ROLE OF SALIVARY GLANDS

Introduction

Salivary glands are essential exocrine glands of the digestive system that produce and secrete saliva into the oral cavity. Although often associated only with lubrication of food, saliva has diverse functions—including digestion, protection, taste facilitation, excretion, buffering, speech assistance, and oral homeostasis. Human beings possess three pairs of major salivary glands (parotid, submandibular, and sublingual) along with numerous minor glands. Together, they produce 1–1.5 liters of saliva per day under normal physiological conditions. Understanding their role is crucial, as disturbances in salivary secretion can lead to profound clinical problems.

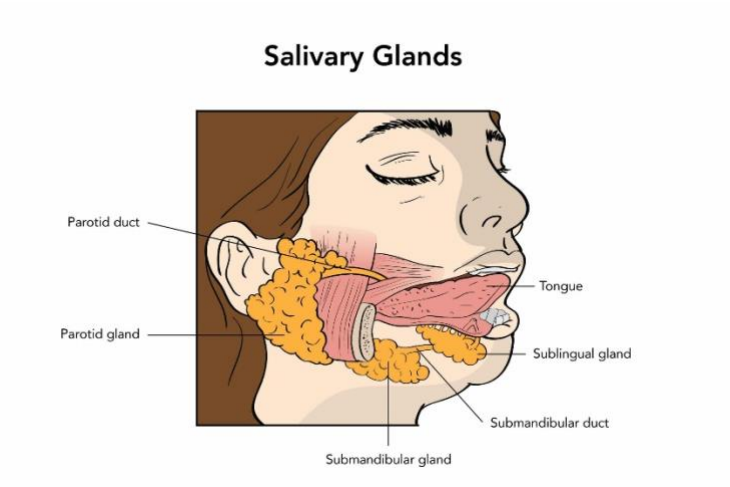
Types of Salivary Glands

A. Major Salivary Glands

1. **Parotid glands**
    - Largest salivary glands located near the ear.
    - Secretion: **Serous, watery, enzyme-rich saliva**.
    - Contains abundant **α-amylase** for carbohydrate digestion.
2. **Submandibular glands**
    - Located beneath the mandible.
    - Secretion: **Mixed (serous > mucous)**.
    - Produce major portion (60–70%) of unstimulated saliva.
3. **Sublingual glands**
    - Smallest of the three, located under the tongue.
    - Secretion: **Mucous-rich** saliva (viscous, lubricating).

B. Minor Salivary Glands

- Found in the lips, cheeks, palate, pharynx, nasopharynx, and tongue.
- Secretion: Mostly **mucous**.
- Provide basal lubrication and maintain oral moisture continuously, especially during sleep.



Composition of Saliva

Saliva is a **hypotonic fluid** consisting of:

- **Water** (99%)
- **Electrolytes:** Na^+, K^+, Cl^-, HCO_3^-, Ca^{2+}, phosphate
- **Enzymes:** Amylase, lipase, lysozyme
- **Glycoproteins:** Mucins
- **Immunoglobulins:** IgA
- **Antimicrobial proteins:** Lactoferrin, peroxidase
- **Growth factors:** Epidermal growth factor
- **Metabolites, urea, ammonia** (small amounts)

Functions and Role of Salivary Glands

A. Role in Digestion

1. Initiation of carbohydrate digestion

- Parotid saliva contains **salivary α-amylase (ptyalin)** which begins the breakdown of starch into maltose and dextrins in the mouth.
- Although amylase stops working in acidic stomach pH, it remains active for a short time in the food bolus.

2. Lipid digestion in infants

- Salivary glands (especially sublingual) secrete **lingual lipase** which initiates the digestion of triglycerides.
- Very important for infants whose pancreatic function is immature.

3. Formation of bolus

- Mucins make the food soft, slippery, and cohesive.
- Facilitates easy swallowing and prevents mechanical injury to the mucosa.

4. Solvent for taste perception

- Saliva dissolves food molecules and allows them to reach taste receptors on taste buds.
- Without saliva, taste sensation becomes severely impaired (dysgeusia).

B. Role in Protection of Oral Cavity

1. Lubrication & Tissue Protection

- Ensures the oral cavity remains moist and reduces friction.
- Prevents dryness (xerostomia) and protects mucosa from abrasion while chewing and speaking.

2. Antimicrobial action

- **Lysozyme** destroys bacterial cell walls.
- **Lactoferrin** binds iron and inhibits bacterial growth.
- **IgA** prevents microbial adherence to mucosal surfaces.
- Peroxidase systems inhibit fungal and bacterial proliferation.

3. Neutralization of acids

- **Bicarbonate** in saliva buffers acids produced by oral bacteria and food.
- Helps maintain optimum pH (6.7–7.4).
- Prevents dental caries by resisting enamel demineralisation.

4. Teeth mineralization

- Saliva contains **calcium and phosphate ions**, crucial for maintaining enamel integrity.
- Helps in **remineralization** of early dental lesions.

5. Cleansing action

- Continuous flow of saliva washes away food particles and bacteria.

C. Role in Moistening & Lubrication

1. During speech

- Moist mucosa helps in articulation and prevents tongue and lips from sticking.

2. During mastication

- Creates a lubricated environment for teeth and soft tissues, preventing mechanical trauma.

3. Maintaining mucosal integrity

- Mucous components form a protective barrier against heat, chemicals, and pathogens.

D. Role in Excretion

Saliva acts as a minor route for excretion of:

- Heavy metals (lead, mercury)
- Drugs (iodine, thiocyanate, alcohol)
- Urea and ammonia
  Although not major like kidneys, saliva helps in detoxification.

E. Role in Water & Electrolyte Balance

- During dehydration, salivary flow decreases.
- Acts as an indicator of hydration status.
- Salivary glands reabsorb Na^+ and Cl^- to maintain electrolyte homeostasis.

F. Role in Taste and Appetite Regulation

- Moistening of food and dissolving chemicals enhances taste perception.
- Taste stimulation increases salivary secretion—part of cephalic digestive response.
- Pleasant taste increases secretion; unpleasant taste leads to reduced flow.

G. Role in Immune Defense

1. First line of defense

- Saliva forms a physical and biochemical blockade against pathogens entering orally.

2. Secretory IgA

- Prevents microbial adhesion.
- Protects the upper respiratory and gastrointestinal tract entry points.

3. Growth factors

- Promote wound healing in the oral cavity.
- Regenerate epithelium and maintain tissue health.

H. Role in Regulation of Oral pH

- Salivary buffering system prevents wide fluctuations in oral pH.
- Essential in preventing acid erosion and maintaining a healthy microbiome.