

Salivary Glands and Salvation

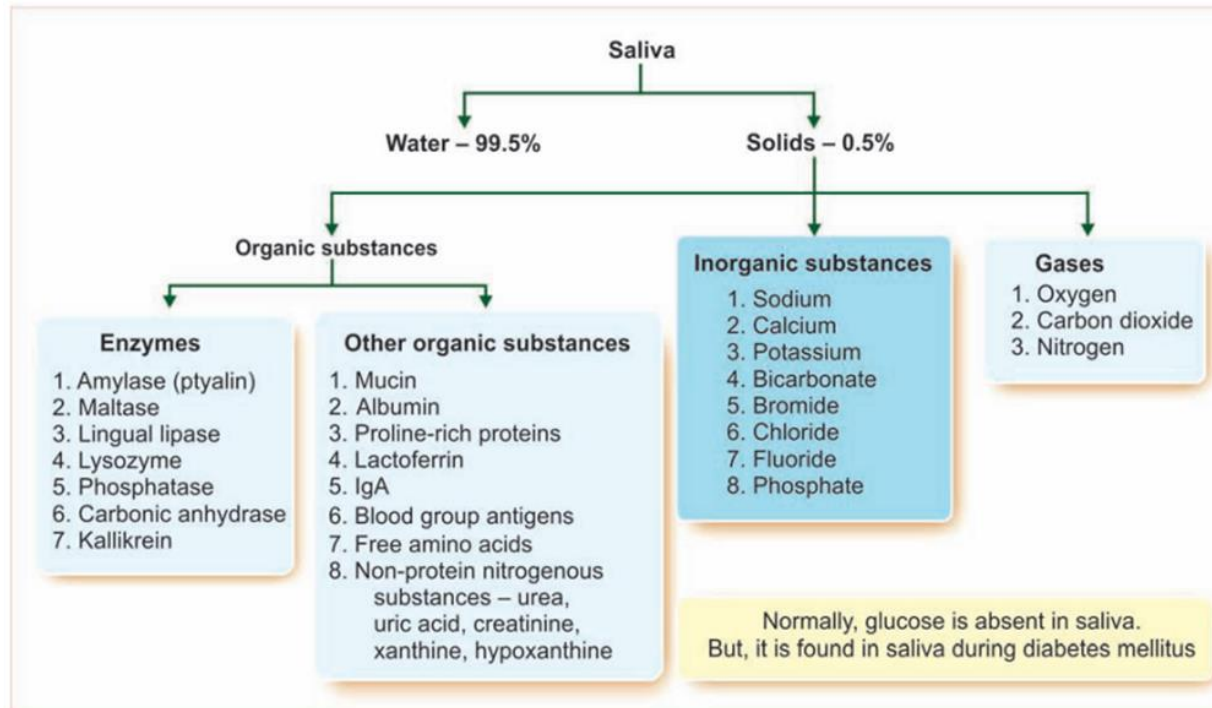
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Saliva

- **Saliva** is an **extracellular fluid produced and secreted by salivary glands in the mouth.**
- Daily secretion of saliva ranges between **800 and 1500 ml.**
- Saliva has a pH between **6.0 and 7.0.**
- During normal awake conditions **saliva is secreted at 0.5ml /min.**
- **Specific gravity:** It ranges between **1.002 and 1.012**
- **Tonicity:** Saliva is **hypotonic** to plasma.

Composition of Saliva

- Saliva contains two major types of protein secretion:
 - 1) **Serous (watery) secretion**
 - Contains **ptyalin (an α -amylase)** – enzyme for digesting starches
 - 2) **Mucus secretion**
 - Contains **mucin** – viscous, glycoprotein rich
 - Lubrication and surface protective purposes



Salivary Glands

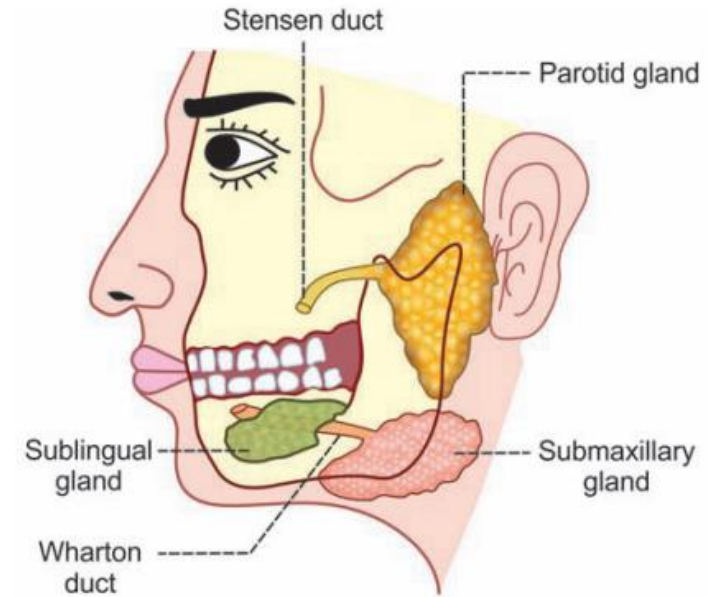
- In humans, the saliva is secreted by **3 pairs of major salivary glands** and some **minor salivary glands**.

1. Major salivary glands:

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

2. Minor salivary glands:

1. Lingual Mucus Glands
2. Lingual Serous Glands
3. Buccal Glands
4. Labial Glands
5. Palatal Glands



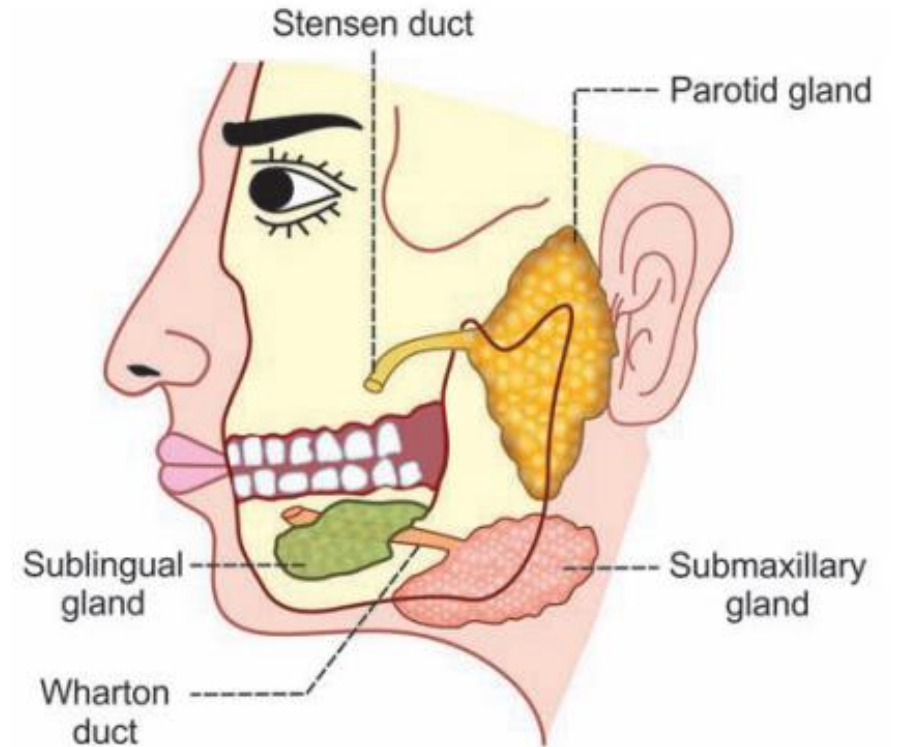
Gland	Duct
Parotid gland	Stensen duct
Submaxillary gland	Wharton duct
Sublingual gland	Ducts of Rivinus/Bartholin duct

Parotid Glands

- Largest Salivary Glands
- Located at the **side of the face, below and in front of the ear**
- Each gland weighs approximately **20 to 30 grams in adults**

Secretions and Ducts

- **Stensen Duct**
 - **Length:** 35 mm to 40 mm
 - Empties secretions into the **oral cavity**
 - **Opens inside the cheek, opposite the upper second molar**



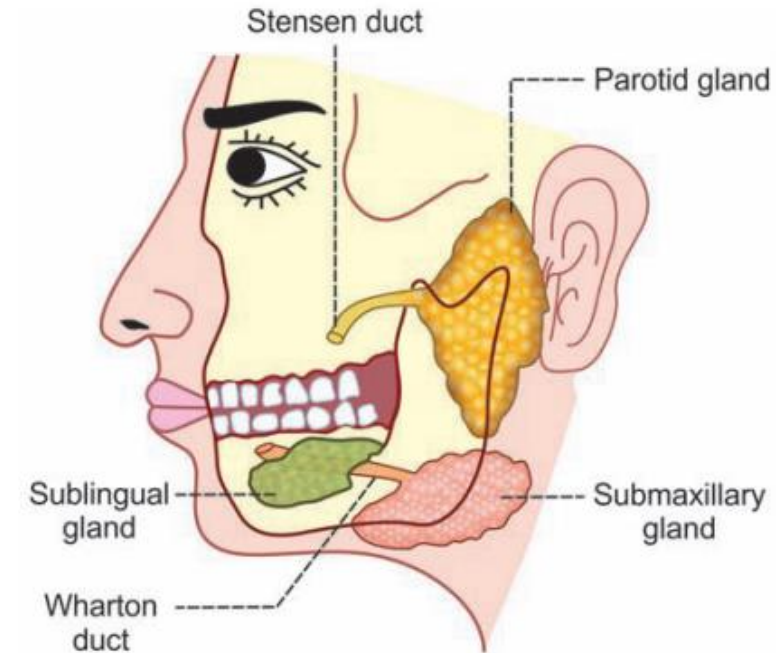
Submaxillary or submandibular glands

Location

- Situated in the **submaxillary triangle**, medial to the mandible
- Each gland weighs approximately **8 to 10 grams**

Secretions and Ducts

- **Wharton Duct**
 - **Length:** About 40 mm
 - Empties saliva into the **oral cavity**
 - Opens at the **side of the frenulum of the tongue**
 - Small opening on the summit of papilla called **caruncula sublingualis**



Sublingual glands

- **Smallest Salivary Glands**
- Located in the mucosa at the **floor of the mouth**
- Each gland weighs approximately **2 to 3 grams**

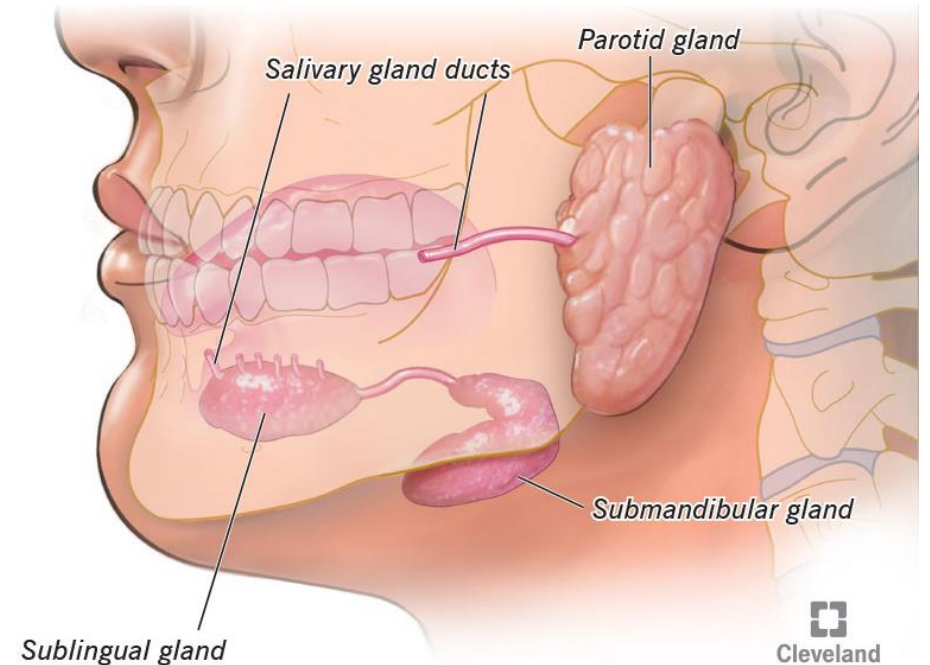
Secretions and Ducts

1. Ducts of Rivinus

- 5 to 15 small ducts
- Open on small papillae **beneath the tongue**

2. Bartholin Duct

- Larger duct draining the **anterior part of the gland**
- Opens on **caruncula sublingualis** near the opening of the submaxillary duct



Minor salivary glands

1. Lingual Mucus Glands

- Located in **posterior 1-3rd of the tongue**, behind circumvallate papillae
- At the tip and margins of the tongue

2. Lingual Serous Glands

- Located near **circumvallate and filiform papillae**

3. Buccal Glands

- Located b/w the **mucous membrane and buccinator muscle**
- **4-5 larger glands** situated outside the buccinator, around the terminal part of the parotid duct

4. Labial Glands

- Located **beneath the mucous membrane** around the **orifice of the mouth**

5. Palatal Glands

- Found **beneath the mucus membrane** of the **soft palate**

Classification of Salivary Glands

1. Serous Glands

- **Composition** – mainly serous cells
- **Secretion** – Thin and watery saliva
- **Examples**
 1. Parotid glands
 2. Lingual serous glands

2. Mucus Glands

- **Composition** – mainly mucus cells
- **Secretion** – Thick, viscous saliva with high mucin content
- **Examples**
 1. Lingual mucus glands
 2. Buccal glands
 3. Palatal glands

3. Mixed Glands

- **Composition** – Both serous and mucus cells
- **Secretion** – Combination of thin and viscous saliva
- **Examples**
 1. Submandibular glands
 2. Sublingual glands
 3. Labial glands

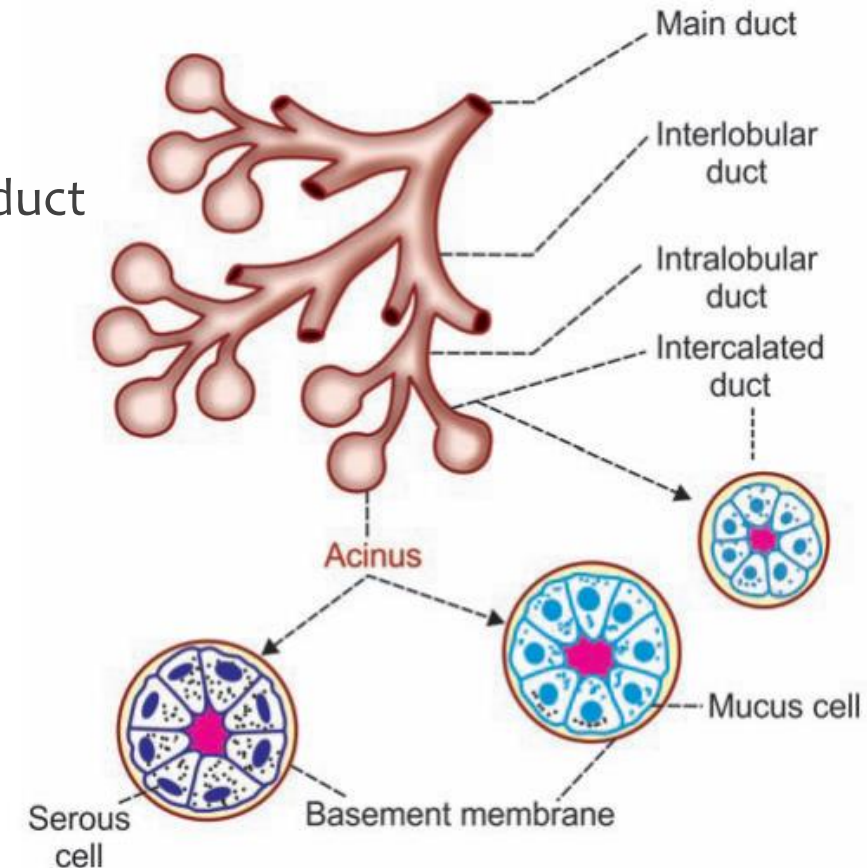
Structure and Duct System of Salivary Glands

Acini/Alveoli Formation

- Salivary glands are composed of acini (or alveoli).
- Each acinus consists of a group of cells surrounding a central globular cavity.

Duct System

- Central cavity of each acinus is continuous with the lumen of the duct
 - **Intercalated Ducts:** Fine ducts draining each acinus
 - **Intralobular Ducts:** Formed by the union of intercalated ducts
 - **Interlobular Ducts:** Created by joining few intralobular ducts
 - **Main Duct:** Formed by the union of interlobular ducts
- Structure resembling a bunch of grapes **racemose type**.



Functions of Saliva

1. Preparation of Food for Swallowing

- Moistens and dissolves food
- Facilitates chewing and bolus formation
- Mucin lubricates the bolus for swallowing

2. Appreciation of Taste

- Saliva dissolves solid food substances for taste bud stimulation
- Taste recognition facilitated by dissolved substances

3. Digestive Function

- **Salivary Amylase:** Digests carbohydrates, **converting starch into dextrin and maltose**
- **Maltase:** Converts **maltose into glucose**
- **Lingual Lipase:** Digests **milk fats, hydrolyzing triglycerides into fatty acids and diacylglycerol**

Functions of Saliva

4. Cleansing and Protective Functions

- Rinses mouth and teeth, **removing debris and foreign particles**
- Enzymes and proteins in saliva **kill bacteria and neutralize toxins**
- Stimulates **enamel formation**, protects teeth
- **Mucin** lubricates and protects the mucus membrane

5. Role in Speech

- Moistens and lubricates **soft parts of the mouth and lips**

6. Excretory Function

- Excretes various substances, including certain **viruses and toxins**
- Can **reflect pathological conditions** by excreting abnormal substances (**glucose, urea, calcium**)

7. Regulation of Water Balance

- Decreased saliva secretion **induces thirst**, restoring body water content

Regulation of Salivary Secretion

- Salivary secretion is regulated by the **autonomic nervous system**.

Nerve Supply to Salivary Glands

1. Parasympathetic Fibers

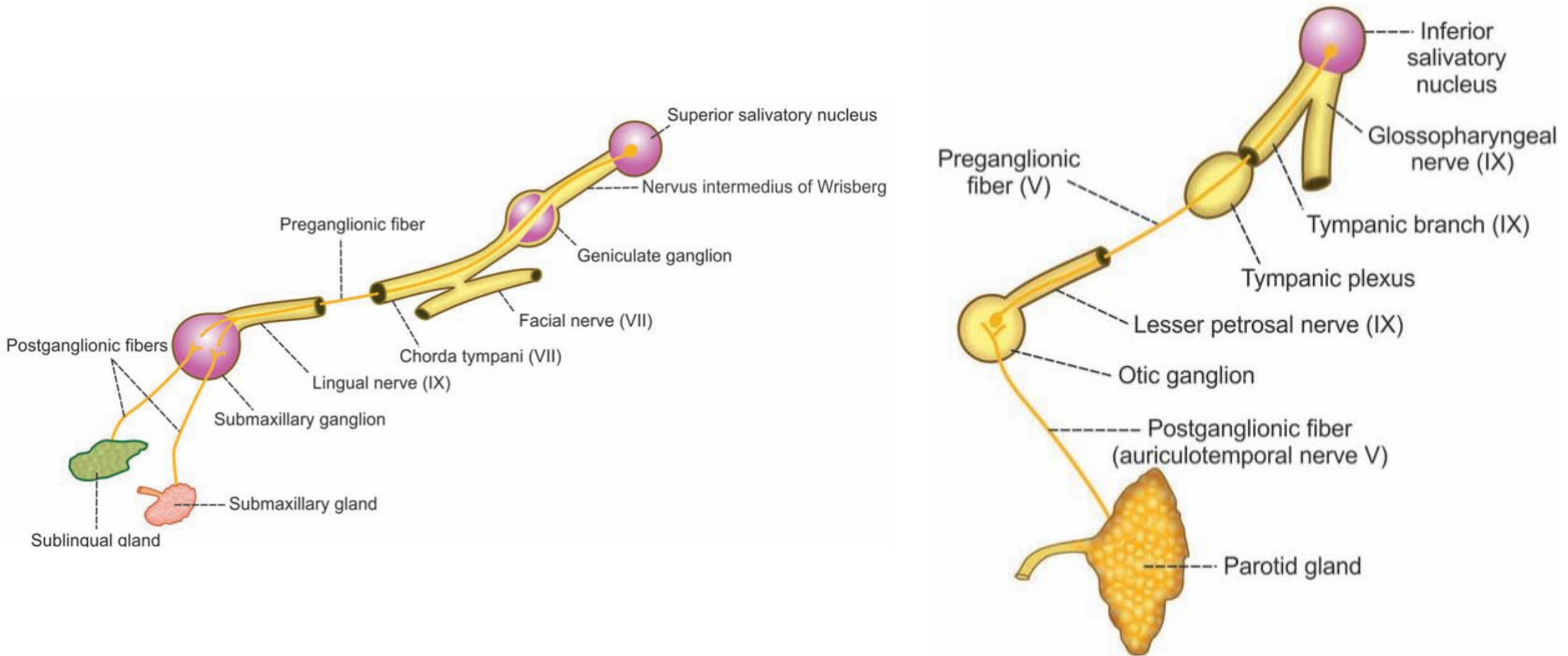
i. Submandibular and Sublingual Glands

- Originate from the **superior salivatory nucleus in the pons**
- Pathway: **Superior salivatory nucleus → chorda tympani (branch of facial nerve) → geniculate ganglion → submaxillary ganglion**

ii. Parotid Gland

- Originate from the **inferior salivatory nucleus in the medulla oblongata**
- Pathway: **Inferior salivatory nucleus → glossopharyngeal nerve → tympanic plexus → lesser petrosal nerve → otic ganglion**

Parasympathetic Nerve Supply to Salivary Glands



Function of Parasympathetic Fibers

- Stimulation of **parasympathetic fibers causes:**
 - Secretion of **saliva rich in water**
 - Activation of **acinar cells and dilation of salivary gland blood vessels**
 - Resulting **saliva has fewer organic constituents**
 - Neurotransmitter involved: **Acetylcholine**

Regulation of Salivary Secretion

2. Sympathetic Fibers

Pathway:

- Sympathetic preganglionic fibers to salivary glands originate from **lateral horns of 1st and 2nd segment of thoracic segment of spinal cord.**
- The fibers leave the cord through **anterior nerve roots and end in the superior cervical ganglion of the sympathetic chain.**
- **Postganglionic fibers** arise from this ganglion and distributed to the salivary glands along the nerve plexus, around the arteries supplying the glands.

Functions of Sympathetic fibers

- Stimulation of sympathetic fibers causes:
 - Secretion of saliva with less water, resulting in **viscous saliva**
 - Resulting saliva is rich in organic substance (**mucin**)
 - **Constriction of blood vessels** supplying the salivary glands
 - Neurotransmitter involved: **Noradrenaline**

Thank You