

# SITES FOR DIGESTION IN DIGESTIVE SYSTEM

There are three main sites for digestion

- i) Buccal Cavity
- ii) Stomach
- iii) Small intestine

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## MECHANICAL AND CHEMICAL DIGESTION IN THE BUCCAL/ORAL CAVITY

### MOUTH

In human body, upper and lower lips constitutes the mouth slit which leads to buccal cavity. It is a specialized organ for receiving food and breaking up large organic masses. In the buccal cavity, food is changed mechanically by biting and chewing.

### BUCCAL CAVITY OR ORAL CAVITY

It is the cavity inside mouth which accomodate ingested food. It contains tongue, teeth and salivary glands etc.

The gastrointestinal tract starts with the oral cavity where ~~yo~~ our teeth grind and chew food, breaking it into small manageable pieces.

### MASTICATION

This chewing process, known as mastication is dependant upon powerful muscles (masseter and temporalis), as well as smaller

muscles that permit fine control; they move the mandible (lower jawbone) against the upper jaw and enable crushing of relatively hard food.

## IMPORTANCE OF MASTICATION

Mastication causes exocrine glands (salivary glands) under the tongue and the back of the mouth to secrete a watery liquid called saliva.

Mastication and saliva secretion work in harmony: chewing increases the surface area of foods which helps to accelerate breakdown of starch molecules into simple sugars by the digestive enzymes.

## 1. TONGUE

It is a rough muscular organ containing scale like structures known as papillae having taste buds, can taste food.

## EBNER'S GLANDS

Lingual lipase is an enzyme secreted by Ebner's glands ~~on~~ which are present on dorsal surface of tongue. Lingual lipase only digest the short chain fatty acids.

## FUNCTIONS OF TONGUE

It is a multifunctional organ e.g selection of food, role in swallowing, and bolus formation.

# SELECTION OF FOOD

By sense of sight, smell, touch and taste man is selecting food for ingestion. In this case tongue is playing major role. It contains taste buds which are specialized for taste identification.

## TASTE IDENTIFICATION

### Tip Of Tongue

The tip of tongue can taste <sup>/sense</sup> sweetness.

### MIDDLE OF TONGUE

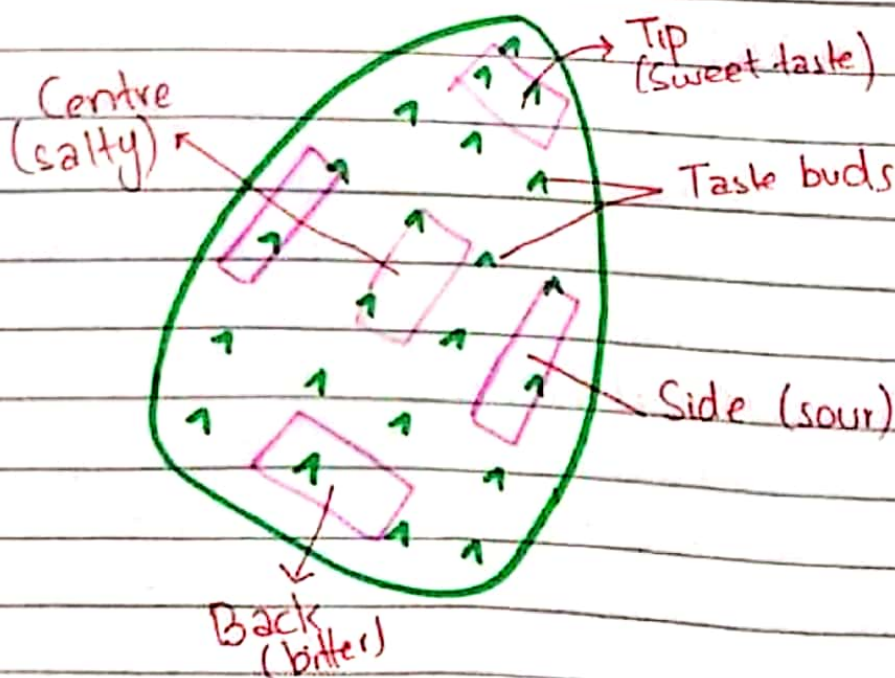
The middle of the tongue tastes salty taste.

### SIDES

The sides of tongue can identify sour food.

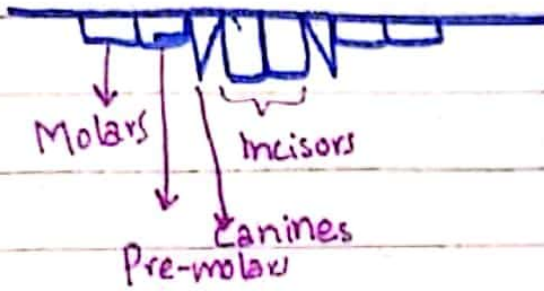
### BACK

The back of tongue can sense bitter taste.



## 2. TEETH

The humans have four kinds of teeth i.e. incisors, canine, premolar and molar.



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### i) INCISORS

The incisor teeth are the flattened teeth in the front of the mouth. They help in cutting and biting of food material.

### ii) CANINES

Canines are sharp and pointed. They help in tearing food.

### iii) MOLARS AND PRE-MOLARS

The premolars and molars are flattened, strong teeth for crushing and grinding of food.

## 3. SALIVARY GLANDS

Humans have 3 pairs of salivary

glands :

1. Parotid (in front of ears)
2. Sub-maxillary (lower jaw)
3. Sub-lingual (below tongue)

# SECRETION OF SALIVA

Saliva is secreted by salivary glands in response to see, smell, sense, touch or think about a food, into the buccal cavity.

## COMPOSITION OF SALIVA

It is a sticky fluid that binds food particles together into a soft mass. The saliva contains:

1. Water
2. Bicarbonates
3. Electrolytes
4. Mucous
5. Enzymes (lysozyme, ptyalin, amylase, lingual lipase)

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## LINGUAL LIPASE

They help in the breakdown of carbohydrate and some lipids (short chain fatty acids)

## SALIVARY AMYLASE

This enzyme begins the breakdown of carbohydrates.

## PTYALIN

These enzymes help in the breakdown of glycogen.

Almost no protein or fat digestion occur in the mouth.

# FUNCTIONS OF SALIVA

Saliva perform two essential functions:

1. It moistens and compacts the chewed food so our tongue can roll it into a ball (bolus) and push it to the back of our mouth for swallowing and easy passage through the pharynx and esophagus
2. It also helps in chemical digestion.

## MECHANICAL DIGESTION

Along with ingestion of food saliva is secreted so mechanical digestion is conducted by coordinated function of teeth, tongue, saliva and muscles.

## CHEMICAL DIGESTION

Partial chemical digestion of lipids and carbohydrates take place in oral cavity by salivary enzymes e.g. Lingual lipase cause digestion of oils or lipids. If single bolus is chewed 65-70 times then its carbohydrate is completely digested to glucose, then one can feel sweetness on tongue surface.

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# SWALLOWING PROCESS

When the food is completely grinded, moistened and bolus is formed. Then it is ready to swallow. The actions of the teeth and tongue prepare food for swallowing.

The three stages of swallowing are as follows:

## 1. THE ORAL STAGE

In this stage the front of the tongue move upward a bit while the back of tongue move downward thus bolus is pushed backward into the pharynx.

## 2. THE PHARYNGEAL STAGE

It is the shortest stage and takes less than two seconds. In this step the trachea (wind pipe) move a little upward toward epiglottis and is closed while the esophagus (food pipe) move downward a bit. Now as trachea is closed so food directly falls into esophagus.

[As in book: The larynx lifts up to meet the epiglottis, which lowers, making a seal that prevents material from entering the wind pipe.]

This is important as it stops food ~~from~~ or quid from being aspirated into the lungs.

### 3. THE OESOPHAGEAL STAGE

The bolus is passed into the esophagus by automatic contractions of the pharynx. It then travels to the stomach by gravity and reflex action. This stage of swallowing is entirely automatic and cannot be controlled.

### INVOLUNTARY EVENTS DURING SWALLOWING

To prevent food in the throat from rising into the nasal cavity or moving down the wind pipe (trachea), the act of swallowing triggers two involuntary events.

The soft palate (the back of the roof of the mouth) closes off the nasal cavity while the epiglottis, a flap of cartilage attached to the root of the tongue tilts downward to seal the trachea.

### REGULATION BY BRAIN

The swallowing process is regulated by nerves in the medulla oblongata and pons. The reflex is instigated by receptors in the throat as a bolus of food is pushed to the back of the mouth by the tongue.



# PERISTALSIS

The esophagus is a thick-walled muscular tube located behind the wind pipe that extends through the neck and chest to the stomach. The bolus of food moves through the esophagus by peristalsis.

Once the food ball enters the esophagus, it is pushed towards the cardiac sphincter by smooth muscle contractions called peristalsis. Food travels from the mouth to the stomach in about 4 to 8 seconds. Peristalsis occurs throughout the length of the digestive tract and is responsible for keeping things moving and the occasional strange sounds that arise. The digestive tract is surrounded by both circular and longitudinal smooth muscle that allows for rhythmic contractions or peristalsis.

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