

Lecture series

Gastrointestinal tract



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Various secretions from GIT

First secretion from GIT that encounter the

food is **SALIVARY SECRETIONS**

What is saliva

- Saliva is the mixed glandular secretion which constantly bathes the teeth and the oral mucosa
- First secretion encounter the food
- It is vital for oral health
- It is constituted by the secretions of the three paired major salivary glands;
 - ❖ The Parotid
 - ❖ Submandibular
 - ❖ and Sublingual

Functions of saliva

1. Defense:

- a. Antibacterial
- b. Antifungal
- c. Immunological

2. Digestive function:

- a. Digestive enzymes – ptyalin, lipase
- b. Formation of bolus
- c. Taste

3. Protective function:

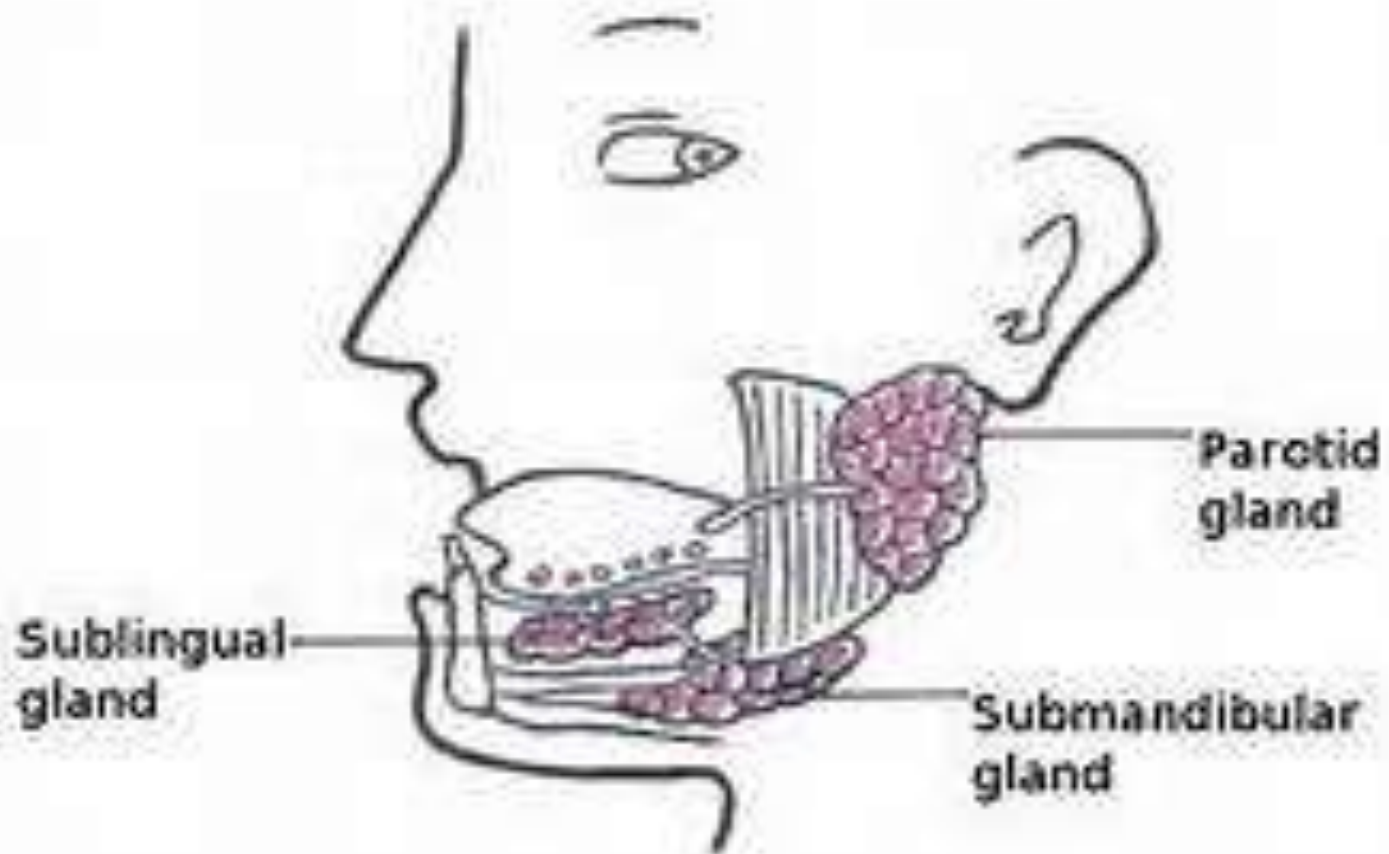
- a. Protective coating for hard tissues-teeth
- b. Protective coating for soft tissues

4. Lubricative function:

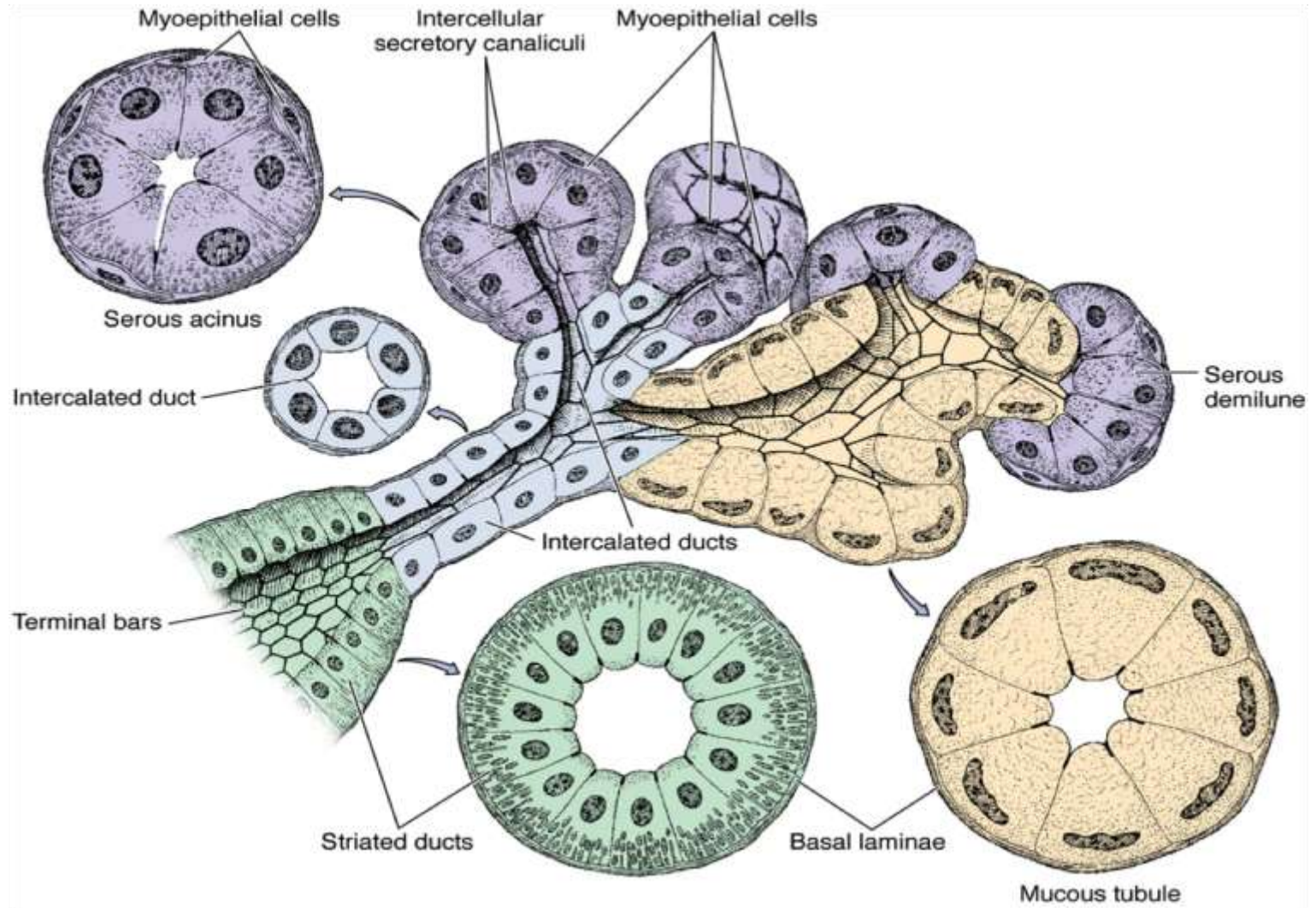
- a. Keeps the oral cavity moist
- b. Facilitates speech
- c. Helps in mastication and swallowing

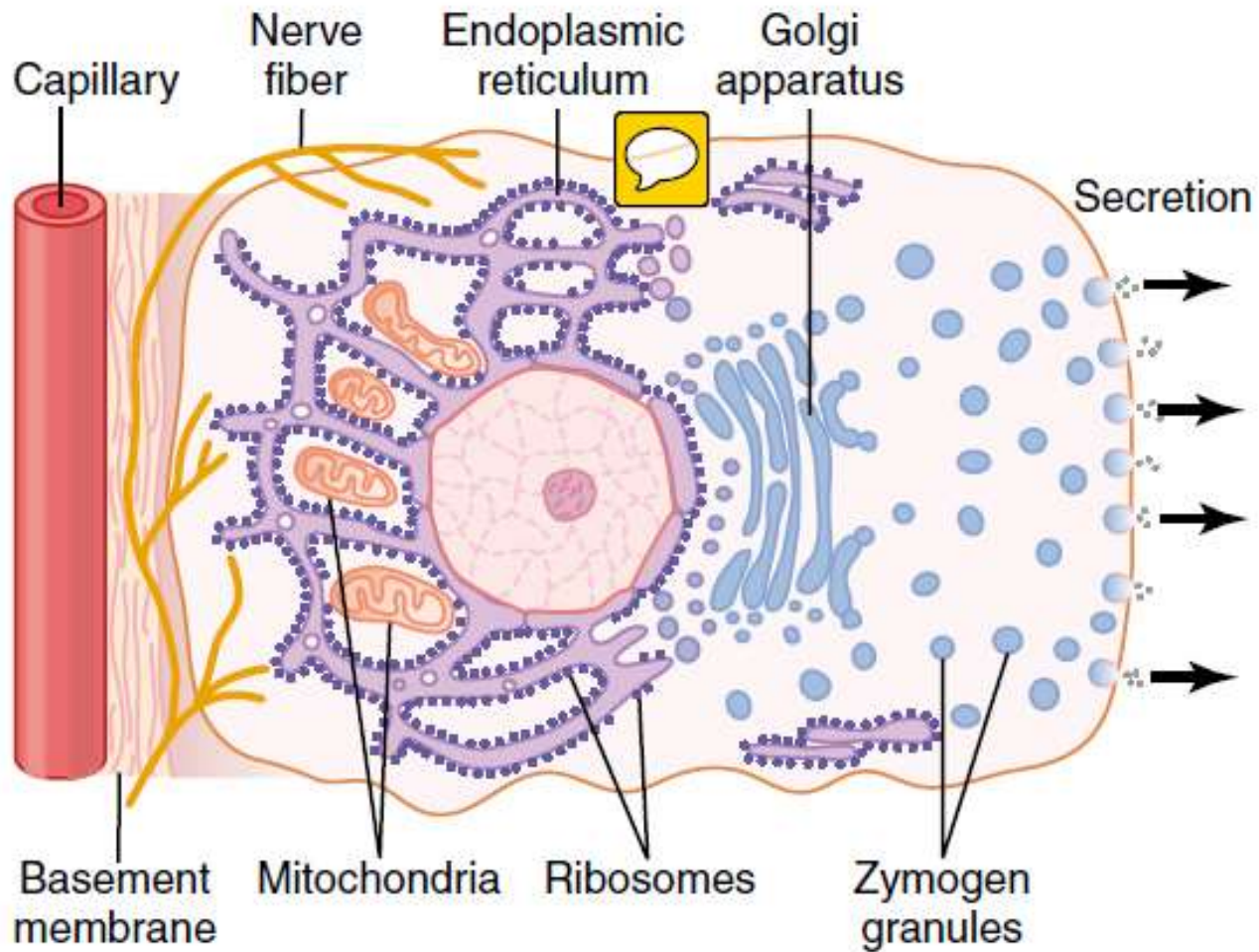
5. Buffering function

Salivary glands



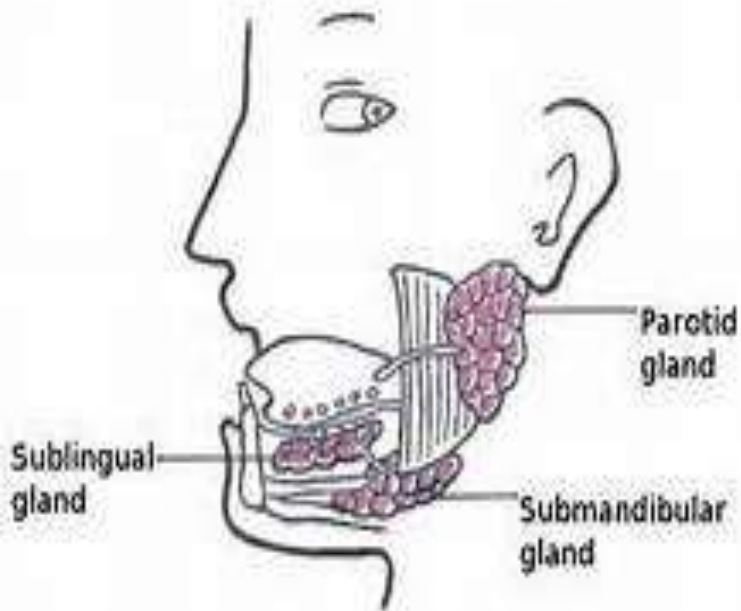
Structure of Salivary Gland





Typical function of a glandular cell for formation and secretion of enzymes and other secretory substances.

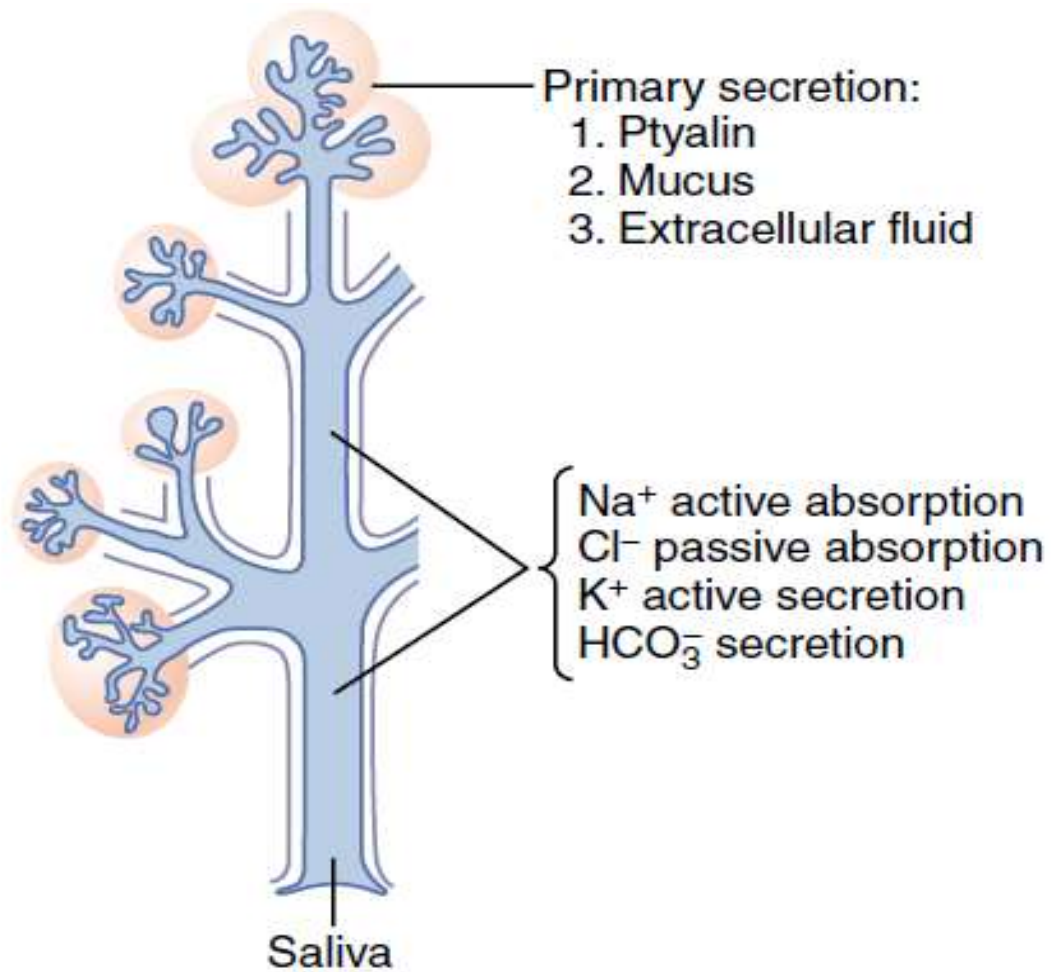
Parotid gland



- Parotid is large accounts for 50% secretion of saliva
- Situated in front of ear behind the ramus of mandible
- Gland drain in to oral cavity opposite to second molar tooth
- Secretions are basically serous

Submandibular and Sub lingual gland

- The submandibular gland is about half the size of the parotid gland
- It lies above the mylohyoid in the floor of the mouth. It opens into the floor of the mouth underneath the anterior part of the tongue
- The sublingual is the smallest of the paired major salivary glands, being about one fifth the size of the submandibular.
- It is situated in the floor of the mouth beneath the sublingual folds of mucous membrane.



Formation and secretion of saliva by a submandibular salivary gland.

Composition of saliva

- Approximately 0.8 – 1.5 litres of saliva is secreted per day
 - (1) **serous secretion that contains ptyalin (an alpha amylase)**, which is an enzyme for digesting starches
 - (2) **mucus secretion that contains mucin for lubricating and for surface protective purposes**
- Parotid - serous

- Submandibular, sublingual glands – serous & mucus
- **0.5 milliliter of saliva, almost entirely of the mucous type, is secreted each minute; but during sleep, secretion becomes very little.**
- Water 99.55% solid 0.45%
- pH 7.04

Saliva

Water – 99.5%

Solids – 0.5%

Organic substances

Enzymes

1. Amylase (ptyalin)
2. Maltase
3. Lingual lipase
4. Lysozyme
5. Phosphatase
6. Carbonic anhydrase
7. Kallikrein

Other organic substances

1. Mucin
2. Albumin
3. Proline-rich proteins
4. Lactoferrin
5. IgA
6. Blood group antigens
7. Free amino acids
8. Non-protein nitrogenous substances – urea, uric acid, creatinine, xanthine, hypoxanthine

Inorganic substances

1. Sodium
2. Calcium
3. Potassium
4. Bicarbonate
5. Bromide
6. Chloride
7. Fluoride
8. Phosphate

Gases

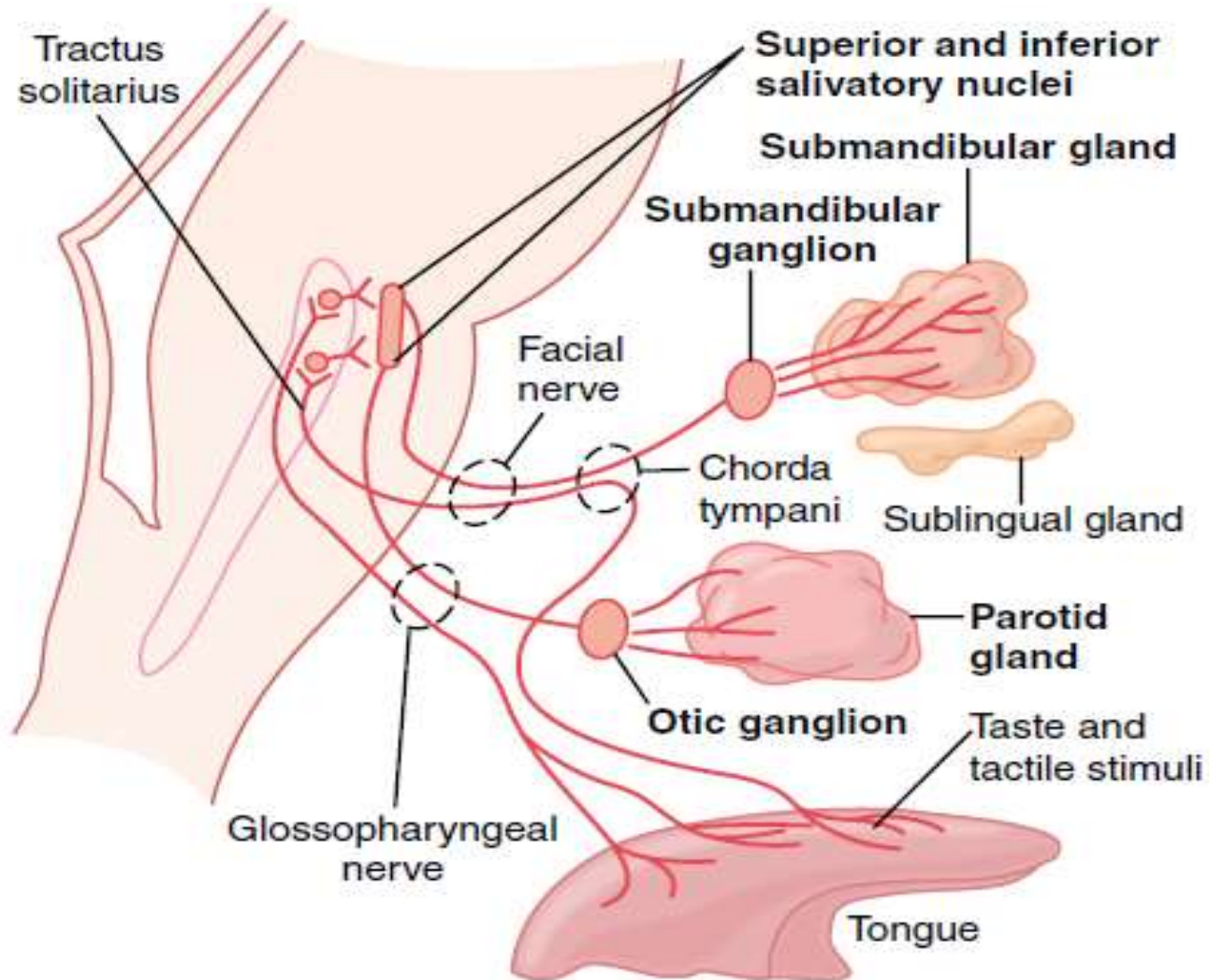
1. Oxygen
2. Carbon dioxide
3. Nitrogen

Normally, glucose is absent in saliva.
But, it is found in saliva during diabetes mellitus

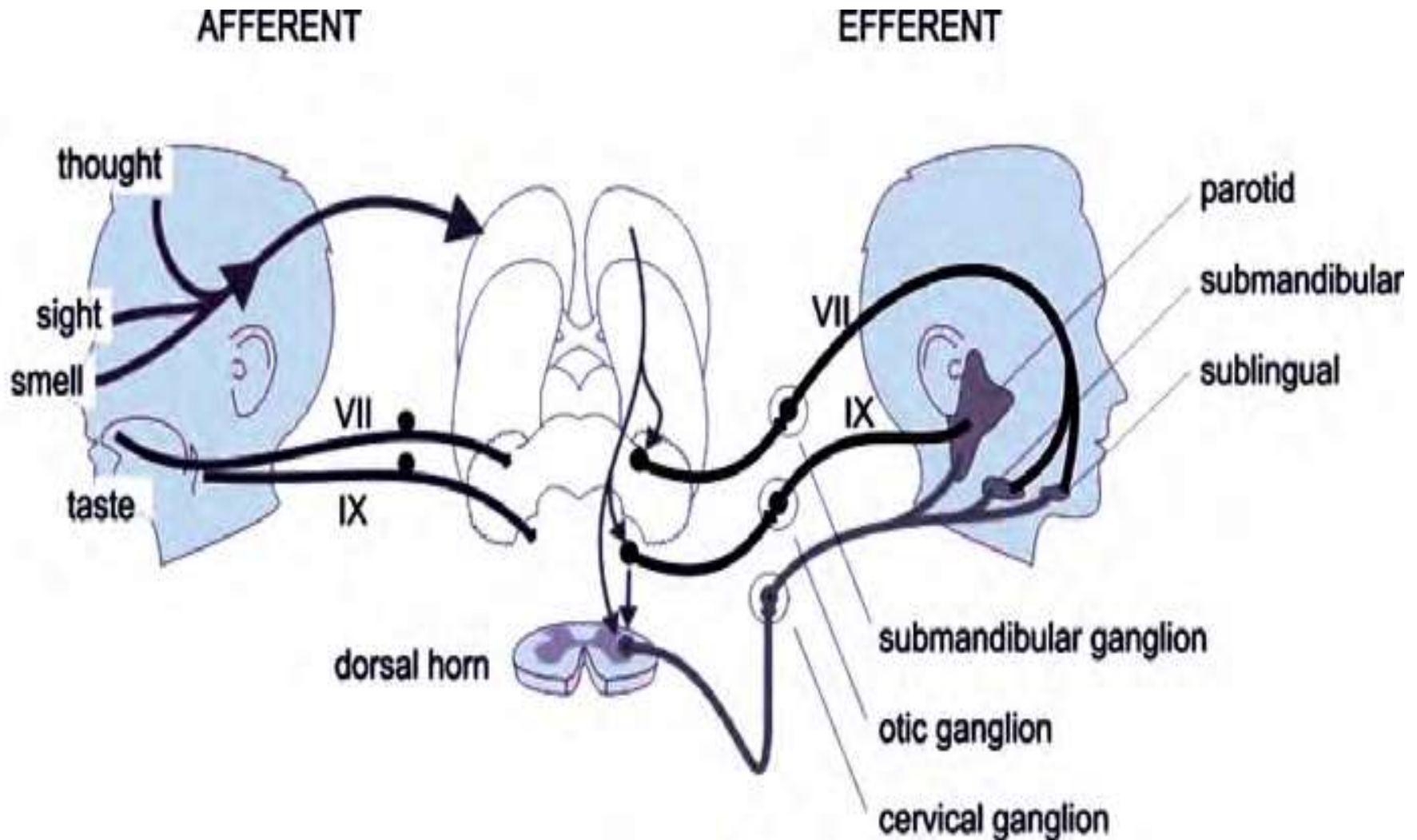
Nervous Regulation

- Salivary glands are controlled mainly by **parasympathetic nervous signals all the way from** the superior and inferior salivatory nuclei in the brainstem
- Salivatory nuclei excited by both taste and tactile stimuli from the **tongue and other areas of the mouth and pharynx**
- when a person smells or eats **favorite foods, salivation is greater than when disliked food is** smelled or eaten - **appetite area**
- Salivation also occurs in response to **reflexes** originating in the stomach and upper small intestines

Parasympathetic nervous regulation of salivary secretion.



Control of Salivary Secretion



- **Sympathetic stimulation can also increase** salivation a slight amount - superior cervical ganglia
- A secondary factor that also affects salivary secretion is the **blood supply to the glands** because secretion always requires **adequate nutrients from the blood.**
- The **parasympathetic nerve signals that induce** copious salivation also moderately dilate the blood vessels

Applied

- The presence of saliva is vital to the maintenance of healthy hard (teeth) and soft (mucosa) oral tissues.
- Patients suffering from dry mouth can experience difficulty with eating, swallowing, speech, the wearing of dentures, trauma to and ulceration of the oral mucosa, taste alteration, poor oral hygiene, a burning sensation of the mucosa, oral infections including Candida and rapidly progressing dental caries
- After radio therapy, old age and multidrug therapy

References

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- Berne & levy, physiology, sixth edition, updated edition
- Ganong's Review of Medical Physiology, 26 t h e d i t i o n