

The Digestive System

How do the accessory organs help with the digestion of food and protection of your intestines?

Photo Credit:

• science.nationalgeographic.com

Tongue Salivary Glands These produce a CARBOHYDRASE enzyme called SALIVARY AMYLASE **Oesophagus** Your gullet.

Sphincters

Rings of muscle which are squeezed shut most of the time.

Liver

Where BILE is produced. Bile EMULSIFIES FATS and neutralises stomach acid (to make conditions right for the enzymes in the small intestine).

Gall bladder

Where bile is stored, before it's injected into the intestine.

Large intestine

Where excess water is absorbed from the food.

Rectum

Where the faeces are stored before they bid you a fond farewell through the anus.

Stomach

- 1) It PUMMELS THE FOOD with its muscular walls.
- 2) It produces the PROTEASE enzyme.
- 3) It produces HYDROCHLORIC ACID for two reasons:
 - a) To kill bacteria
 - b) To give the right pH for the protease enzyme to work (pH2 - acidic).

Pancreas

Produces all three enzymes: PROTEASE, CARBOHYDRASE and LIPASE.

Small intestine

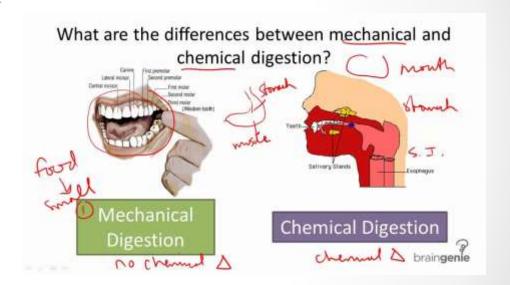
- 1) Produces all the three enzymes: PROTEASE, CARBOHYDRASE and LIPASE.
- 2) This is also where the "food" is absorbed into the blood.
- 3) The inner surface is covered with villi to increase the surface area. It's also very long.

The Big Picture

Study this figure well; we can almost stop right here with the notes!

Two Types of Digestion

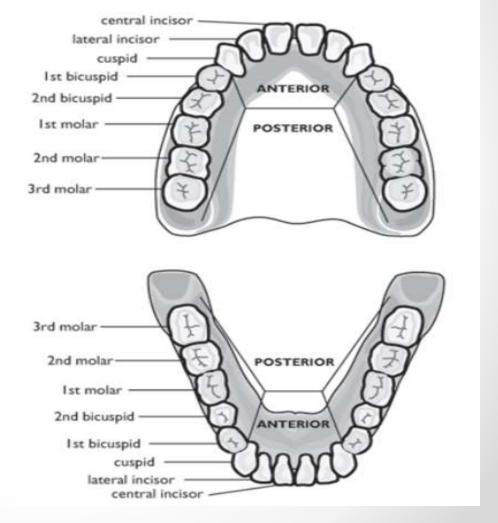
- Mechanical think ripping, churning – think teeth and stomach
- Chemical think enzymes and chemical reactions – think mouth (starch), stomach (acid), and small intestine



Teeth

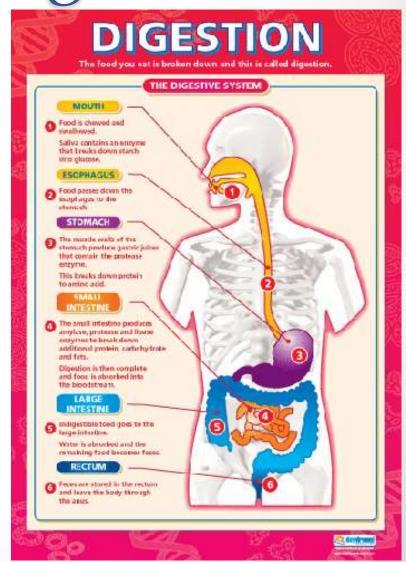
- We use teeth to masticate (chew) our food
- We usually have two sets throughout life – baby teeth and permanent teeth

Figure 6 - Names of the anterior and posterior teeth.



Chemical Digestion

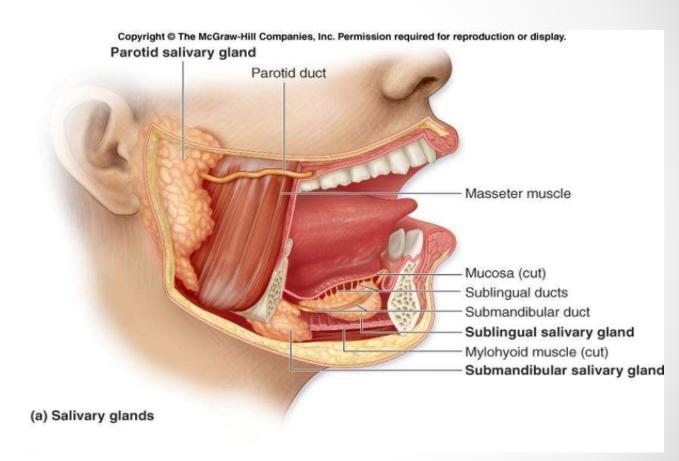
- Mouth : salivary amylase - starch
- Stomach: Pepsin and HCI – protein
- Pancreas: trypsin protein
- Small Intestine: trypsin
 (& other pancreatic enzymes) – protein. Bile
 & lipase – fat



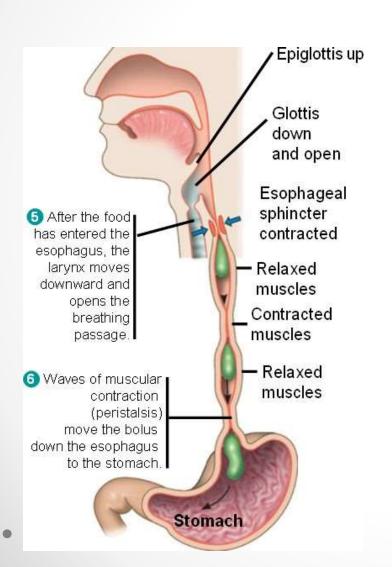
Salivary Glands

We have 3 pairs of salivary glands

- 1. Parotid
- 2. Submandibular
- 3. Sublingual
- produce saliva
 - enzyme salivary amylase
 - initiates starch digestion

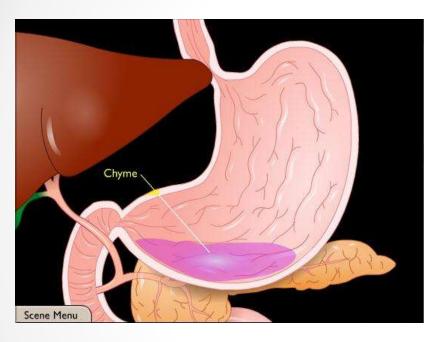


Peristalsis



- You can swallow food while "standing" on your head
- This is thanks to peristalsis
 - involuntary waves of contraction/relaxation of your alimentary canal
- Guess what happens when peristalsis goes backwards?

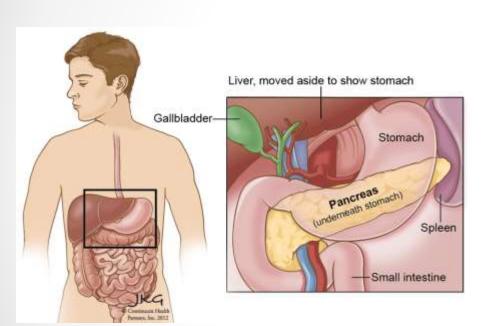
A Look at Chyme





Chyme is what we call partly digested food as it leaves the stomach; it's full of good stuff...yum!

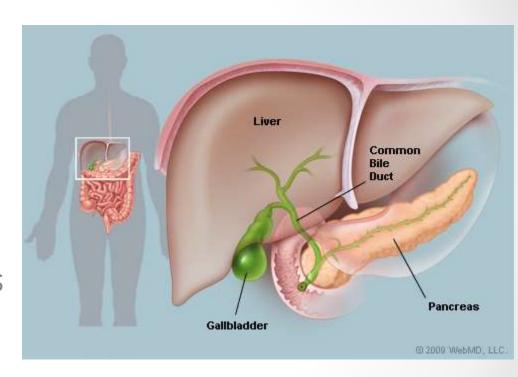
Pancreas



- Produces enzymes that breaks down chyme
- Its solutions are secreted into the duodenum and neutralize the stomach acid
- The pancreas also has an endocrine function
 - remember insulin and glucagon?

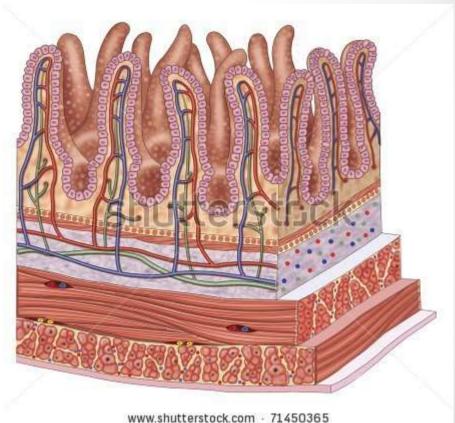
Liver & Gall Bladder

- The liver is the largest gland in the body – it has many roles in metabolism but in digestion it produces
 - Bile a yellow to green solution that emulsifies fat (breaks big fat globs into little globs)
 - Bile is stored in the gall bladder

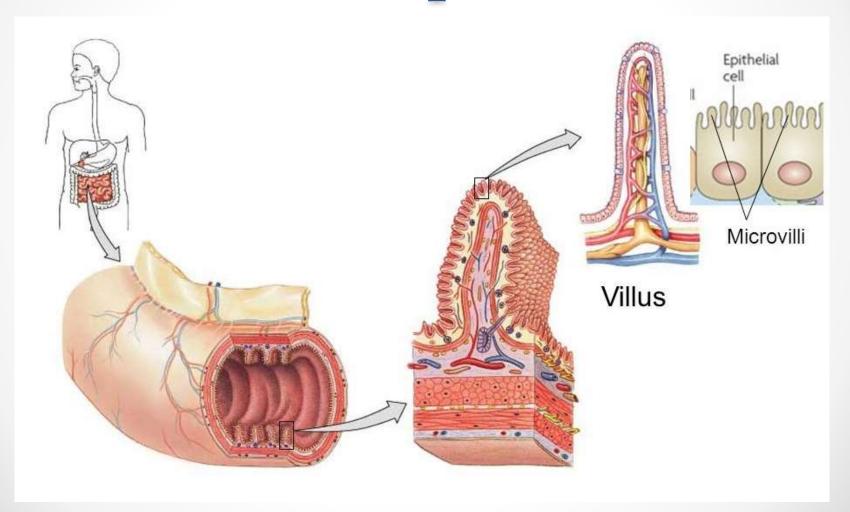


Absorption

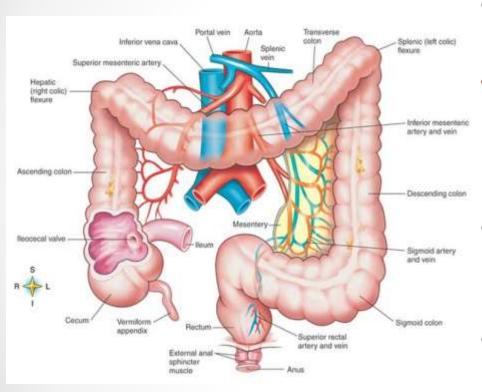
- Now that food is broken down to molecular size, it needs to be sent to the blood stream
- The major site for absorption is the small intestine
- The villi are loaded with capillaries and that's where the action happens



Absorption



Elimination



- The large intestine is the player here
- No enzymes but a lot of symbiotic bacteria, which make vitamin K and some B for us
- Water is absorbed here to produce the end product – feces
- What you see here is what you ate hours ago!

A Word on Farts

- Also called flatus
- Produced by large intestine bacteria breaking down what little nutrients are left
- Mostly CO2, methane, and hydrogen sulfide
- About 500 ml/day
- Certain foods cause more gas production; carbohydrate-rich foods like beans, certain green vegetables