



جامعة المستقبل
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المحاضرة الخامسة

Glandular Tissues (The Glands)

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Glandular Tissues (The Glands)

1. Introduction to Glandular Tissue

The glandular tissue is a specialized type of epithelial tissue designed for the **production and secretion of substances** such as hormones, enzymes, mucus, and sweat. Glands play a crucial role in maintaining **homeostasis** and coordinating bodily functions.

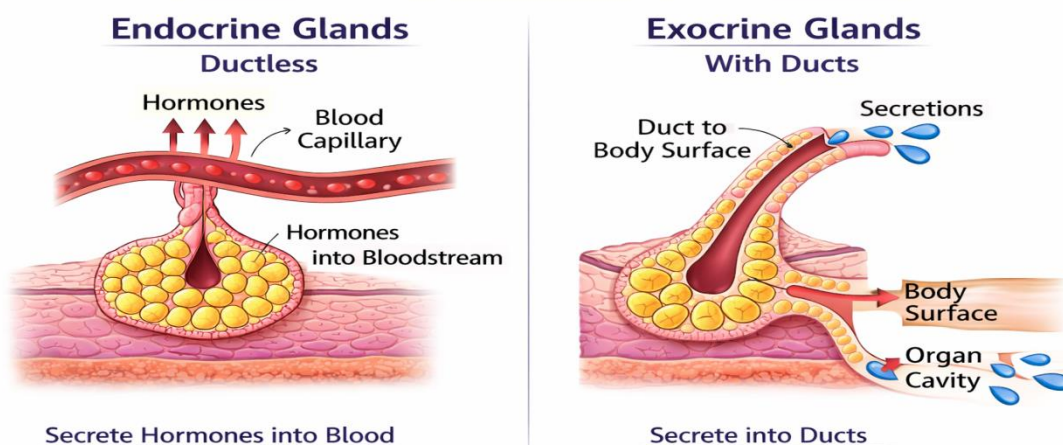
Definition:

A gland is a group of epithelial cells specialized to **synthesize and secrete chemical substances** into a duct, onto a surface, or directly into the bloodstream.

Importance:

- Regulation of metabolism (endocrine glands)
- Digestion and nutrient processing (exocrine glands)
- Protection and lubrication of tissues
- Thermoregulation (sweat glands)

Glandular Tissue



2. Classification of Glands

Glands can be classified based on **structure, secretion type, and mode of secretion**:

A. Structural Classification

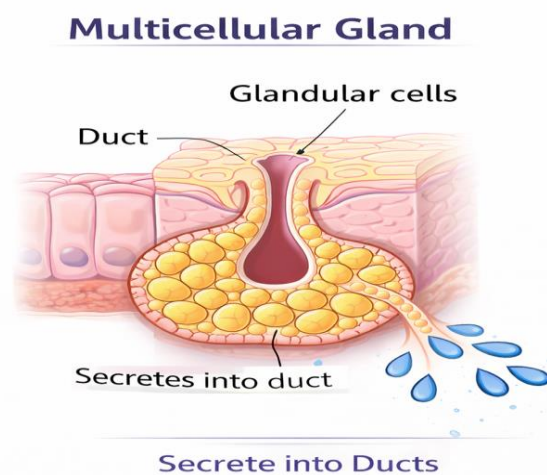
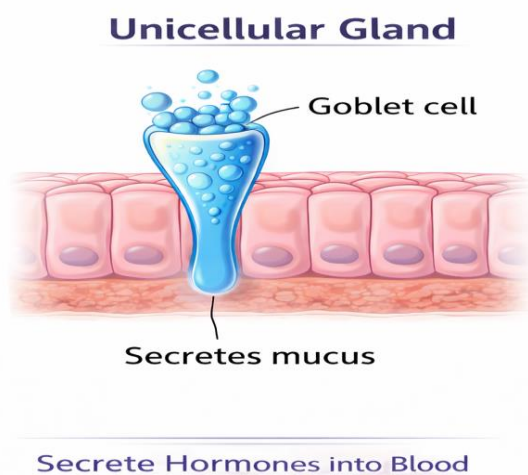
1. Unicellular glands:

- Single secretory cell (e.g., goblet cells)
- Found in epithelial linings such as the intestines and respiratory tract

2. Multicellular glands:

- Many cells forming glandular tissue
- May be **simple** (undivided duct) or **compound** (branched ducts)

Unicellular vs Multicellular Glands



B. Functional Classification (Mode of Secretion)

1. Exocrine Glands

- Secrete substances **onto epithelial surfaces** via ducts
- Examples: sweat glands, salivary glands, pancreas (exocrine portion)

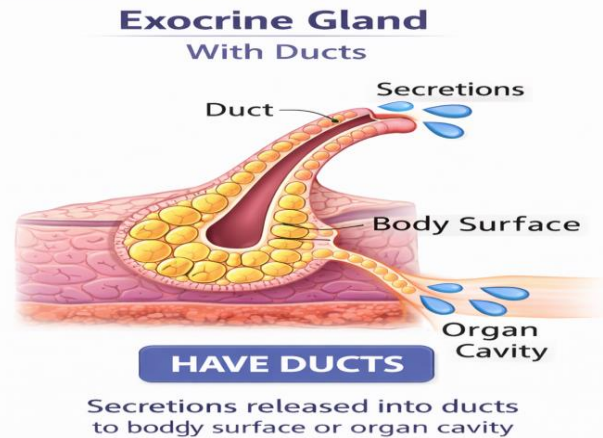
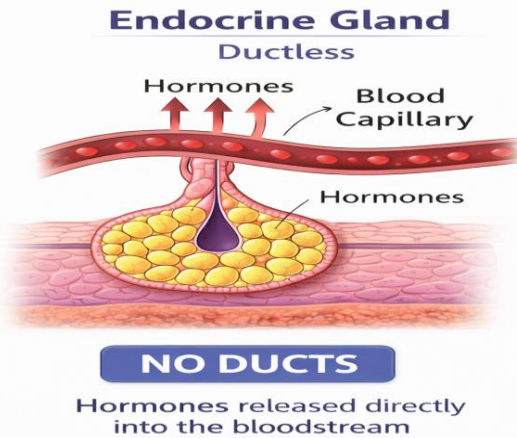
2. Endocrine Glands

- **Ductless** glands; secrete hormones **directly into the bloodstream**
- Examples: thyroid, adrenal, pituitary glands

3. Mixed or Amphicrine Glands

- Contain both endocrine and exocrine portions
- Example: pancreas (exocrine: digestive enzymes, endocrine: insulin, glucagon)

Endocrine vs Exocrine Glands Diagram



C. Classification by Secretion Type

1. Merocrine (Eccrine) Glands

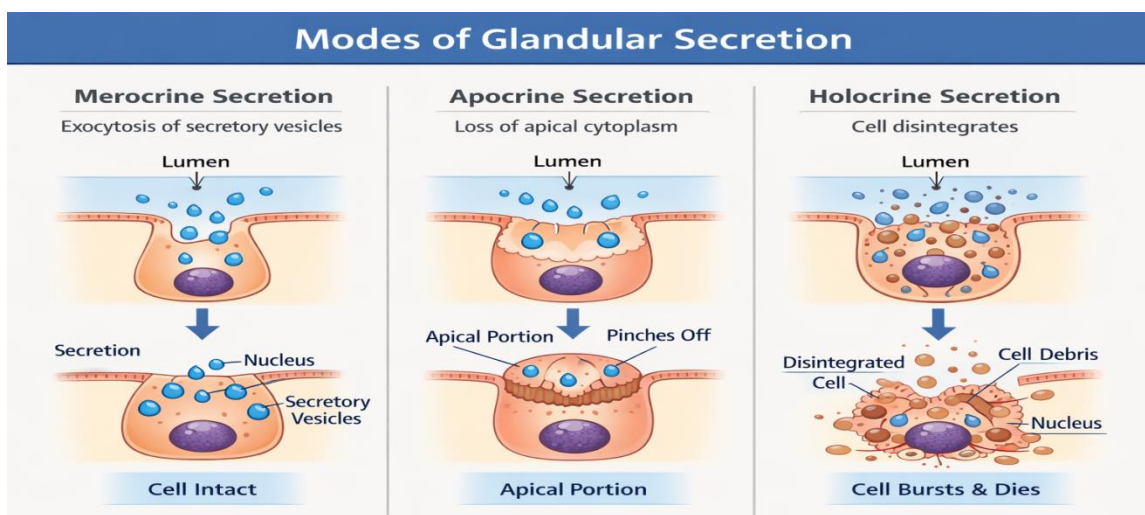
- Secretion occurs via **exocytosis** without loss of cytoplasm
- Example: salivary glands, pancreas
- Most common type of secretion

2. Apocrine Glands

- Part of the cytoplasm pinches off with secretory product
- Example: mammary glands, some sweat glands

3. Holocrine Glands

- Entire cell disintegrates to release secretion
- Example: sebaceous (oil) glands in skin



3. Structure of Multicellular Glands

Multicellular glands consist of:

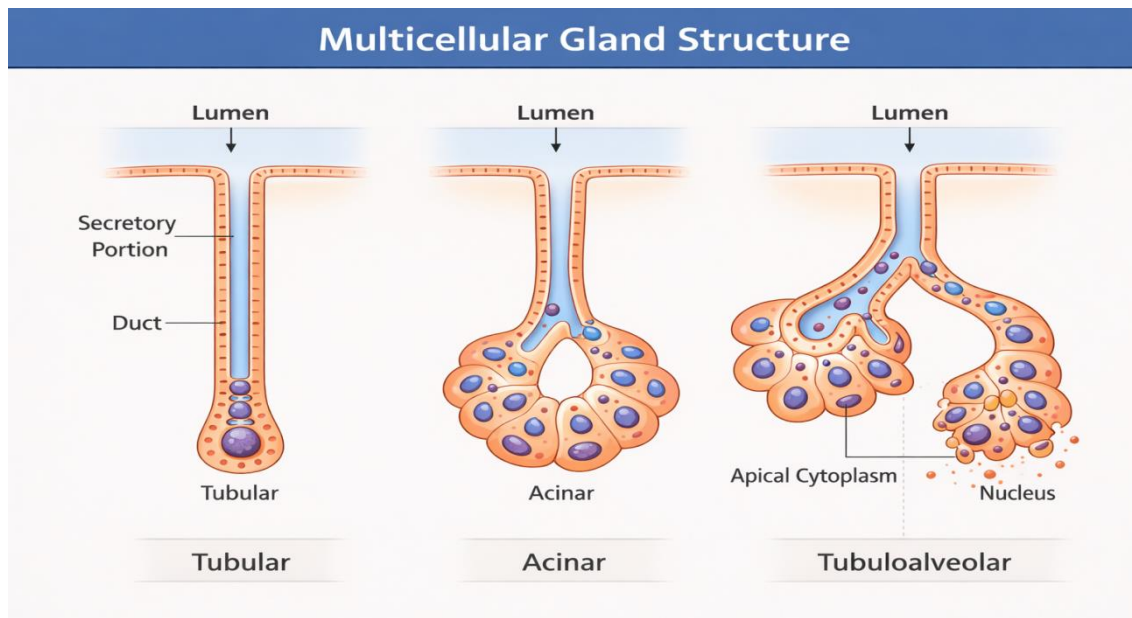
1. **Secretory portion (acinus/alveolus):** synthesizes secretions
2. **Duct system:** transports secretions to surface or target site
3. **Supporting connective tissue:** provides blood supply and structural support

Duct Morphology:

- **Simple glands:** single, unbranched duct
- **Compound glands:** branched ducts leading to multiple secretory units

Secretory Unit Shapes:

- **Tubular:** tube-like (intestinal glands)
- **Alveolar/acinar:** sac-like (sebaceous glands)
- **Tubuloalveolar:** combination (salivary glands)



4. Exocrine Glands in Detail

A. Types of Exocrine Glands

1. **Sweat (Sudoriferous) Glands**
 - Function: thermoregulation
 - Location: dermis of skin
 - Type: eccrine (merocrine) & apocrine

2. Sebaceous (Oil) Glands

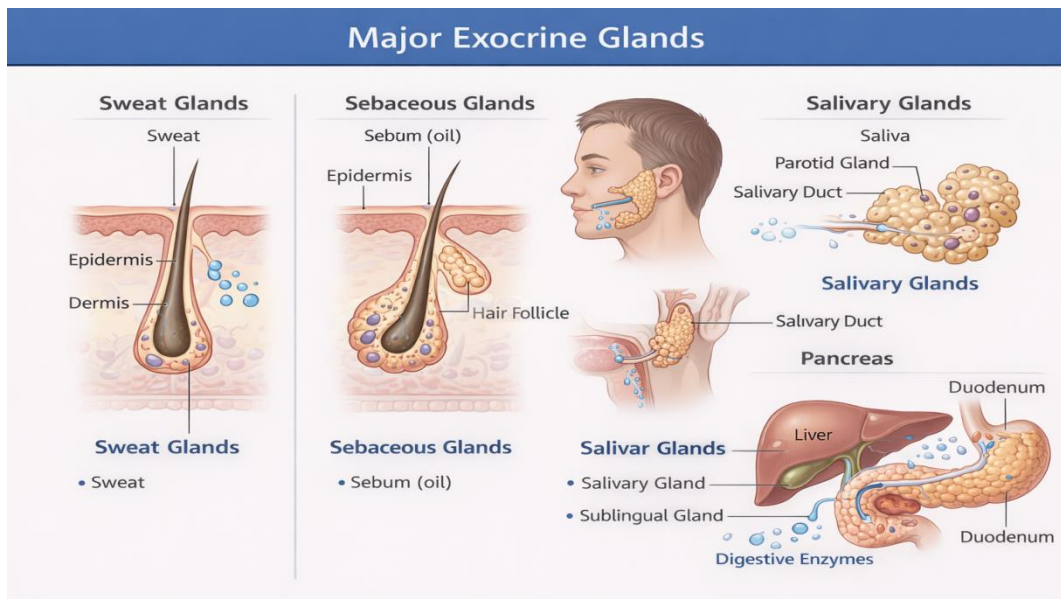
- Function: sebum secretion for skin lubrication
- Type: holocrine
- Associated with hair follicles

3. Salivary Glands

- Produce saliva (enzymes + mucus)
- Major glands: parotid, submandibular, sublingual
- Function: digestion, lubrication, antimicrobial

4. Digestive Glands

- Pancreas (exocrine portion): digestive enzymes
- Liver: bile secretion



5. Endocrine Glands in Detail

A. General Characteristics

- Ductless, highly vascularized
- Secrete hormones directly into blood
- Control metabolism, growth, reproduction, stress responses

B. Examples of Endocrine Glands

1. **Pituitary gland (Hypophysis):** master gland
2. **Thyroid gland:** metabolism regulation
3. **Adrenal glands:** stress and electrolyte balance
4. **Pancreatic islets:** insulin and glucagon
5. **Gonads (Ovary & Testis):** reproductive hormones

6. Functional Classification of Secretions

1. **Serous glands:** watery, enzyme-rich secretion (e.g., parotid gland)
2. **Mucous glands:** viscous, glycoprotein-rich secretion (e.g., sublingual gland)
3. **Mixed glands:** both serous and mucous (e.g., submandibular gland)

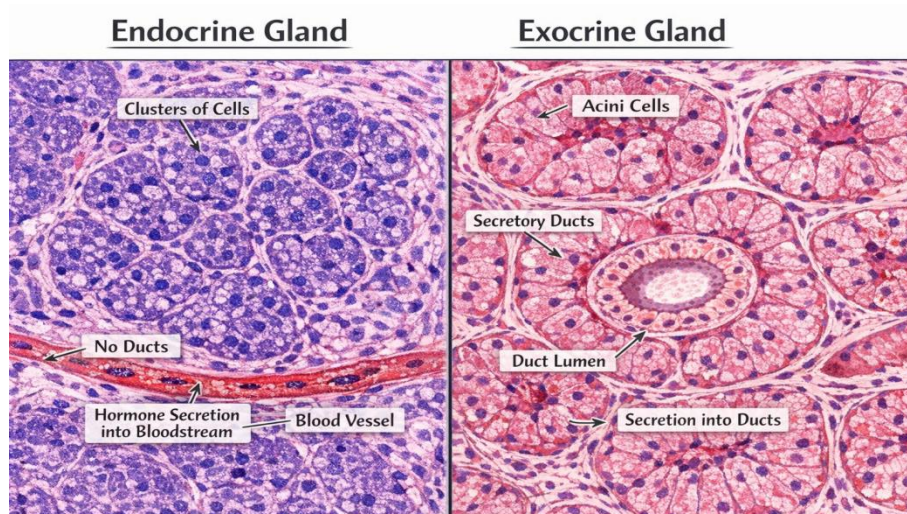
7. Histological Features of Glands

Endocrine:

- Cells arranged in cords, clusters, or follicles
- Rich blood capillaries surrounding secretory cells

Exocrine:

- Secretory portion may be **simple columnar, cuboidal, or pyramidal**
- Duct lined by simple or stratified epithelium
- Supporting connective tissue contains vessels and nerves

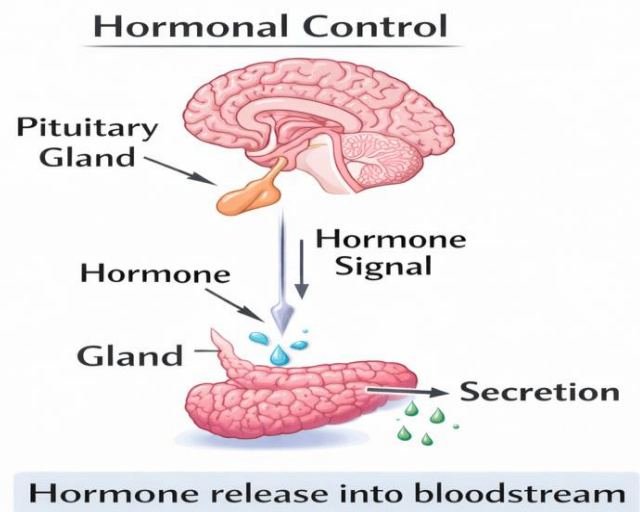
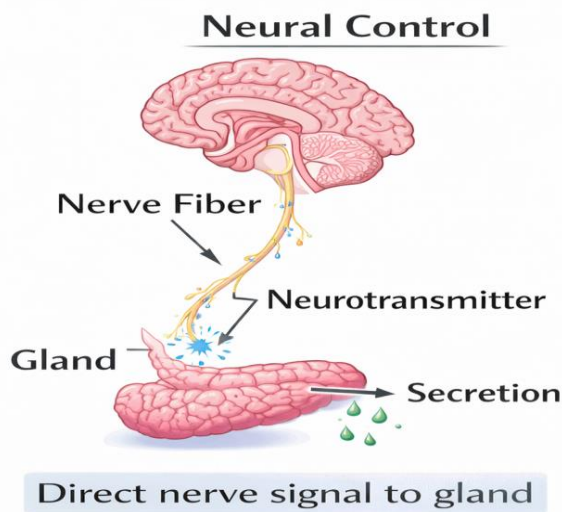


8. Regulation of Glandular Activity

Glandular secretion is regulated by:

1. **Neural control:** e.g., sympathetic stimulation of sweat glands
2. **Hormonal control:** e.g., TSH regulates thyroid
3. **Autocrine & paracrine signals:** local chemical messengers

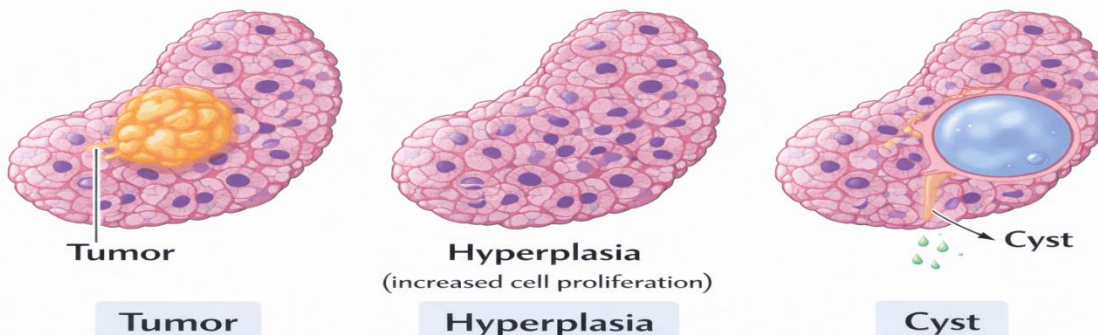
Neural vs Hormonal Control of Glands



9. Clinical Importance of Glandular Tissue

- **Hyperactivity:** hyperthyroidism, acromegaly
- **Hypoactivity:** hypothyroidism, adrenal insufficiency
- **Tumors:** adenoma, adenocarcinoma (benign & malignant)
- **Obstruction of ducts:** cysts, pancreatitis, sialolithiasis

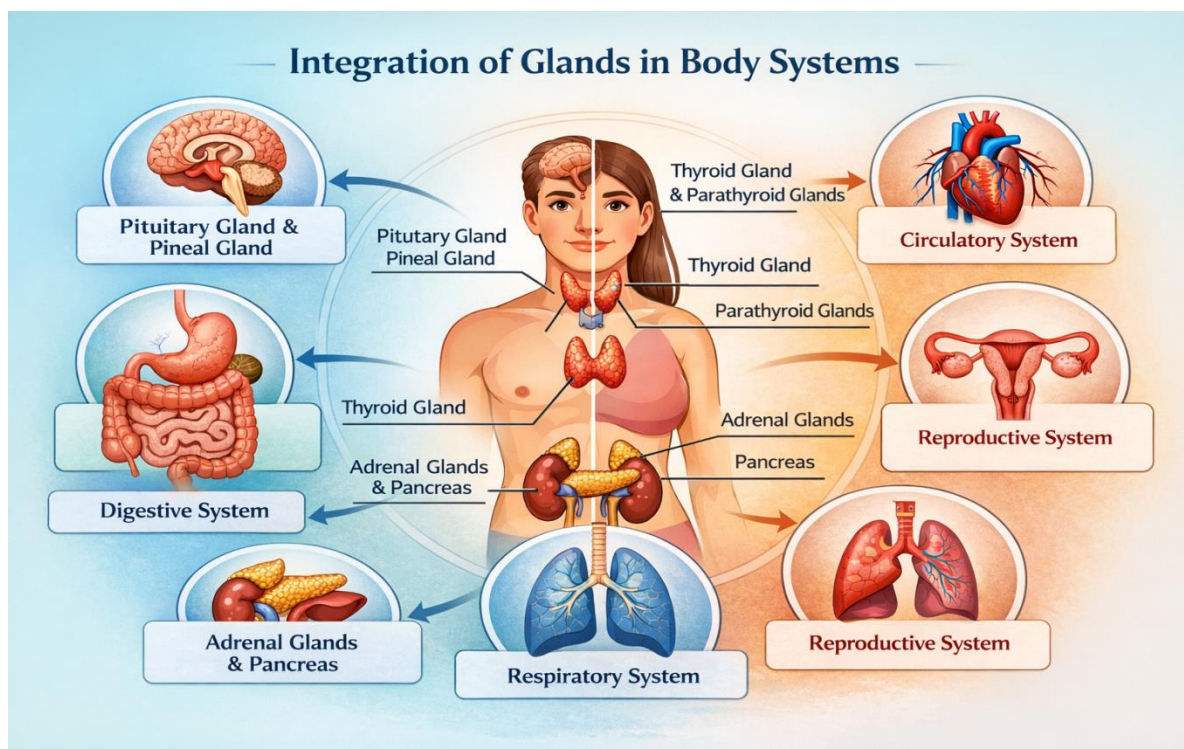
Glandular Pathologies – Tumor, Hyperplasia



10. Integration with Body Systems

Glands function as integral components of:

- **Endocrine system:** hormone secretion for metabolism, growth, stress
- **Digestive system:** exocrine glands assist in digestion
- **Integumentary system:** sweat and sebaceous glands for skin health



11. Summary and Key Points

- Glandular tissue = specialized epithelial tissue
- Two main types: **exocrine** (ducts) & **endocrine** (ductless)
- Secretion types: **merocrine, apocrine, holocrine**
- Glands maintain **homeostasis**, facilitate **digestion**, and control **metabolism**
- Histology and anatomy of glands are crucial for **medical diagnosis and research**