Salivary Secretions

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Salivary Glands

A-3 pairs of larger glands:

-Parotid (20 %).

-Submandibular (submaxillary) (70 %).

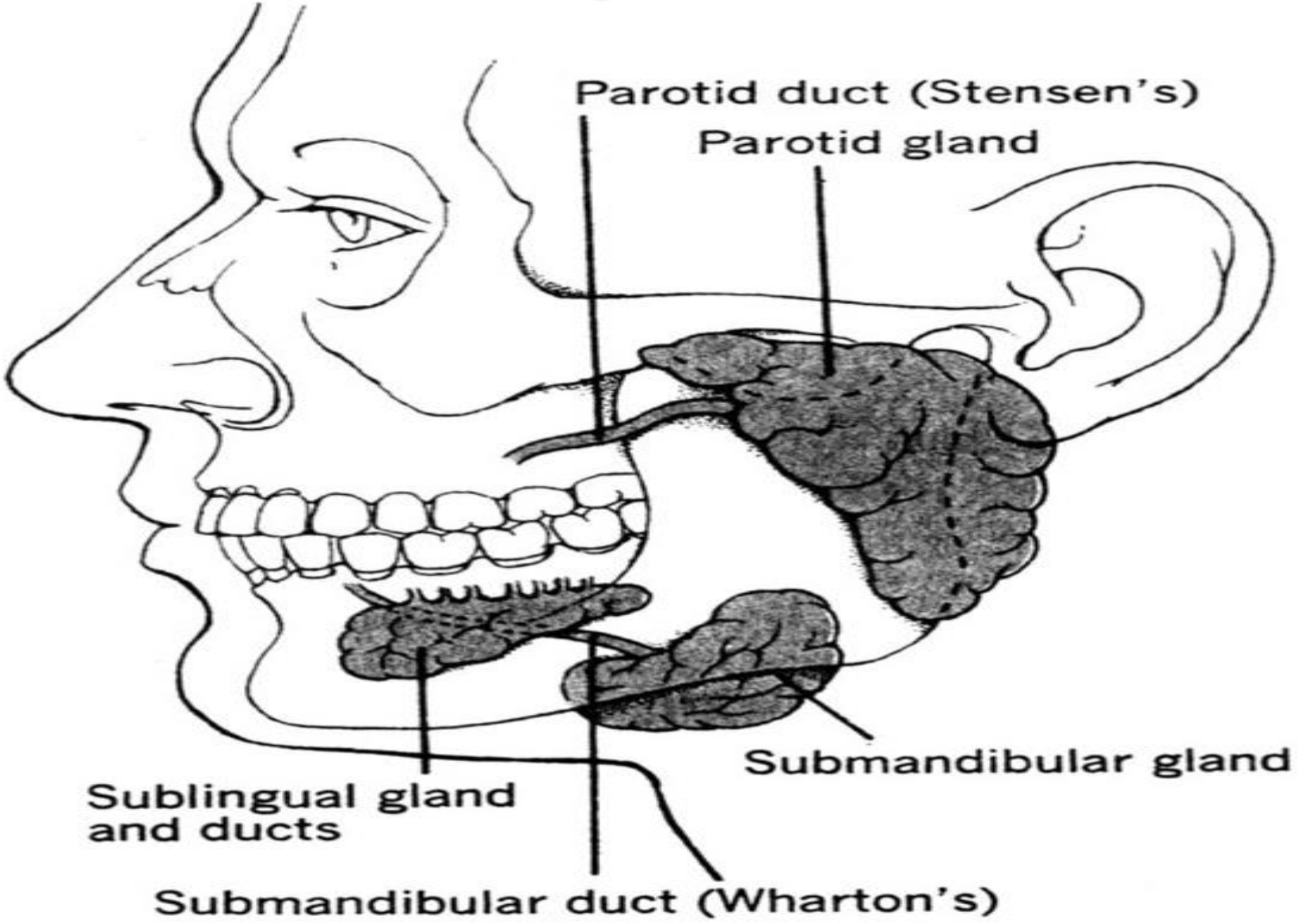
Sublingual (5 %).

B-Other minor glands: (5%).

-Lingual glands.

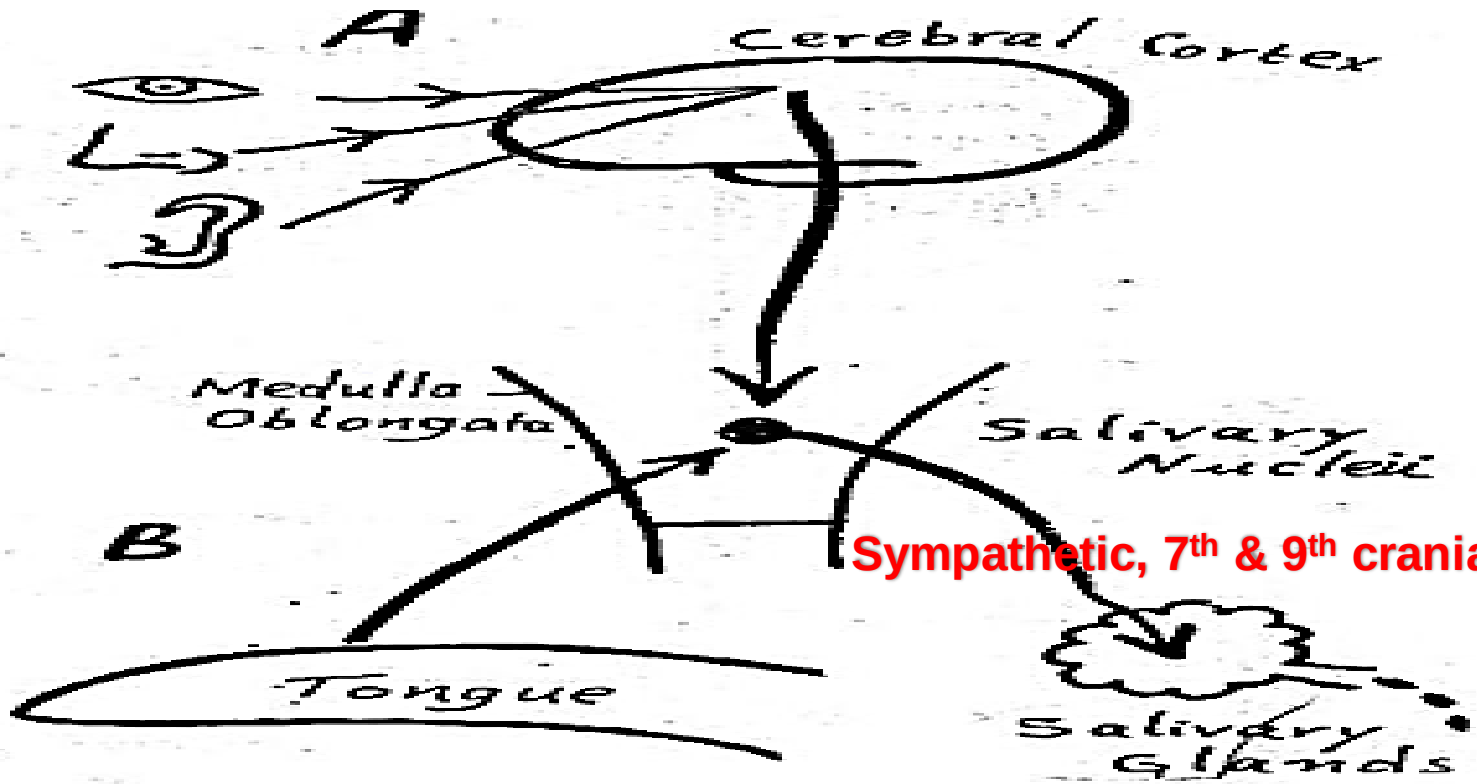
-Buccal glands.

Salivary Glands



•Regulation of Salivary Secretion

-**Only nervous regulation**, because it is rapid.



Sympathetic, 7th & 9th cranial nerves

Mechanism of Salivary Secretion

A = Conditioned Ref B = Uncond. Ref.

•Regulation of Salivary Secretion

[I] Unconditioned reflexes:

Stimulus: Presence of food in the mouth.

Receptors: Taste receptors

Afferent: ***Impulses for taste sensation.***

Center:

a-Parasympathetic: Salivary nuclei in the medulla oblongata.

b-Sympathetic: LHC of upper two thoracic segments.

Efferent: Sympathetic , 7^{th} & 9^{th} cranial nerves

•Regulation of Salivary Secretion

[II] Conditioned reflexes:

Mechanism of conditioned reflexes:

1- Stimulus: Seeing, smelling hearing, or thinking

2-Receptors ⇒ in the eye, nose and ear.

3-Afferent ⇒ cranial nerves

4-Center ⇒ cerebral cortex ⇒ salivary nuclei

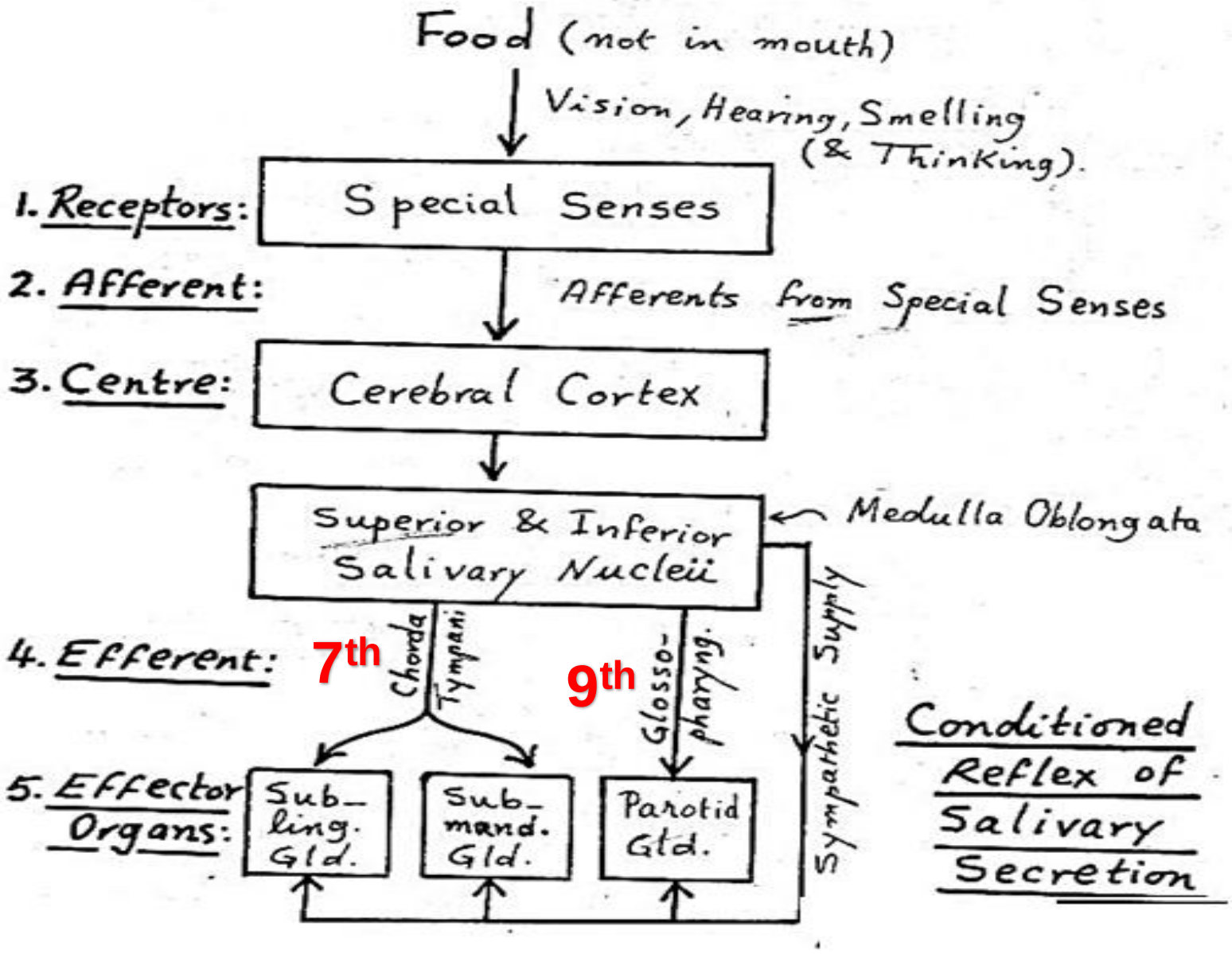
5-Efferent ⇒ Sympathetic, 7^{th} & 9^{th} cranial nerves

6-Response: ⇒ salivary secretion:

Parasympathetic supply ⇒ True secretion.

Sympathetic supply ⇒ Trophic secretion.

•Regulation of Salivary Secretion



•Functions of Saliva: (10 a,b,b,c,c,d,d,e,e,f)

(1) It helps of **articulation** by moistening the mouth cavity.

(2) It has a **buffering action:**

-It contains *bicarbonate and phosphate* buffers. keep pH of the mouth at about 7. At this pH teeth do not lose their Ca^{++} to oral fluid and remains healthy and strong.

(3) It helps the **balance of water** by thirst.

(4) It has a **cooling** effect of hot food.

(5) It has a **cleaning action:** by:

a- Washing away the pathogenic bacteria.

b- It has antibacterial action through lactoferrin, thiocyanate, lysozyme and (IgA).

(6) It helps of **digestion** of cooked starch to maltose.

Salivary α-amylase function does not happen to a great extend (only 3-5% of starch digestion) because: A-Food dose not stay in mouth for long enough time. B-When food is swallowed it is inactivated by gastric HCl because its optimum pH for activity is 6.9.

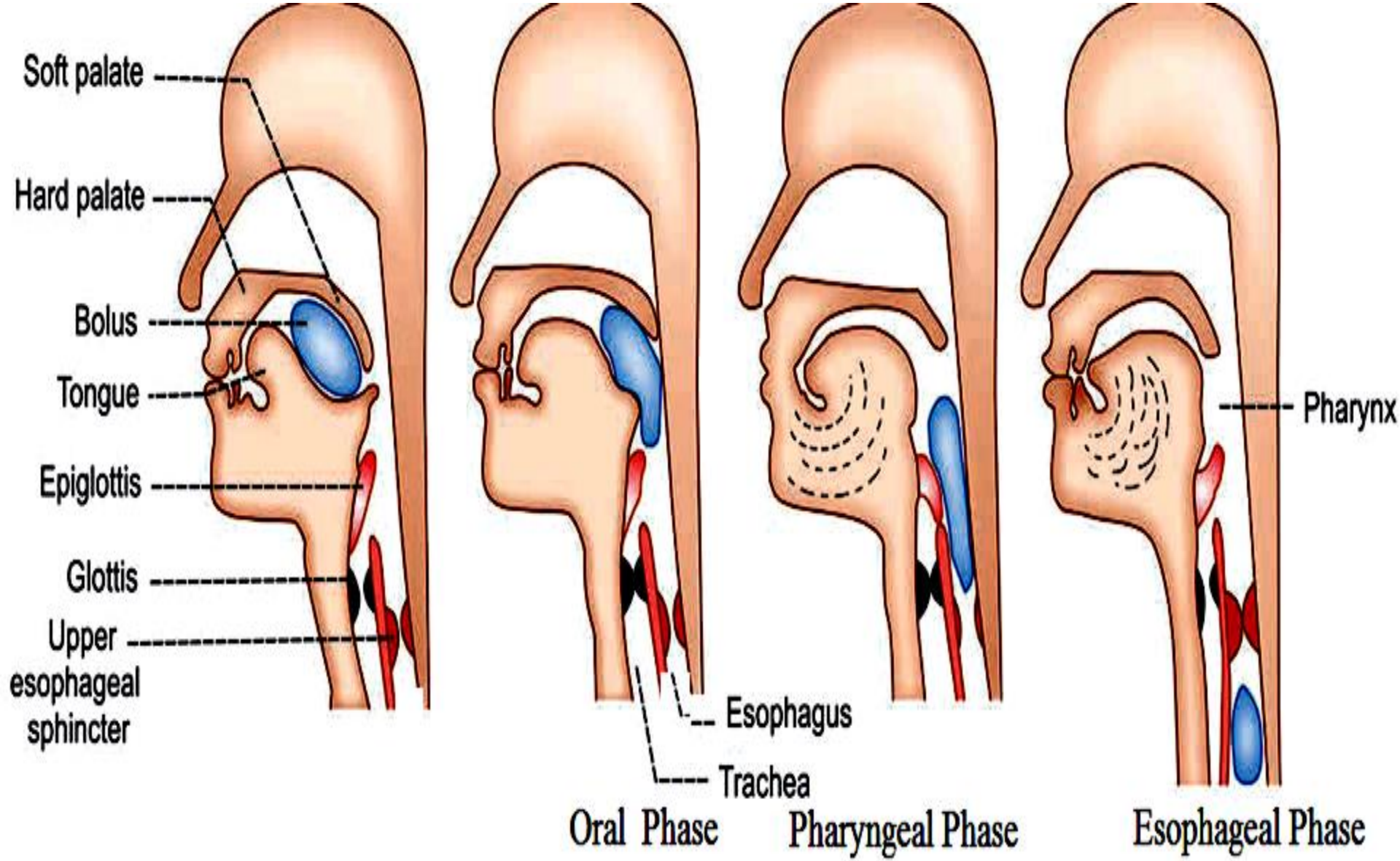
(7) It helps of **deglutition** by moistening & lubricating.

(8) It can **excrete**: Heavy metals (mercury), Waste products (urea)& Some drugs e.g. pencillin.

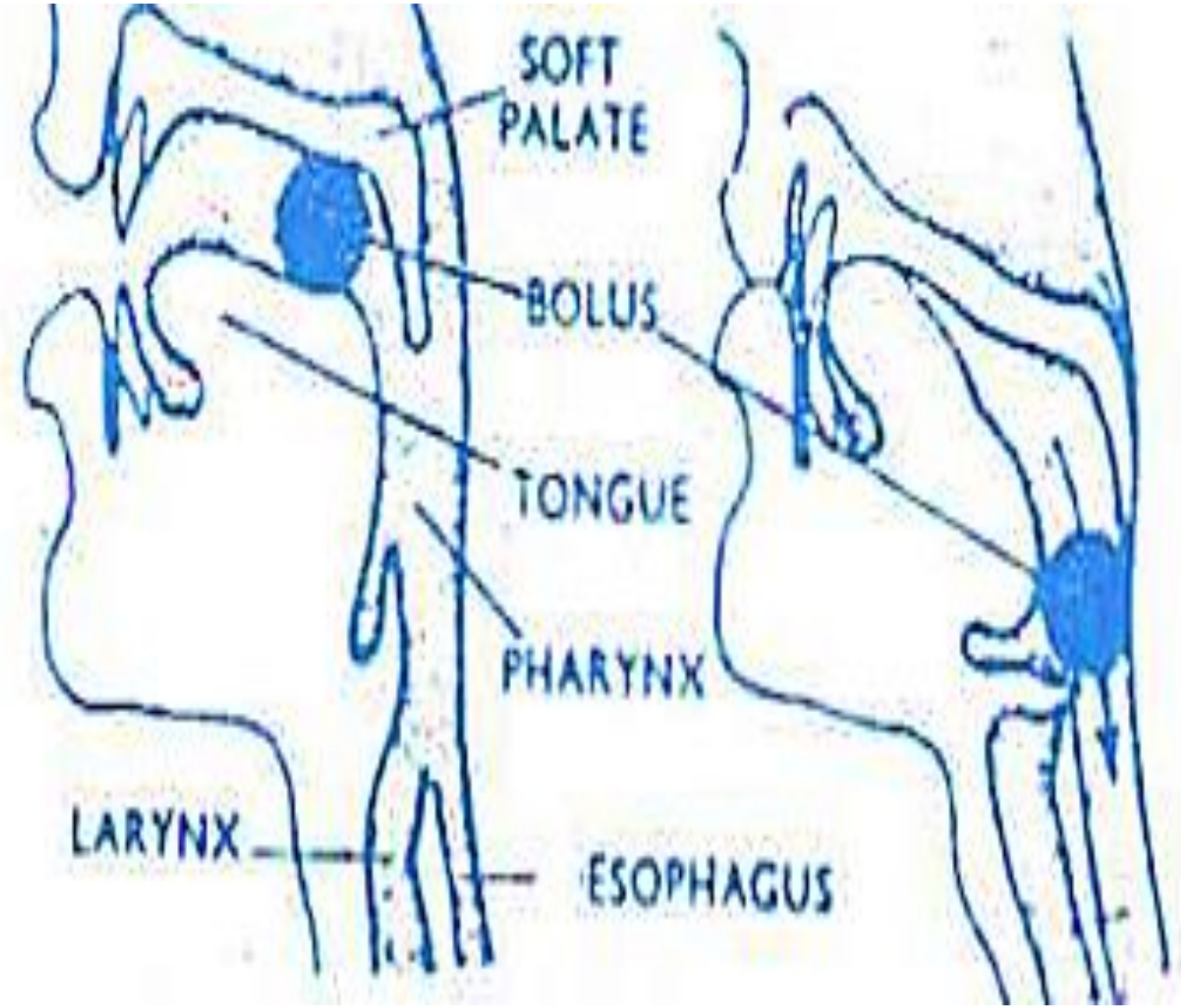
(9) **Evaporation** of saliva helps in body temperature regulation in animals with no sweat glands.

(10) **Facilitation** of taste sensation by solving of the food.

Deglutition (Swallowing)



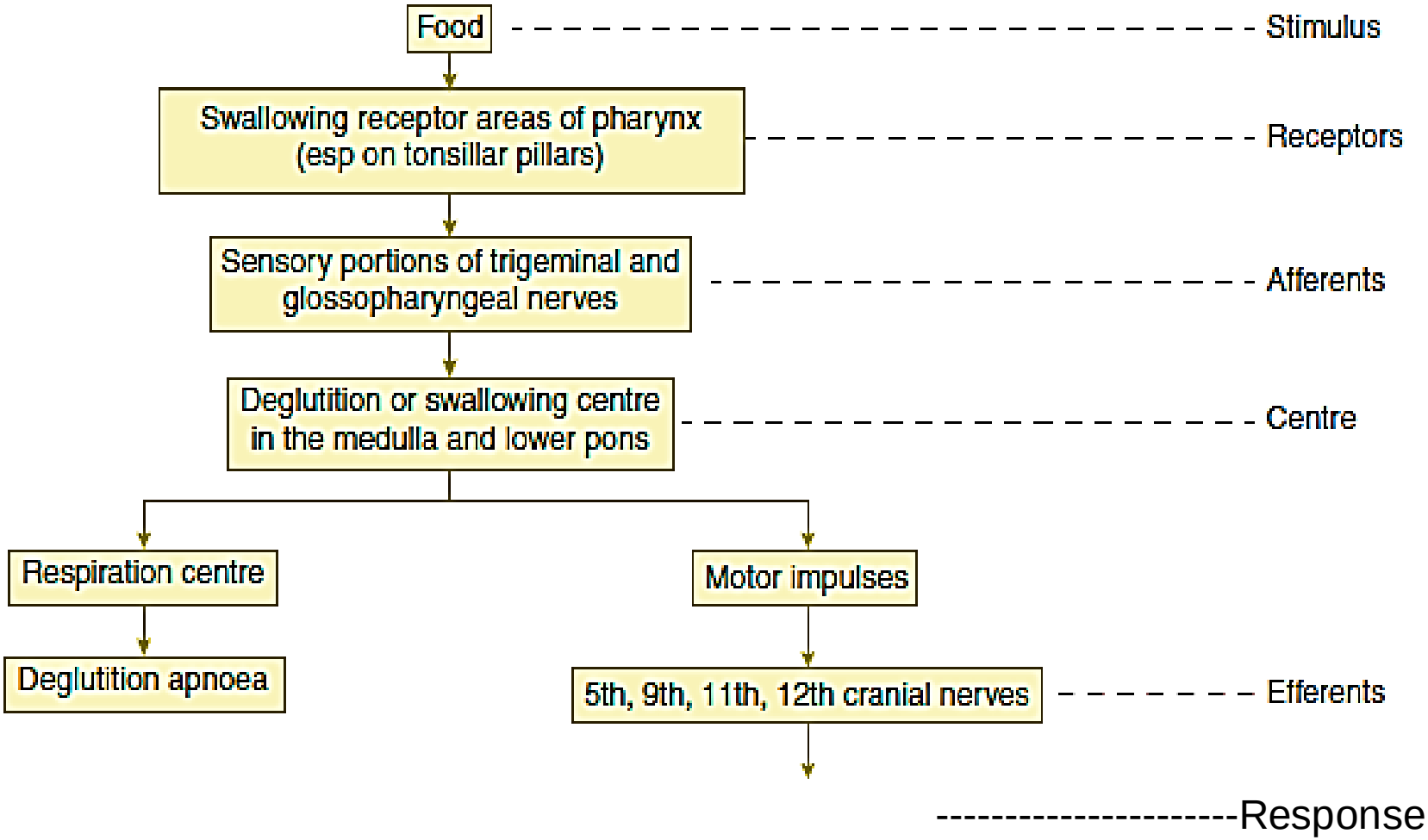
Deglutition (Swallowing)



pharynx.

(II) The Second or Pharyngeal Phase:

-Def., - It is involuntary phase. - Mechanism (= deglutition reflex):



Response: ***A-Protective reflexes*** : closed of

1-Nose by (**one)** elevation of soft palate which closing the posterior nasal opening.

2-Mouth by (**Two)**: i. Elevation of the tongue against hard palate (by contraction of mylohyoid ms) ii. Approximation of tonsillar pillars.

3-Larynx by (**Three)** : i. Elevation of the larynx to be covered by epiglottis, ii. Approximation of vocal cords. iii. **Inhibition** of respiration (apnea).

B-Pharyngeal peristalsis

(III) The Third or Esophageal Phase

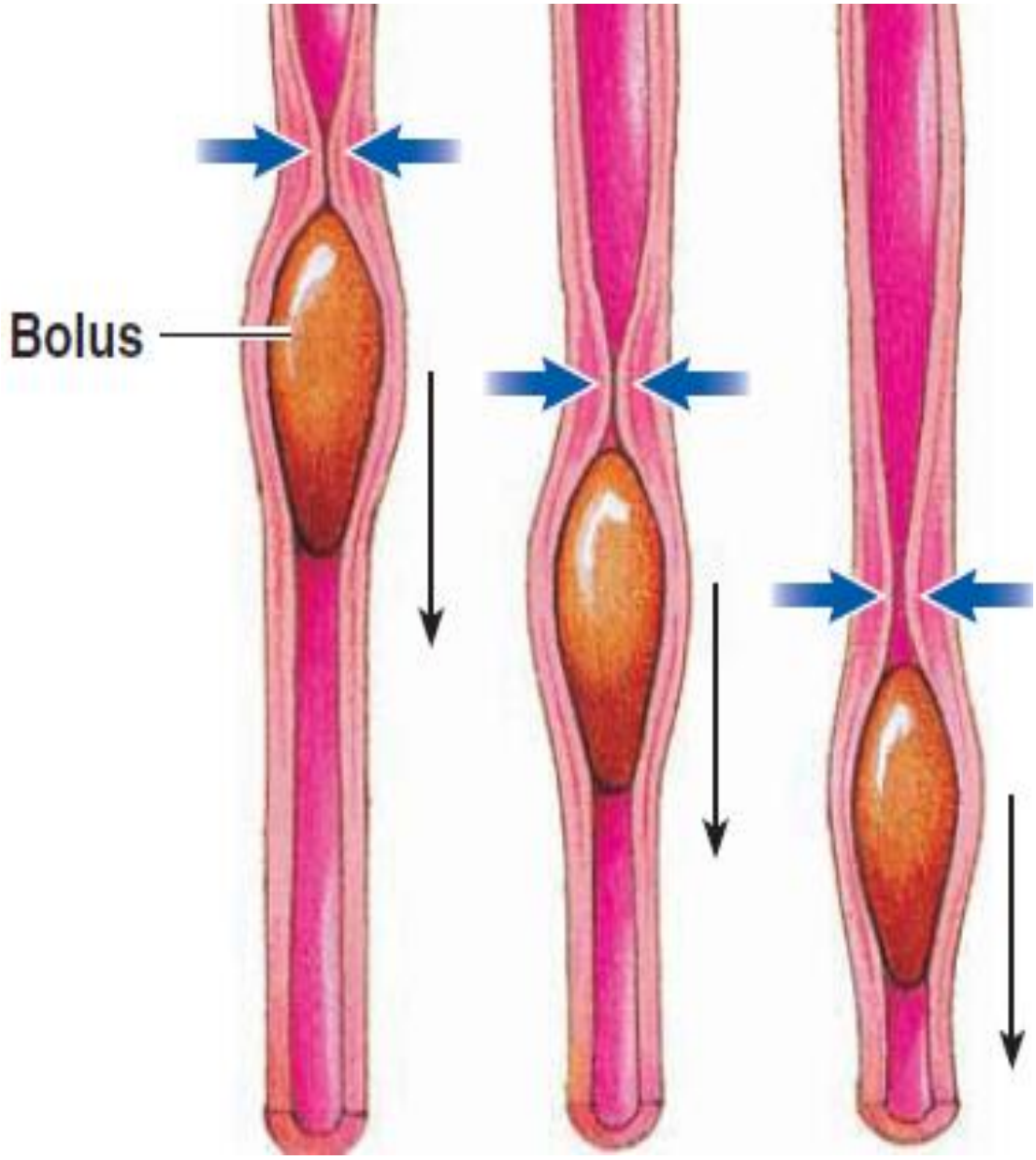
Def., - It is involuntary phase. - Mechanism

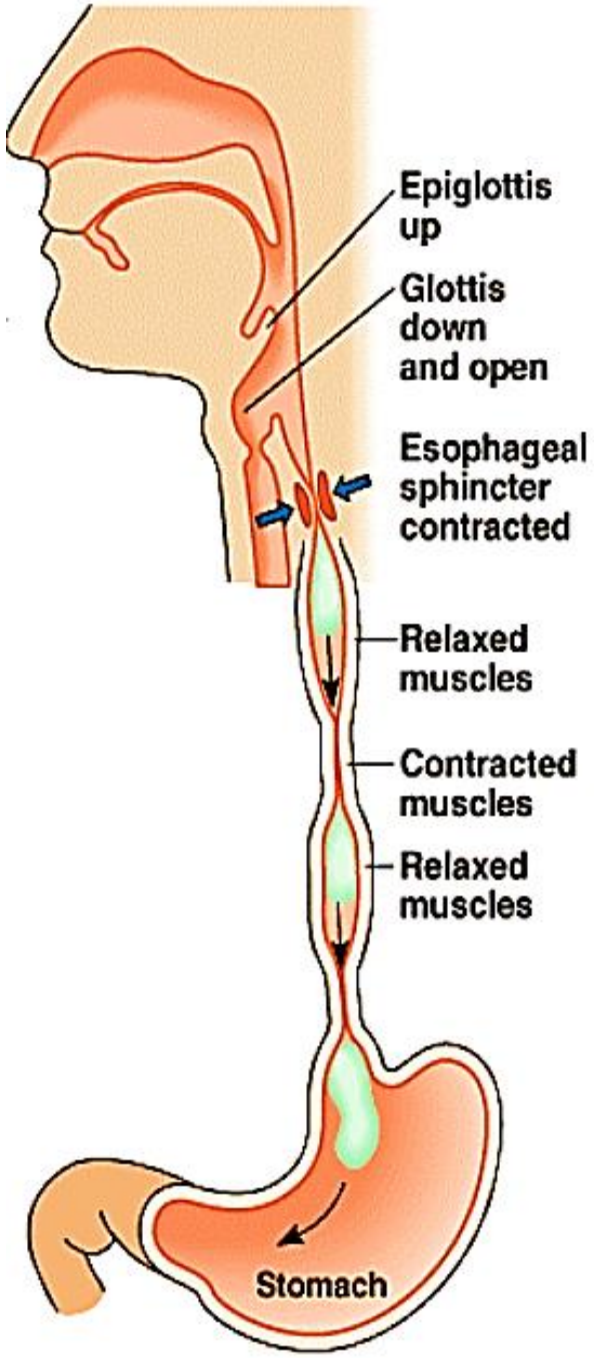
a- If the bolus is fluid or semisolid, it travels by gravity. b-If the bolus is solid, the bolus travels by a peristaltic wave. There are 2 types:

a-Primary peristaltic contractions:

They start in the pharynx & spreads into the esophagus even before the food reaches the esophagus.

b-Secondary peristaltic contractions: in response to distention of the esophagus by bolus


Bolus


Epiglottis up
Glottis down and open
Esophageal sphincter contracted
Relaxed muscles
Contracted muscles
Relaxed muscles
Stomach

Test your self

Saliva is responsible for all except:

A. deglutition;
B. dental caries prevention;
C. complete digestion of proteins;
D. the concentration of iodine;
E. maintaining the oral pH at about 7.0.

Salivary secretion:

A. Contains no organic substances.
B. Is markedly increased in amount after sympathetic stimulation.
C. Secretion is increased after injection of atropine.
D. Secreted by the submandibular glands is about 70% of the total secretion.

Salivary secretion:

a) is under hormonal control only.

b) is under nervous control only.

c) is stimulated by gastrin.

d) contains bile salts.

e) contains HCl.

Regarding salivary secretions & swallowing :

A. the food bolus is propelled down the esophagus by segmentation movement.
B. sympathetic stimulation produces scanty viscid salivary secretion.
C. swallowing is purely voluntary activity.
D. hormones are more important than nerves in the regulation of salivary secretion.

Saliva is responsible for all except:

a- Helps in deglutition

b- Prevents dental caries

c- Is essential for complete digestion of starch

d- Prevents decalcification of the teeth

It is true to say the following about the control of secretion of saliva:

A. The parasympathetic nervous system is the main stimulator of its secretion
B. Adrenaline acts on the muscarinic receptors in the salivary glands to inhibit its secretion
C. The presence of food in the mouth normally causes secretion of saliva through a conditioned reflex
D. The control center is in the frontal lobe of the brain

Bacterecidal action of saliva is due to:

A. Hyaluronidase

B. Amylase

C. Lysozymes

D. Peptidase

Failure of the salivary glands to secrete amylase would make it impossible to digest which of the following?

a) Proteins

b) Fats

c) Disaccharides

d) Starch

e) None of the above

About salivary glands, which of the following statement is true?

A. Their secretion is mainly under hormonal control.

B. The sym . system is the Only natural pathway for stimulatation of their secretion.

C. Their secretion increase in conditions of dehydration.

D. Both sympathetic and parasympathetic nerves stimulate their secretion.

Concerning salivary amylase, all are true EXCEPT:

A. Is secreted mainly by the parotid glands.
B. Is a protein in nature.
C. Is secreted in response to parasympathetic stimulation.
D. Is most active at pH 1-2.

Saliva is needed for:

A. Digestion of sucrose
B. Digestion of phospholipids
C. Ability to speak
D. Breaking food down into small pieces
E. Absorption of chloride

Saliva does not contain:

A. Blood group antigens
B. Lysozymes
C. Immunoglobulins
D. Pepsin
E. Chloride

Salivation can become a conditioned reflex .This suggests that:

A. Pleasant taste sensation are not related to the reflex .
B. Only salivatory nuclei in the brainstem need to be excited by taste sensation without participation of suprasegmental influences.
C. The cerebral cortex partially controls salivation.
D. salivation could be completely interrupted in a decorticate animal whose tongue is mechanically stimulated.

Saliva function are the following EXCEPT :

a) helps in speaking.

b) important for swallowing.

c) is needed for intrinsic factor action.

d) teeth cleaning.

During the pharyngeal phase of swallowing all the following occur, except:

a- The larynx moves upwards to be covered by the epiglottis

b- Peristalsis of the pharynx occurs

c- The vocal cords relax and separate from each other

d- The soft palate is elevated

e- The respiration is inhibited

All the following about swallowing is true, except:

a- The swallowing center is in the cervical segments of the spinal cord

b- The swallowing reflex includes inhibition of respiration

c- It is initiated by a voluntary act

d- It is dependent on the intrinsic innervation of the esophagus

e- It is more effective when the person is standing rather than when lying down

The swallowing process is characterized by all of the following, except:

a- Only the oral phase is voluntary

b- Both pharyngeal and esophageal stages are involuntary reflexes

c- Swallowing center is present in the medulla and lower pons

d- Only the vagus nerve is the efferent in swallowing reflex

During pharyngeal phase of swallowing food is prevented from entering larynx by:

a) stoppage of respiration.

b) elevation of the tongue.

c) elevation of soft palate.

d) contraction of upper esophageal sphincter.

e) contraction of lower esophageal sphincter.

The process of swallowing (deglutition):

A. Consists of 5 phases all of which are involuntary.
B. Can easily occur while the mouth is open.
C. Is controlled by a centre in the medulla & lower pons that initiates a peristaltic wave in the pharyngeal musculature.
D. In the buccal phase the tongue moves downwards and the larynx is depressed.

In contrast to Secondary esophageal peristalsis,primary esophageal peristalsis characterized by which of the following statements?

A. It does not involve relaxation of the lower esophageal sphincter.
B. It involves only contraction of esophageal smooth muscle.
C. It is not influenced by intrinsic nervous system.
D. It starts at pharyngeal phase.