The Digestive System
15.1

Functions: mechanical and chemical breakdown of food

absorption of nutrients

Consists of alimentary canal and accessory organs
15.2 Characteristics of the Canal
1. Mucosa - protects tissues and carries absorption
2. Submucosa - glands, blood vessels, nerves
3. Muscular Layer - smooth muscle tissue, pushes food (PERISTALSIS)
4. Serosa - visceral peritoneum, lubricates surfaces (serous fluid)
Villi increase surface area for absorption of nutrients.
DRAW THIS!

Serosa
Muscle Layers
Submucosa
Mucosa
Mixing Movements
Contractions mix food with digestive juices

Propelling Movements
Peristalsis - pushes food down the tube
15.3 Anatomy of the Mouth

Mouth - begins digestion by chewing and mixing with saliva

Tongue - moves food, connects to floor of mouth via FRENULUM; has papillae

Palate - forms roof of oral cavity (hard and soft); Uvula - back of the mouth
Palatine Tonsils - part of the immune system

**Tonsillitis** is an inflammation of the tonsils and will often, but not necessarily, cause a sore throat and fever. In chronic cases tonsillectomy may be indicated.
What are **tonsil stones**? Tonsilloliths, are hard white formations that are located on or within the tonsils.

What causes them?

Grooves and ridges on the tonsils can harbor bacteria and other debris. That debris eventually hardens, forming a stone.
Teeth
Primary (baby) vs Secondary teeth
Teeth

1st, 2nd, 3rd Molars

BICUSPIDS

CUSPIDS

INCISORS

CANINES

1st, 2nd, 3rd Molars
Anatomy of a Tooth

- Enamel
- Dentin
- Pulp
- Gums
- Bone
- Root Canal
- Nerves and blood vessels

Crown
Root
Tooth Anatomy
Tooth Decay
ROOT CANAL
Salivary Glands produce **AMYLASE**

This enzyme breaks down starch into sugars.

Mucus cells also produce mucus for lubrication during swallowing.

1. Parotid Gland
2. Submandibular Gland
3. Sublingual Gland
1. Parotid - ear, cheek
2. Submandibular - below jaw
3. Sublingual - under tongue
Pharynx

nasopharynx
oropharynx
laryngopharynx
**Esophagus**

esophageal hiatus is where it penetrates the diaphragm

cardiac sphincter at entrance to stomach
STOMACH MUSCLES: Longitudinal, Circular, Oblique

- Cardiac sphincter
- ESOPHAGUS
- FUNDUS
- CARDIAC REGION
- LESSEER CURVATURE
- PYLORIC SPHINCTER
- DUODENUM
- BODY of stomach
- GREATER CURVATURE
- RUGAE
- Longitudinal muscles
- Circular muscles
- Oblique muscles
Stomach

Regions

- Cardiac
- Fundic
- Body (greater and lesser curvature)
- Pyloric
Stomach Lining

Mucus prevents stomach from digesting itself, small openings called gastric pits contain glands.

Glands secrete gastric juices to breakdown food.

PEPSIN - most important digestive enzyme for breaking down food.
Chyme - paste, after food has been broken down, released then into the duodenum via the pyloric sphincter valve

Rugae - folds within stomach
PANCREAS - secretes insulin which breaks down sugars

Pancreatic Juice also breaks down fat

Chemicals empty into the

DUODENUM
Liver

1 large right lobe  |  1 smaller left lobe
BILIARY SYSTEM

Consists of liver, gall bladder, ducts
Functions to create bile used in digestion

(5) Cystic Duct (gall bladder)

(4) Hepatic Duct (liver)

Join to form the
(6) COMMON BILE DUCT

Empties into the duodenum
Liver Functions

1. blood glucose levels
2. breakdown of lipids and fats
3. protein metabolism
4. stores vitamins
5. recycles RBCs
6. removes toxins
7. secretes bile

Bile – yellowish-green liquid aids in digestion, breakdown of fat
Remember Bili Lights?

Using bili lights is a therapeutic procedure performed on newborn or premature infants to reduce elevated levels of bilirubin. If blood levels of bilirubin become too high, the bilirubin begins to dissolve in the body tissues, producing the characteristic yellow eyes and skin of jaundice.
15.9 Small Intestine

Main function: **absorption** of nutrients

1. Duodenum
2. Jejunum
3. Ileum

**MESENTERY** - supports coils of small intestine and contains blood vessels
Greater Omentum (peritoneum)

a "curtain-like" membrane that covers the intestines, stores fat and lays like a drape
Greater Omentum
Intestinal villi - increase surface area to absorb nutrients, connect to vessels
Large Intestine

1. **Cecum** = start of large intestine, has an attached appendix

2. **Colon** = 4 sections, ascending / transverse / descending / sigmoid

3. **Rectum** – stores waste before it is expelled from the body

4. **Anus** - muscular sphincter which controls the exit of waste
Function of Large Intestine

Secretes mucus, reabsorbs water, contains bacteria to aid in digestion (intestinal flora)

Mass Movements (defecation) - removes undigested food

The main job is

**WATER REABSORPTION**..
How to Make Fake Poop...
Types 1–2 indicate constipation, with 3 and 4 being the ideal stools (especially the latter), as they are easy to defecate while not containing any excess liquid, and 5, 6 and 7 tending towards diarrhea.

Source: wiki
1. esophagus
2. liver
3. stomach
4. pyloric sphincter
5. duodenum
6. pancreas
7. jejunum
8. ileum
9. cecum
10. appendix
11. ascending colon
12. descending colon
13. sigmoid colon
14. anus
Disorders of the Digestive System

A Gastroenterologist is a physician with dedicated training and unique experience in the management of diseases of the gastrointestinal tract and liver.
GERD
Gastroesophageal reflux disease (acid reflux)
Dysentery or Diarrhea

Failure to reabsorb water in the large intestine, which leads to watery stool. Dehydration can lead to death.

Causes Include:

- Parasitic Infection (Ameba, Cryptosporidium)
- Bacterial Infection (Cholera, E. coli, Salmonella)
- Viruses (Norovirus and other stomach bugs)
- Food allergy or intolerance

Gastroenteritis is a generic name used to describe vomiting and diarrhea
Cholera cots
The **MICROBIOME**

The average human digestive tract is home to as many as 1,000 species of microorganisms. When something upsets the balance of these organisms in your gut, otherwise harmless bacteria can grow out of control and make you sick.

One of the worst offenders is a bacterium called *Clostridium difficile* (or C. *diff*).

[Become a Stool Donor at OPENBIOME.org](https://openbiome.org)
HEPATITIS A, B, C

Hepatitis A

-caused by eating food or water infected with a virus called HAV.

While it can cause swelling and inflammation in the liver, it doesn't lead to chronic disease. Almost everyone who gets hepatitis A has a full recovery, some may need hospitalization.

There is a vaccine!
Hepatitis B is spread by contact with an infected person's blood, semen, or other body fluid. Some people never develop symptoms, others develop chronic symptoms that stay with them their whole life.

There is a vaccine!
**Hepatitis C** is caused by the virus HCV. It is spread the same way as hepatitis B, through contact with an infected person's blood, semen, or body fluid.

Like hepatitis B, hepatitis C causes swelling of the liver and can cause liver damage that can lead to cancer. Most people who have hepatitis C develop a chronic infection. This may lead to a scarring of the liver, called **cirrhosis**.
Crampy abdominal pain
Fatigue
Loss of appetite
Pain with passing stool (tenesmus); bloody stool
Persistent, watery diarrhea
Weight loss
Constipation
IBS - Irritable Bowel Syndrome

The muscles in the bowel wall may contract too forcefully or too weakly, too slowly or rapidly at certain times.
Burning upper abdominal pain, particularly between meals, early in the morning, or after drinking orange juice, coffee, or alcohol,

Treated with antibiotics to kill H. pylori bacteria.
Constipation
difficulty in emptying the bowels, usually associated with hardened feces.

symptoms of chronic constipation include:

- Passing fewer than three stools a week
- Having lumpy or hard stools
- Straining to have bowel movements
- Feeling as though you can't completely empty the stool from your rectum
Hemorrhoids

swollen veins in your anus and lower rectum

may result from straining during bowel movements or from the increased pressure on these veins during pregnancy

Can cause pain, itching, and minor bleeding during bowel movements
Lactose Intolerance

Inability to digest milk, can cause stomach upset
Appendicitis

Recent news on the function of the appendix.

The appendix acts as a storehouse for good bacteria, “rebooting” the digestive system after diarrheal illnesses.

ScienceDaily Article
Hernia

intestines poke through abdominal muscles
When people with celiac disease eat foods containing gluten, their immune system responds by damaging villi.

Without healthy villi, a person becomes malnourished, no matter how much food one eats.
Gallstones are made from cholesterol and other things found in the bile. They can be smaller than a grain of sand or as large as a golf ball.
Gallstones within the gall bladder
what is it, gall bladder?
can’t you see I have a lot to do?

I maked these

you made STONES?

YOU'RE JUST SUPPOSED TO HOLD WHAT I GIVE YOU!
GET OUT! GO ON!

I maked these

theAwkwardYeti.com
Obesity = BMI is 30 or more

*Body Mass Index* is based on height and weight
Treatments (extreme) for obesity

Gastric Bypass

Lap Band
Dysphagia - problems with swallowing

Aspiration - when food or other objects enter the airway.

Can result in aspiration pneumonia.
Colon Cancer

Colonoscopy is a screening technique to detect cancer.

See Katie Couric's Colonoscopy