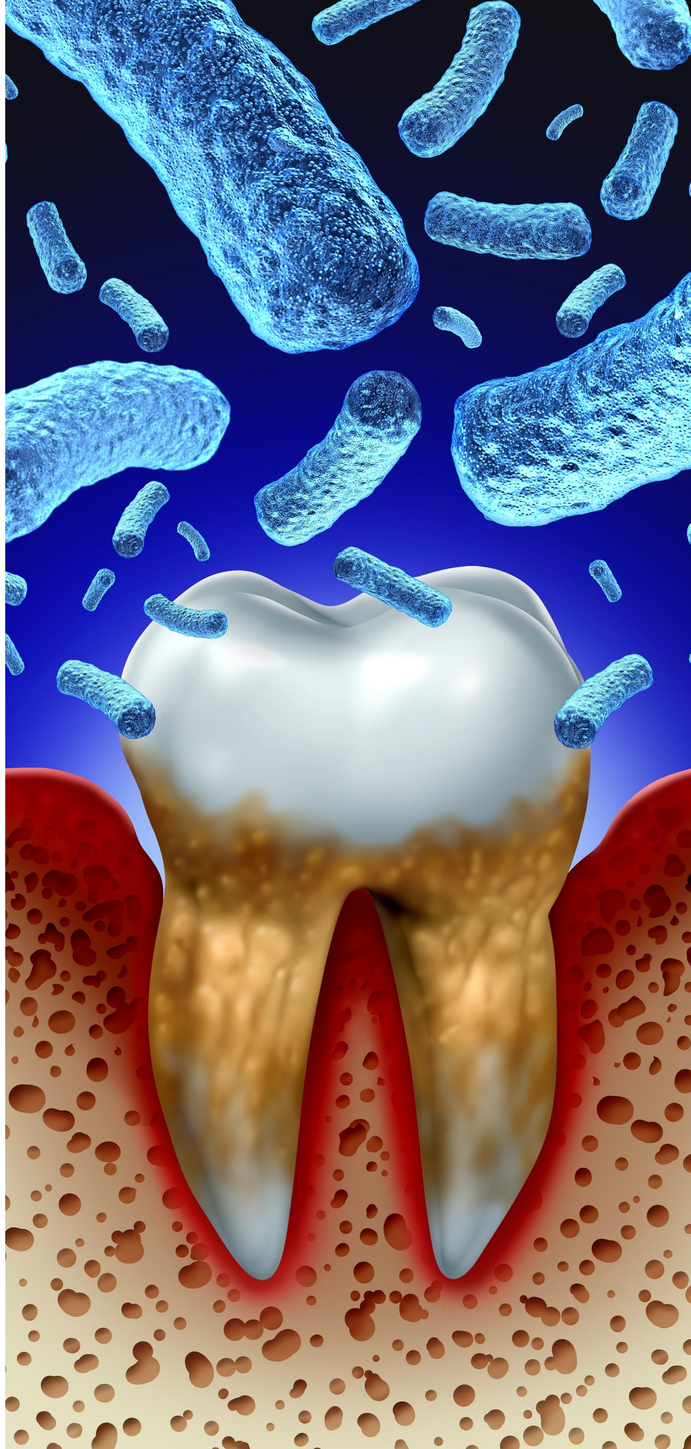
HAVE YOUR **DIGESTIVE SIGNS & SYMPTOMS SELF-ASSESSMENT** HANDY!

As we go through each step along the digestive pathway, mark any signs or symptoms that you personally experience. We'll come back to this in later modules when we cover specific problems-solutions and troubleshooting.

NOTE: There will be overlap between sections. It's all about identifying possibilities and patterns!

The Mouth & Oral Microbiome

- **Chewing (Mastication)**
  - Breaks down food (increasing its surface area) and signals the digestive system to prepare for further digestion
  - At least 20-30 chews per bite (more for fibrous foods) - slow down and *chew* your food!
- **Saliva**
  - Amylase and lingual lipase begin the breakdown of carbohydrates and fats in food - starch is broken down to maltose and dextrin
- **Oral Microbiome**
  - Dysbiosis in oral microbiome linked to the development of SIBO, IBS, and other GI conditions
  - Communicates with, contributes to, and produces metabolites that interact with the gut microbiome
  - Enhances carbohydrate digestion in the mouth
  - Plays a role in bioaccessibility and transformation of nutrients during digestion
  - Forms biofilms that help maintain the integrity of oral tissues and creates a balanced environment for enzymes in saliva to function optimally
  - Produce metabolites with beneficial roles, such as protecting teeth from acids during early stages of food breakdown



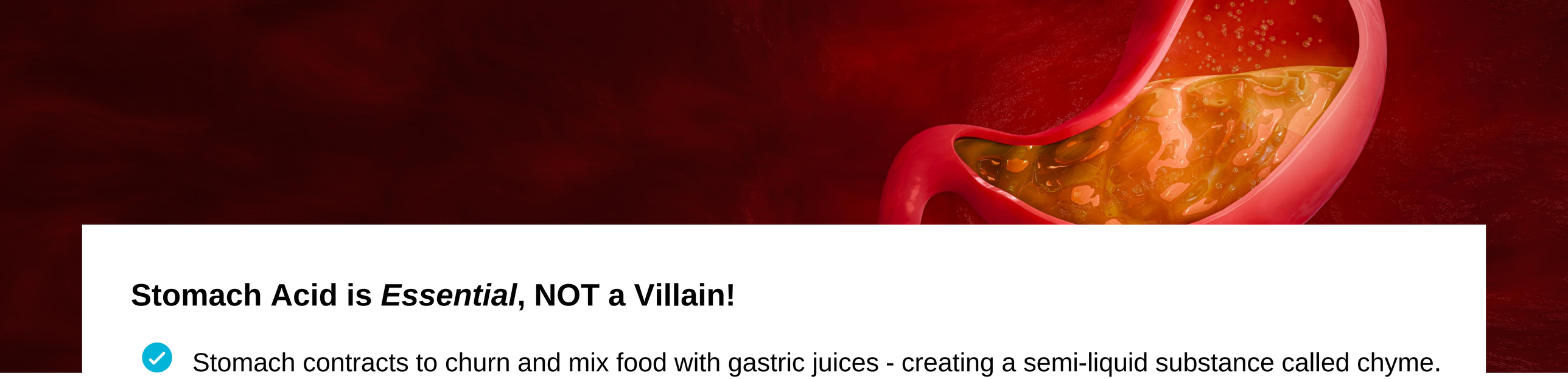
Signs & Symptoms:

CEPHALIC RESPONSE, MEAL HYGIENE, MOUTH & ORAL MICROBIOME

Before we move to the digestive process from stomach onwards, lets add a time for typical gi transit timing. How long does food take in the stomach, then to the small bowel, then to the large bowl and to be passed. We always have people confused about gastric timing. I think a picture of the digestive tract from stomach to anus and times labeled on it

HYPOCHLORHYDRIA (LOW STOMACH ACID)

- [ ] Bloating & Gas
- [ ] Heartburn/Acid Reflux
- [ ] Indigestion and/or Feeling Full Too Quickly
- [ ] Nutrient Deficiencies/Anemia
- [ ] Chronic Bad Breath
- [ ] Irregular Bowel Movements (Constipation or Diarrhea)
- [ ] Undigested Food in Stool
- [ ] Frequent Belching
- [ ] Food Sensitivities
- [ ] SIBO



Stomach Acid is *Essential*, NOT a Villain!

- Stomach contracts to churn and mix food with gastric juices - creating a semi-liquid substance called chyme.
- Adequate stomach acid (HCl) production activates pepsinogen into pepsin, an enzyme that is crucial for breaking down proteins into smaller peptides for easier absorption in the intestines
- HCl kills harmful pathogens and prevents bacterial overgrowth in the small intestine (SIBO)
- Adequate HCl production triggers the production/release of intrinsic factor, a glycoprotein essential for the absorption of vitamin B12 in the small intestine
- Adequate HCl is necessary for the absorption of minerals like iron, calcium, magnesium and zinc
- The acidity of chyme entering the small intestine triggers the release of bile and pancreatic enzymes for further digestion & nutrient absorption
- Low HCl can slow the process of food leaving the stomach (delayed gastric emptying) - causing bloating, gas, and reflux and can mimic symptoms associated with high stomach acid (which is rare)

It's a *huge* misconception that most stomach-related issues are due to the *over*production of stomach acid. The opposite is actually true!

Nothing Can Live in the Stomach, Right?

WRONG!

The stomach has a specialized but less diverse microbiome compared to other parts of the digestive system due to its highly acidic environment. Despite this, certain microorganisms can survive, including **H. pylori**, **Lactobacillus**, and species of **Streptococcus**.

These microbes play roles in digestion, immune modulation, and protection against harmful pathogens. Although the stomach microbiome is small, it influences both local and systemic health, and its balance is important for preventing conditions like **gastritis**, **ulcers**, and **dysbiosis**.

Signs & Symptoms:

STOMACH-RELATED DYSFUNCTIONS

NOTE:

Excess stomach acid production is actually quite rare, despite what conventional “wisdom” may say on the matter.

HYPOCHLORHYDRIA (LOW STOMACH ACID)

- [ ] Bloating & Gas
- [ ] Heartburn/Acid Reflux
- [ ] Indigestion and/or Feeling Full Too Quickly
- [ ] Nutrient Deficiencies/Anemia
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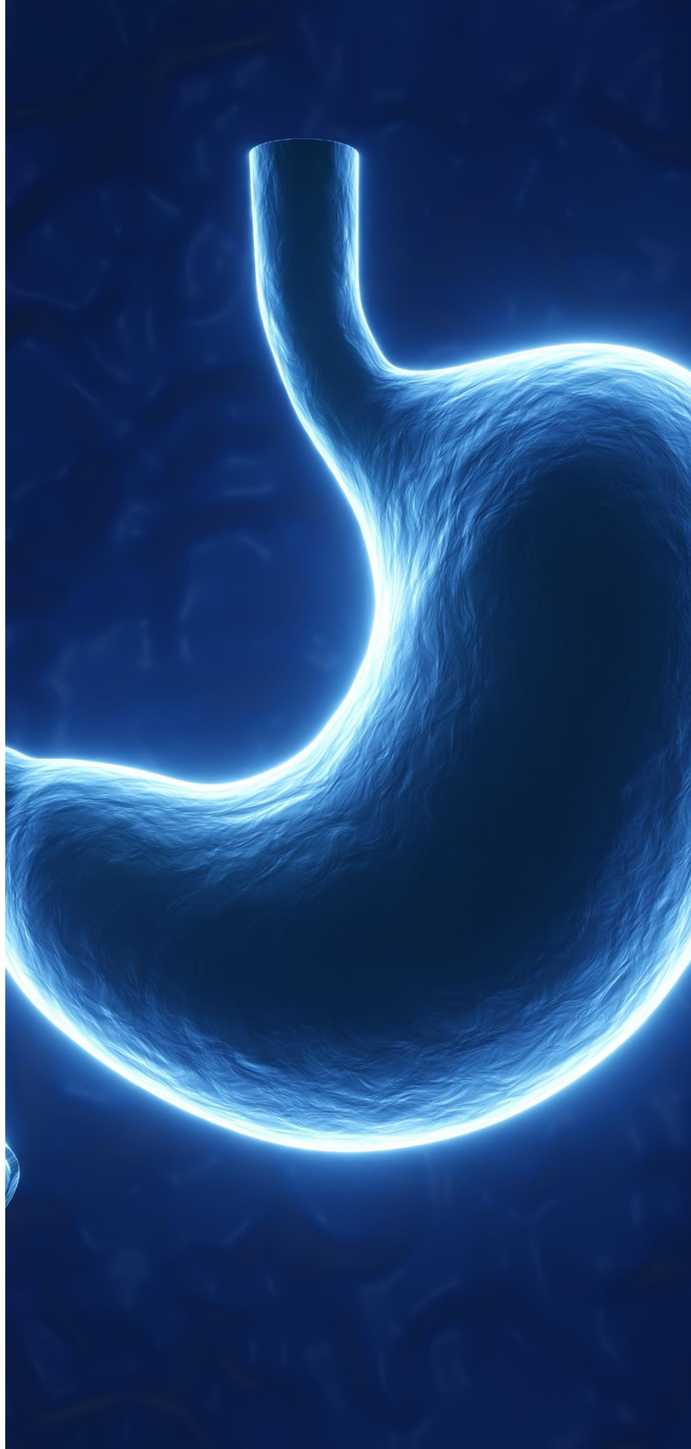
- [ ] Undigested Food in Stool
- [ ] Frequent Belching
- [ ] Food Sensitivities
- [ ] SIBO

HYPERCHLORHYDRIA (HIGH STOMACH ACID)

- [ ] Heartburn/Acid Reflux
- [ ] Nausea/Vomiting
- [ ] Peptic Ulcers (generally linked to h. Pylori overgrowth)
- [ ] Excessive Hunger or Empty Stomach Sensation



Signs & Symptoms:

STOMACH-RELATED DYSFUNCTIONS

NOTE:

H. Pylori is a commensal organism in the stomach. The goal is never to eradicate it completely. It becomes a problem when overgrown - More on this coming in MODULE 4.

DAMAGE TO STOMACH LINING (GASTRITIS OR ULCERS)

- [ ] Burning/Gnawing Pain in Upper Abdomen (Often worse after meals)
- [ ] Nausea/Vomiting (Esp. blood or coffee ground-like material)
- [ ] Black Stools
- [ ] Loss of Appetite
- [ ] Bloating/Feeling of Fullness (Premature)
- [ ] Weakness/Fatigue (Due to anemia, blood loss, etc...)
- [ ] Reactive/Sensitive to Supplements/Meds (Esp. iron, zinc, vit C, probiotics, enzymes, NSAIDS, mint, garlic, etc...)

GASTROPARESIS (DELAYED GASTRIC EMPTYING)

- [ ] Feeling Full After Small Meals
- [ ] Bloating w/ Nausea
- [ ] Vomiting Undigested Food Hours After Eating
- [ ] Blood Sugar Dysregulation

H. PYLORI OVERGROWTH

- [ ] Burning or Gnawing Abdominal Pain (Often worse on empty stomach)
- [ ] Chronic Burping/Bloating
- [ ] Nausea w/ Occasional Vomiting
- [ ] Loss of Appetite
- [ ] Gastric Ulcers

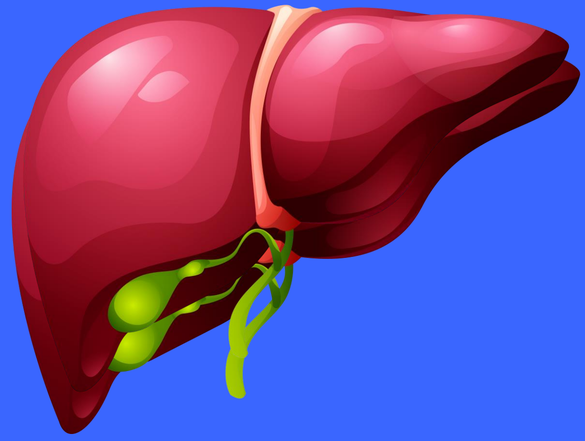
Digestive System Functions of the Liver & Gallbladder

The Liver: Fat Metabolism, Detoxification & Essential Nutrient Storage

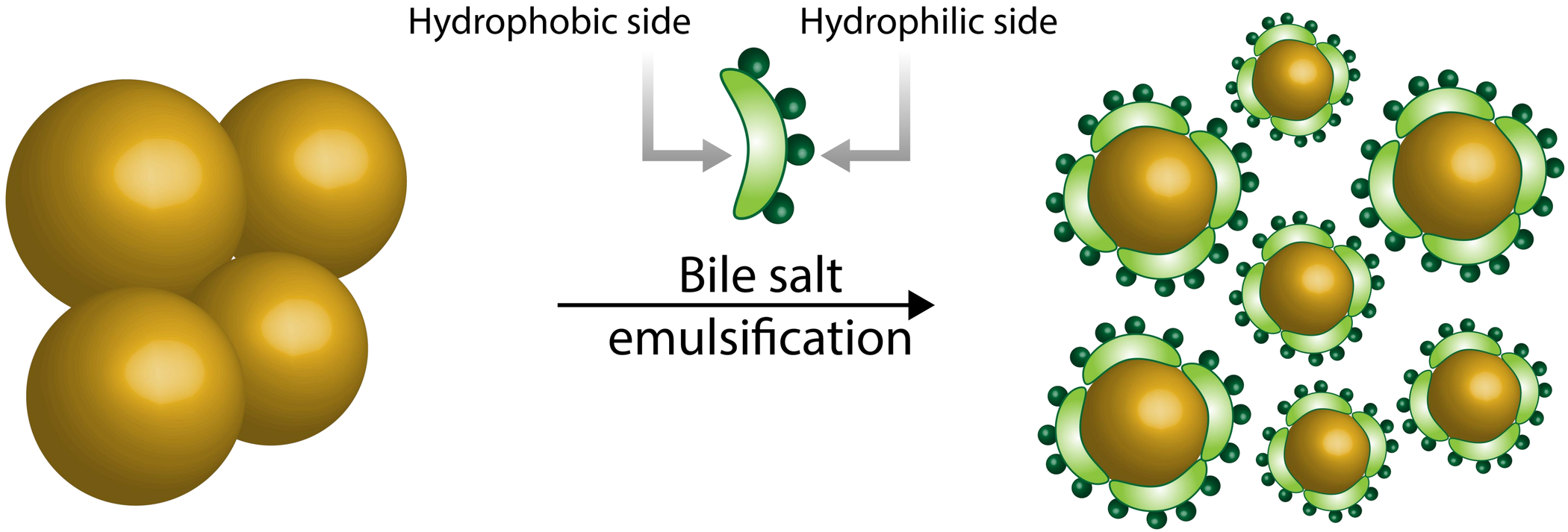
- Bile production (continuous) - made up of bile salts, cholesterol, bilirubin, and water
- Nutrient storage - specifically vitamins A, D, E, K and iron, copper, and other essential minerals
- Processes fat-soluble toxins, hormones, and waste products, then secretes them into bile - into the small intestine, for elimination via feces

The Gall Bladder Matters!

- Stores bile produced by the liver and releases it into the small intestine during digestion
- Bile release is triggered by the hormone **cholecystokinin (CCK)**, which is released when:
    - Fat enters the small intestine (strongest trigger)
    - Partially digested proteins or amino acids enter the small intestine (promotes enzyme release as well)
    - Acidic *chyme* enters the small intestine (modulates digestive enzyme and bile secretion)



Important Functions of Bile: Unsung Hero of the Gut



Important Functions of Bile: Unsung Hero of the Gut

- **Emulsification of Fats**
  - Breaks fat molecules down into smaller droplets, making them easier to digest/absorb
- **Fat-Soluble Vitamin Absorption**
  - Bile is essential for the absorption of vitamins A, D, E, K and essential fatty acids like DHA, EPA, etc…
- **Detox & Elimination**
  - Bile carries waste products (exogenous and endogenous) out of the body, through the GI tract
- **Antimicrobial Properties**
  - Has a detergent-like structure that can disrupt the cell membrane of certain bacteria
  - Prevents certain bacteria from adhering to mucosal lining of the small intestine
  - Promotes a low-oxygen environment in the small intestine - discouraging growth of pathogenic microbes
  - Bile acids act as signaling molecules that positively influence the composition/behavior of gut biome
  - Up-regulates antimicrobial production by IECs, especially during digestion
- **Helps to Neutralize the Acidic Chyme from Stomach**
  - Prevents damage to the intestines and creates a suitable environment for pancreatic enzymes to function

Bile Recycling & The Role of the Microbiome

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Enterohepatic Circulation

- Bile is produced in the liver and released by the gallbladder
- Bile emulsifies fats in the small intestine
- Approximately 95% of bile salts are reabsorbed by the small intestine (mainly in the ileum) and returned to the liver for reuse (Enterohepatic Circulation)

The Microbiome's Role

- Beneficial bacteria are involved in bile acid conjugation and deconjugation
- Production of secondary bile salts through deconjugation and dehydroxylation. These secondary bile salts enhance the growth of beneficial bacteria in the colon and reduce the growth of pathogens. They also bind receptors like FXR and TGR5 which enhances metabolic pathways that impact lipid and glucose metabolism. It can also modulate immune response.
- An unhealthy or dysbiotic microbiome can disrupt bile metabolism, affecting fat digestion and toxin

See Kiran's Deep Dive Video on SIBO in the Advanced Training Vault for more on this topic!

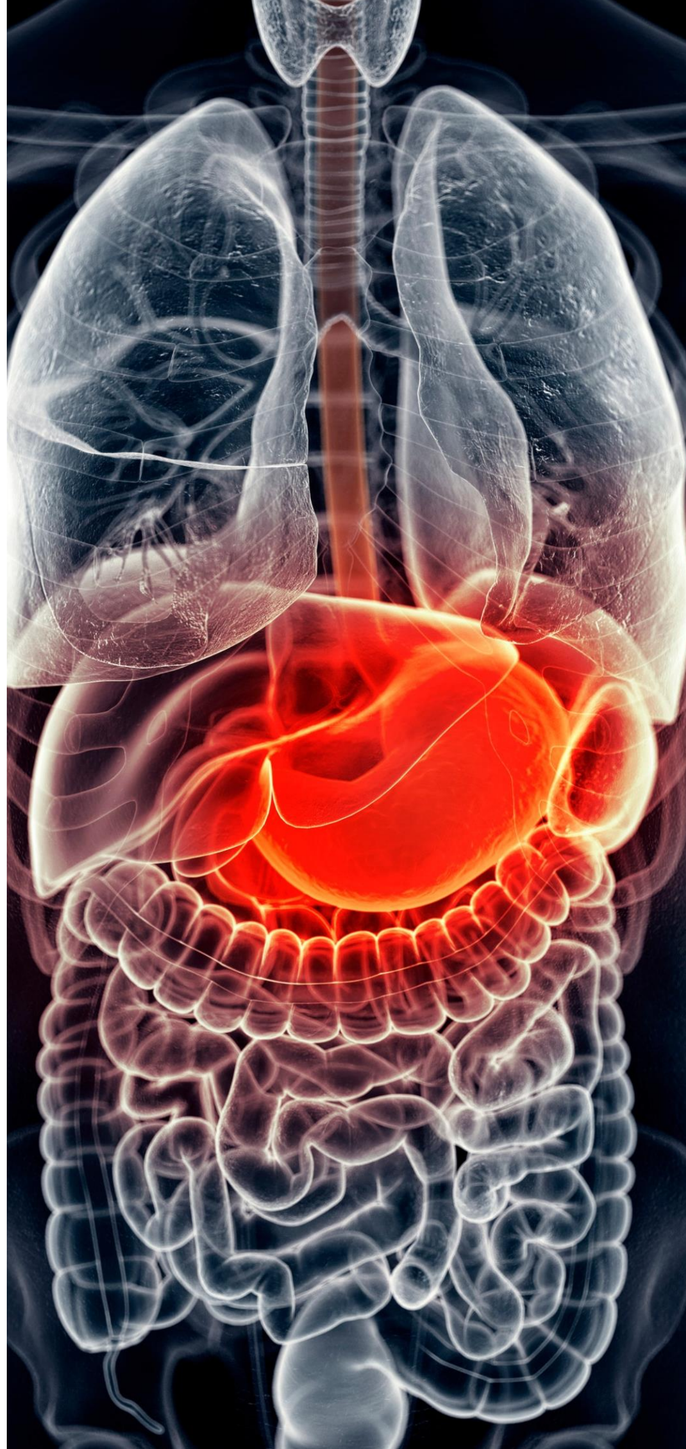
Signs & Symptoms:

POOR LIVER/GALLBLADDER FUNCTION OR INADEQUATE BILE PRODUCTION/FLOW

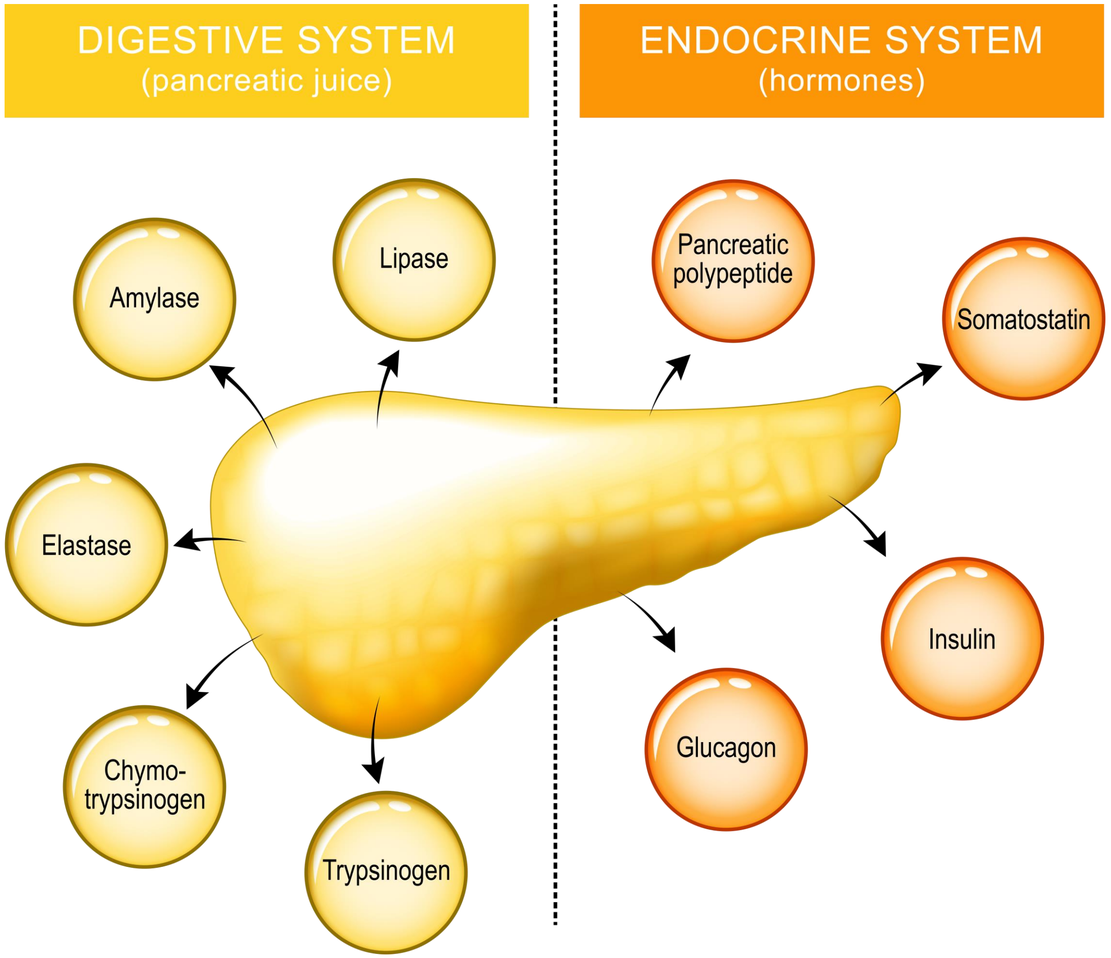
NOTE:

More on this in MODULE 4 - as well as discussion gallbladder removal.

- [ ] Bloating & Gas
- [ ] Chronic Constipation
- [ ] Nausea (After meals - esp. fatty foods)
- [ ] Pale, Clay-Colored, Greasy, Foul-Smelling and/or Floating Stools
- [ ] Discomfort After Fatty Meals
- [ ] Indigestion/Burping (Less immediate than stomach problems)
- [ ] SIBO
- [ ] Dark Urine
- [ ] Unexplained Itching (Pruritus)
- [ ] Gallstones
- [ ] Brain Fog, Headaches, etc... (Toxin buildup)
- [ ] Hormonal Imbalance (Poor bile flow)



The Pancreas: Digestive Enzymes & More



The Pancreas: Digestive Enzymes & More

Producer of Digestive Enzymes

- CCK (mentioned earlier) triggers the release of digestive enzymes from the pancreas
- **Protease** enzymes, such as trypsin and chymotrypsin break down proteins into amino acids for absorption
- **Lipase** breaks down dietary fats into fatty acids and glycerol for absorption
- **Amylase** converts starches into simple sugars like glucose for easy absorption

Regulator of Small Intestine pH

- The hormone **secretin**, stimulated when acidic chyme enters the small intestine, stimulates the pancreas to release **bicarbonate** - which neutralizes the acid, creating optimal digestion environment & protecting the intestine

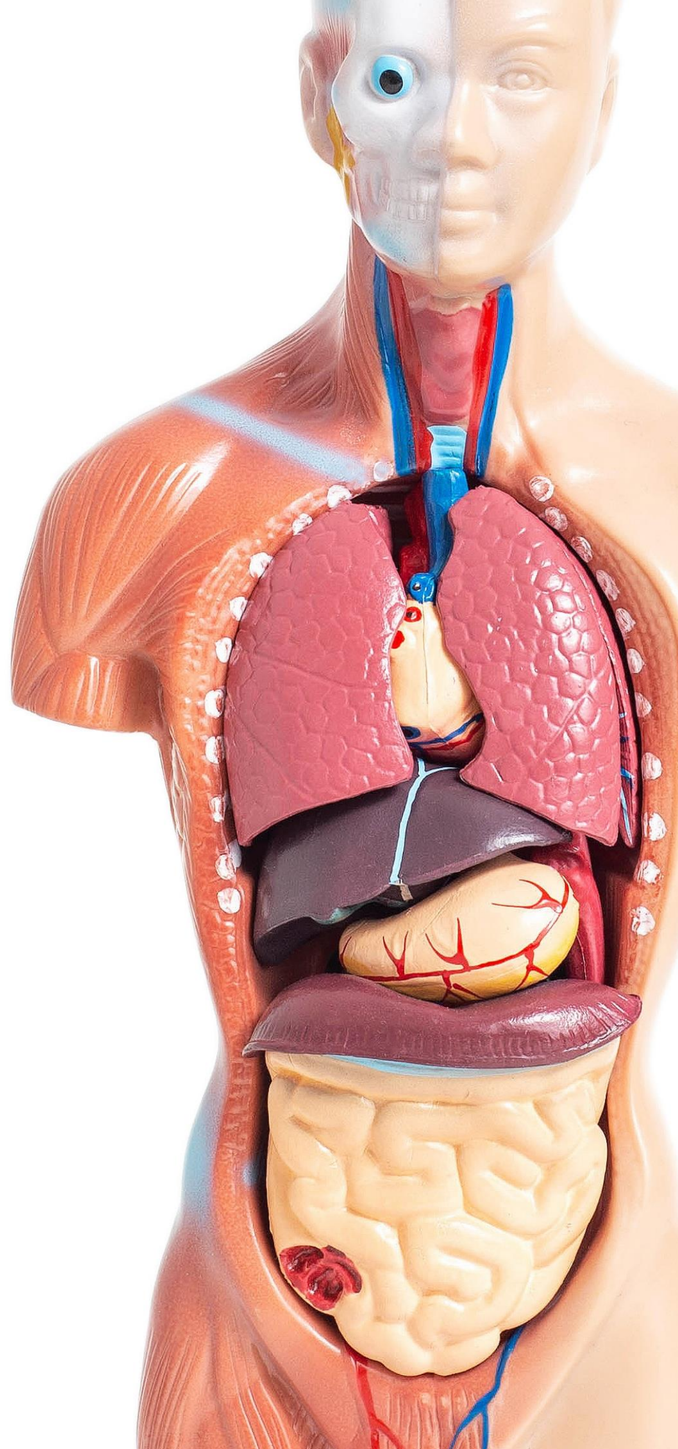
Blood Sugar Regulation

- The pancreas also releases **insulin** to lower blood sugar and **glucagon** to raise blood sugar

Signs & Symptoms:

PANCREATIC DYSFUNCTION AND/OR ENZYME INSUFFICIENCY

- [ ] Bloating & Gas
- [ ] Diarrhea or Greasy, Foul-Smelling Stools
- [ ] Undigested Food in Stools
- [ ] Weight Loss Despite Normal Eating (or inability to gain weight)
- [ ] Frequent Nausea (After meals - esp. fatty foods)
- [ ] Chronic Indigestion
- [ ] Blood Sugar Imbalances (Frequent hunger, thirst, fatigue, etc...)
- [ ] Abdominal Pain (Worse after meals)
- [ ] Food Sensitivities (Difficulty digesting certain foods)



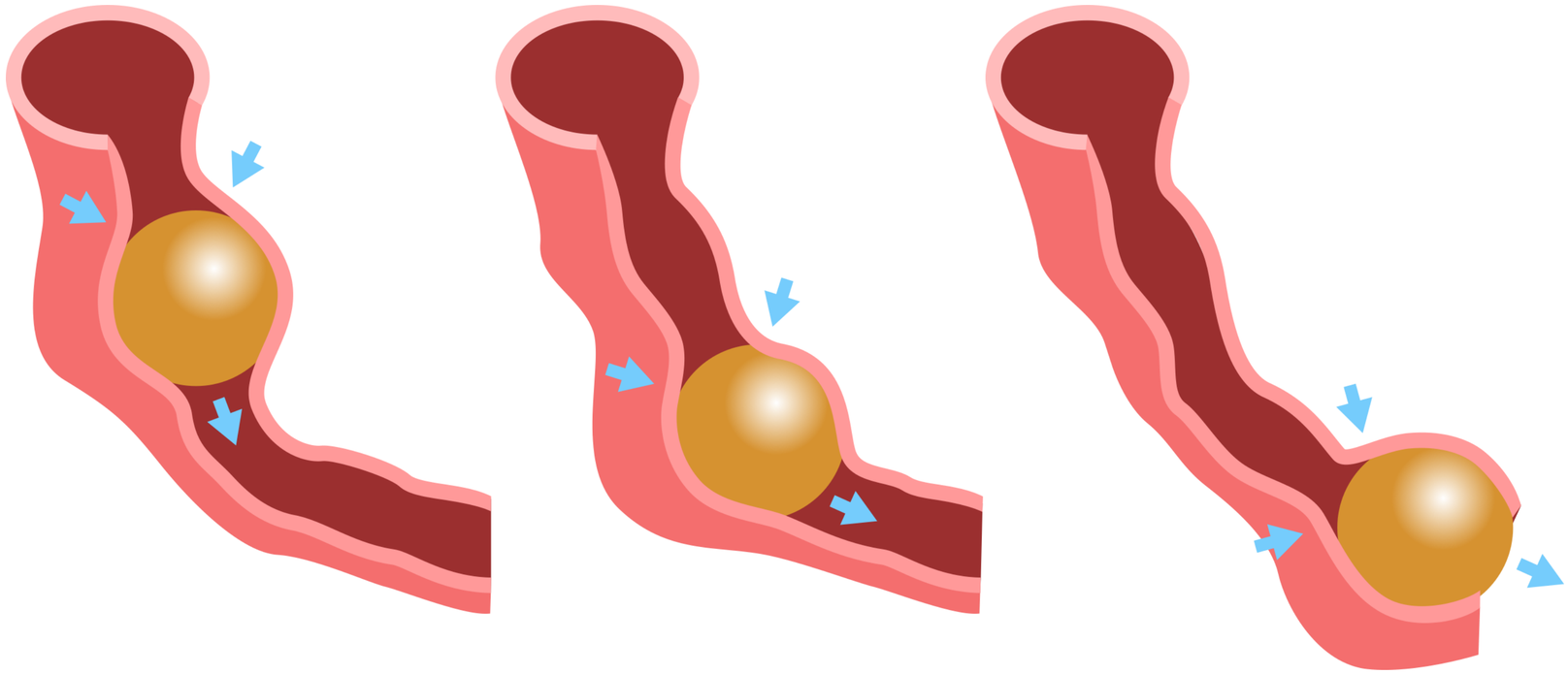
Sphincters: The Gut's Traffic Police

Sphincters are circular muscles that act as valves - regulating the passage of food, liquid, and waste through the GI tract. Here are the primary sphincters, their locations, and functions:

- **Upper Esophageal Sphincter -** Top of the esophagus; controls the entry of food in the esophagus from the mouth.
- **Lower Esophageal Sphincter (LES) -** Between esophagus and stomach; prevents stomach acid from entering the esophagus.
- **Pyloric Sphincter -** Between the stomach and small intestine; controls release of chyme into the small intestine.
- **Ileocecal Valve -** Between small and large intestine; regulates movement of food into colon and prevents migration of microbes back up into the small intestine.
- **Anal Sphincters (Internal/External) -** Controls the release of stool.

Riding the Wave: Understanding Gut Motility

PERISTALSIS



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Riding the Wave: Understanding Gut Motility

Gut Motility

- Motility refers to the movement of food, liquids, and waste through the GI tract - controlled by muscle contractions in the walls of the GI tract and essential for proper digestion & elimination.
- The Enteric Nervous System (ENS) regulates peristalsis, the coordinated contractions that move food through the GI system. This is also stimulated when fiber is present in the diet.
- The Vagus Nerve communicates between the gut and brain - influencing motility.
- The Migrating Motor Complex (MMC) is a cyclic, recurring motility pattern that occurs during fasting and “cleans out” the small intestine between meals. This is crucial for preventing overgrowth like SIBO.

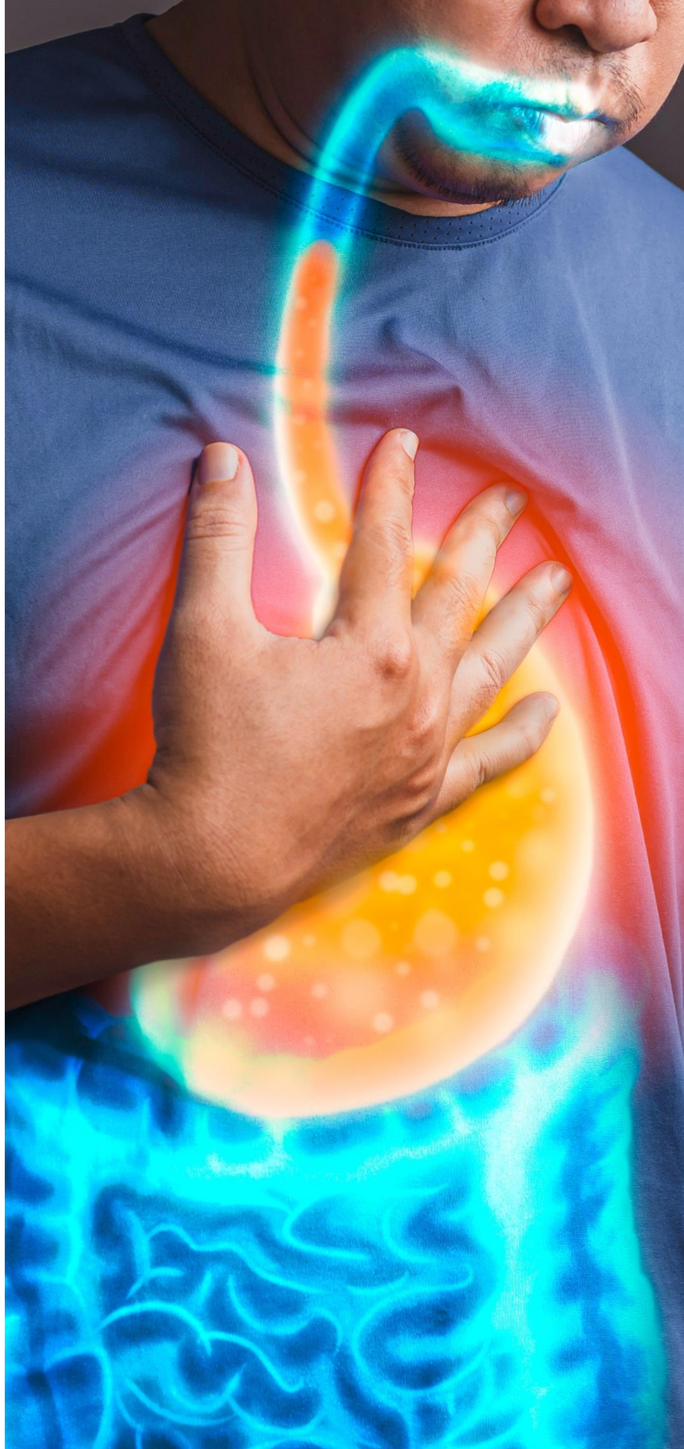
Microbiome’s Role

- The microbiome impacts motility in the gut via its metabolites (like SCFAs) and the serotonin it produces - both stimulate and regulate healthy motility!
- The Microbiome can also impact motility by altering the production of secondary bile acids
- Disruption of the gut microbiome, such as SIBO, can impair MMC function, leading to stagnant motility and more bacterial buildup. (Specifically methane-producing bacteria)

Signs & Symptoms:

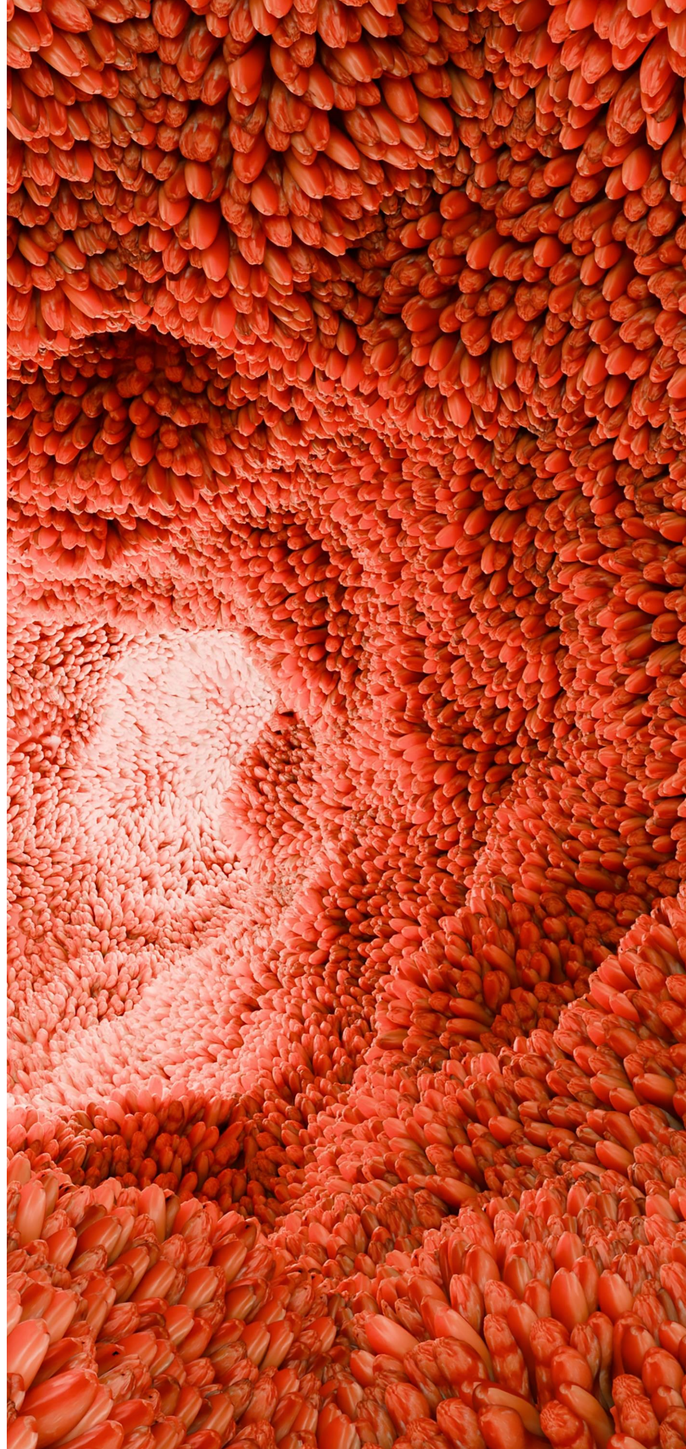
SPHINCTER DYSFUNCTION & IMPAIRED MOTILIY

- [ ] Acid Reflux/Heartburn
(Lower Esophageal Sphincter)
- [ ] Bloating & Gas
(Slow Motility and/or Poor Sphincter Function)
- [ ] Constipation
(Slow Motility and/or Ileocecal Valve)
- [ ] Diarrhea
(Rapid Motility)
- [ ] Nausea After Meals
(Pyloric Sphincter)
- [ ] Incontinence
(Anal Sphincter)
- [ ] SIBO
(Impaired Motility and/or Ileocecal Valve)



Form and Function of the Small Intestine

- The small intestine is approximately 20 feet long and has a surface area between 200-300 square meters. This is approximately the size of a *tennis court*!
- There are three sections:
    - **Duodenum** (closest to stomach) receives chyme and mixes it with bile, pancreatic enzymes, and bicarbonate.
    - **Jejunum** is where most nutrient absorption takes place.
    - **Ileum** is the final section, where B12, bile salts, and remaining nutrients are absorbed.
- Approximately 90% of nutrients are absorbed in the small intestine - including carbohydrates, proteins, and fats.
- The small intestine is covered in **villi** and **microvilli**, tiny finger-like projections that produce **brush border enzymes** (play crucial role in final stages of carbohydrate and protein digestion)
- Carbohydrates, proteins, and fats are digested with the help of pancreatic enzymes, bile, brush border enzymes, and the microbiome - into glucose, amino acids, and fatty acids for absorption.



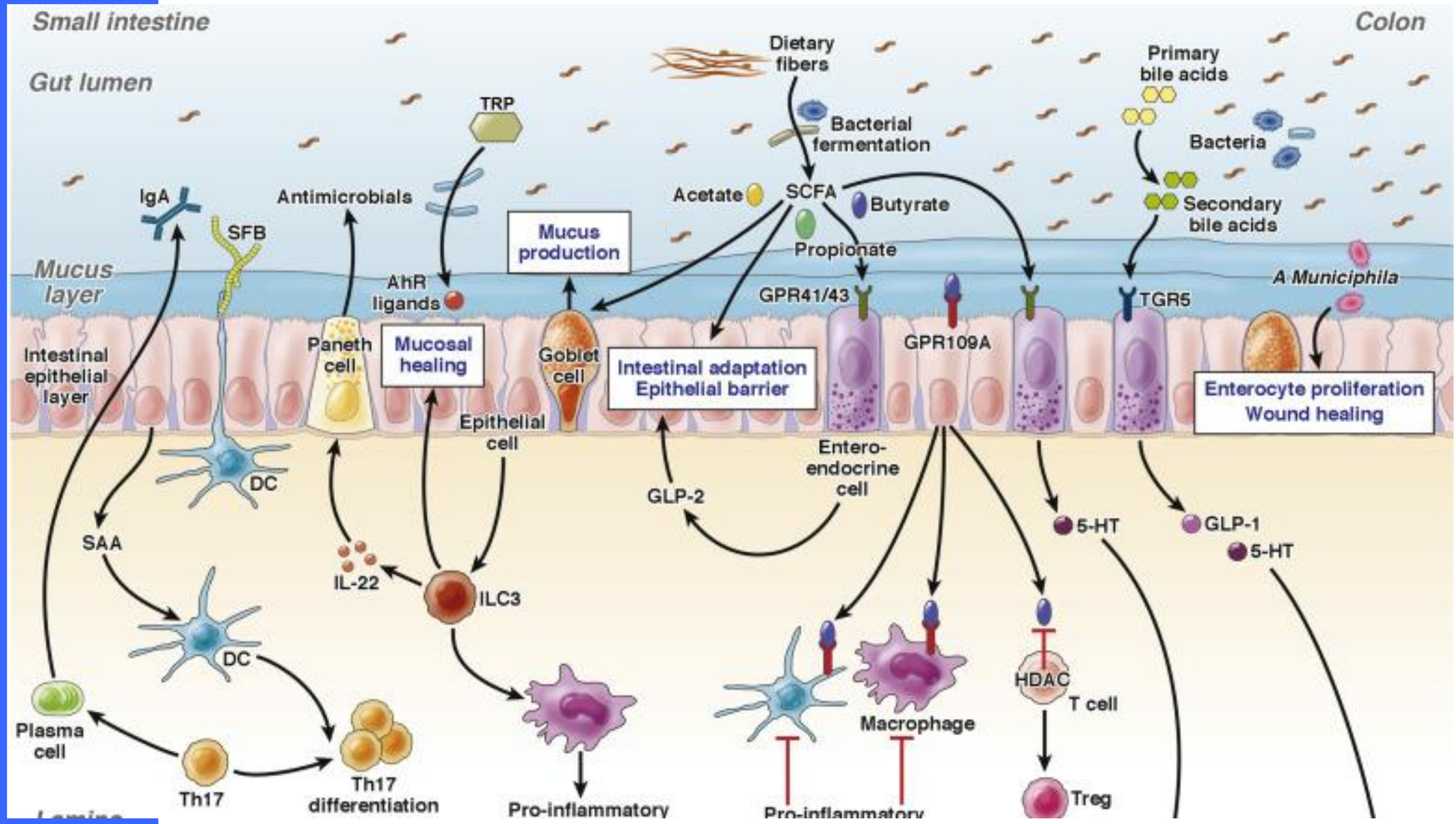
The Small Intestine Microbiome & Environment

- The microbial population in the small intestine is minimal compared to the large intestine - specifically near the stomach (proximal) the concentration is 10^4 cfu/ml and as you move close to the colon (distal) it goes as high as 10^9 cfu/ml (100,000 times higher concentration!)
- In addition, approximately 70-80% of the body's immune cells are located in the small intestines as part of the GALT - key locations are Peyer's patches, intraepithelial lymphocytes and lamina propria lymphocytes.
- Adequate bile production/release is essential for maintaining optimal microbial balance in the small intestine

The Small Intestine Microbiome & Environment

- Microbes in the small intestine do have many roles to play, including:
    - Production of vitamins and beneficial metabolites, such as SCFAs like **butyrate**.
    - Immune signaling and regulation of inflammation in the gut (More on this in MODULE 1)
    - Motility regulation via SCFAs
- The pH of the small intestine is relatively neutral (6-7pH), maintained by bicarbonate released from the pancreas to neutralize acidic chyme from the stomach.
- Ideal oxygen levels are low, which is optimal for beneficial microbes and inhospitable to many pathogenic organisms.
- Butyrate plays an essential role in maintaining a low-oxygen environment and healthy gut barrier

Leaky Gut, or increased intestinal permeability occurs in the small intestine when the tight junctions between intestinal cell walls become weakened. This allows bacteria, toxins (including LPS), and undigested food particles to “leak” into the bloodstream, triggering inflammation and immune responses.



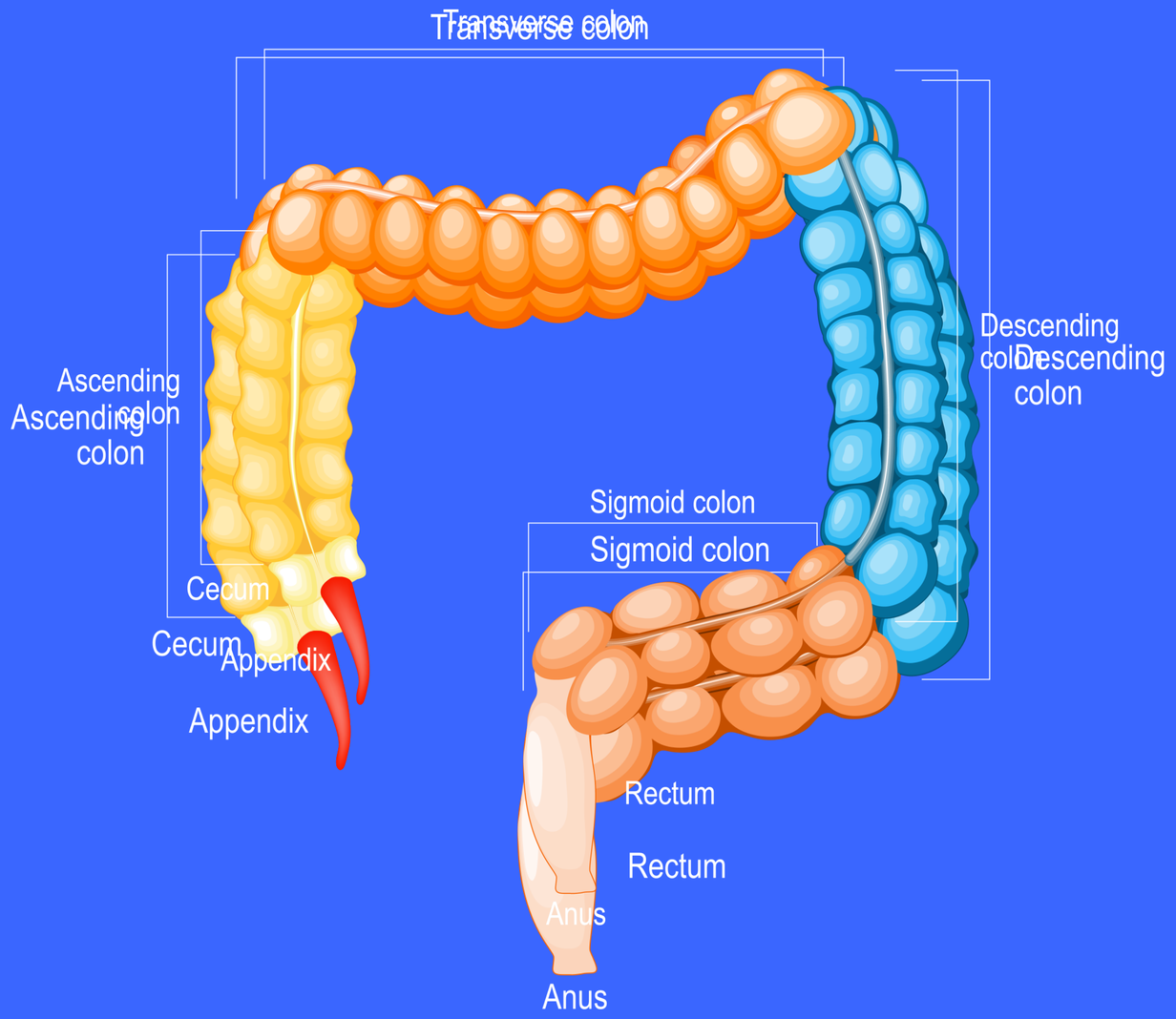
We’ll talk MUCH more about this in MODULE 3.

Signs & Symptoms:

SMALL INTESTINE DYSFUNCTION & DYSBIOSIS

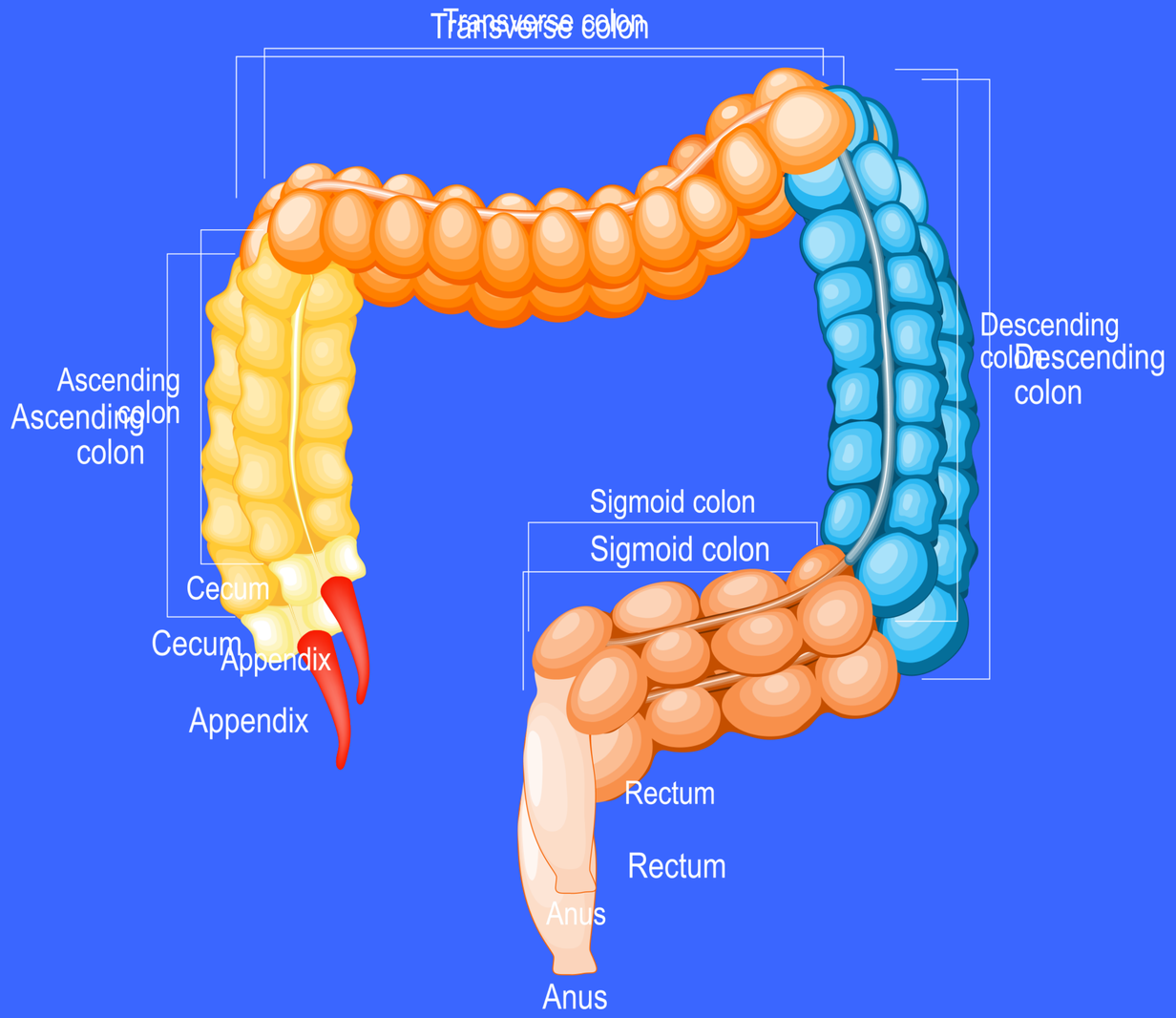
- [ ] SIBO
- [ ] Bloating & Gas
- [ ] Abdominal Pain or Discomfort
- [ ] Diarrhea/Loose Stools
- [ ] Constipation
- [ ] Undigested Food in Stools
- [ ] Fatigue/Brain Fog
- [ ] Food Sensitivities/Intolerances
- [ ] Nutrient Deficiencies/Anemia
- [ ] Unexplained Weight Loss/Difficulty Gaining Weight
- [ ] Immune Dysregulation (Autoimmune, Allergies, Histamine Intolerance, MCAS, Frequent Infections, etc...)
- [ ] Chronic Inflammation/Pain
- [ ] Skin Conditions (Rashes, Acne, Eczema, etc...)
- [ ] Greasy Stools

Form and Function of The Large Intestine



- The large intestine, or **colon**, is approximately 5-6 feet long and includes:
  - **Cecum** - Starting point where the small intestine meets the large intestine through the ileocecal valve
  - **Ascending, Transverse, Descending, and Sigmoid Colon** - Sections of the large intestine that absorb water and nutrients and move waste towards the rectum
  - **Rectum and Anus** - Final section where waste is stored and eliminated

Form and Function of The Large Intestine



- Water (90-95%) and electrolytes are absorbed from the remaining indigestible food matter in the large intestine
- As water is absorbed, the remaining material is compacted into stool for elimination
- In the large intestine, the microbiome ferments undigested fibers - producing beneficial SCFAs like butyrate, which “feed” colon cells, maintain a low O2 environment, and provide dozens of well-documented health benefits
- The pH of the large intestine is slightly acidic and low oxygen - which helps create an environment where beneficial microbes can thrive

The Main Home of the Gut Microbiome

- The large intestine is home to *trillions* of microbes, the most densely populated microbiome in the human body.
- Microbes break down fibers, resistant starches, and other remaining carbohydrates to produce SCFAs
- Butyrate supports gut barrier function, reduces inflammation, protects against the development of colon cancer, “feeds” colonsites (colon cells), lowers O2 levels in the colon, and *many* other beneficial functions!
- Microbes in the colon help metabolize bile acids, converting them into secondary bile acids that play a role in digestion and regulating harmful bacteria

The Main Home of the Gut Microbiome

- The interrelationship between microbes and the GI immune system in the large intestine serves to:
  - Monitor and regulate bacterial population & prevent dysbiosis
  - Balance immune function and inflammatory responses

Signs & Symptoms:

LARGE INTESTINE DYSFUNCTION & DYSBIOSIS

- [ ] Constipation
- [ ] Diarrhea/Loose Stools
- [ ] Bloating & Gas
- [ ] Lower Abdominal Pain/Cramping
- [ ] Mucus in Stools
- [ ] Hard, Dry Stools
- [ ] Foul-Smelling Stools
- [ ] Inflammatory Bowel Disease
- [ ] Blood in Stool (Red)
- [ ] Diverticulosis/Diverticulitis
- [ ] Hemorrhoids

What You Can Learn From Poop!

Bristol Stool Chart

Type 1		Separate hard lumps, like nuts (hard to pass)
Type 2		Sausage-shaped but lumpy
Type 3		Like a sausage but with cracks on its surface
Type 4		Like a sausage or snake, smooth and soft
Type 5		Soft blobs with clear-cut edges (passed easily)
Type 6		Fluffy pieces with ragged edges, a mushy stool
Type 7		Watery, no solid pieces. **Entirely Liquid**

Digestion Optimization 101

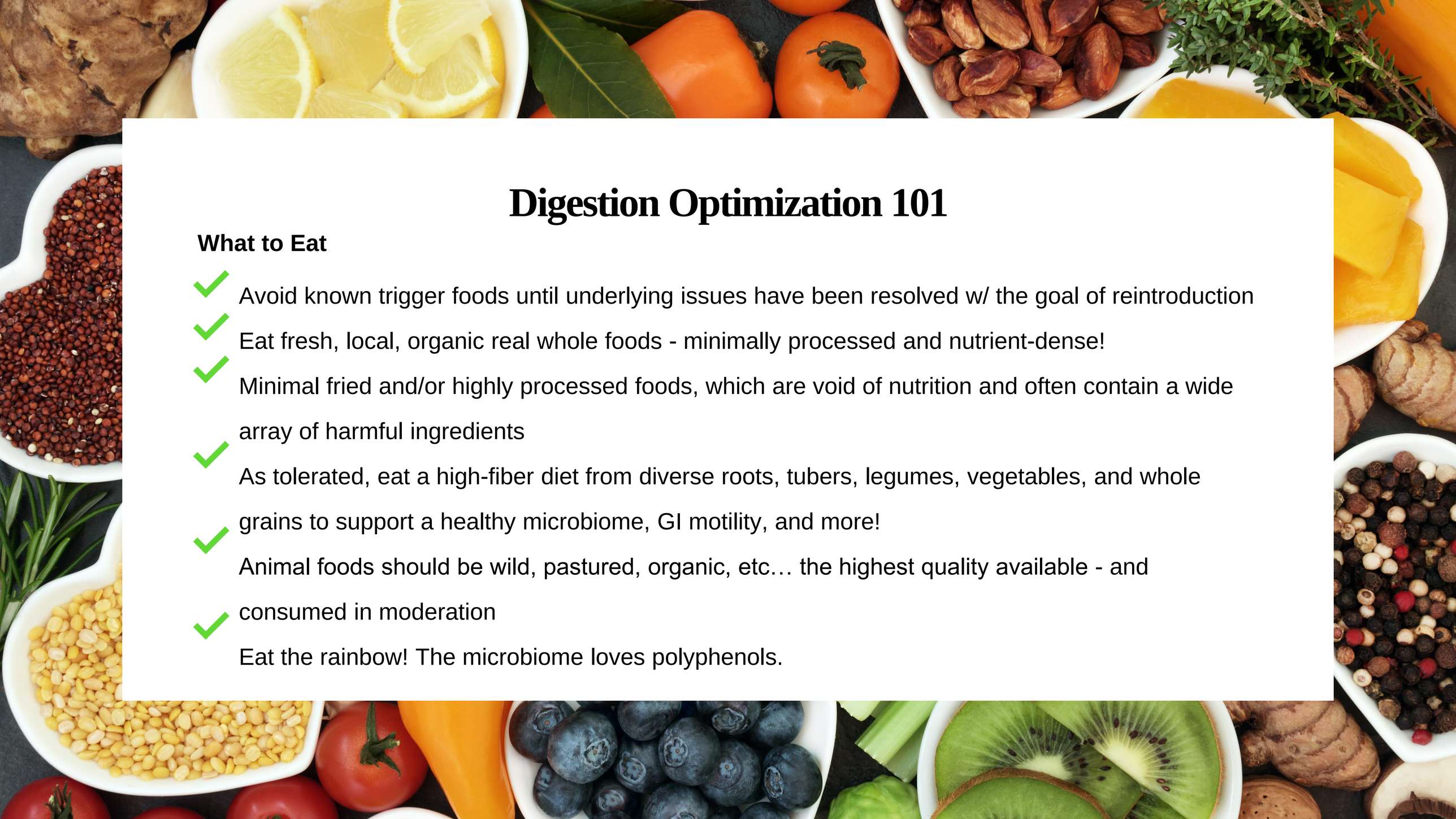
How, When, and Where - Setup for Digestive Success!

- ✓ Mindful eating preparation - take time to look at, smell, appreciate your food before eating
- ✓ Relax before meals - shift into a parasympathetic state via deep breathing or a few minutes of meditation
- ✓ Focus on the food - no driving, working, or stressful distractions
- ✓ Eat at regular times - helps the body prepare for optimal digestion
- ✓ Consider time-restricted eating/intermittent fasting if you are healthy and not under too much stress
- ✓ Chew your food - at least 20-30 times per bite
- ✓ Eat slowly and mindfully - taste your food, take breaks, breathe
- ✓ Avoid excess liquid consumption during meals - hydrate 30+ min before or after
- ✓ Eat until you feel about 80% full - don’t wait until you feel stuffed to stop

Rebel health

Build Your Resilient Gut

MICROBIOME & BEYOND



Digestion Optimization 101

What to Eat

- Avoid known trigger foods until underlying issues have been resolved w/ the goal of reintroduction
- Eat fresh, local, organic real whole foods - minimally processed and nutrient-dense!
- Minimal fried and/or highly processed foods, which are void of nutrition and often contain a wide array of harmful ingredients
- As tolerated, eat a high-fiber diet from diverse roots, tubers, legumes, vegetables, and whole grains to support a healthy microbiome, GI motility, and more!
- Animal foods should be wild, pastured, organic, etc… the highest quality available - and consumed in moderation
- Eat the rainbow! The microbiome loves polyphenols.

Digestion Optimization 101

Build Your Resilient Gut
MICROBIOME & BEYOND

Digestive Support Supplements (As Needed)

- Stomach acid support like **HCLGuard+** can provide a boost to inadequate stomach acid levels, improve digestion & absorption, trigger enzyme release, and maintain a healthy upper GI microbiome
- Digestive Enzymes like **Holozyme** can improve protein, fat, and carbohydrate breakdown and digestion.
- Bile & Upper GI supports like **TUDCA** or **MegaGuard** can help support bile production/flow and stimulate upper GI motility
- Quality probiotics like **MegaSporeBiotic** support a healthy microbiome, regulate gut immune function, and can help optimize digestion
- Effective butyrate supplementation like **Tributyrin-X** can enhance gut barrier function, support motility, and regulate oxygen levels in the gut - among other digestion-related benefits.

NOTE: We will get into more specifics regarding the use of supplementation for specific problems, conditions, and symptoms in upcoming modules

Digestion Optimization 101

After You Eat

- Avoid stress, which activates the sympathetic nervous system, shutting down digestive processes (this includes intense exercise)
- A gentle walk after eating (10-15 min) can aid motility, support digestion, and regulate blood sugar levels
- Stay upright after meals - sitting or standing allows gravity to aid digestion and prevent issues like acid reflux
- Consider relaxation practices such as diaphragmatic breathing or meditation for a few minutes after meals to stimulate the vagus nerve and activate the parasympathetic nervous system
- Support the Migrating Motor Complex (MMC) by leaving at least 4-5 hours between meals (no snacking) to “clean out” the small intestine and prevent SIBO