

GASTROINTESTINAL SYSTEM

[Anatomy and functions of salivary gland]



INTRODUCTION

Digestive system is made up of gastrointestinal tract (GI tract) or alimentary canal and accessory organs, which help in the process of digestion and absorption. GI tract is a tubular structure extending from the mouth up to anus, with a length of about 30 feet.

GI tract is formed by two types of organs:

- Primary digestive organs.
- Accessory digestive organs

Primary Digestive Organs:

Primary digestive organs are the organs where actual digestion takes place.

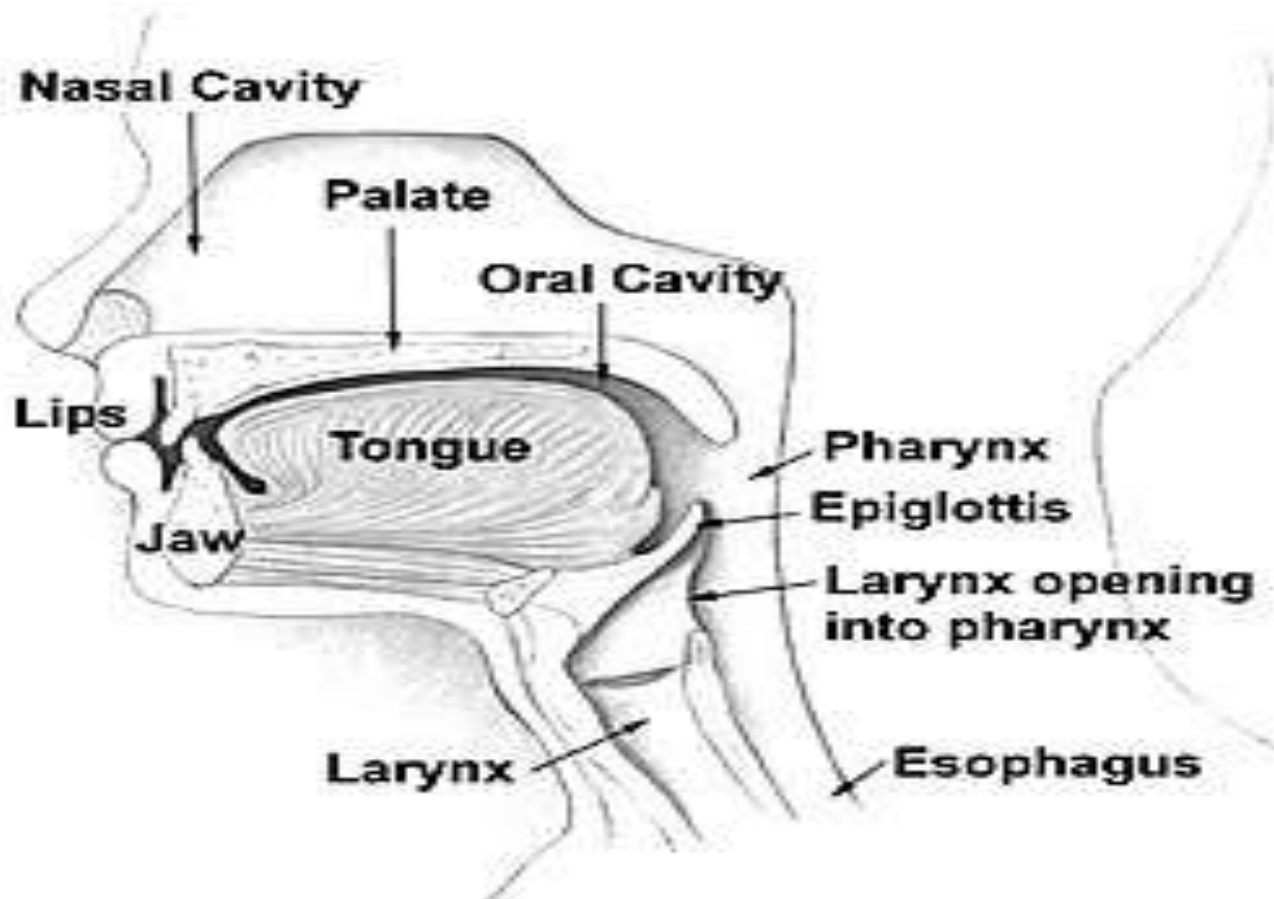
Primary digestive organs are:

- Mouth
- Pharynx
- Esophagus
- Stomach

Anatomy and functions of mouth:

FUNCTIONAL ANATOMY OF MOUTH:

- Mouth is otherwise known as oral cavity or buccal cavity.
- It is formed by cheeks, lips and palate.
- It encloses the teeth, tongue and salivary glands. Mouth opens anteriorly to the exterior through lips and posteriorly through fauces into the pharynx.
- Digestive juice present in the mouth is saliva, which is secreted by the salivary glands.



ANATOMY OF MOUTH

FUNCTIONS OF MOUTH:

Primary function of mouth is eating and it has few other important functions also.

Functions of mouth include:

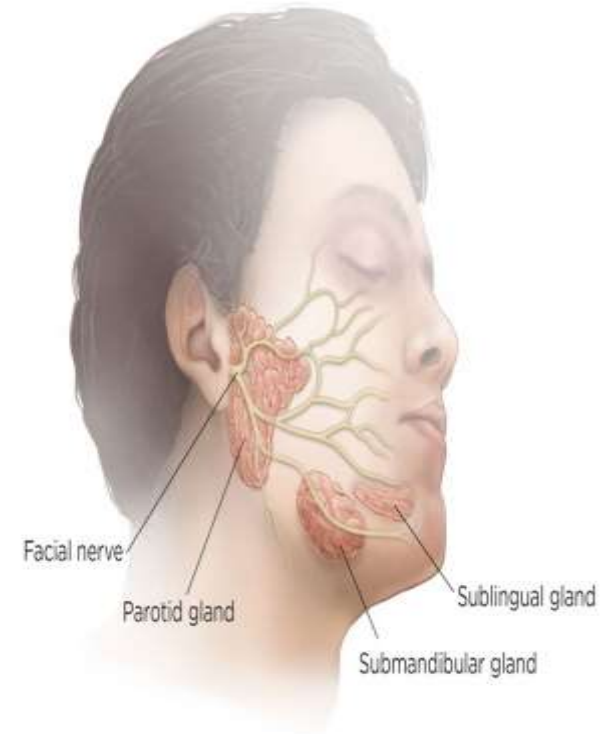
- Ingestion of food materials.
- Chewing the food and mixing it with saliva.
- Appreciation of taste of the food.
- Transfer of food (bolus) to the esophagus by swallowing .
- Role in speech .
- Social functions such as smiling and other expressions.

SALIVARY GLANDS:

The saliva is secreted by three pairs of major (larger) salivary glands and some minor (small) salivary glands.

Major glands are:

1. Parotid glands
2. Submaxillary or submandibular glands
3. Sublingual glands.



Parotid Glands:

- Parotid glands are the largest of all salivary glands, situated at the side of the face just below and in front of the ear.
- Secretions from these glands are emptied into the oral cavity by Stensen duct.
- This duct is about 35 mm to 40 mm long and opens inside the cheek against the upper second molar tooth.

Submaxillary Glands:

- Submaxillary glands or submandibular glands are located in submaxillary triangle, medial to mandible.
- Saliva from these glands is emptied into the oral cavity by Wharton duct, which is about 40 mm long.
- The duct opens at the side of frenulum of tongue, by means of a small opening on the summit of papilla called caruncula sublingualis.

Sublingual Glands

- Sublingual glands are the smallest salivary glands situated in the mucosa at the floor of the mouth.
- Each gland weighs about 2 to 3 g.
- Saliva from these glands is poured into 5 to 15 small ducts called ducts of Rivinus. These ducts open on small papillae beneath the tongue.
- One of the ducts is larger and it is called Bartholin duct. It drains the anterior part of the gland and opens on caruncula sublingualis near the opening of submaxillary duct.



- Lingual minor glands:
 - Anterior: **mixed**
 - Middle: **serous**
 - Posterior: **mucous**
- Buccal: **mixed**
- Palatine: **mucous**
- Labial: **mixed**

MINOR SALIVARY GLANDS

MINOR SALIVARY GLANDS

Lingual Mucus Glands:

Lingual mucus glands are situated in posterior one third of the tongue, behind circumvallate papillae and at the tip and margins of tongue.

Lingual Serous Glands:

Lingual serous glands are located near circumvallate papillae and filiform papillae.

Buccal Glands:

- Buccal glands or molar glands are present between the mucus membrane and buccinator muscle.
- Four to five of these are larger and situated outside buccinator, around the terminal part of parotid duct.

Labial Glands:

Labial glands are situated beneath the mucus membrane around the orifice of mouth.

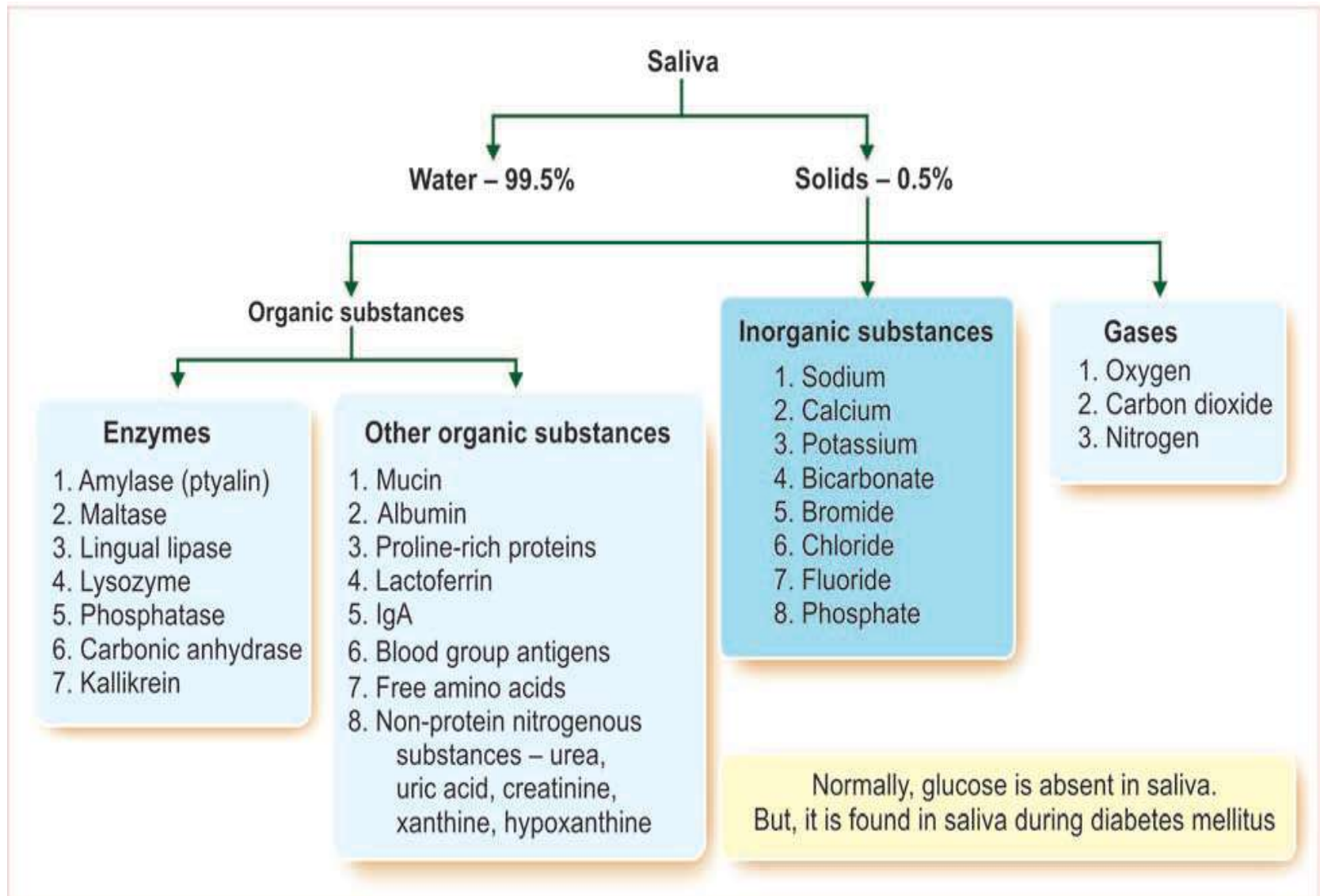
Palatal Glands:

Palatal glands are found beneath the mucus membrane of the soft palate

COMPOSITION OF SALIVA:

Saliva is the combined secretions from the salivary glands and the small mucus-secreting glands of the lining of the oral cavity. About 1.5 litres of saliva is produced daily and it consists of:

- water
- mineral salts
- enzyme: salivary amylase
- mucus
- lysozyme
- immunoglobulins
- blood-clotting factors.



FUNCTIONS OF SALIVA

Saliva is a very essential digestive juice. Since it has many functions, its absence leads to many inconveniences.

1. Preparation of food for swallowing:

- When food is taken into the mouth, it is moistened and dissolved by saliva.
- The mucus membrane of mouth is also moistened by saliva. It facilitates chewing.
- By the movement of tongue, the moistened and masticated food is rolled into a bolus. Mucin of saliva lubricates the bolus and facilitates swallowing.

2. Appreciation of taste:

➤ Taste is a chemical sensation. By its solvent action, saliva dissolves the solid food substances, so that these solved substances can stimulate the taste buds. The stimulated taste buds recognize the taste.

3. Digestive function:

➤ Saliva has three digestive enzymes, namely salivary amylase, maltase and lingual lipase.

a) Salivary Amylase:

- Salivary amylase is a carbohydrate-digesting (amylolytic) enzyme. It acts on cooked or boiled starch and converts it into dextrin and maltose.
- Optimum pH necessary for the activation of salivary amylase is 6. Salivary amylase cannot act on cellulose.

b) Maltase:

- Maltase is present only in traces in human saliva and it converts maltose into glucose.

c) Lingual Lipase:

- Lingual lipase is a lipid-digesting (lipolytic) enzyme.
- It digests milk fats (pre-emulsified fats). It hydrolyzes triglycerides into fatty acids and diacylglycerol.

3. Proline-rich proteins and lactoferrin protect the teeth by stimulating enamel formation.

4. Mucin present in the saliva protects the mouth by lubricating the mucus membrane of mouth.

5. Role in speech:

By moistening and lubricating soft parts of mouth and lips, saliva helps in speech. If the mouth becomes dry, articulation and pronunciation becomes difficult.

6. Excretory function:

Many substances, both organic and inorganic, are excreted in saliva. It excretes substances like mercury, potassium iodide, lead, and thiocyanate. Saliva also excretes some viruses such as those causing rabies and mumps.

7.Regulation of body temperature:

In dogs and cattle, excessive dripping of saliva during panting helps in the loss of heat and regulation of body temperature. However, in human beings, sweat glands play a major role in temperature regulation .

8.Regulation of water balance:

When the body water content decreases, salivary secretion also decreases. This causes dryness of the mouth and induces thirst. When water is taken, it quenches the thirst and restores the body water content.

Possible questions

1. Anatomy and physiology of digestive system (10 m).
2. Anatomy and functions of mouth(5 or 10 m)
3. Anatomy and functions of salivary glands(5 or 10 m)
4. Composition of saliva(5m)

If u have any doubts or if u need any more materials or information ask me.

**You will have class tests on
the completed chapter at the
week end**