Secretory Epithelia & Glands

Epithelial cells that function mainly to produce and secrete various macromolecules may occur in epithelia with other major functions or comprise specialized organs called **glands**.

Secretory Epithelia & Glands

- Synthesize and release of substances: lipids, carbs, and proteins.
- Types based on the presence of duct system:

  A. Exocrine glands (duct)

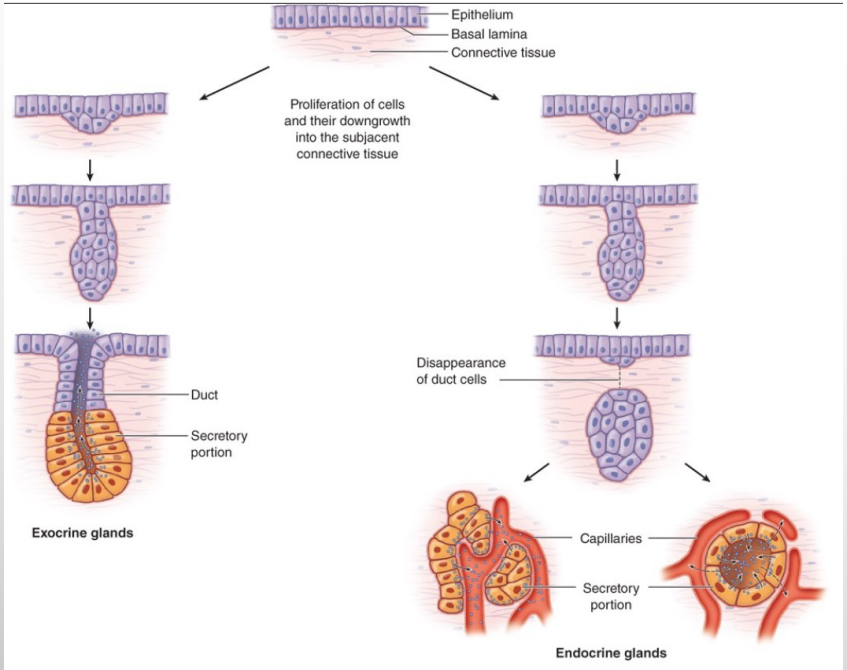
  B. Endocrine glands (no duct)

Types based on number of cells:

A. Unicellular (Goblet cells-mucous-secreting cells)

B. Multicellular

Glands' Formation



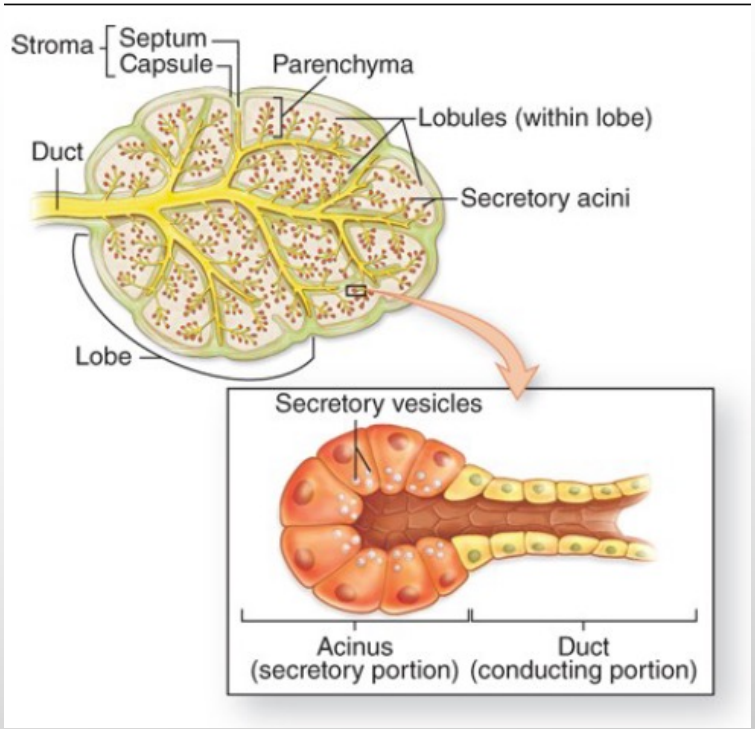
- Develop from covering epithelia in the fetus by cell proliferation and growth into the underlying connective tissue, followed by further differentiation.

1. If cells retains their connection with the surface=exocrine glands.

2. Lose their connection with the surface=endocrine glands; capillaries surround them to deliver their products (hormones).

Gland Structure

- Glands are organized into secretory and ducts parts.
- Parenchyma: secretory part and ducts.
- Stroma connective tissue element that surround and support parenchyma.
- Glands are usually surrounded by capsules.
- Capsules sends septa to divided the gland into smaller compartments; lobes and lobules within it.



Classification Of Exocrine Glands

- Simple glands: glands with unbranched duct.
- Compound glands: the ducts have two or more branches.
- The secretory portions can be tubular or acinar (different in the nature of the secretory material).

SIMPLE Glands **(Ducts Do Not Branch)**

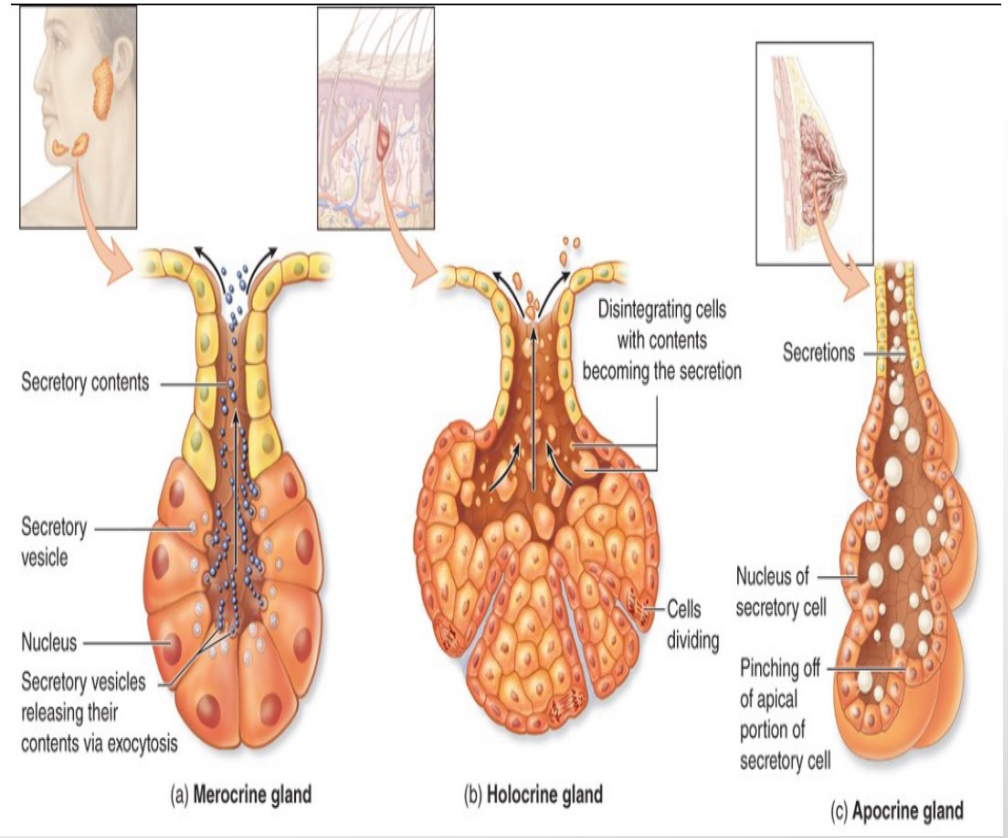
Class	Simple Tubular	Branched Tubular	Coiled Tubular	Acinar (or Alveolar)	Branched Acinar
					
Features	Elongated secretory portion; duct usually short or absent	Several long secretory parts joining to drain into 1 duct	Secretory portion is very long and coiled	Rounded, saclike secretory portion	Multiple saclike secretory parts entering the same duct
Examples	Mucous glands of colon; intestinal glands or crypts (of Lieberkühn)	Glands in the uterus and stomach	Sweat glands	Small mucous glands along the urethra	Sebaceous glands of the skin

COMPOUND Glands **(Ducts from Several Secretory Units Converge into Larger Ducts)**

Class	Tubular	Acinar (Alveolar)	Tubuloacinar
			
Features	Several *elongated* coiled secretory units and their ducts converge to form larger ducts	Several *saclike* secretory units with small ducts converge at a larger duct	Ducts of both tubular and acinar secretory units converge at larger ducts
Examples	Submucosal mucous glands (of Brunner) in the duodenum	Exocrine pancreas	Salivary glands

Types Of Secretion

- **Merocrine** (salivary): most common method of protein or glycoprotein secretion---exocytosis from membrane-bound vesicles or secretory granules.
- **Apocrine** (mammary): product accumulates at the cells' apical ends, portions of which are then extruded to release the product together with small amounts of cytoplasm and cell membrane



- **Holocrine** (sebaceous): cells accumulate product continuously as they enlarge and undergo terminal differentiation, culminating in complete cell disruption which releases the product and cell debris into the gland's lumen.

Nature Of Secretory Products.

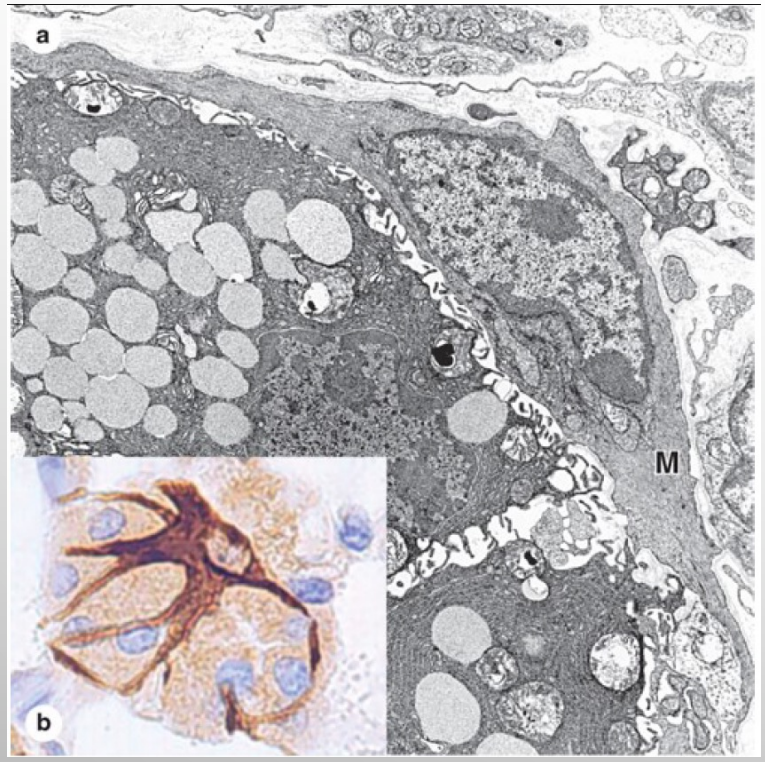
- Exocrine glands secretion is categorized based on the nature of their secretory products into serous or mucous.
- **Serous** cells synthesize proteins (mostly not glycosylated; digestive enzymes)--- well-developed RER and Golgi complexes and are filled apically with secretory granules in different stages of maturation---stain intensely with basophilic or acidophilic stains.
- **Mucous** cells filled apically with secretory granules contain heavily glycosylated proteins called mucins (when released from the cell---become hydrated and form a layer of mucus)---hydrophilic mucins are usually washed from cells during routine histological preparations, causing the secretory granules to stain poorly.

Nature Of Secretory Products

- Some salivary glands are mixed **seromucous** glands, having both serous acini and mucous tubules
- Myoepithelial cells: contractile at the basal ends of the secretory cells. Long processes of these cells embrace an acinus. Are rich in actin and myosin filament--- strong contractions serve to propel secretory products from acini into the duct system.

Myoepithelial Cells

- In exocrine glands only



- Contractile cells at the basal ends of the secretory cells---long processes of these cells embrace acini.
- Connected to the other epithelial cells by both gap junctions and desmosomes.
- Rich in actin filaments and myosins.
- Strong contractions in these cells serve to help propel secretory products from acini into the duct system.

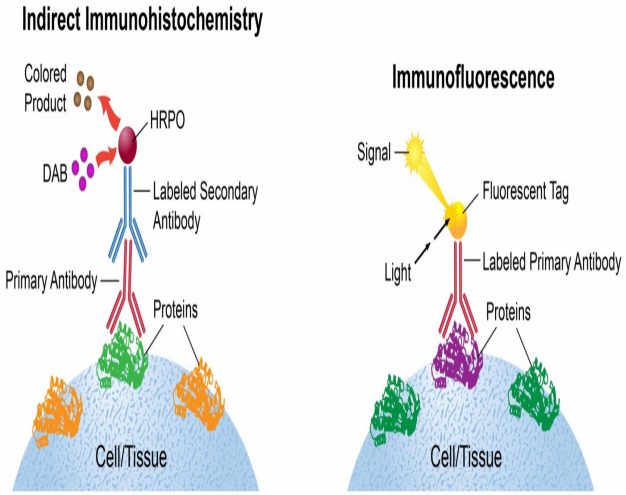
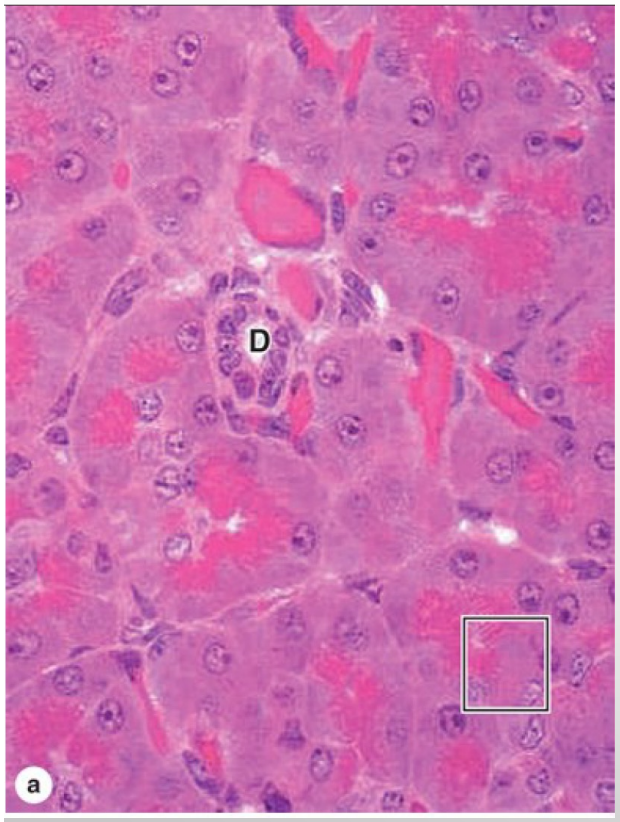


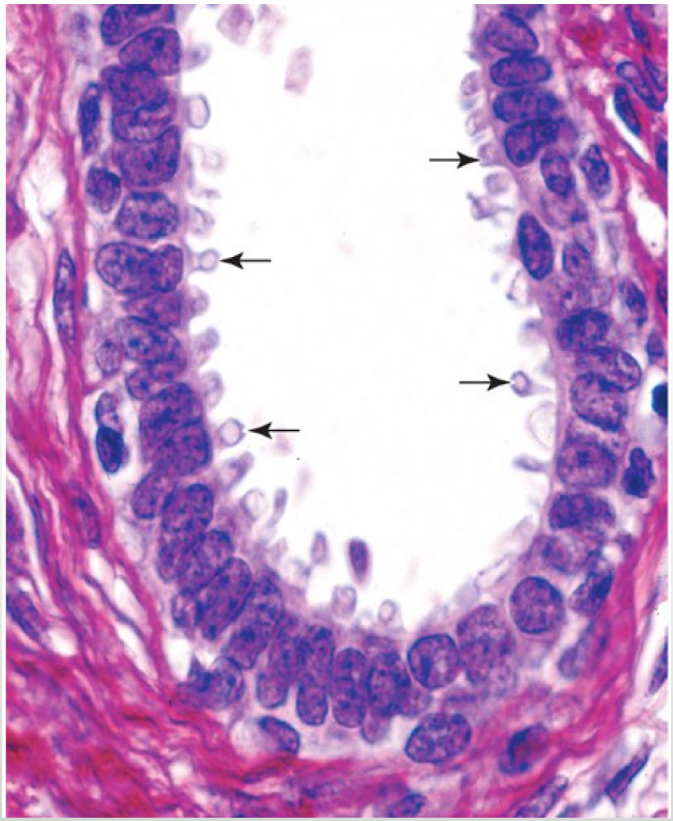
Diagram 1: *Illustration of Indirect Immunohistochemistry and Immunofluorescence methods.*

immunohistochemistry-02

Merocrine



Apocrine



Holocrine

Serous and Mucous Secretory Cells