

Vet. Anatomy

- ▶ Gland/ glandular epithelium



Gland/ glandular epithelium

- ❖ Epithelial cell modified into secretory structure
- ❖ most of the internal organs contain glands

Classification

A) on the basis of Morphological character:

a) unicellular

b) multicellular

I) Intra epithelial

II) Extra epithelial

1. Endocrine

2. Exocrine

a) Simple b) compound

Classification

a) Simple gland

1. Tubular – straight, coiled and branched
2. Acinar (alveolar) – single and branched
3. Tubulo-acinar/ alveolar

B) On the basis of type of secretory product

1. Serous
2. Mucous
3. Mixed

C) Mode of release of Secretory product:

1. Merocrine
2. Apocrine
3. Holocrine
4. Cytocrine

Unicellular Gland

- Single secretory cell
- Present in non secretory epithelium
- Eg, goblet cell
- Found scattered throughout epi. Lining of tubular organs of GIT, Respi., urinary, Repro. System. Also in adrenal, kidney & thyroid gland.

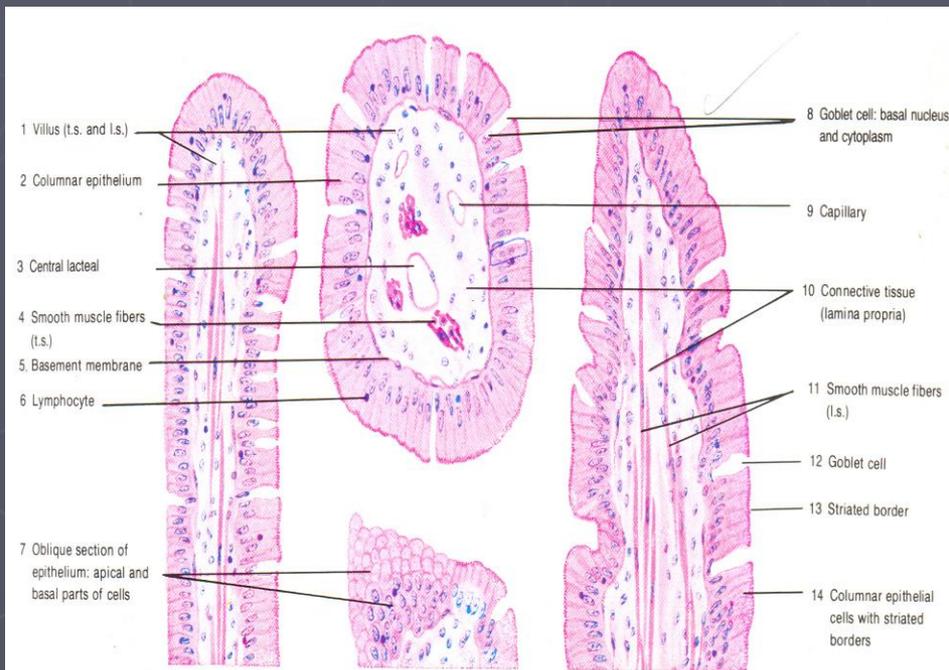
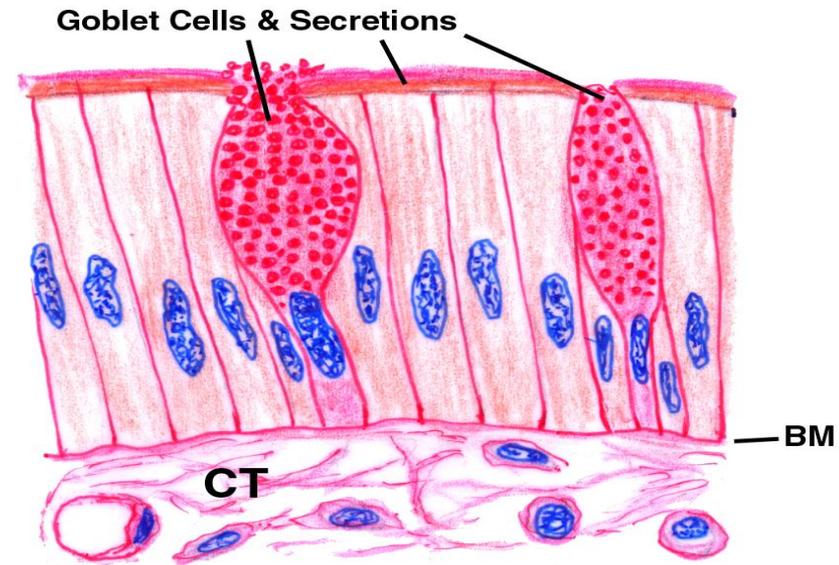


Fig. 2. Simple columnar epithelium: cells with striated borders and goblet cells. Stain: hematoxylin-eosin. 250 x.

Multicellular Gland

- ❖ More than one cell
- ❖ Most of the glands in body is of this type
- ❖ E.g salivary gland

A) Intraepithelial gland:

- ❖ Clusters of few secretory cells present within surface epi.

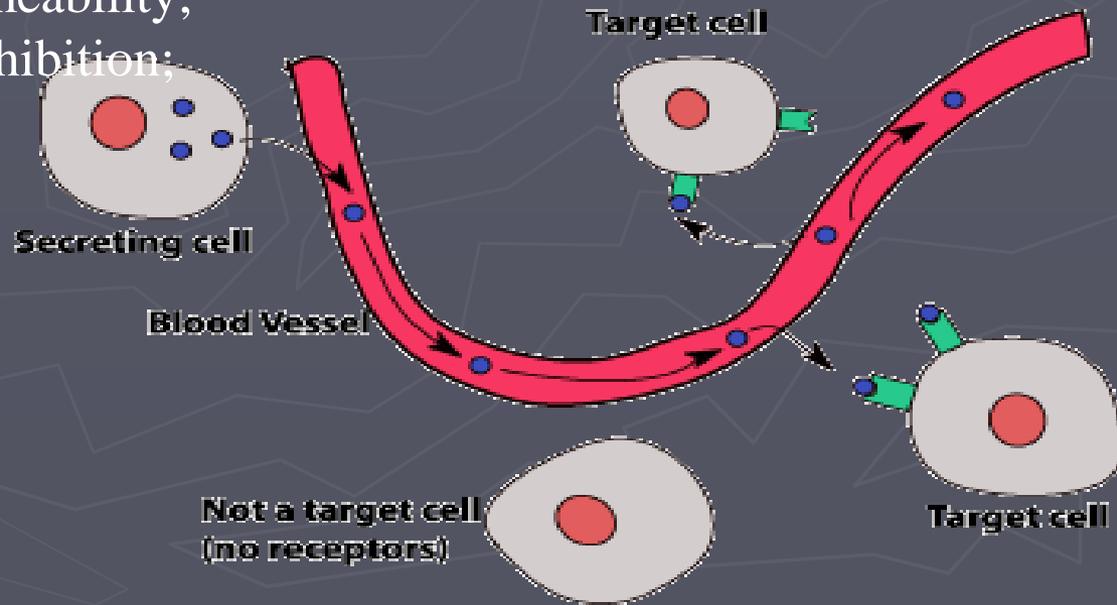
B) Extra epithelial gland:

- ❖ Large accumulation of cells
- ❖ Proliferated into the underlying connective tissue

1) Endocrine glands

- Multicellular
- Derive from all three germ layers.
- Those derived from mesoderm produce steroidal hormones; the others produce the amino acid–based hormones.
- Do not have duct system for convey their secretion (transported by blood or lymph)
- Secretion (Hormones) released into the intercellular fluid
- Hormones alter cell activity by stimulating or inhibiting characteristic cellular processes of their target cells.
- Cell responses to hormone stimulation may involve changes in membrane permeability; enzyme synthesis, activation, or inhibition; secretory activity; gene activation; and mitosis.

E.g thyroid, pituitary, adrenal



Multicellular Gland (Conti....)

- ❖ Exocrine gland:
- ❖ Multicellular
- ❖ Have duct system for transport of their secretory products to site of action
- ❖ Branching system
- ❖ Connective tissue for support
- ❖ Lobes and lobules
- ❖ Divided into simple and compound type
- ❖ **Simple exocrine Gland**
- ❖ Consists of single or several secretory units
- ❖ Secretory units are connected to surface through an unbranched duct
- ❖ Secretory units are of various shape and disposition
- ❖ Three types: tubular, acinar/alveolar and tubuloacinar

❖ **A) simple tubular exocrine gland**

1) straight 2) coiled 3) branched

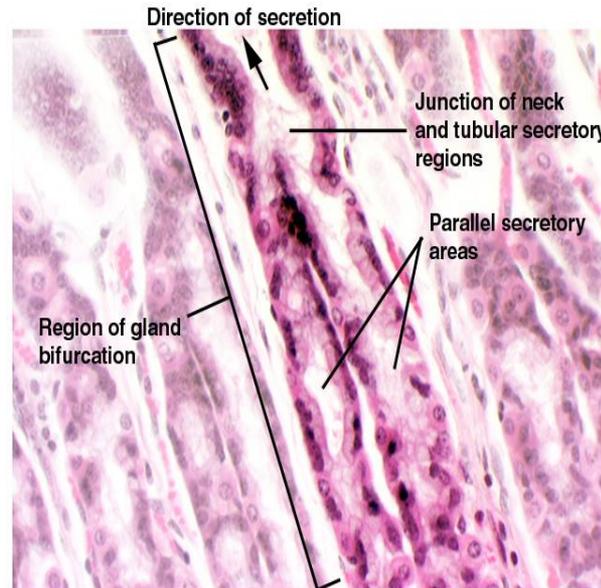
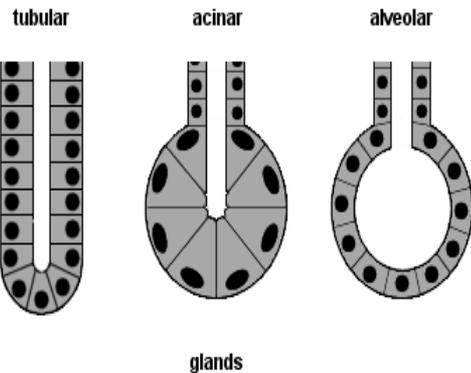
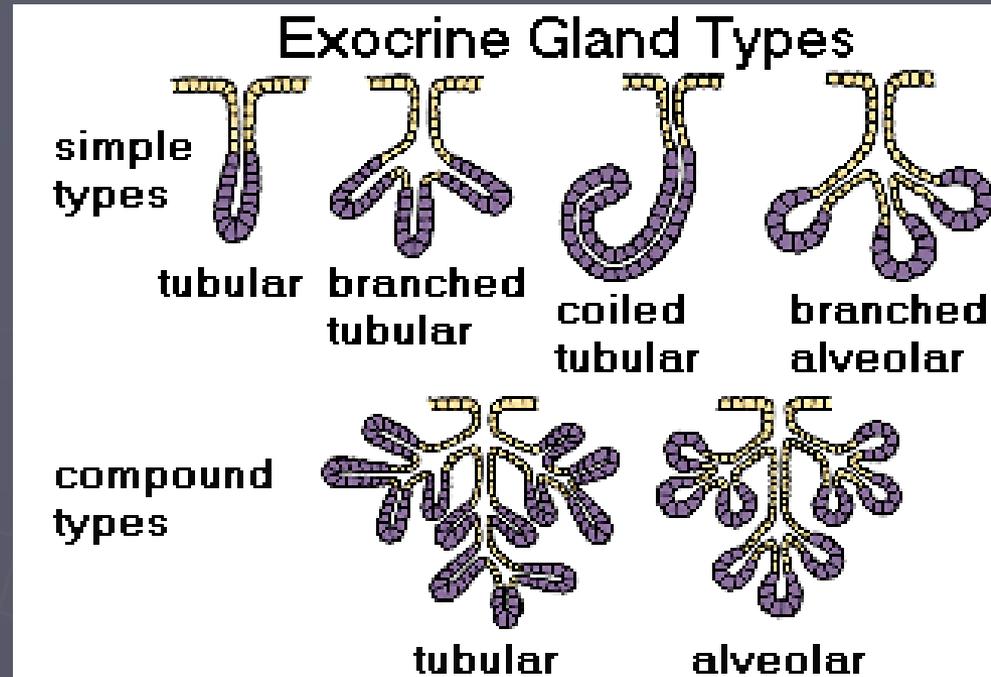
1) straight :- unbranched direct open onto surface
eg. Intestinal glands

2) coiled :- terminal portion is coiled eg. sweat gland

3) branched:-

- Branches converge into surface and open onto surface as single duct

- Eg. stomach gland



Simple exocrine Gland

B) Simple acinar/alveolar exocrine gland

- ❖ Secretory unit large, spherical
- ❖ Secretory units connected to surface by constricted portion (duct)
- ❖ Acinus:- lumen is small and narrow
- ❖ Alveolus :- Lumen is larger and distended
- ❖ Sub types: single and branched
- ❖ Single acinar :- rarely found
- ❖ Branched:- have two or more acini
eg. sebaceous glands

(simple Br.alveolar glands found in Respi. Sy. Of chicken)

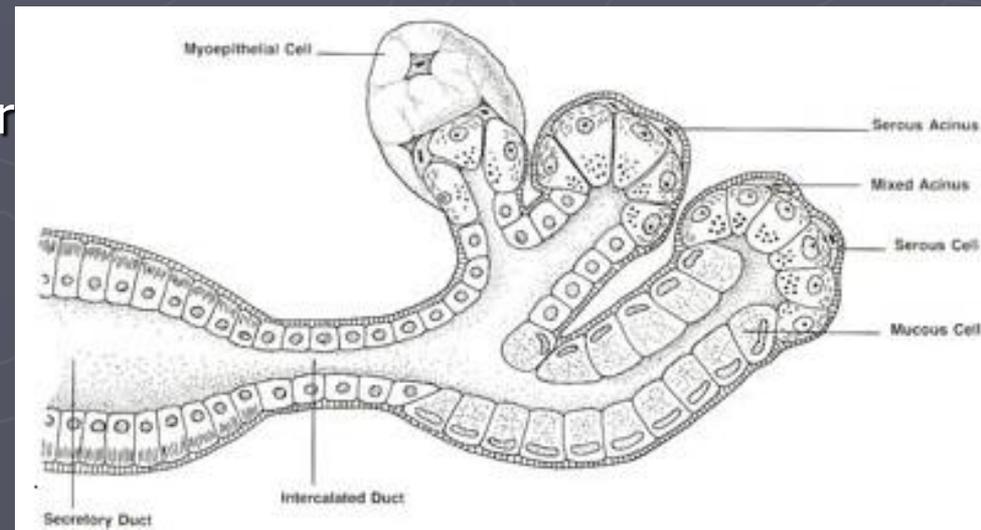


C) Simple tubuloacinar/ tubuloalveolar exocrine gland

- ❖ Secretory units composed of tubular part and enlarged terminal acinus/alveolus

Branched

- ❖ Eg. minor salivary glands,



Compound exocrine Gland

- ❖ Many secretory units
- ❖ Branched duct system
- ❖ Structure of compound gland
- ❖ Parenchyma and stroma (supportive CT) and capsule

Parenchyma

- ❖ Composed of secretory units and ducts
- ❖ Gland divides into lobes and lobules
- ❖ Lobules composed of numerous secretory units

Ducts :

- ❖ Main duct:- formed by convergence of lobar ducts
- ❖ Lobar duct:- the large duct drains the lobe
- ❖ Intralobar duct:- duct within the lobe
- ❖ Inter lobar duct:- between lobes and present in the CT
- ❖ Intralobular duct:- present within the lobule
- ❖ Interlobular duct:- present in CT between lobules
- ❖ Intercalated duct:- small non secretory duct connect secretory unit with secretory ducts
- ❖ Excretory duct: transport secretion to the site of utilization,
- non secretory

Compound exocrine Gland

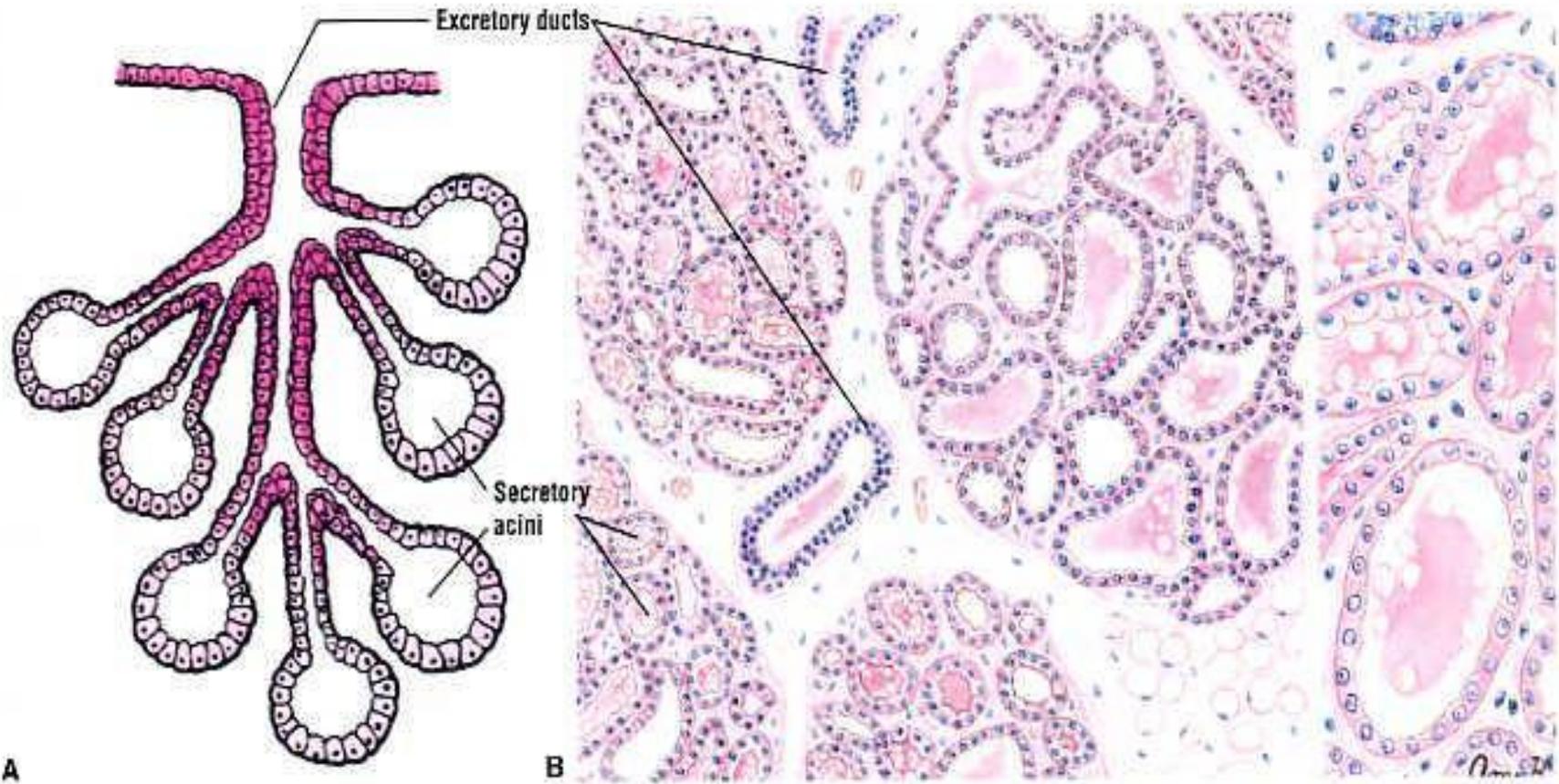
Stroma

- ❖ Consists of capsule and internal supporting framework

Capsule

- ❖ Composed of collagen, elastic and reticular fibers
- ❖ Completely surrounds the gland
- ❖ Septa/trabeculae extends into parenchyma and divides gland into lobes and lobules
- ❖ Septa gives support to interlobar and lobular ducts
- ❖ Type of compound gland : three
- ❖ Tubular, acinar/alveolar and tubuloacinar/alveolar

Compound exocrine Gland



A

B

Fig. 1-14 Compound Acinar (Exocrine) Gland: Mammary Gland. (A) Diagram of gland. (B) During lactation. Stain: hematoxylin-eosin. (A) Low magnification. (B) Medium magnification.

الواقع والحياة

B) According to Type of secretory product

- ❖ Both simple and compound gland are classified as mucus, serous and seromucus

Mucus

- ❖ Produces thick viscous secretion (mucus)
- ❖ Mucus forms protective coating over lining of hollow organ
- ❖ Cells filled with mucinogen
- ❖ Nuclei of the cells displaced towards basal part
- ❖ Nuclei are flattened
- ❖ Eg. mandibular gland

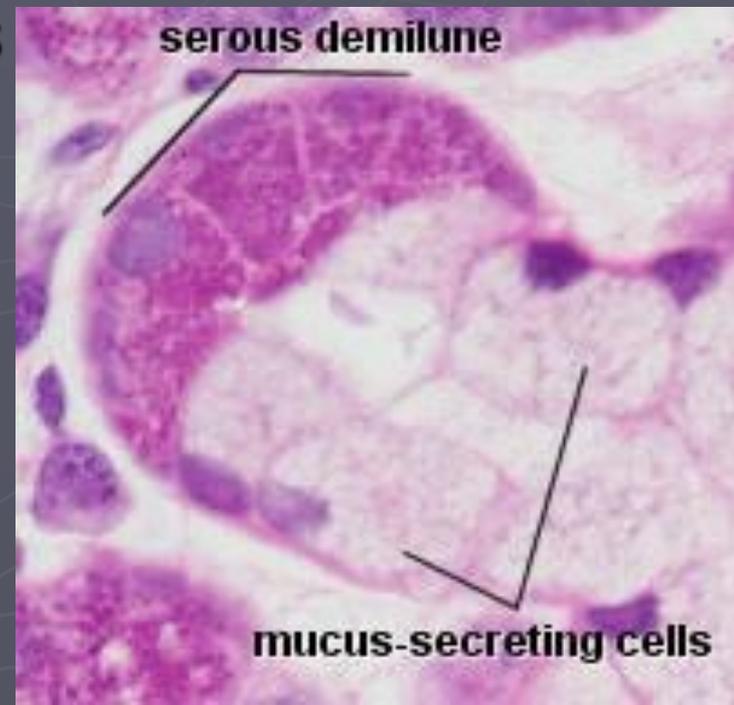
according to type of secretory product

Serous

- ❖ Secretes thin watery product
- ❖ Cells of secretory unit have spherical nucleus
- ❖ Nucleus near to the centre of cell
- ❖ Cytoplasm contain small secretory granules (Zymogen granules)
- ❖ Eg. Parotid and exocrine part of pancreas

Seromucous gland

- ❖ Contain serous as well as mucous cells
- ❖ Serous cells located at the periphery of mucus secretory unit
- ❖ Secretory unit of serous are half moon shaped clusters of cells called serous demilunes



According to mode of secretion

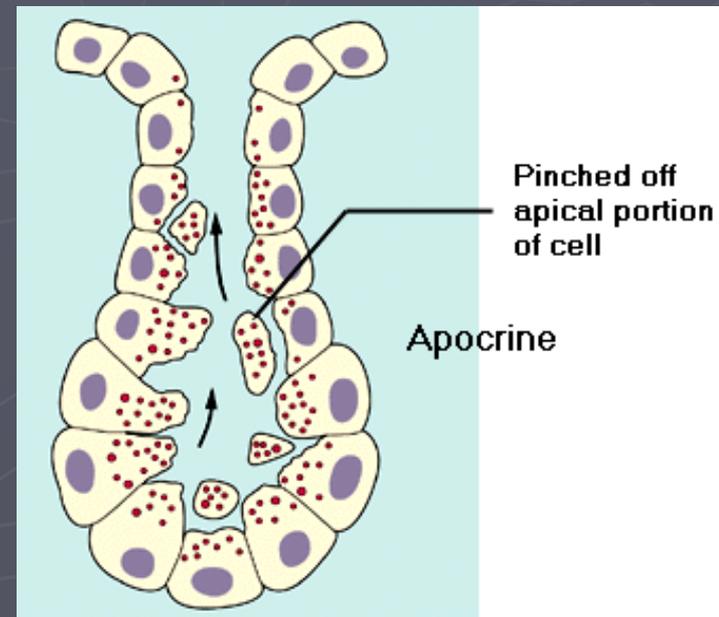
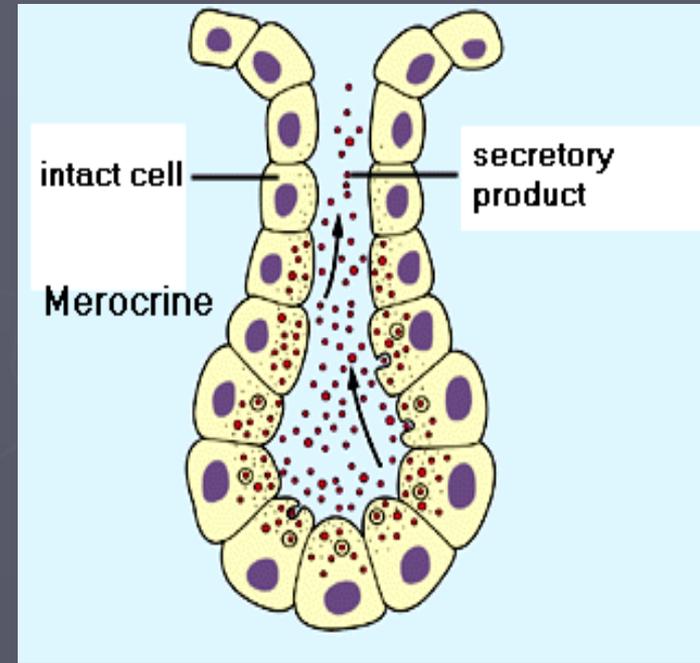
- ❖ Mode by which secretory product is released from cells

1. **Merocrine:**

- ❖ Secretory product is released as small secretory granules
- ❖ Several granules usually enclosed within a memb. Called granulate vesicles.
- ❖ Vesicle reaches to the surface of cell and discharges
- ❖ Eg. sweat gland

2. **Apocrine gland**

- ❖ little amount of cytoplasm of secretory cell is lost along with secretory product
- ❖ Apical portion is of cell in secretion eg. mammary gland



3. Holocrine gland

- ❖ Entire cell is extruded and constitutes the secretory product
- ❖ Cells becomes filled with lipid secretion granules and moves towards duct
- ❖ Cell dies and disintegrates
- ❖ Eg, sebaceous gland

4. Cytocrine:

- ❖ Secretory product is transferred from one cell to the cytoplasm of another cell
- ❖ Eg. epidermis in skin (melanocyte transfers brown pigment into the cytoplasm of Keratinocytes)

