# Human Digestive System

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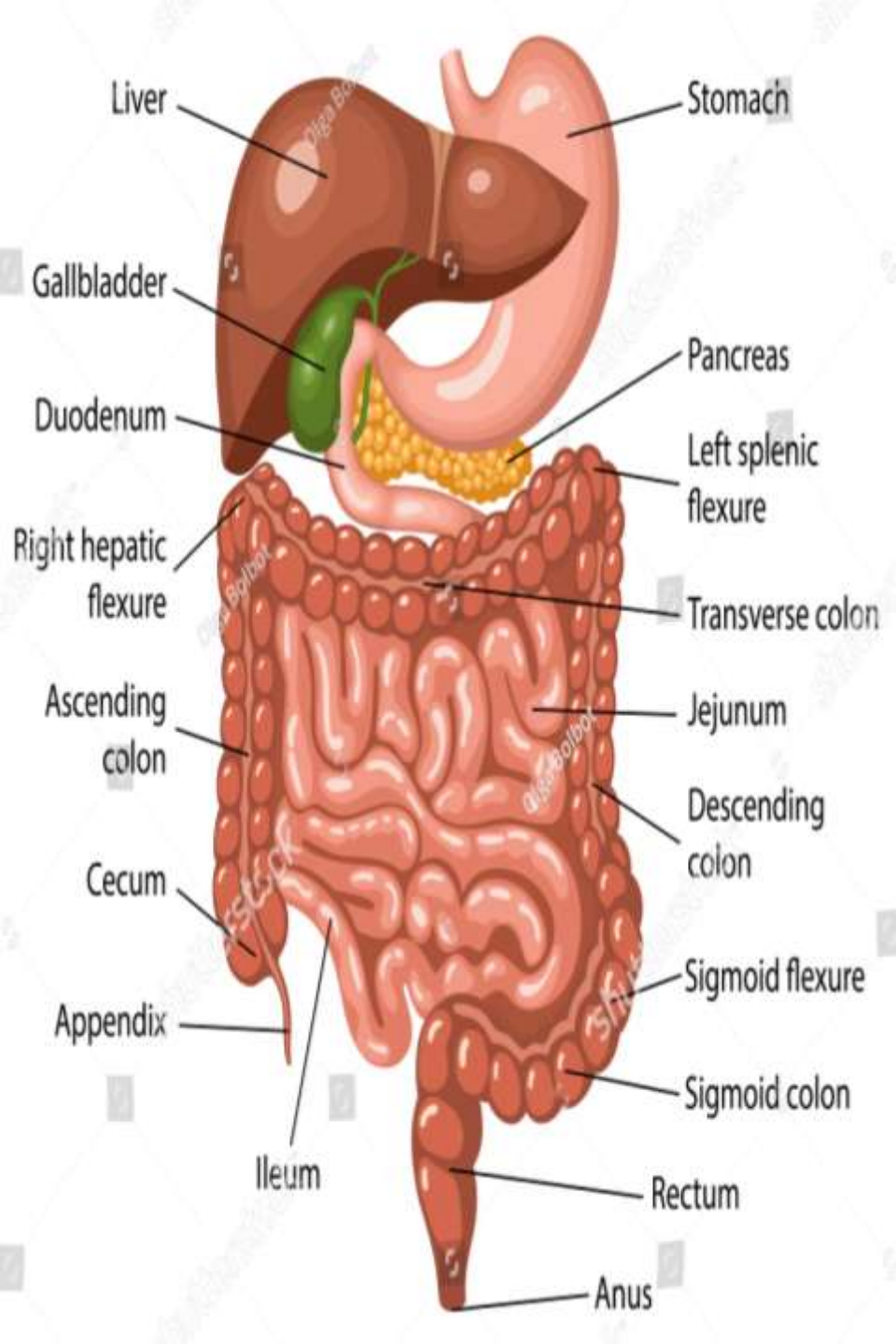


# Human Digestive System

- The digestive system is made up of the **gastrointestinal (GI) tract** – also called the **digestive tract** – and the liver , pancreas and gallbladder.
- The GI tract is a series of hollow organs joined in a long , twisting tube from mouth to anus.
- The hollow organs that make up the GI tract are the **mouth , esophagus , stomach , small intestine and large intestine** which includes the rectum – and anus.

# Human Digestive System

- Bacteria in GI tract also called ***gut flora or micro biome*** help with digestion.
- Parts of the nervous and circulatory system also play roles in the digestive process.
- A combination of nerves, hormones, bacteria, blood and the organs of the digestive system completes the complex task of digesting the foods, a person consumes each day.

## Importance Of Digestion

- Digestion is important for breaking down food into nutrients, which the body uses for energy, growth, and cell pair.
- The body breaks down nutrients from food and drink into carbohydrates , proteins , fats , and vitamins.

## Six Major Processes

- Food undergoes six major processes:

1. Ingestion
2. Propulsion
3. Mechanical digestion
4. Chemical digestion
5. Absorption
6. Defecation

# Ingestion & Propulsion

**Ingestion**

- Process of eating
- Food is taken into the mouth where it is physically broken down by the teeth into the smaller pieces.

**Propulsion**

- It is the movement of food along the digestive tract.
- The major means of propulsion is peristalsis, a series of alternating contraction and relaxation of smooth muscles that lines the wall of the digestive organs and that forces food to move forward.

# Mechanical & Chemical Digestion

**Mechanical**

- It is the process of physically breaking down food in to smaller pieces.
- Prepares food for chemical digestion.
- This process begins with the chewing of food mixing with saliva by tongue action and churning in the stomach.

**Chemical**

- It is the process of chemically breaking down food into simpler molecules.
- The process is carried out by enzymes in the stomach and small intestine.

# Absorption & Defaction

**Absorption**

- It is the movement of molecules from the digestive tract to the adjacent blood and lymphatic vessels.
- It is an enterance of the digestive food into the body.

**Defaction**

- It is the process of eliminating undigested material through the anus.

# Parts Of Human Digestive System

**Main parts:**

- Mouth
- Esophagus
- Stomach
- Small Intestine
- Large Intestine

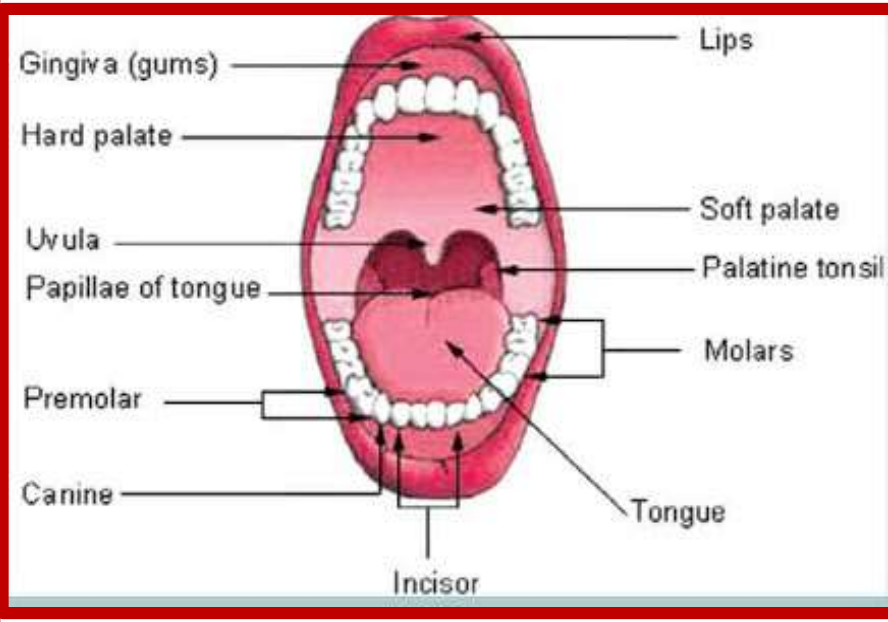
**Accessary parts:**

- Liver
- Pancreas
- Gall Blader
- Salivary Glands

# Mouth

There are two major processes which take place:

- Mystification (chewing):
- Breakdown large food molecules.
- increases surface area of food particles.
- Secretion of Saliva:
- Contains SALIVARY AMYLASE (ptyalin)
- Digests starch to maltose.
- Provides an alkaline medium.
- Lubricants and moistens food.



# Epiglottis

- It is a flap like structure at the back of the throat that closes over the trachea preventing food from entering it.
- It is located in the Pharynx.

# Esophagus

Approximately **20** cm long.

- The main functions are
- Secrete mucus.(It is a mucus muscular membrane lined tube).
- There occurs a process known as *Peristalsis.*

**PERISTALSIS***:*

- It is an involuntary process of muscular contraction forcing the bolus (food) down to the stomach.

# Stomach

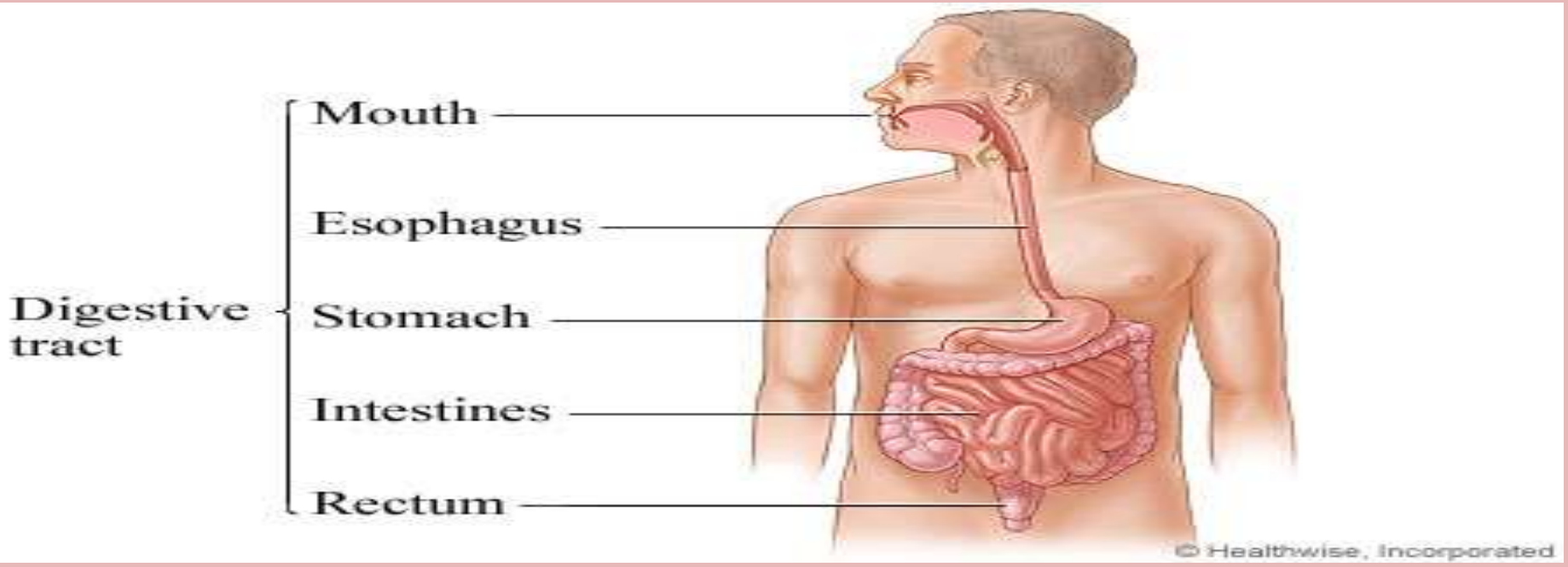
- The stomach is a hollow , muscular holding pouch for food.
- Stomach has three main regions:

1. The fundus
2. The body
3. The Pylorus

- Mixes food with **Digestive Juices** that contains enzymes to break down proteins and lipids.
- Acid (HCl) in the stomach kills bacteria.
- Food found in the stomach is called **Chyme.**

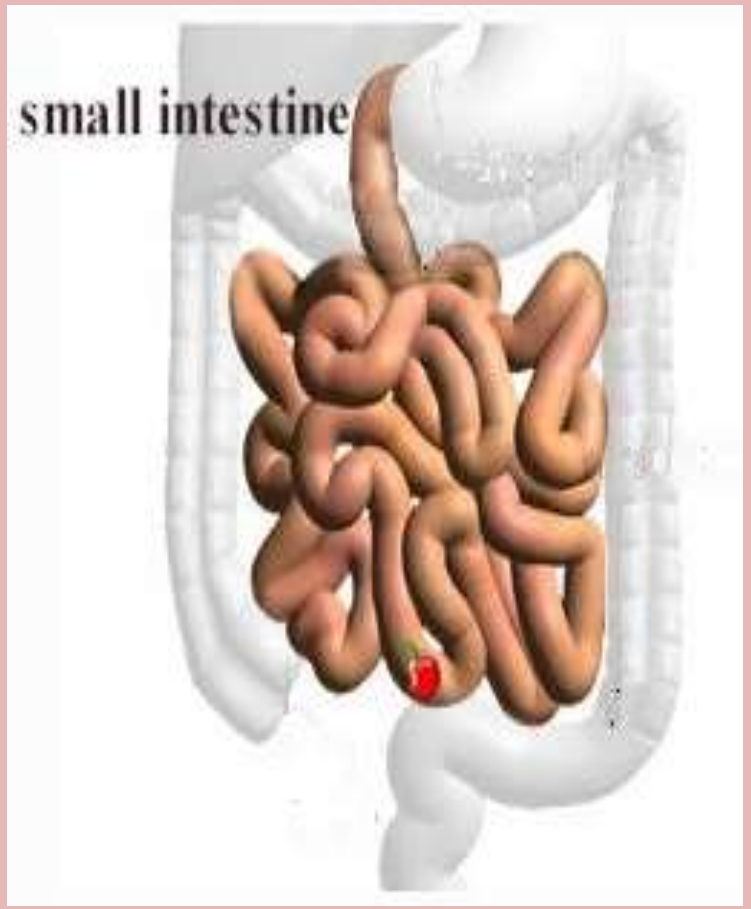
# Stomach

- In humans the stomach has a relaxed volume of about **45** ml.
- It generally expands to hold about 1 litre of food , but can hold as much as 4 litres.



# Small Intestine

- Nutrients from the food pass into the bloodstream through the small intestine walls.
- Absorbs :
- 80% ingested water
- Vitamins
- Minerals
- Carbohydrates
- Proteins
- Lipids
- Secrete digestive enzymes.



# Small Intestine

- The small intestine extends from the *pyloric sphincter to the ileocecal valve* , where it empties into the large intestine.
- The **liver , gall bladder** , **and pancreas** are accessary organs of the digestive system that are closely associated with the small intestine.
- The most important factor for regulating secretion in the small intestine is the presence of chyme.
- This is a largely a local reflex action in response to chemical and mechanical irritation from the chyme and in response to distention of the intestinal wall.

# Small Intestine

- This is a direct reflex action , does the greater amount of chyme the greater the secretion.
- **ABSORPTION**
- It occurs within the ileum in fingre like projection known as *villi.*
- Each villus is approximately **0.5 – 1.6** mm in length ( in humans).
- Amino acids and simple sugars like glucose , fructose diffuse through thin Epithelial cells into the blood capillaries.
- Fatty acids and glycerol enter the Lacteal into the Lymphatic system the finally into the blood system through the Innominate vein.

# Large Intestine

- It is the last part of the digestive system , the final stage of the alimentary canal – invertebrate animals.
- Its function is to absorb water from the remaining indigestible food matter , and then to pass this useless waste material from the body
- It consist of the **cecum and colon.**
- It starts in the right iliac region of the pelvis , just at or below the right waste where it is join to the bottom and of the small intestine.

# Large Intestine

- From here it continues of the abdomen , then across the width of the abdominal cavity , and then turns down continuing to its end point at the anus.
- The large intestine is about 1.5 m ( 4.9 ft ) long , which is about one –fifth of the whole length of the intestinal canal.

# Liver

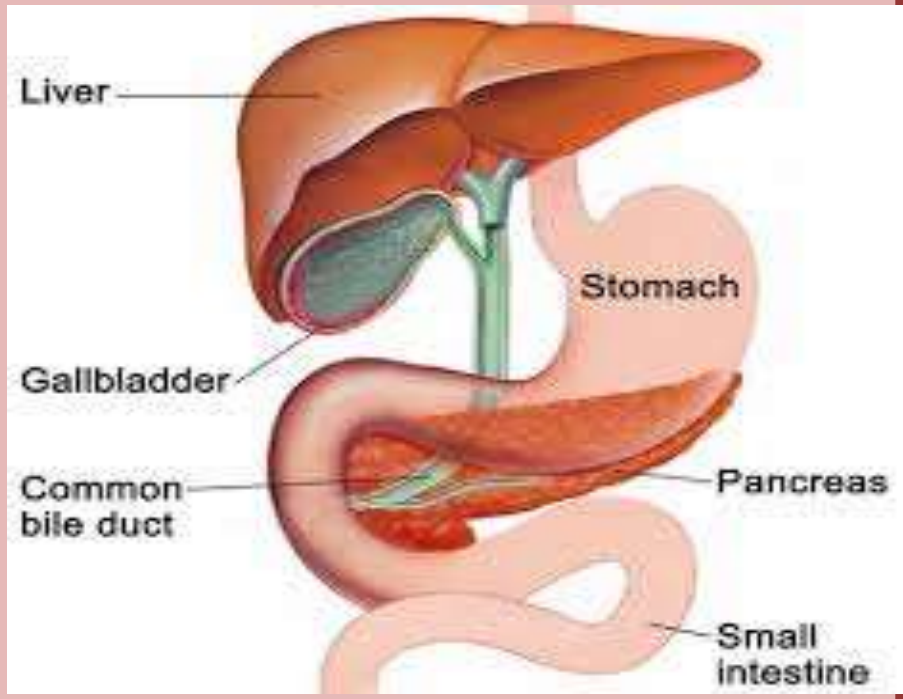
- It is the largest organ in the mammalian body.
- It secretes bile which is told in the gall bladder.
- **Bile** breaks down into tiny droplets through emulsification.

**ROLES**:

1. Regulates sugar–glucose
2. Breaks down RBC
3. Storage of blood
4. Detoxification
5. Generation of heat

# Pancreas

- It is an endocrine gland because it secretes insulin hormones – converts access glucose into glycogen for storage
- It is also an exocrine gland because it secretes pancreatic juice in the duodenum.
- Pancreatic juice contains lipase , trypsin and pancreatic amylase for digestion of lipids , proteins and starch

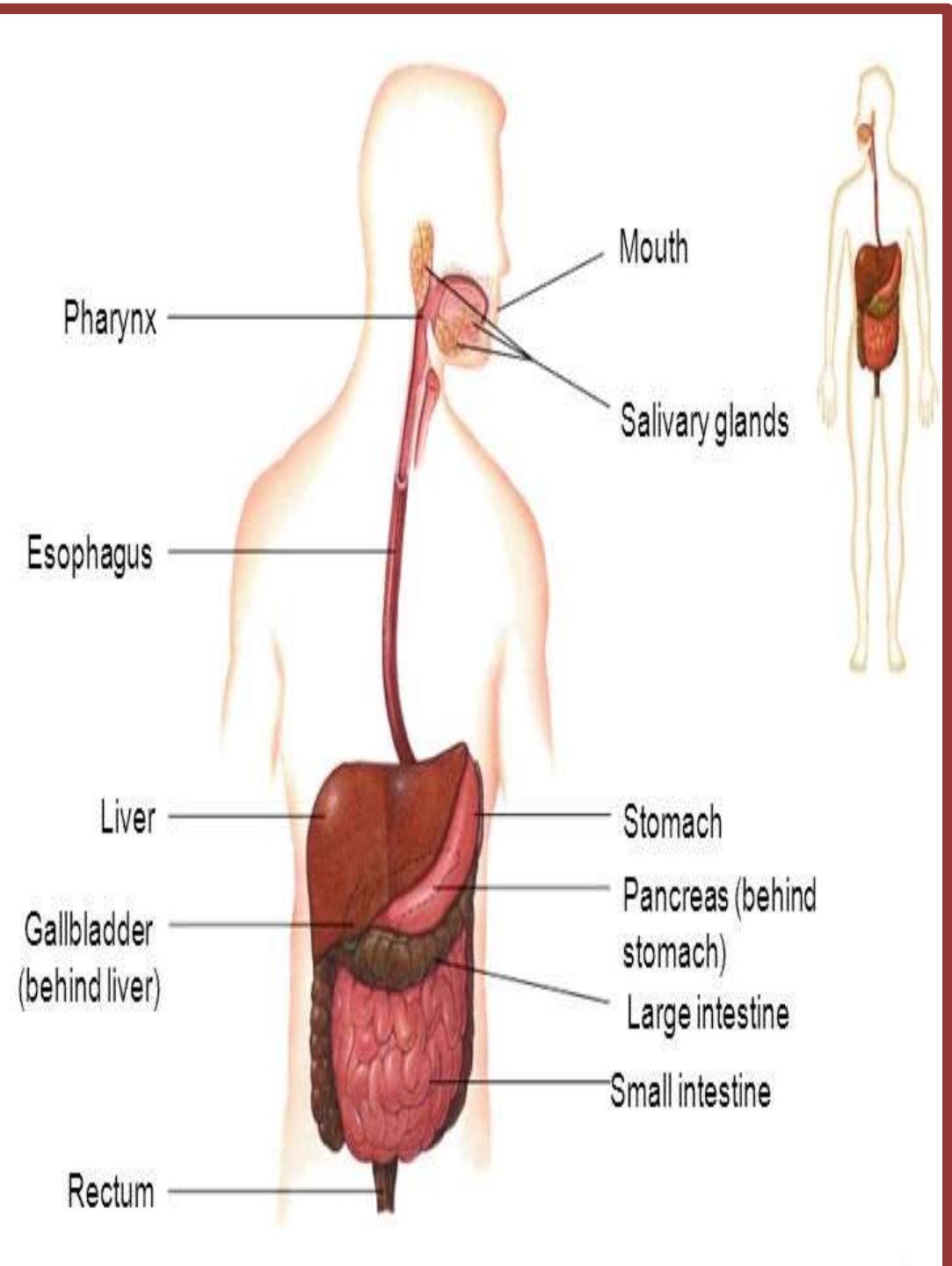


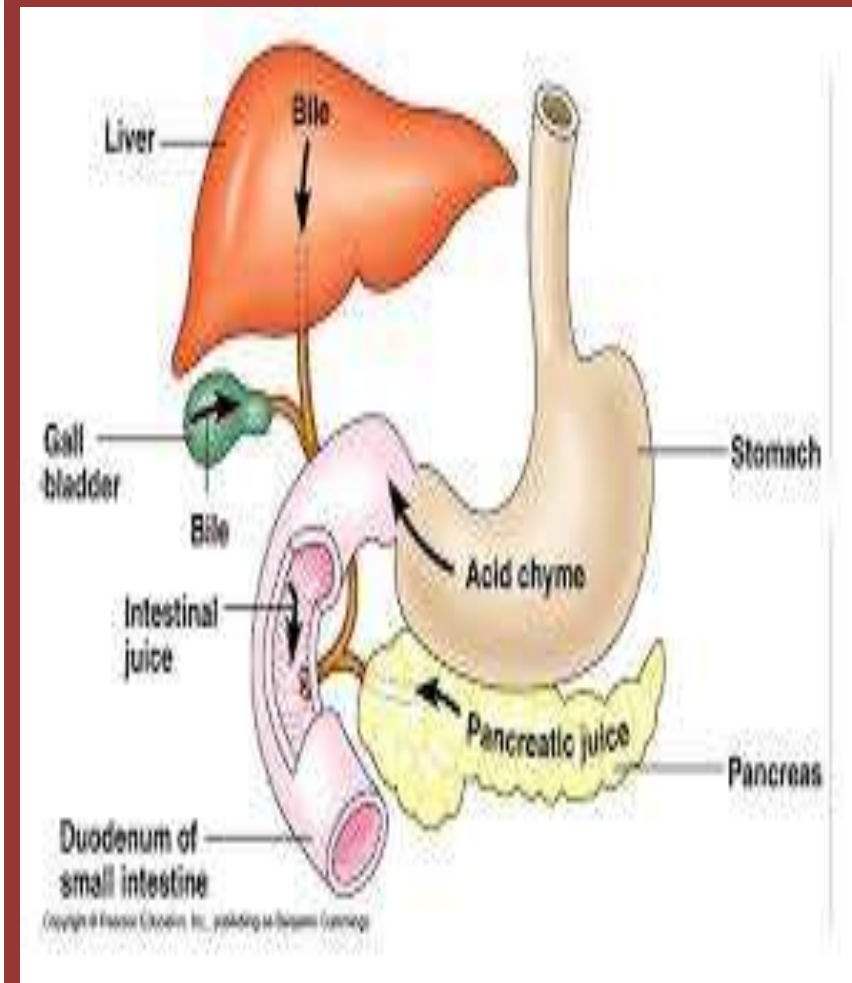
# Gall Bladder

- It is a pear shaped sack that is attached to the visceral surface of the liver by the cystic duct. The principle function of the gall bladder is to serve as a storage.
- Stores bile from the liver , releases it into the small intestine.
- Fatty diets can cause *Gall stones.*

# Salivary Glands

- Located near the mouth
- They produce and secrete saliva , a substance that helps chewing and swallowing by moistening the food.


Mouth
Pharynx
Salivary glands
Esophagus
Liver
Stomach
Pancreas (behind stomach)
Gallbladder (behind liver)
Large intestine
Small intestine
Rectum


Liver
Bile
Gall bladder
Bile
Stomach
Acid chyme
Intestinal juice
Pancreatic juice
Pancreas
Duodenum of small intestine

# HOW IS THE DIGESTIVE PROCESS CONTROLLED?

- Through hormone & nerve regulators.

**Hormone Regulators:**

The cells in the lining of the stomach & small intestine produce and release hormones that control the function of the digestive system.

**Nerve Regulators:**

Two types of nerve that help control the action of the digestive system.

1. **Extrinsic or outside** nerve connect digestive organs to the *brain & spinal cord*.
2. **Intrinsic or inside** nerves within the GI tract are triggered when food stretches the walls of hollow organs.


Thank
you