Forks and Facts
vs
Fantasy and Fiction

Food, Fiber, Flatulence and Feces

Cindy Miller Mikolajczyk, RN
Ask Nurse Cindy

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Disclaimer

- We are going to talk about Food, Fiber, Flatulence and Feces
- Poop Happens.
- Potty talk cannot be “eliminated” from this discussion
- Nurses have an odd sense of humor

- My sincere and everlasting thanks to the Keto Chow family for all they have done and do everyday

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Medical Disclaimer: I am not a doctor

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In Memoria: Debbie Stokes and Dee Davis

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My sister, Debbie Stokes, has always looked out for me…

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And this journey is **all her fault:**

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So Mom…Debbie…this talk is for you

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Dr. Sarah Hallberg

https://www.youtube.com/watch?v=da1vvigy5tQ

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Me: at 307 Lbs

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The “Whoosh” Effect

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94 pounds GONE!!

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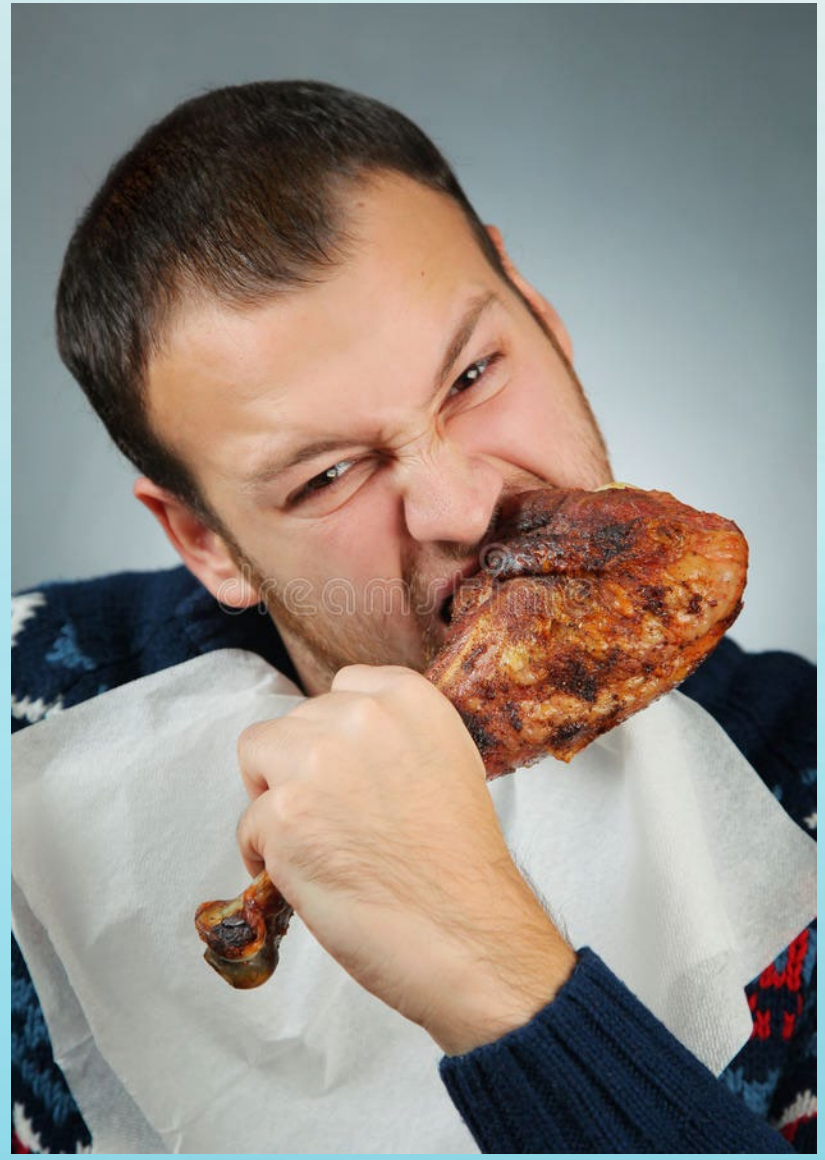
So, let’s start talking about all those “F”s



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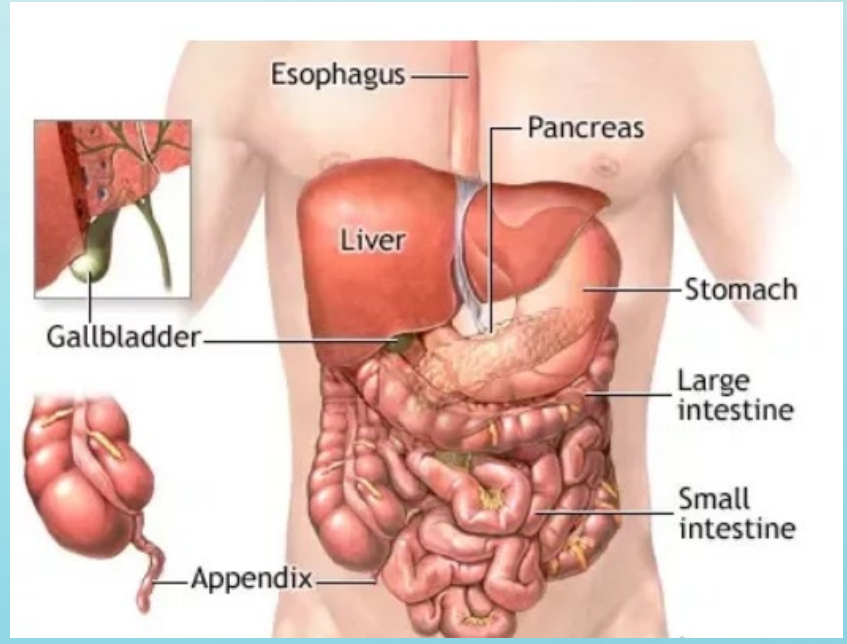
Objectives

- Explain the digestive tract and how it functions
- Discuss the many F words associated with digestion
  - Food (Feasting or Fasting)
  - Flatulance
  - Fiber
  - Feces
- When Feces Misbehaves
  - Leaky Gut
  - Constipation
  - Diarrhea
  - ETC



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Food for Thought:

- **When we <u>eat</u>**
  - We are giving our body instructions to digest the food (Feasting)
  - Digested components of food is sorted as useful and is stored for later needs (Fat=FUEL)
  - What is not useful is eliminated as waste (FECES)
- **When we <u>don't eat:</u>**
  - <u>W</u>e are also giving our body instructions (Fat Storage is waiting)
  - Stored food (fat/glucose/glycogen) can be used to fuel body's processes (FASTING)

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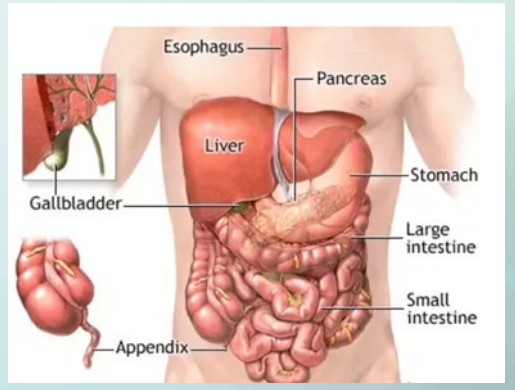
Food for Thought:



- **What we eat:**
  - instructs specific enzymes to be released to aid in digestion
  - Instructs different hormones to be activated to carry nutrients to cells
- **IF WHEN and WHAT** we eat, gives our body specific instructions/hormone production signals, then we need to leave the FANTASY behind that a calorie is a calorie is a calorie
- Calories deliver specific instructions based on where they come from

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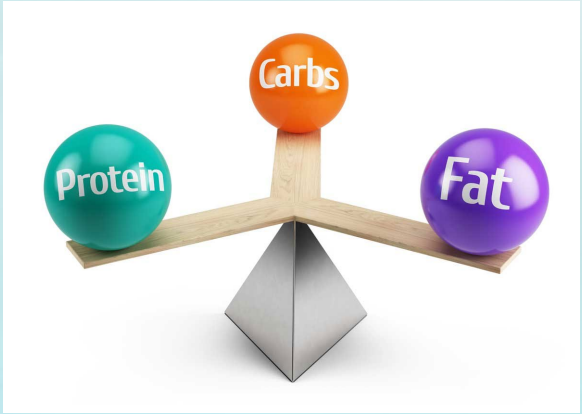
Macronutrients and Micronutrients

- Macronutrients have calories
  - Protein
  - Fat
  - Carbohydrates



- Micronutrients do NOT have calories
  - Vitamins
  - Minerals

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Healthy GI Tract: Protection from Harm

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What is the GI Tract?

- Think of your digestive system as a hollow insulated tunnel that allows the outside world to pass through your inside.
- Food enters as complex structure and what exits is the non usable junk (fiber and feces)
- What is not needed is thrown away (feces)

- Our GI Tract is a disassembly line, and it has emissions (flatulence)
- We must maintain good gut health to keep the good stuff moving into our cells and the bad stuff out of our bloodstream/cells
- Shipping, handling and delivery system

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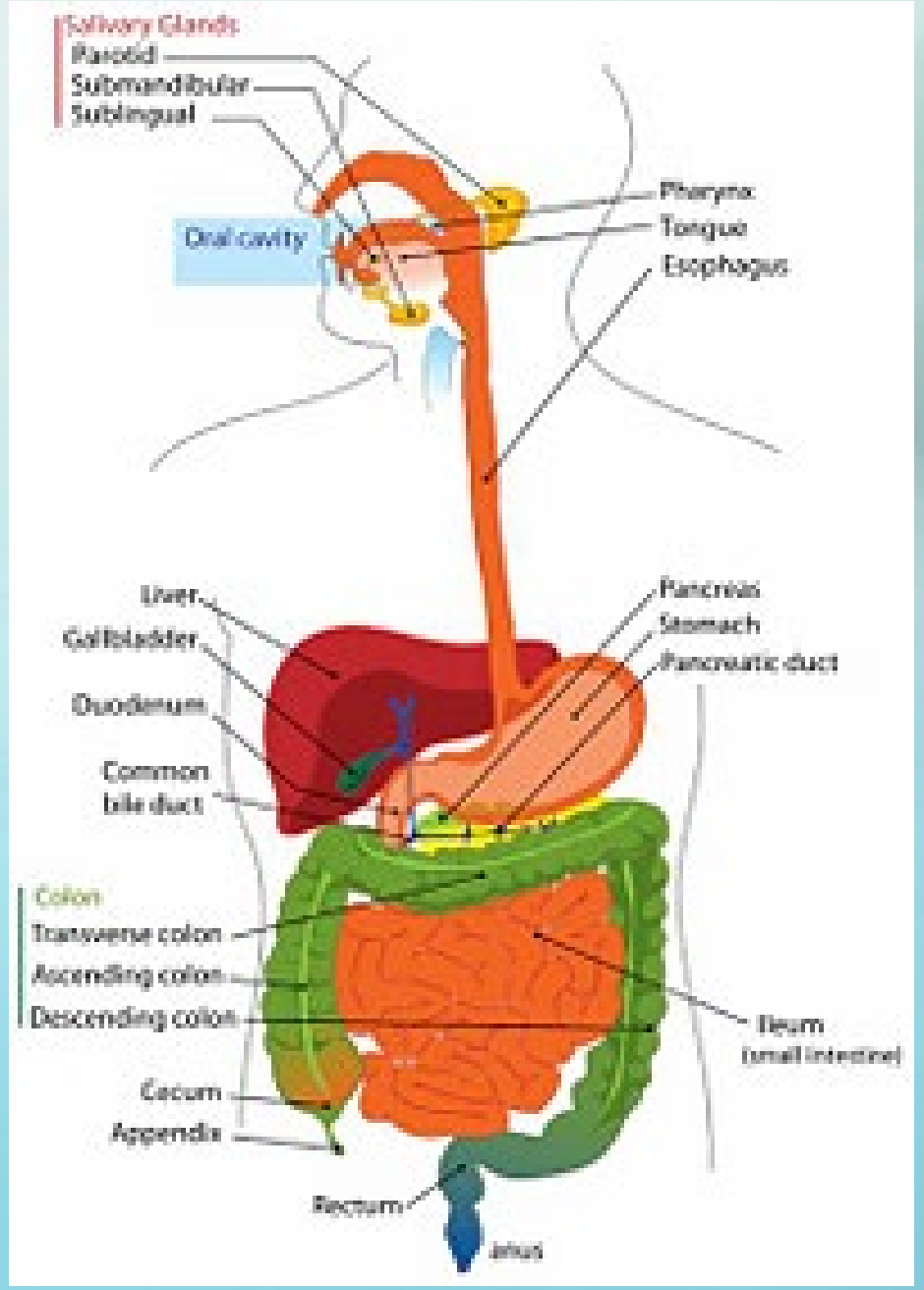
Digestive Tract and Food

- GI (Gastro-Intestinal) Tract
  - Lined with types of mucosal tissue
  - Resistant to food enzymes
- Major Components
  - Mouth (oral cavity)
  - Pharynx
  - Esophagus
  - Stomach
  - Small Intestine
  - Large Intestine (Colon)
  - Rectum
  - Anus



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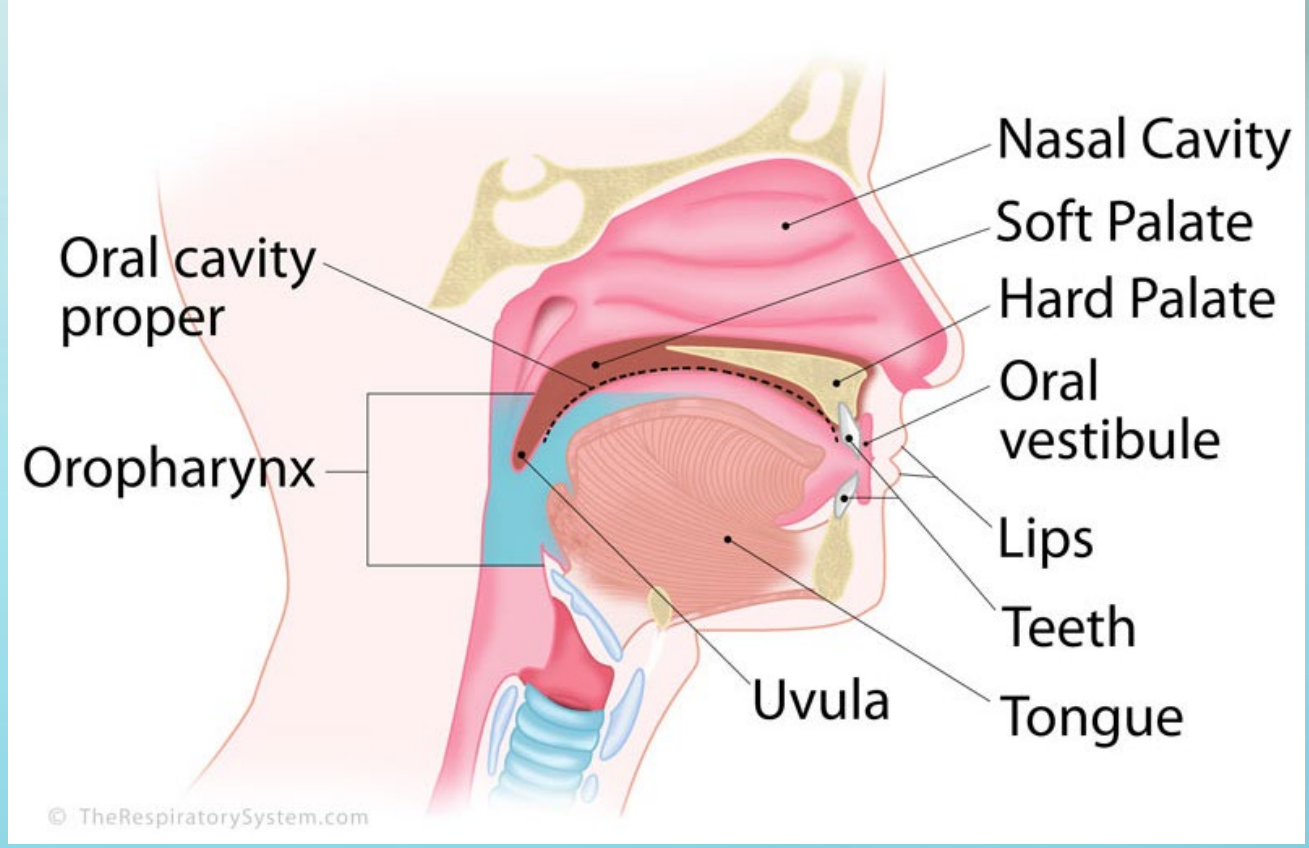
Mouthing off :
The Importance of the Oral Cavity

- Where both mechanical and chemical digestion begins
- Teeth cut/tear or grind it into smaller pieces (mechanical digestion)
- Adequate chewing of food turns it into a pulp (mechanical digestion)
- Salivary glands produce saliva (spit) which has enzymes (chemical digestion)
- Moist pulp is easy to swallow



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Food for Thought
Salivation: Spit is our friend

- Salivation can begin from smelling, seeing or thinking about food
- The cephalic phase (brain engagement) of digestion triggers this
- Our body can produce 2-4 Liters of Saliva a day
- Saliva is very mildly acidic and rich in amylase, the enzyme that helps break down carbohydrates into sugar
- Enzymes ambush the mush in our mouth
- Allows the bolus of food to easily slide down esophagus

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Food for Thought:
Chew your food well

- Well chewed food pulp more amenable to appropriate nutrient absorption and utilization
- Food bolus enters stomach in slower manner, allowing stretch signals to indicate fullness to brain
- Using taste buds to savor food is related to satiety
- Slowly chewing food and then swallowing assists in less air being swallowed (less belching)

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Esophagus

- Tube like smooth muscle
  - Glorified laundry chute lined with smooth muscle
- Connects oral cavity to stomach
- Saliva moistened bolus of food is swallowed (voluntary)
- Rest of digestion is involuntary
- Peristalsis moves food from back of mouth down to stomach upon swallowing
- Travels through thoracic cavity through diaphragm into abdominal cavity
- Empties into stomach

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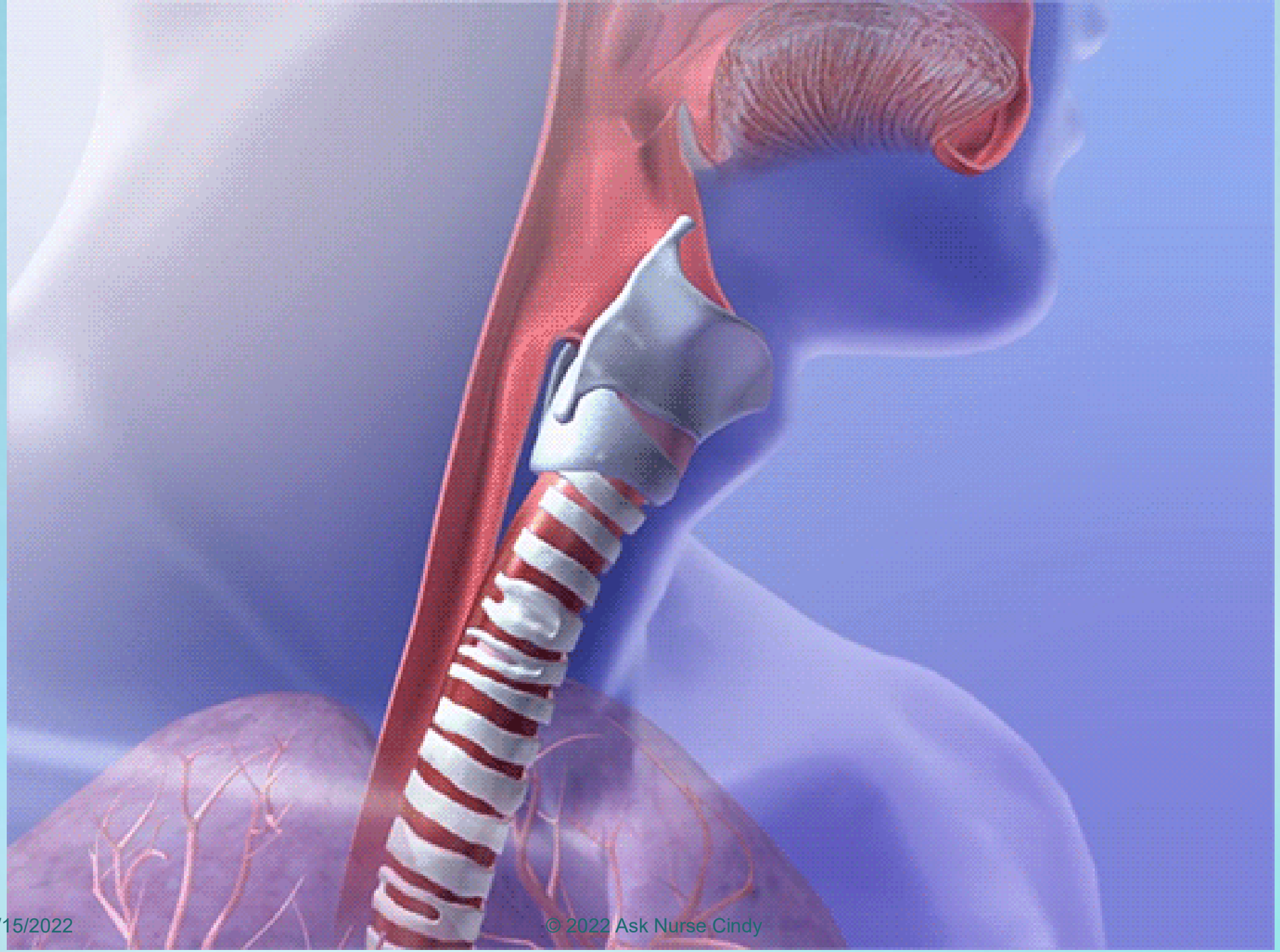

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Food for Thought
Esophageal Function

- Should have smooth passage of food bolus from point of swallowing until entering the stomach
- Glottis closes to shift food into esophagus instead of trachea
- Esophageal sphincter opens and closes allowing bolus to enter stomach
- The only time we think of our esophagus is when something gets stuck or if we have GERD/Reflux

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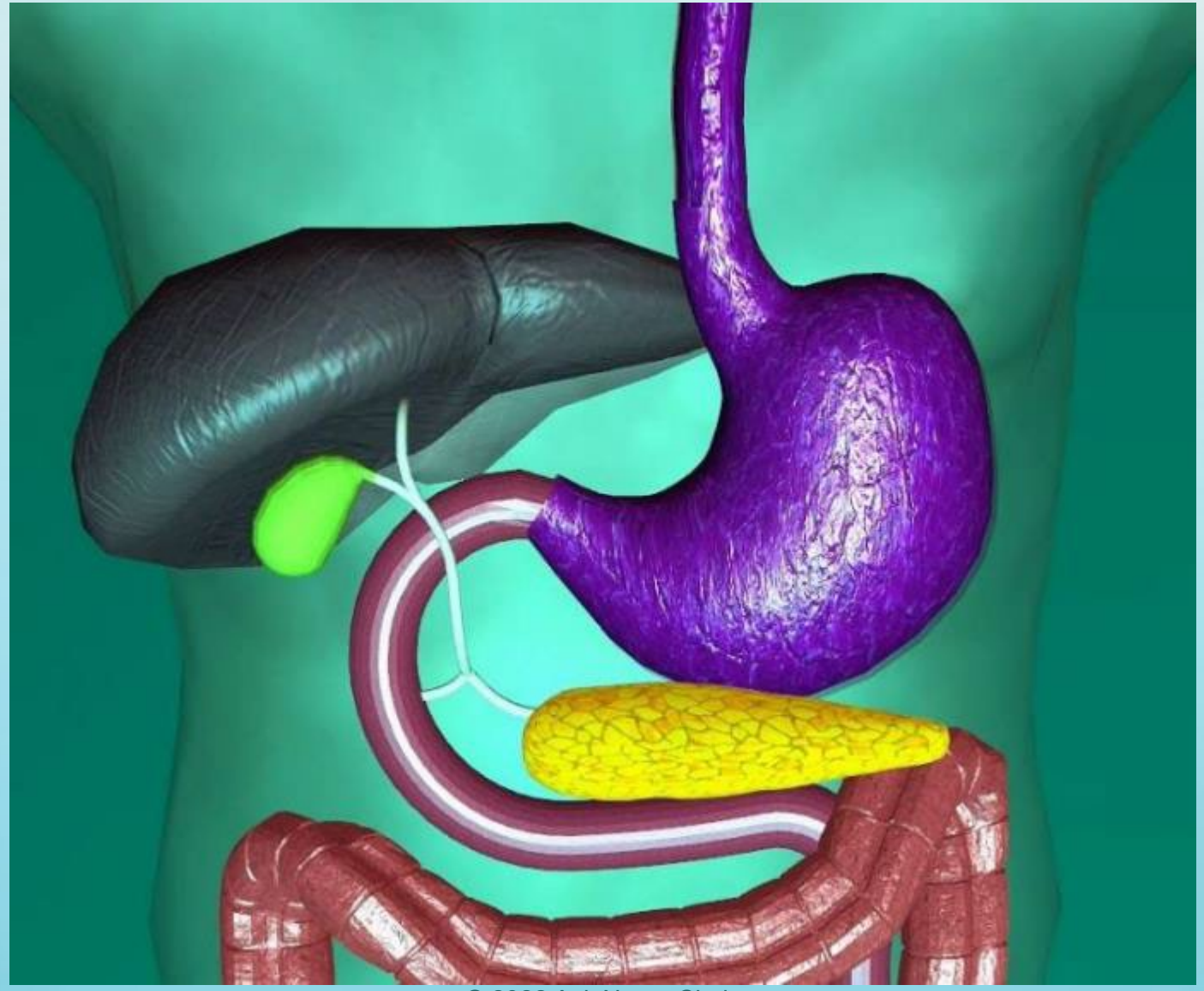
Do you have the stomach for the rest of the talk?



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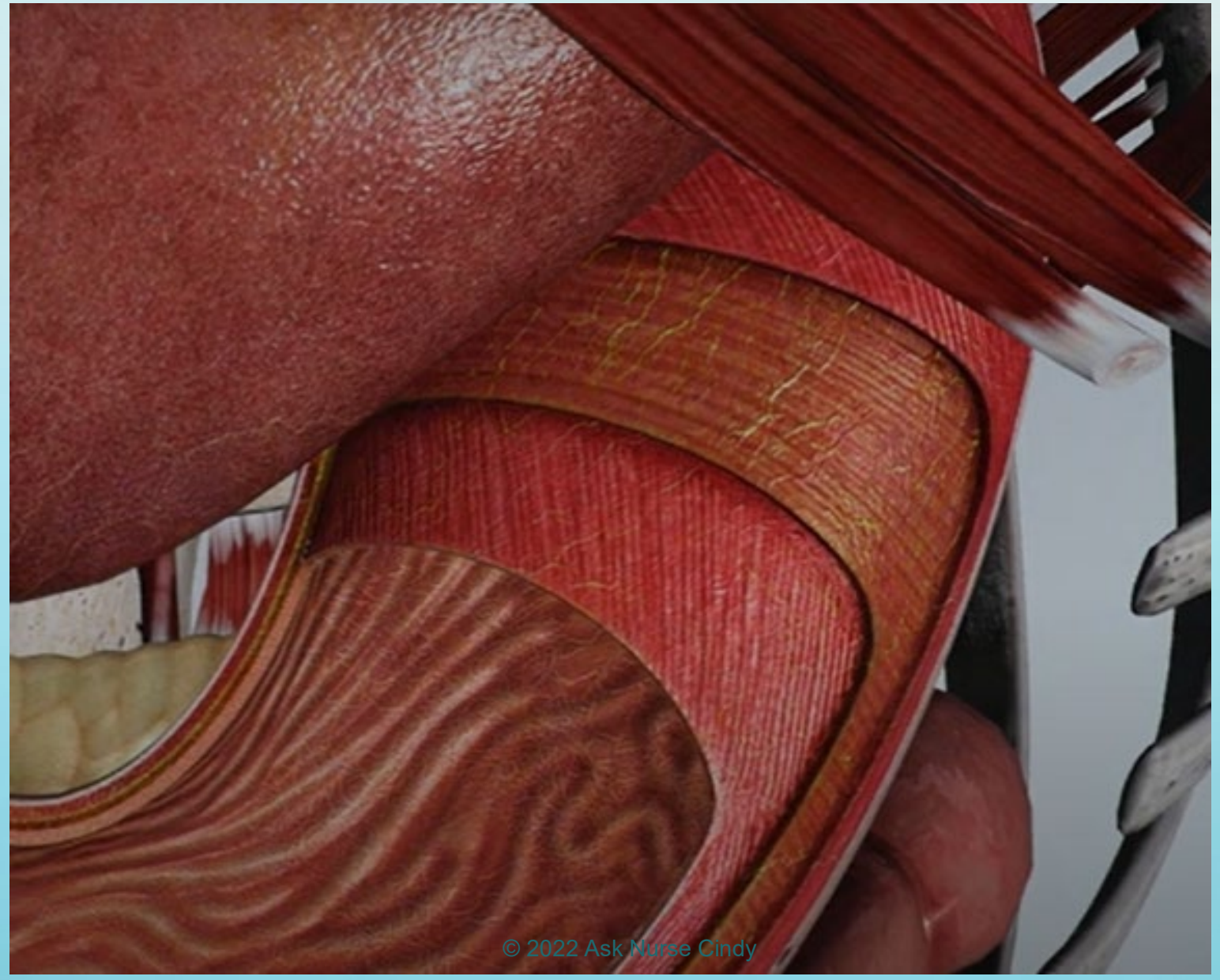
Stomach (Outside View)-3 Layers of Muscle



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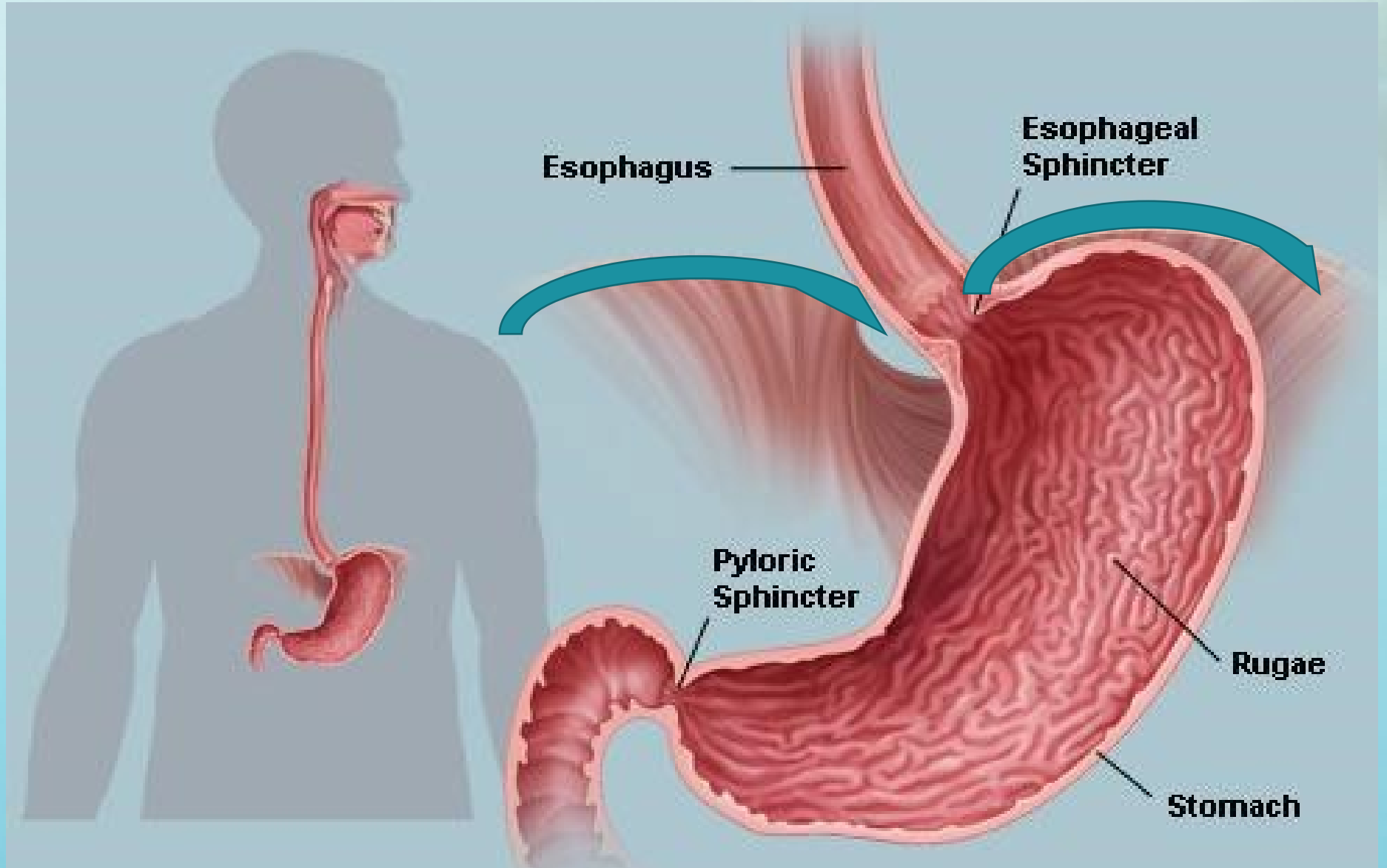
Stomach (Inside View)



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Food for Thought: Stomach Function

- Once food bolus enters stomach, the esophageal sphincter closes
- Stretches to hold between 2-4 Liters of food at one time
- Has stretch receptors to tell you when to stop eating
- Thick layer of mucosal cells that are kept coated with mucus to keep stomach from being damaged by stomach acids
- Decontamination Tank
- Very acidic environment due to production of HCL Acid
- HCL acid helps break down food and kills bacteria that enter through mouth (more acidic than battery acid)
- Gastric acids and enzymes continue digestive process and break bolus down into smaller particles (chyme)

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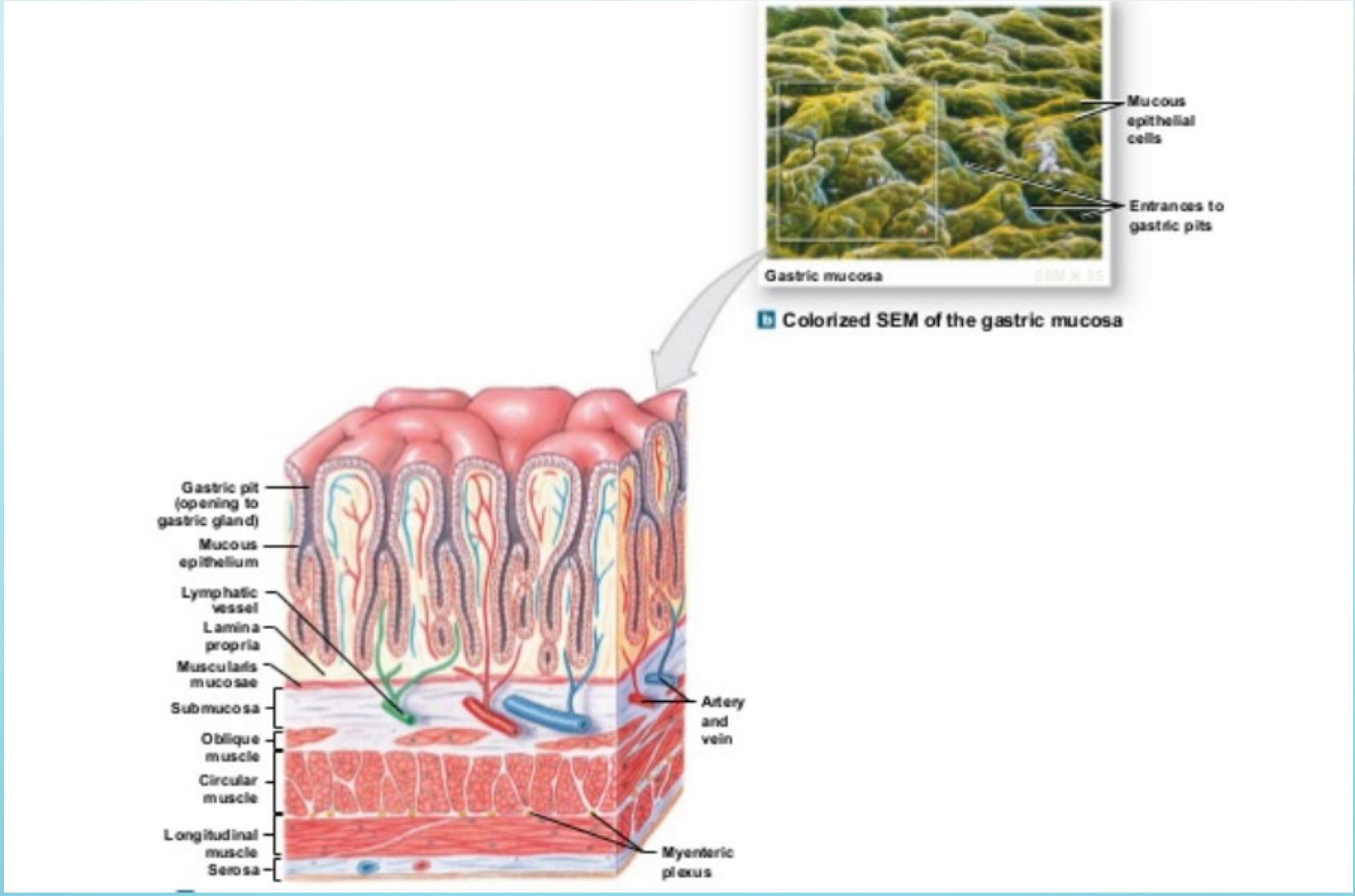

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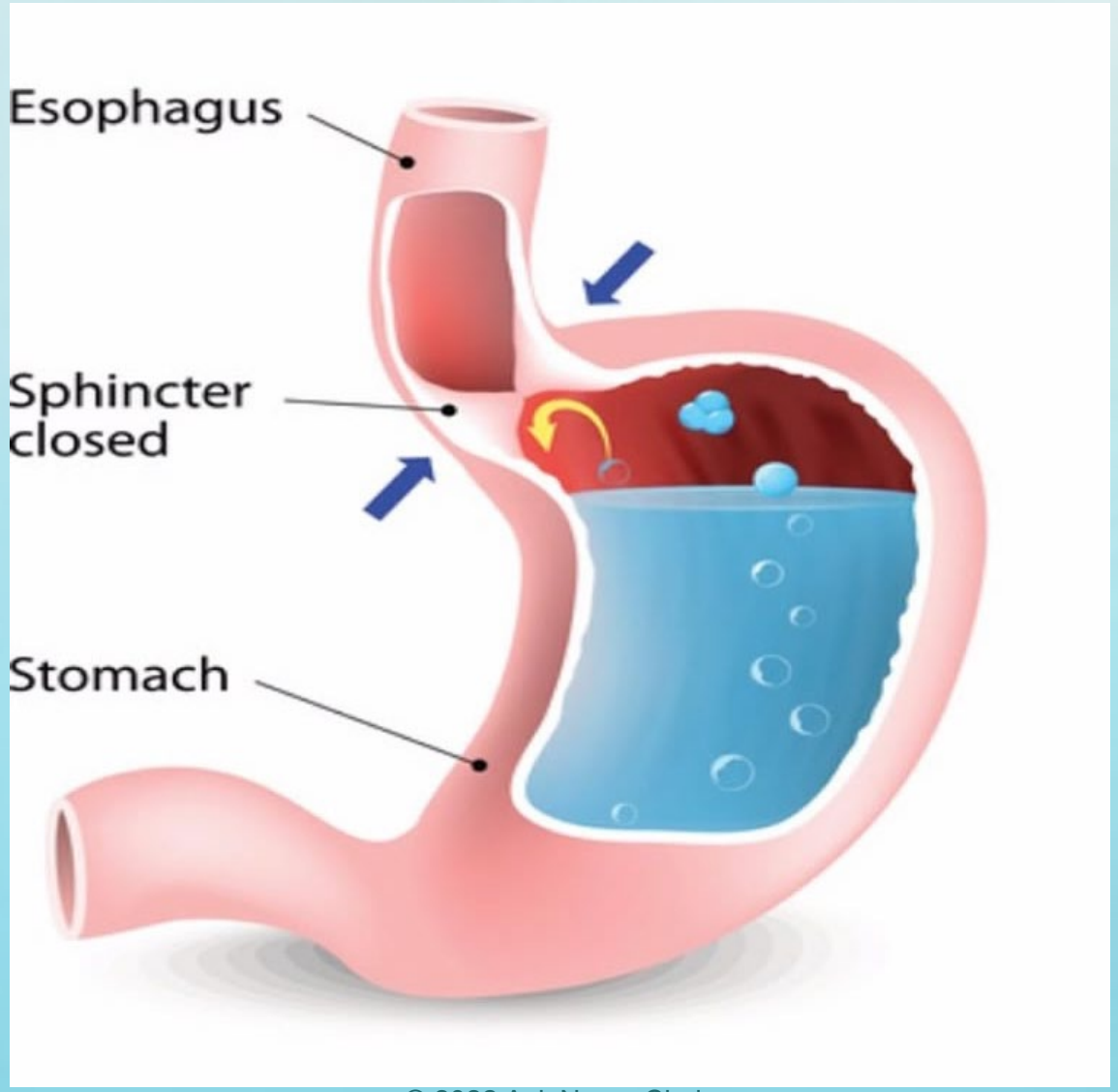
Churning and Yearning to Digest



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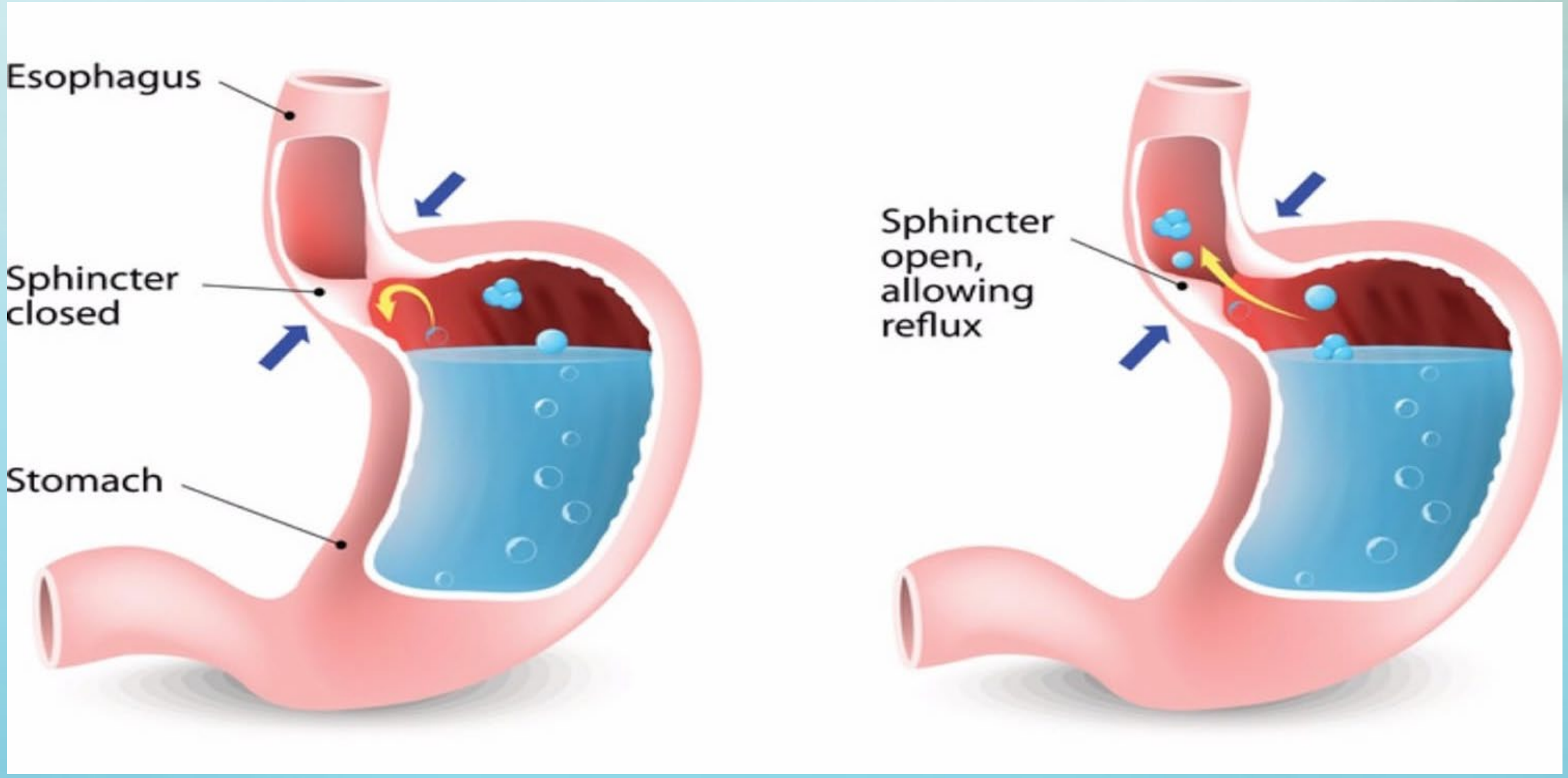
Gastro-Esophageal Reflux Disease (GERD)



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Food for Thought:

- Are Acid Blockers your friends?
- Proton pump inhibitors reduce the production of HCL acid
- IF the HCL acid kills bacteria via it's acidity and begins digestion, what happens if we take proton pump inhibitors for GERD
- Are there alternate ways to manage GERD?

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Small Intestines

- Don’t confuse “small” with short or unimportant
- ½ diameter of the large intestines but about 22 feet long
- 3 different areas with different functions (duodenum, jejunum and ilium)
- Almost all nutrient absorption occurs HERE
- This is not a small thing

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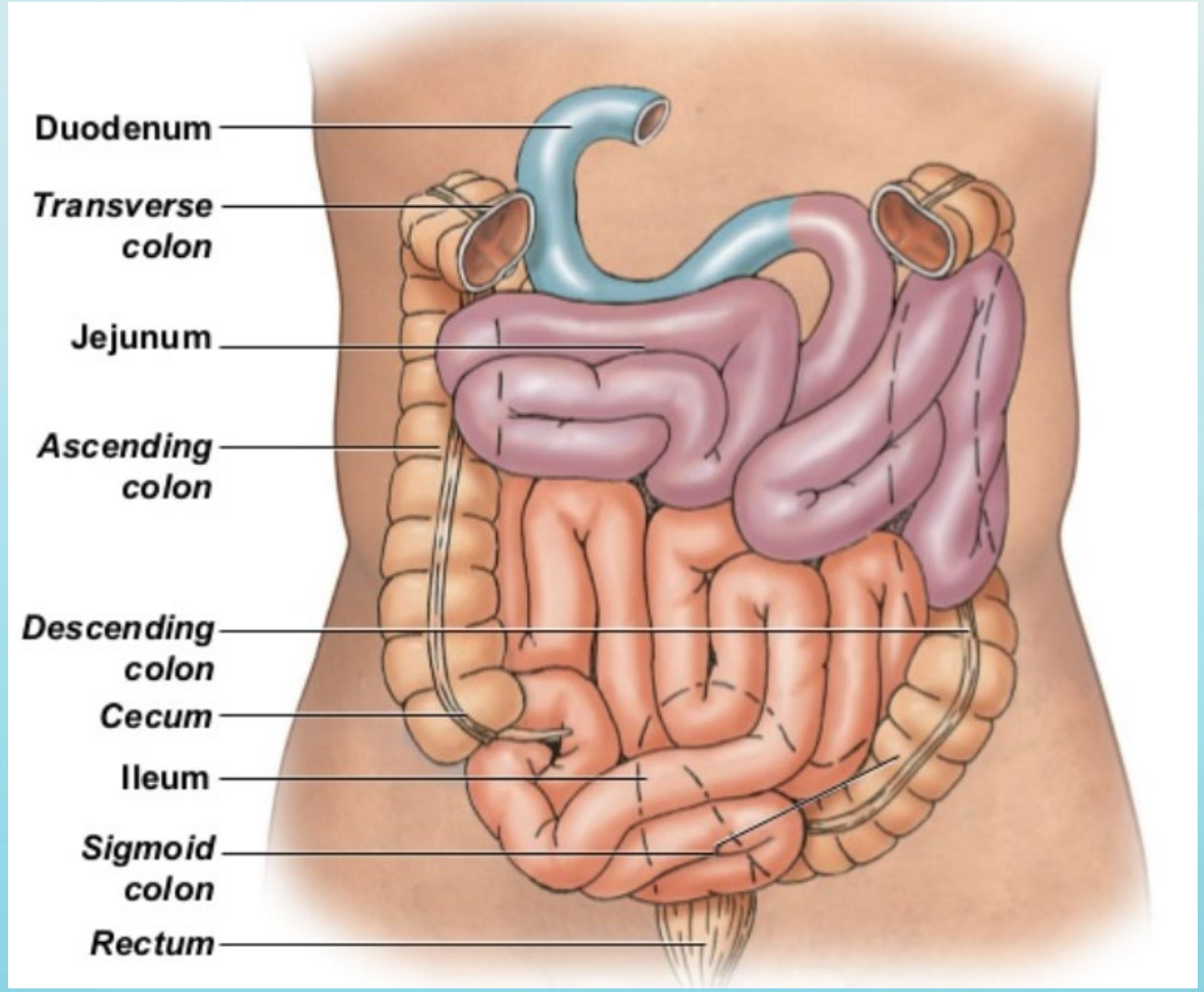
Duodenum, Jejunum, Ileum



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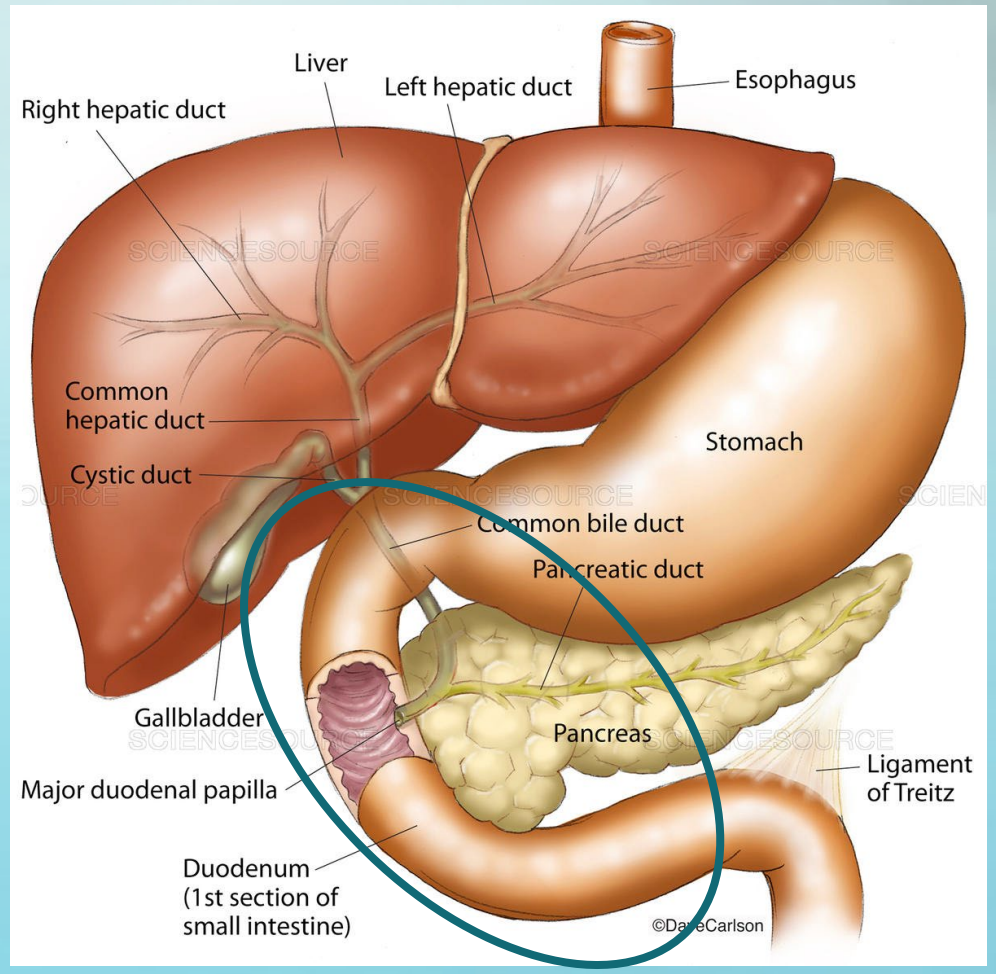
Duodenum

- First part of small intestines when chyme leaves stomach
- Shortest part of small intestines
- The mixing bowl
- Major work of digestion occurs here
- Bile from Gall Bladder
- Digestive enzymes from pancreas



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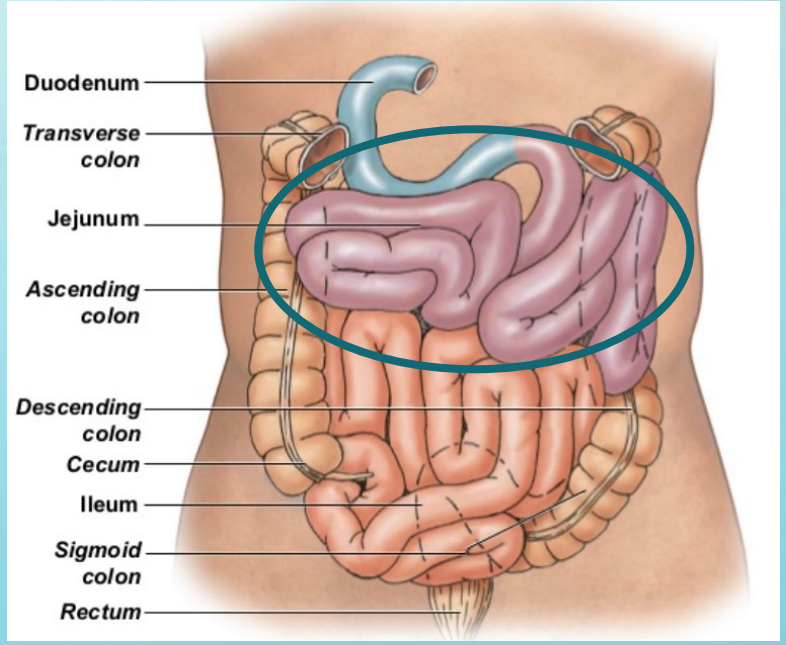
Jejunum

- Bulk of digestion absorption occurs here
- Chyme is further broken down
  - Fats=Fatty Acids and Glycerol
  - Protein=Amino Acids
  - Carbohydrates=Glucose, Fructose
    - and fiber



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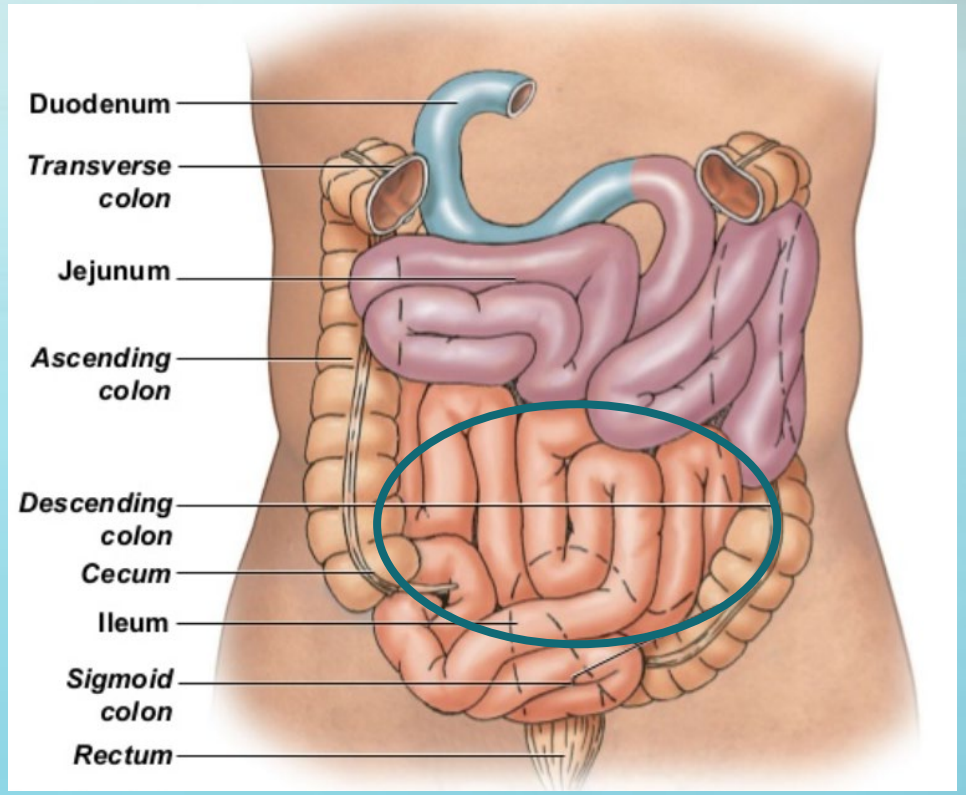
Ileum

- Longest part of small intestines
- Digested particles flow towards large intestines
- Increasing water absorption and nutrient absorption happens here
- B12 absorption here



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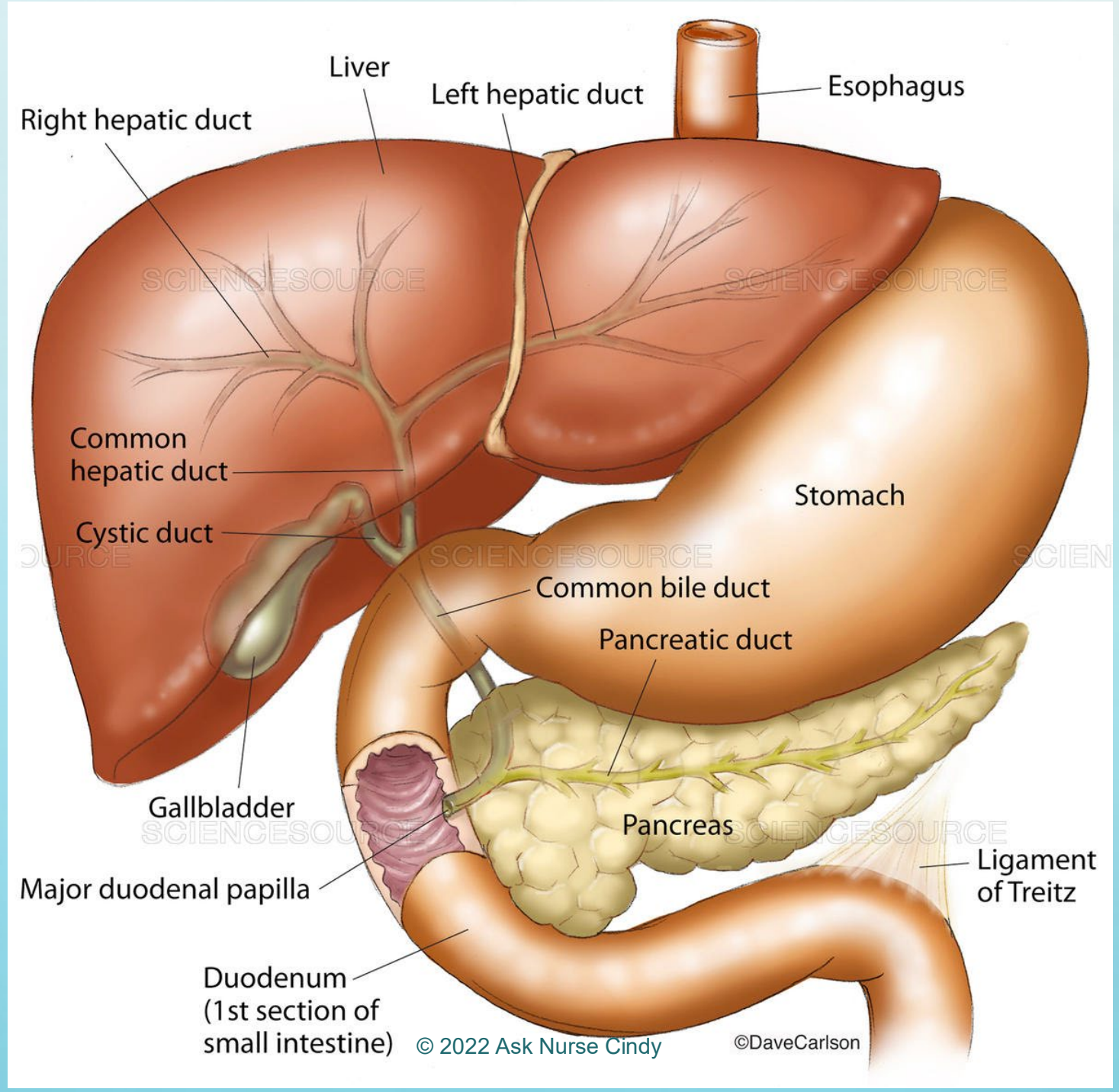

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A few functions of the Liver

- Synthesis and secretion of bile
- Storage of glycogen and lipid reserves
- Maintenance of blood glucose, amino acids and fatty acid concentrations
- Synthesis and release of cholesterol and binding to transport proteins
- Synthesis of clotting factors and plasma proteins
- Detoxification
- Storage of iron reserves, actual blood reserves and fat soluble vitamins
- Absorption and breakdown of circulating hormones (insulin and epinephrine)

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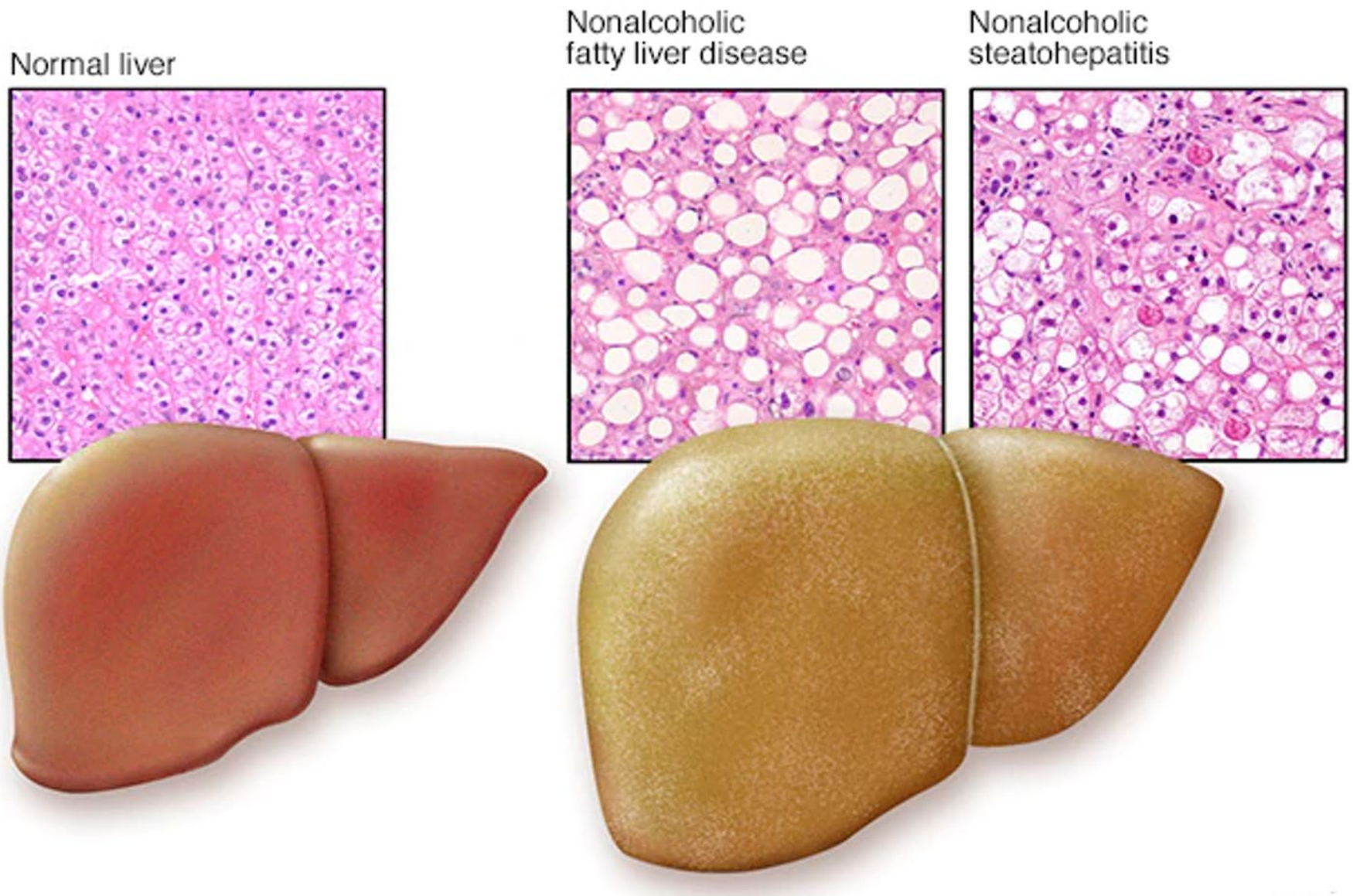

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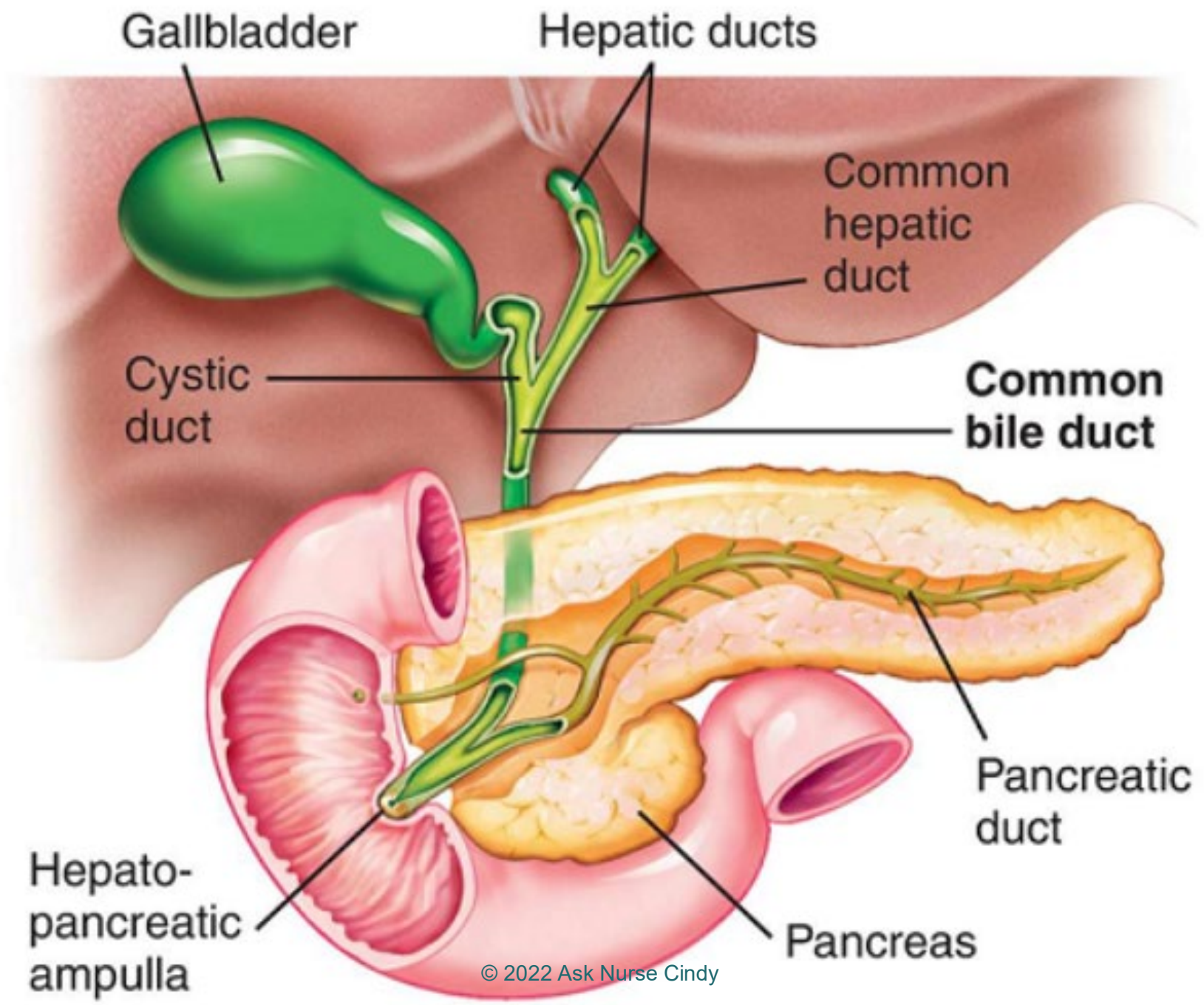

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Pancreatic Function

- Islet Cells-Insulin
- Beta Cells- Digestive enzymes

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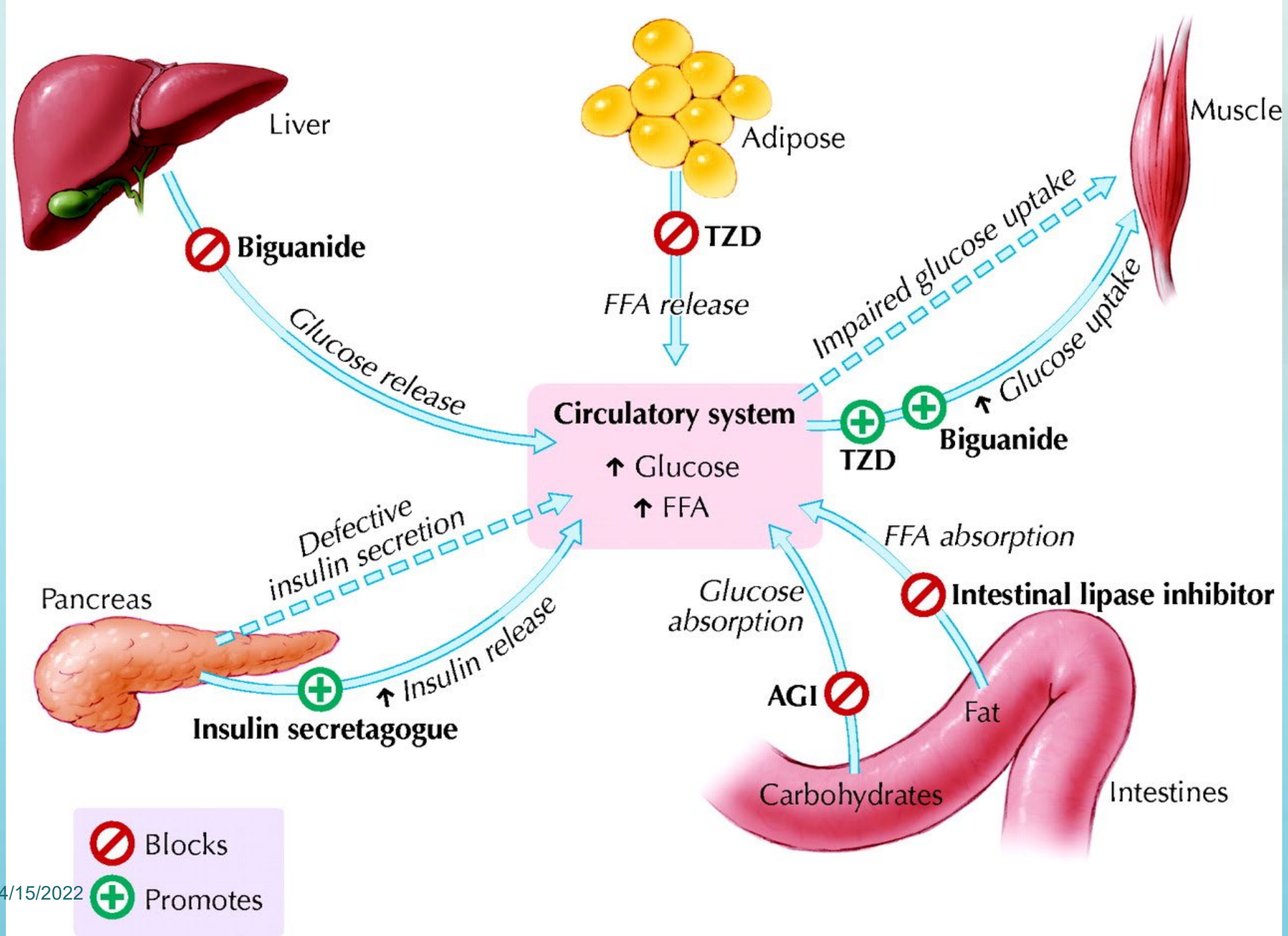
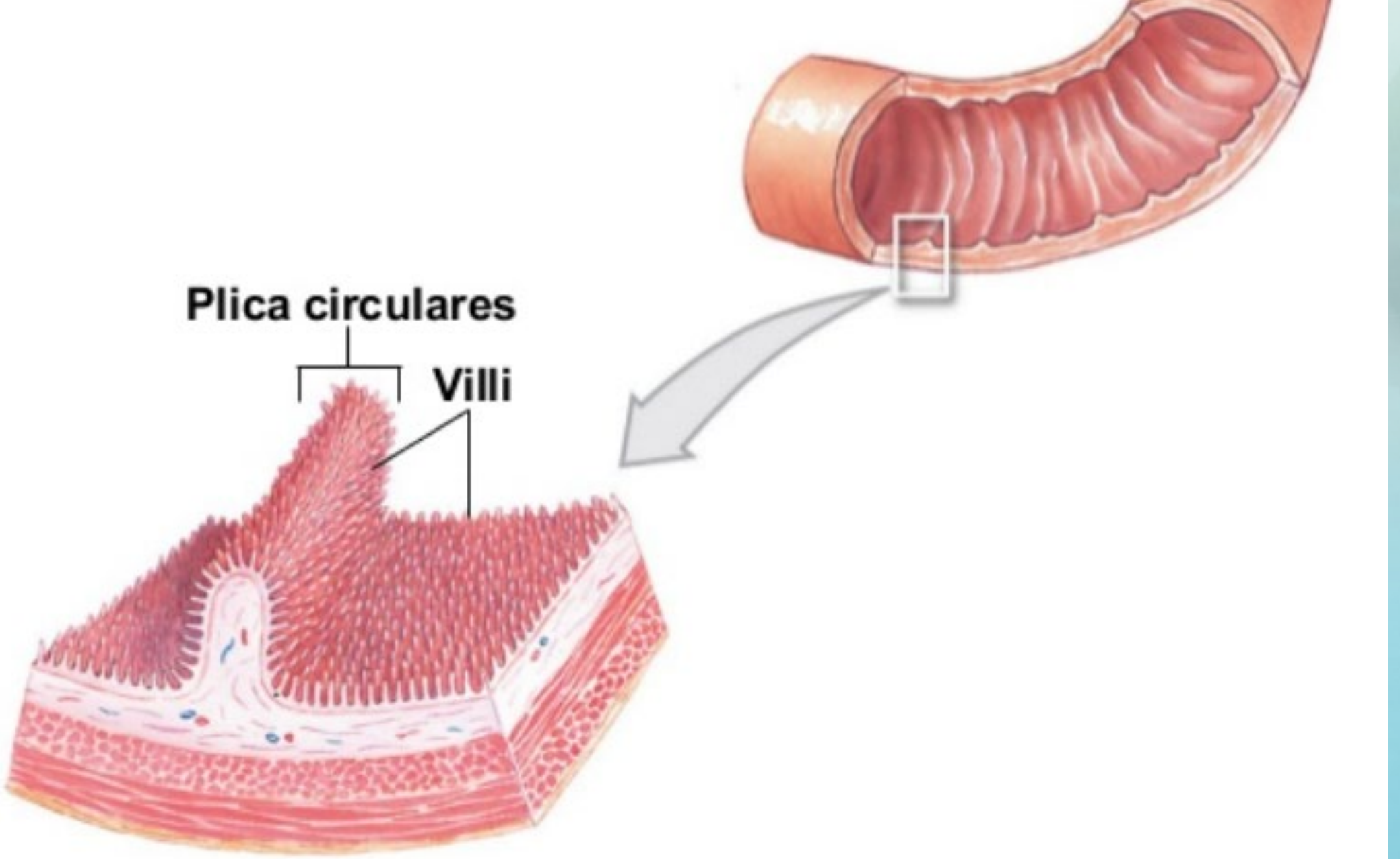

Liver
Biguanide
Glucose release
Adipose
TZD
FFA release
Muscle
Impaired glucose uptake
Glucose uptake
Circulatory system
↑ Glucose
↑ FFA
TZD
Biguanide
Defective insulin secretion
Pancreas
↑ Insulin release
Insulin secretagogue
FFA absorption
Intestinal lipase inhibitor
Glucose absorption
AGI
Fat
Carbohydrates
Intestines
Blocks
Promotes



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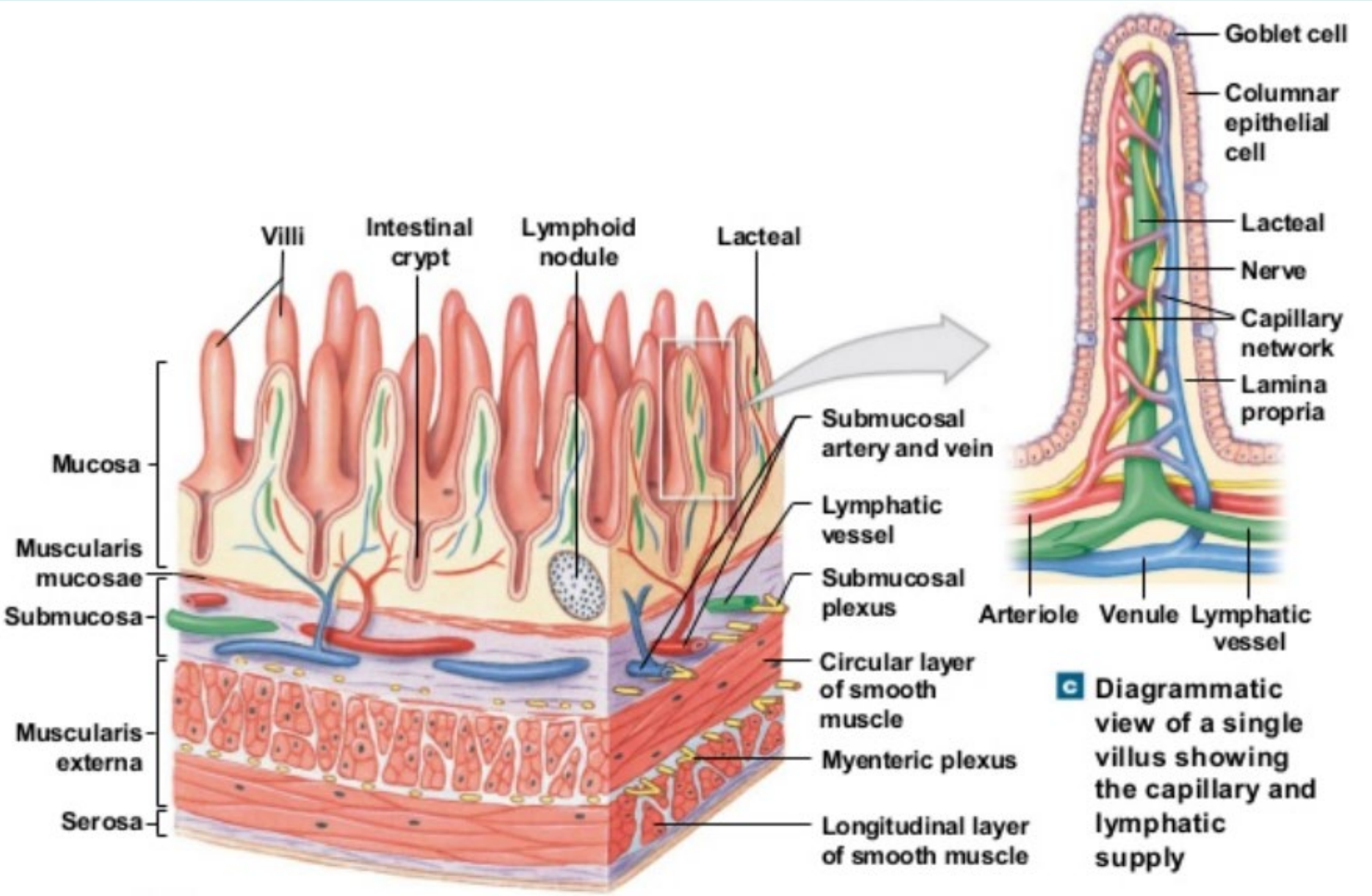

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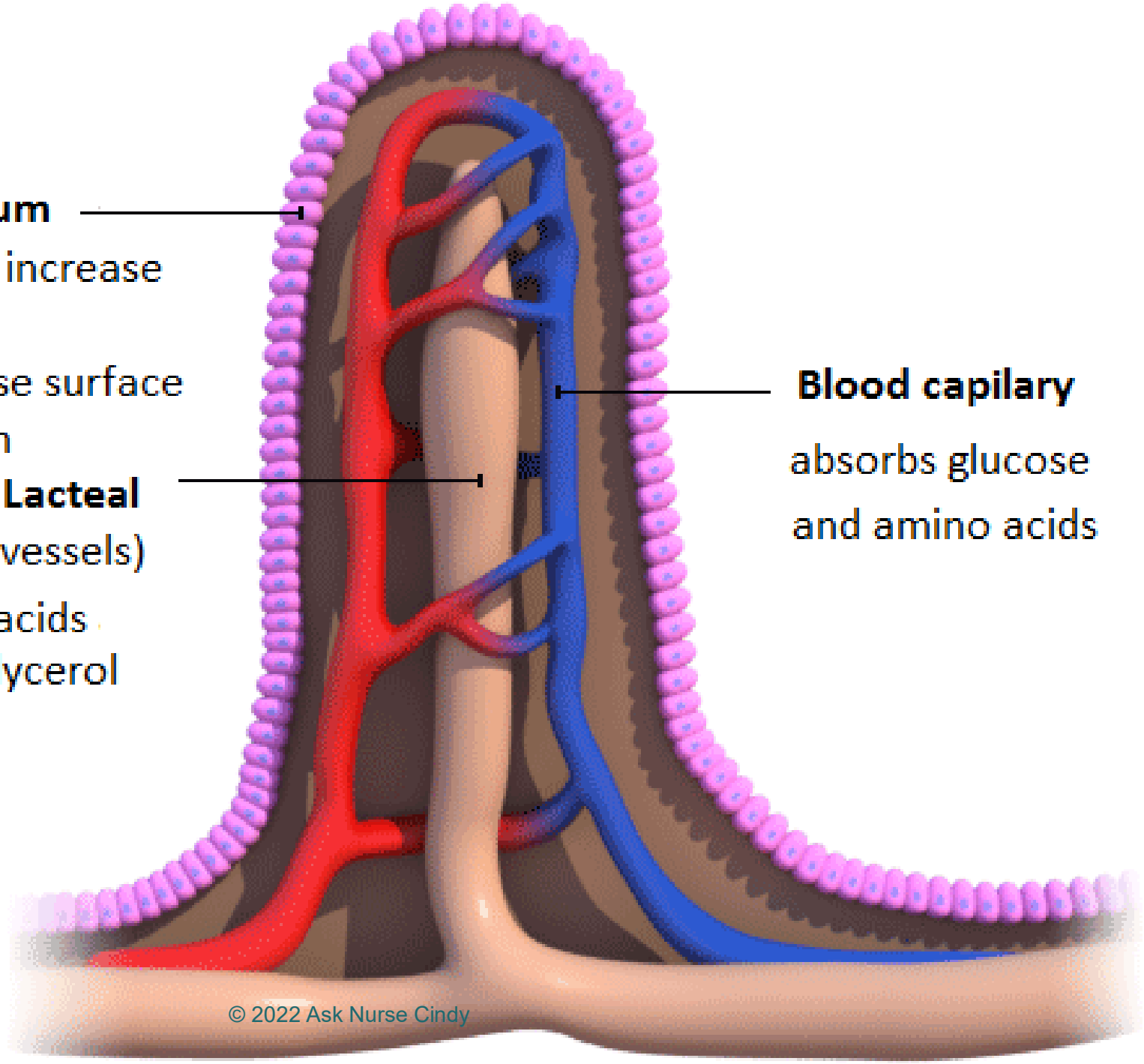
Thin epithelium

- one cell thick to increase diffusion rate
- microvilli increase surface area for absortion

Lacteal

(tiny lympatic vessels)

Absorbs fatty acids and glycerol



Blood capilary

absorbs glucose and amino acids

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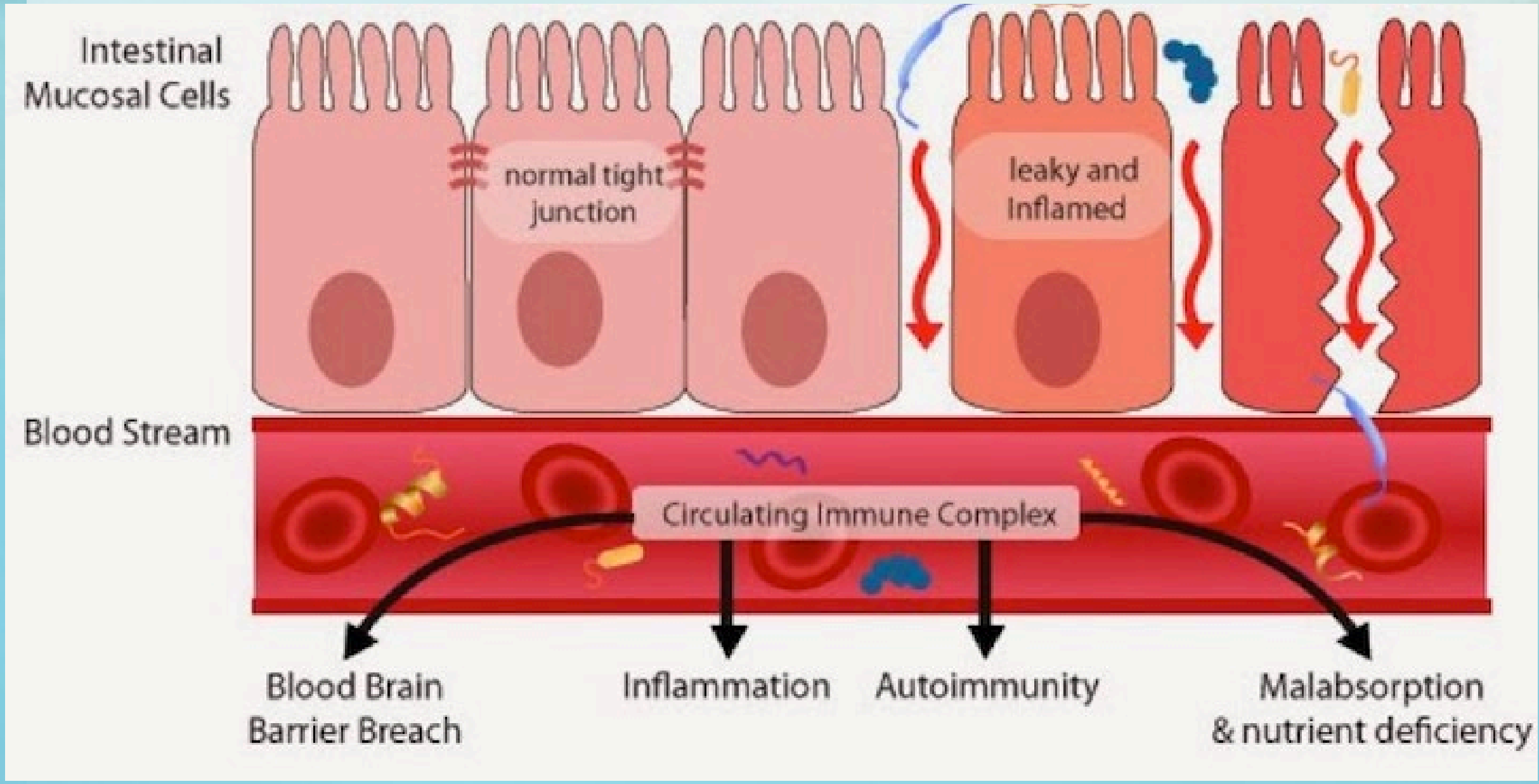

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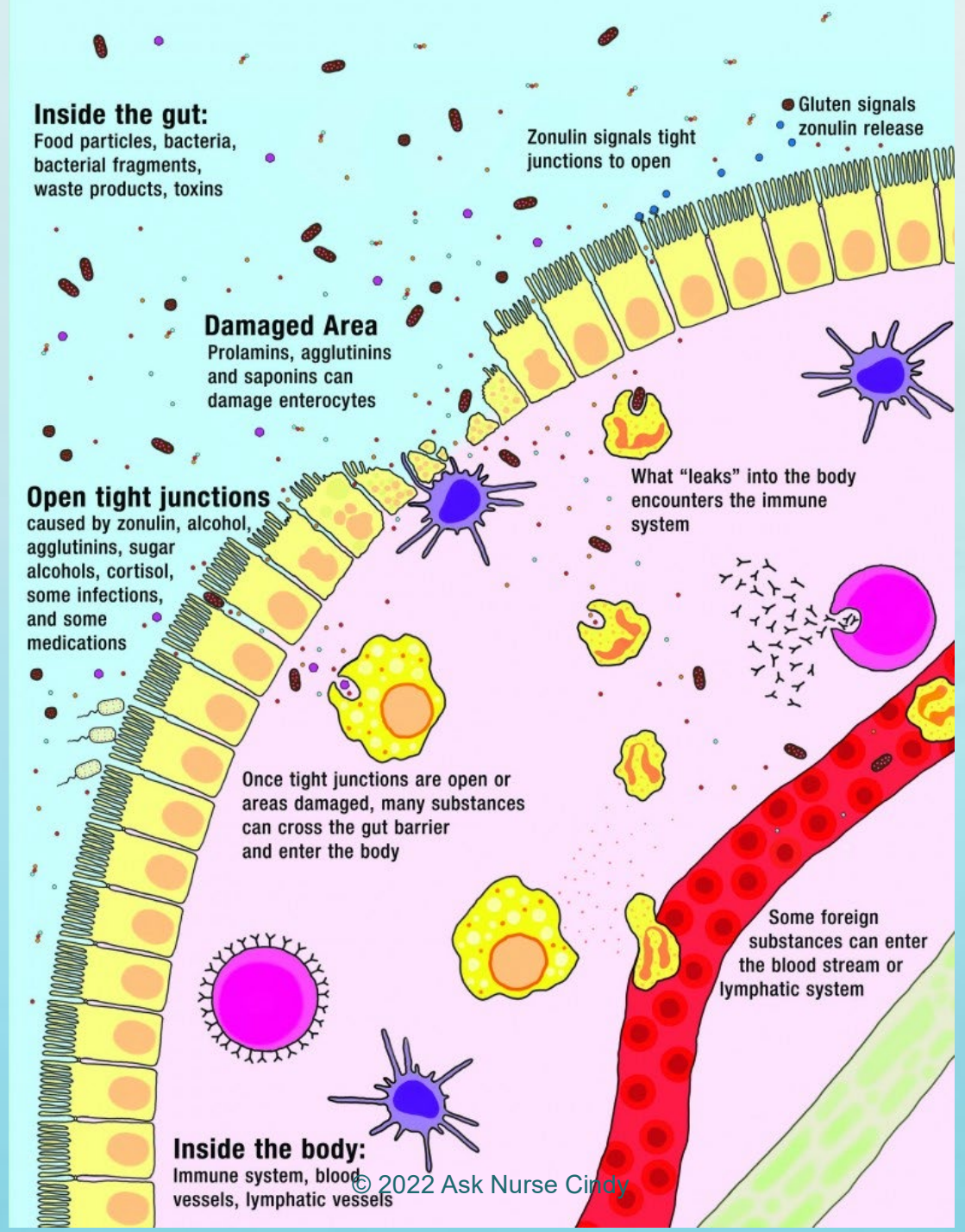

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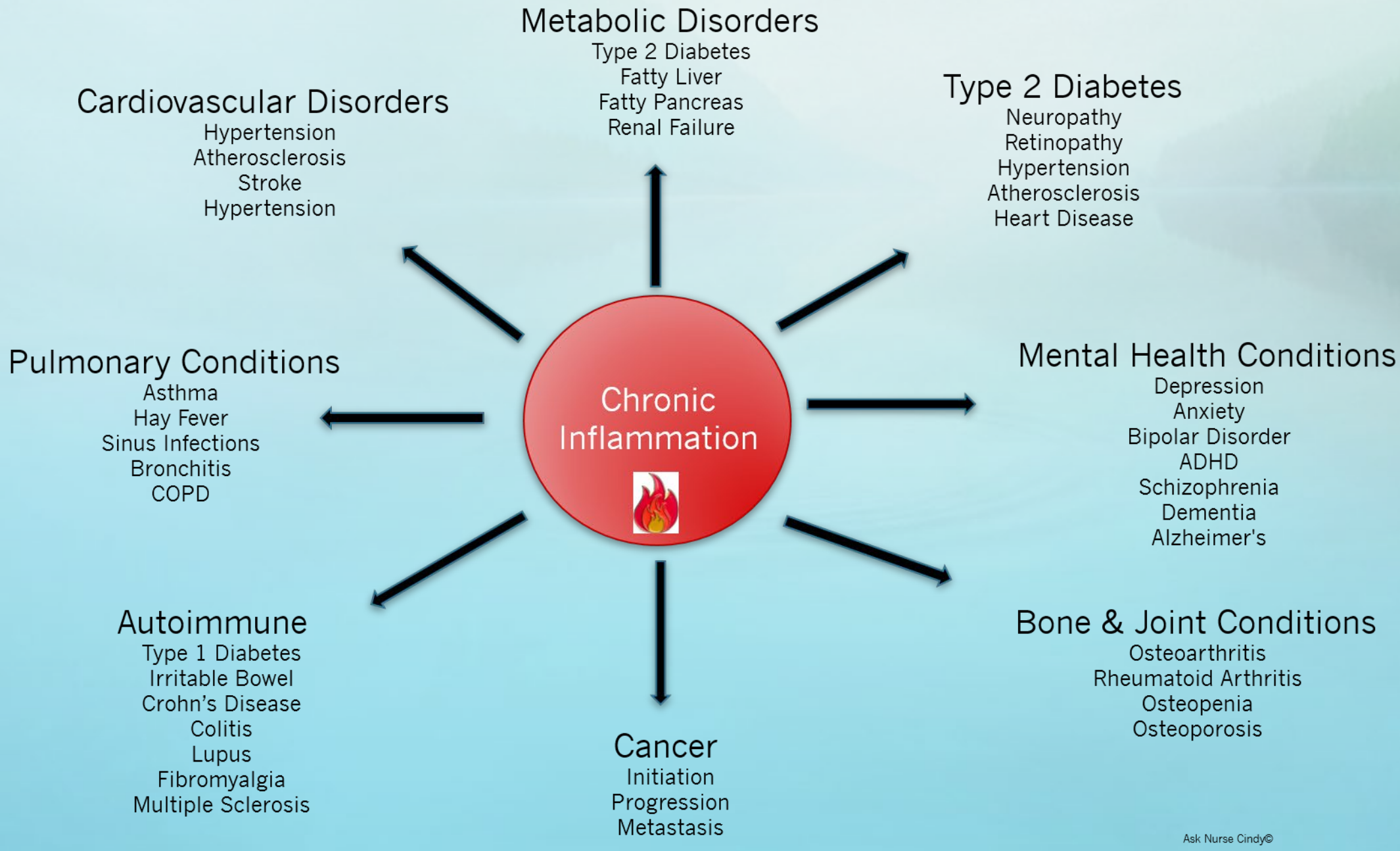

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Large Intestines:

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Food for Thought:
Large Intestine (Colon) Function

- Absorption of water
- Absorption of salts/some minerals
- Passage of junk (waste products) down and out
- Waste products (feces) become increasingly solid during transition
- Mucin produced to keep colon lubricated
- Feces exits the body (defecation)
- You are no longer full of crap

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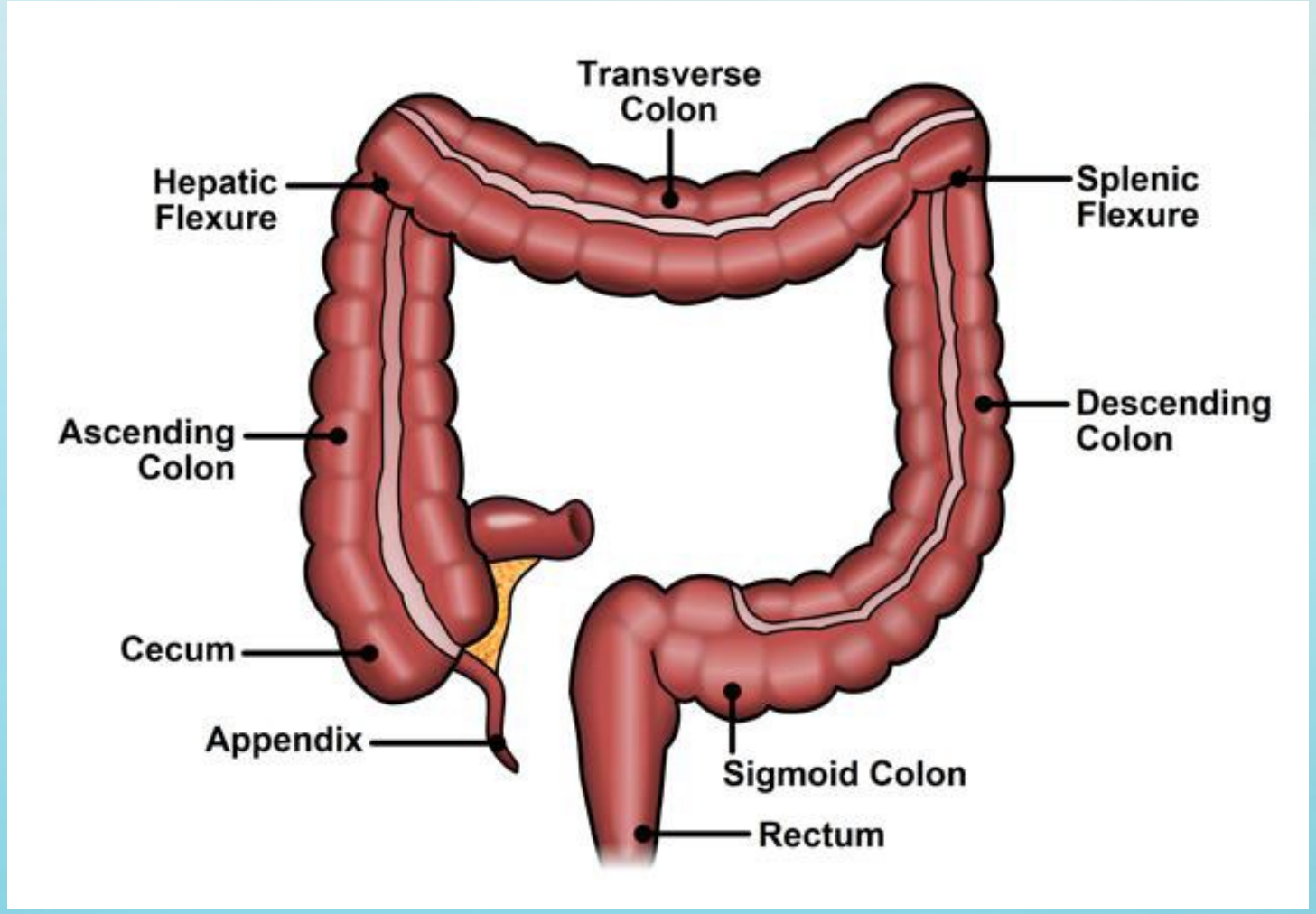
Colon: Down and OUT



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BRISTOL STOOL CHART

	Type 1	Separate hard lumps	SEVERE CONSTIPATION
	Type 2	Lumpy and sausage like	MILD CONSTIPATION
	Type 3	A sausage shape with cracks in the surface	NORMAL
	Type 4	Like a smooth, soft sausage or snake	NORMAL
	Type 5	Soft blobs with clear-cut edges	LACKING FIBRE
	Type 6	Mushy consistency with ragged edges	MILD DIARRHEA
	Type 7	Liquid consistency with no solid pieces	SEVERE DIARRHEA

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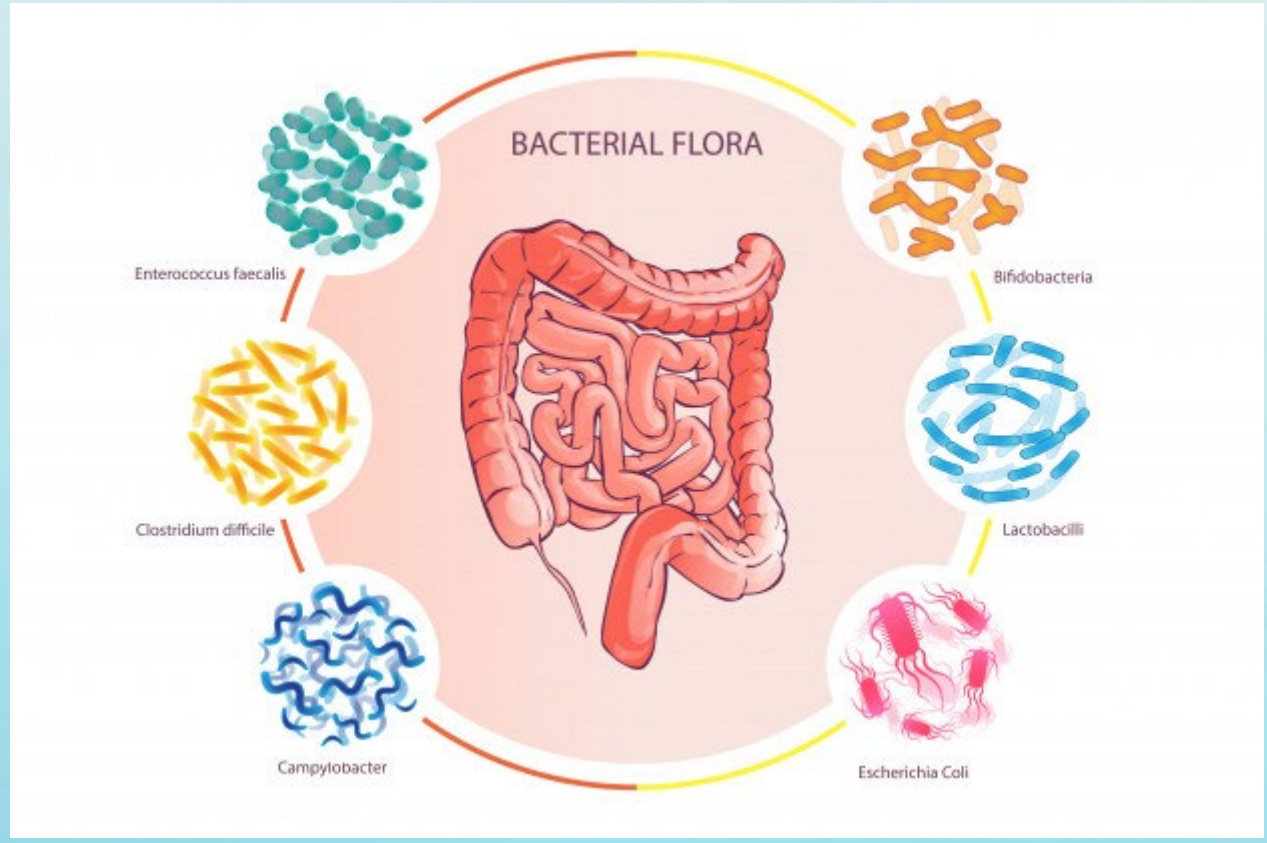
Good Bacteria/Bad Bacteria



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Fiber, Fermentation, Flatulence and Feces

- Soluble and Insoluble Fibers
- Soluble may be broken down and carbs released
- Insoluble of no benefit to nutrition and must be removed
- Intricate fermentation process using gut bacteria
- Anything that ferments produces gas bubbles
- Flatulence (Farts) often occurs and can be malodorous
- Many carnivores report they are not full of hot air

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Rectum and Anus

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Constipation

- Defined as less than 3 bowel movements/week
- Increased dehydration of feces occurs
- Characterized by straining, pain and difficulty with pain
- Rectum and parts of colon can become filled with feces and dehydration continues
- Impacts twice as many women as men
- Tends to grow more common with aging

- Fiber? Necessary or problematic?

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Constipation Risk Factors

- Smoking
- Certain medications
- Sedentary lifestyle
- Dehydration
- Fiber????
- Ignoring the urge to defecate

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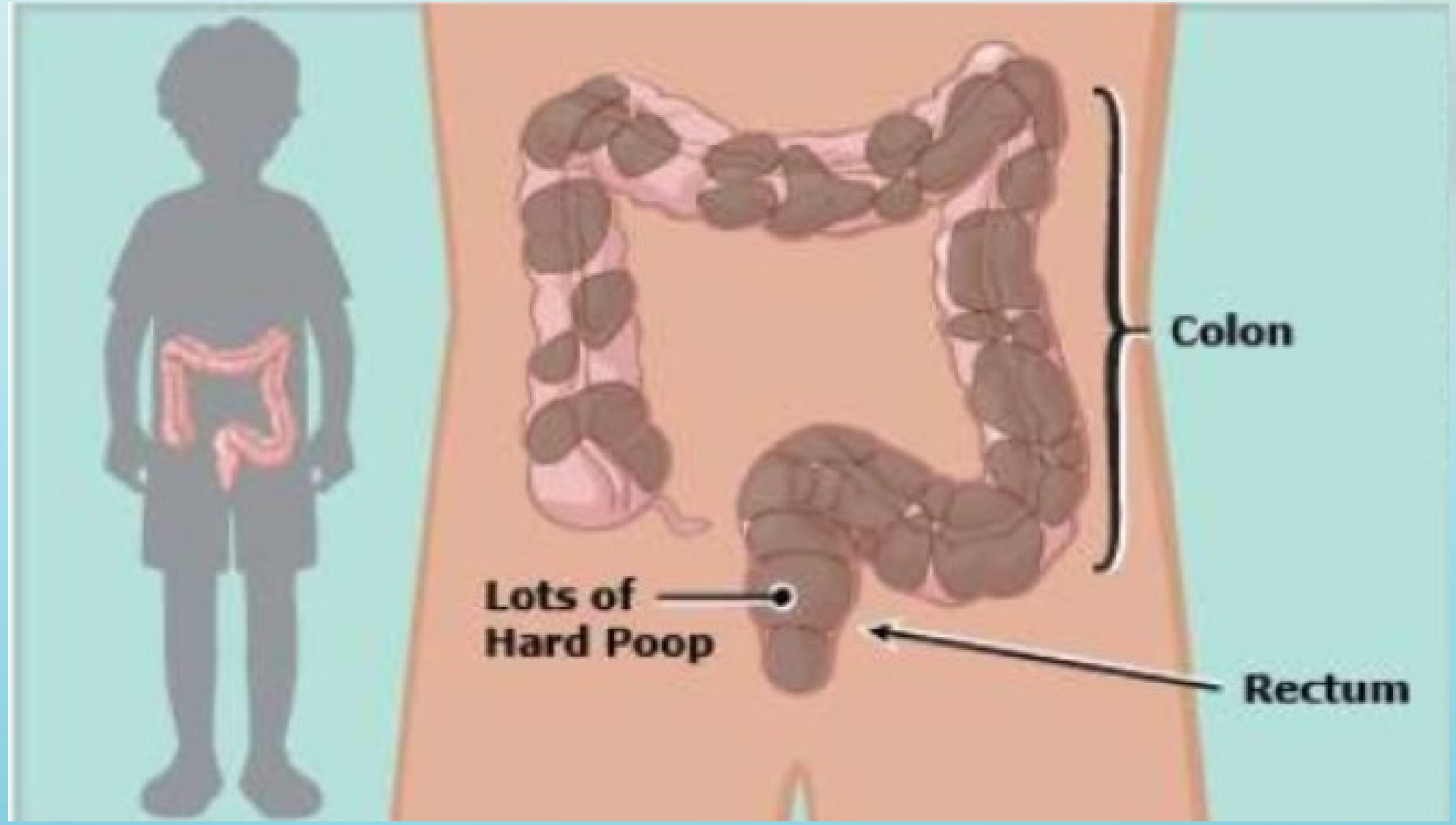
Feces Happens



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Constipation Non Drug Options

- Increase movement
  - Stretch prior to getting out of bed
  - Walk, bend, stretch through out the day
- Increase Water
  - Do not become dehydrated (drink drink drink)
  - Half your body weight in ounces
  - Warm water may be helpful
  - Consider decreasing/stopping dairy x 2 weeks
- Increase these:
  - Sodium
  - Magnesium Citrate
  - MCT or other oils

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Constipation Non Drug Options

- Adjust Fiber Intake
  - Soluble vs Insoluble-Go for the insoluble-Gluten can be a problem in many ways
  - Be aware may not be good if currently constipated
- DO NOT IGNORE THE URGE TO GO
  - Do not lean forward excessively
  - Sit straight up or slight lean forward
  - Consider foot stool to elevate knees above hips
  - Relax and breathe deeply and slowly
  - Do not stay on toilet more than 10 minutes at a time

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Diverticulosis, IBS, Crohns, Ulcerative Colitis

- Keto foods often reduce or eliminate flares/severity

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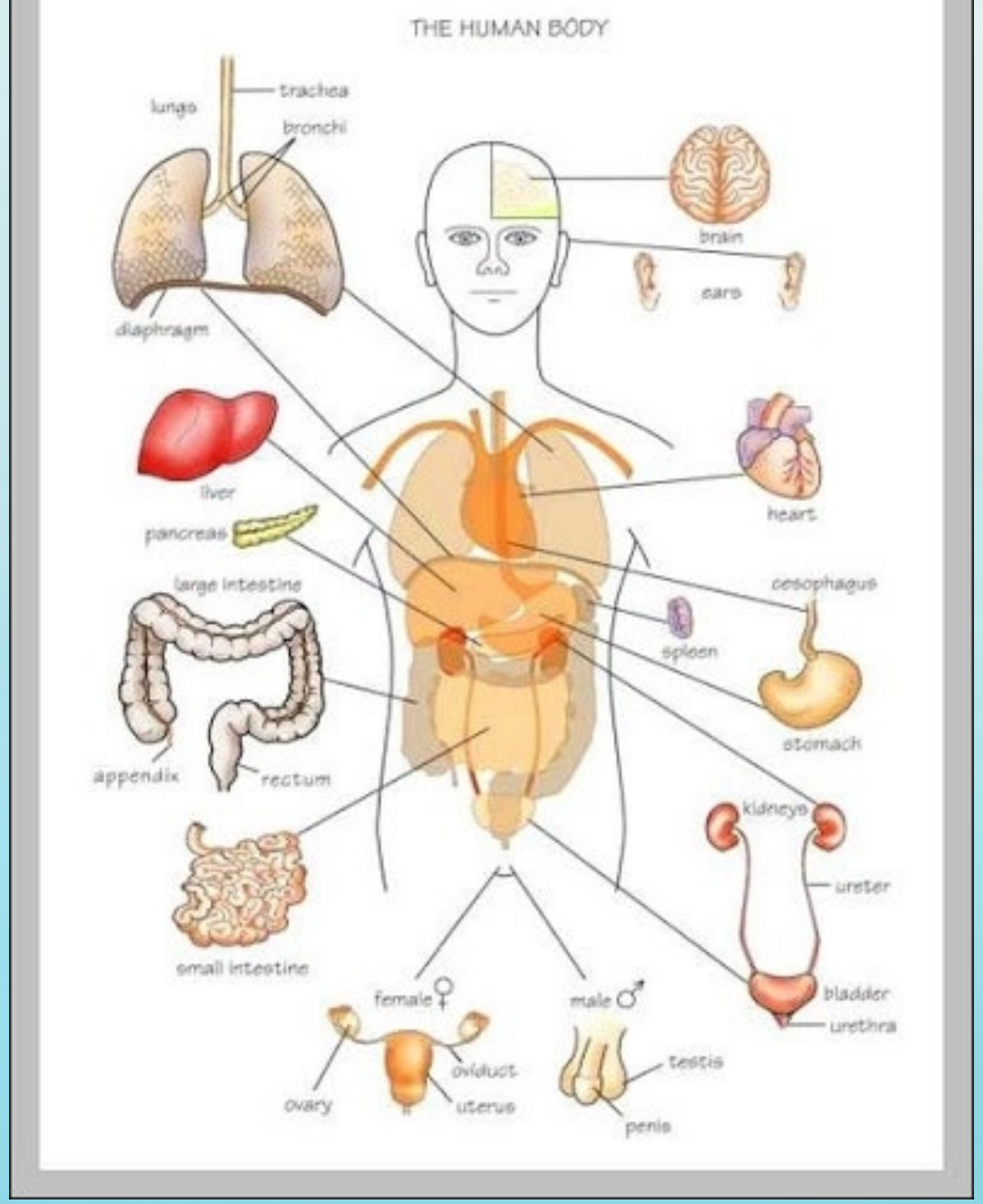

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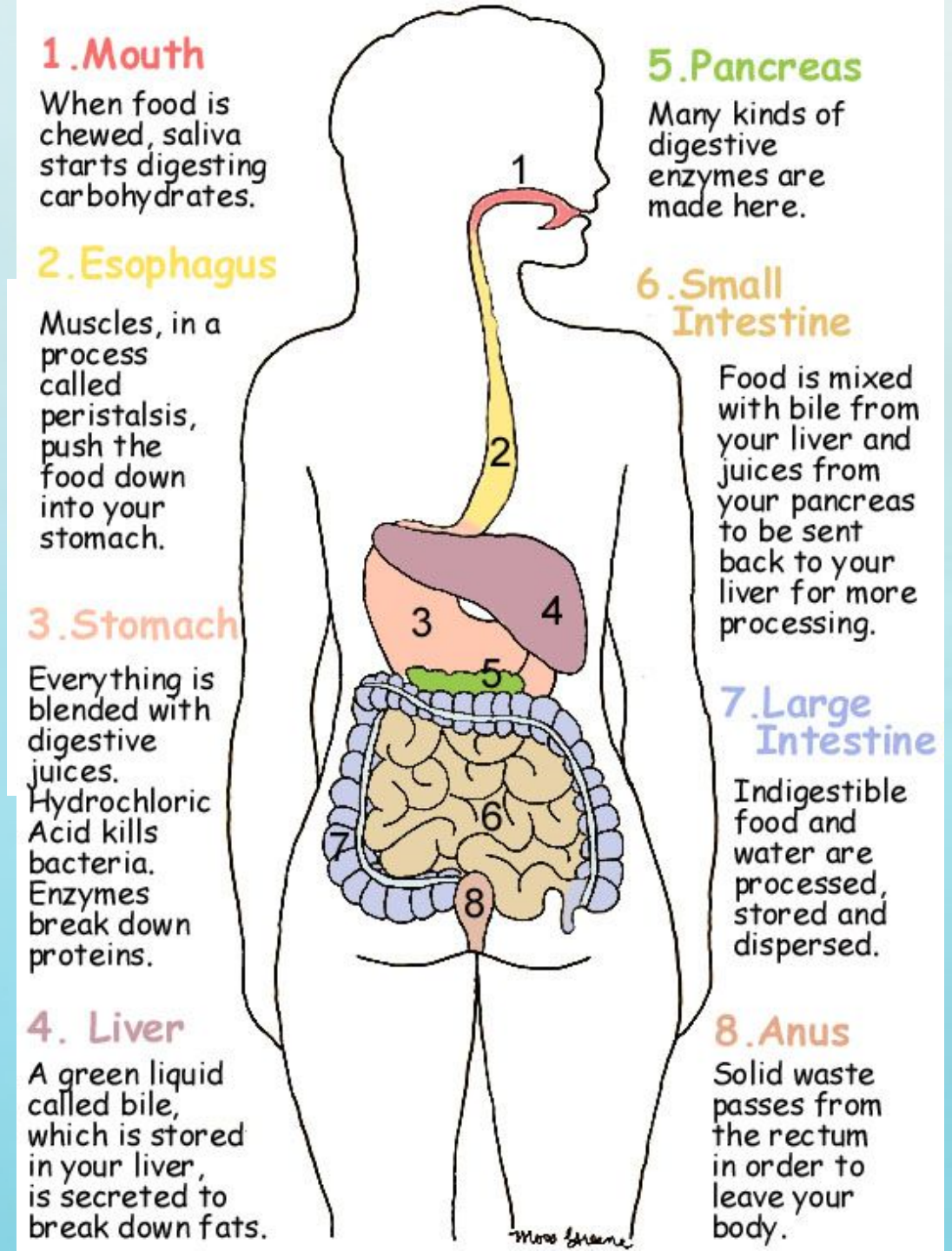
1.Mouth
When food is chewed, saliva starts digesting carbohydrates.
2.Esophagus
Muscles, in a process called peristalsis, push the food down into your stomach.
3.Stomach
Everything is blended with digestive juices. Hydrochloric Acid kills bacteria. Enzymes break down proteins.
4. Liver
A green liquid called bile, which is stored in your liver, is secreted to break down fats.
5.Pancreas
Many kinds of digestive enzymes are made here.
6.Small Intestine
Food is mixed with bile from your liver and juices from your pancreas to be sent back to your liver for more processing.
7.Large Intestine
Indigestible food and water are processed, stored and dispersed.
8.Anus
Solid waste passes from the rectum in order to leave your body.
1
2
3
4
5
6
7
8

Thanks for staying until the end. Questions?

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