Glandular Epithelium

Descriptive Histology

15/09/2019

Glandular Epithelial

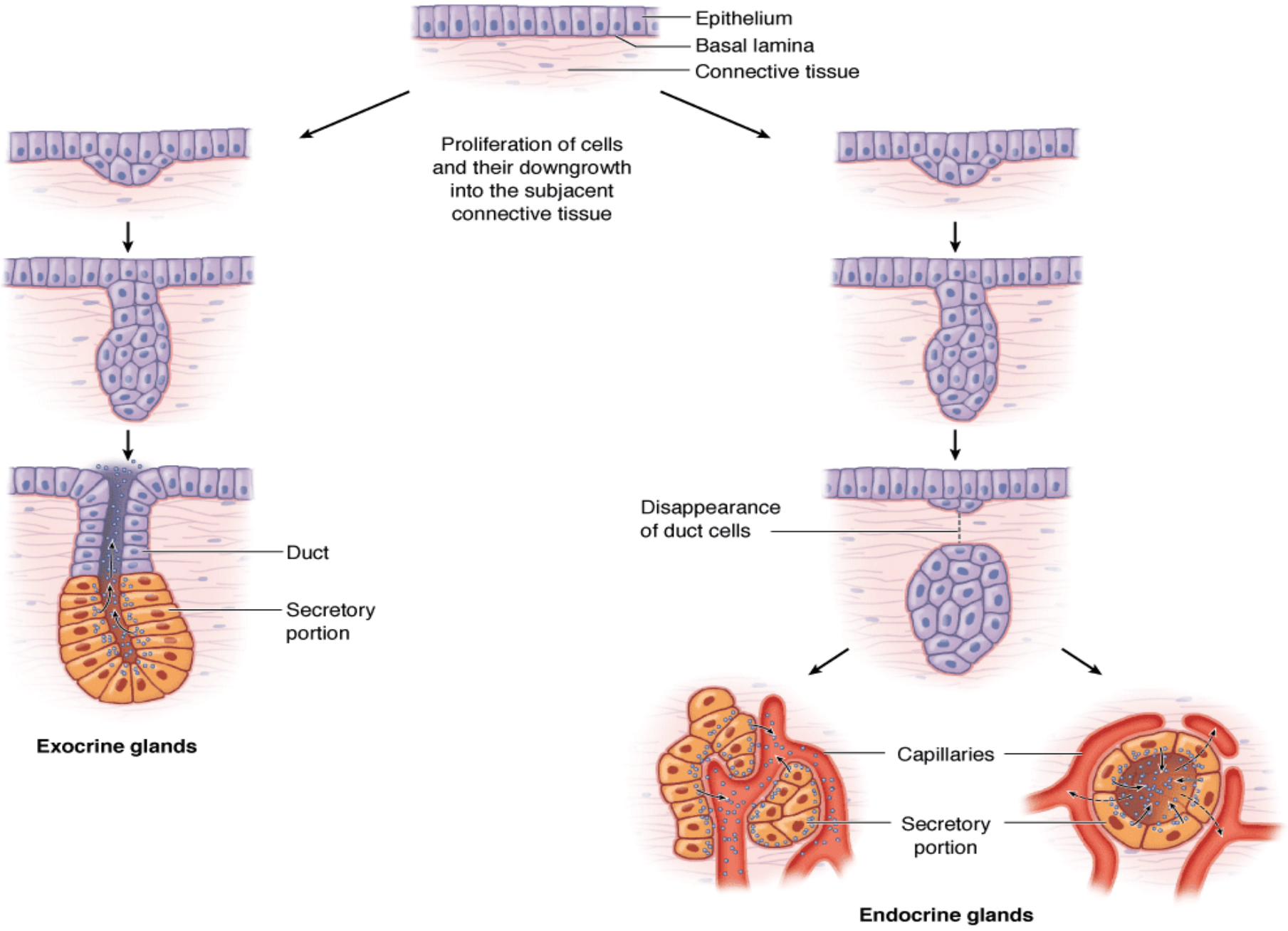
Glandular: Columnar and cuboidal cells often become specialized as gland cells which are capable of secreting substances such as enzymes, hormones, mucus, sweat and saliva. Examples include the salivary, sweat and adrenal glands

Glandular Epithelia

- Glandular Epithelia are formed by cells specialized to produce secretion.
- Secretion – Exocytotic release of products, not metabolic wastes
- Products to be secreted are generally stored in the cells within small membrane-bound vesicles called secretory granules.

Gland Development

Glands develop during fetal life from covering epithelia by means of cell proliferation and invasion of the subjacent connective tissue, followed by further differentiation as we will see in the following diagram


Epithelium
Basal lamina
Connective tissue
Proliferation of cells and their downgrowth into the subjacent connective tissue
Duct
Secretory portion
Exocrine glands
Disappearance of duct cells
Capillaries
Secretory portion
Endocrine glands

Type of secretion

- Secretory epithelial cells may synthesize, store, and release
  - proteins (e.g., in the pancreas),
  - lipids (e.g., adrenal, sebaceous glands),
  - complexes of carbohydrates and proteins (e.g., salivary glands).
- Epithelia of mammary glands secrete all three substances.
- The cells of some glands (e.g., sweat glands) have little synthetic activity and secrete mostly water and electrolytes (ions) transferred from the blood.

Gland Categories

The epithelia that form glands can be classified according to

A) Presence or absence of ducts
   - Exocrine – ducted
   - Endocrine - ductless

B) Uni- or multicellular

C) Mode of secretion

D) Secretion products

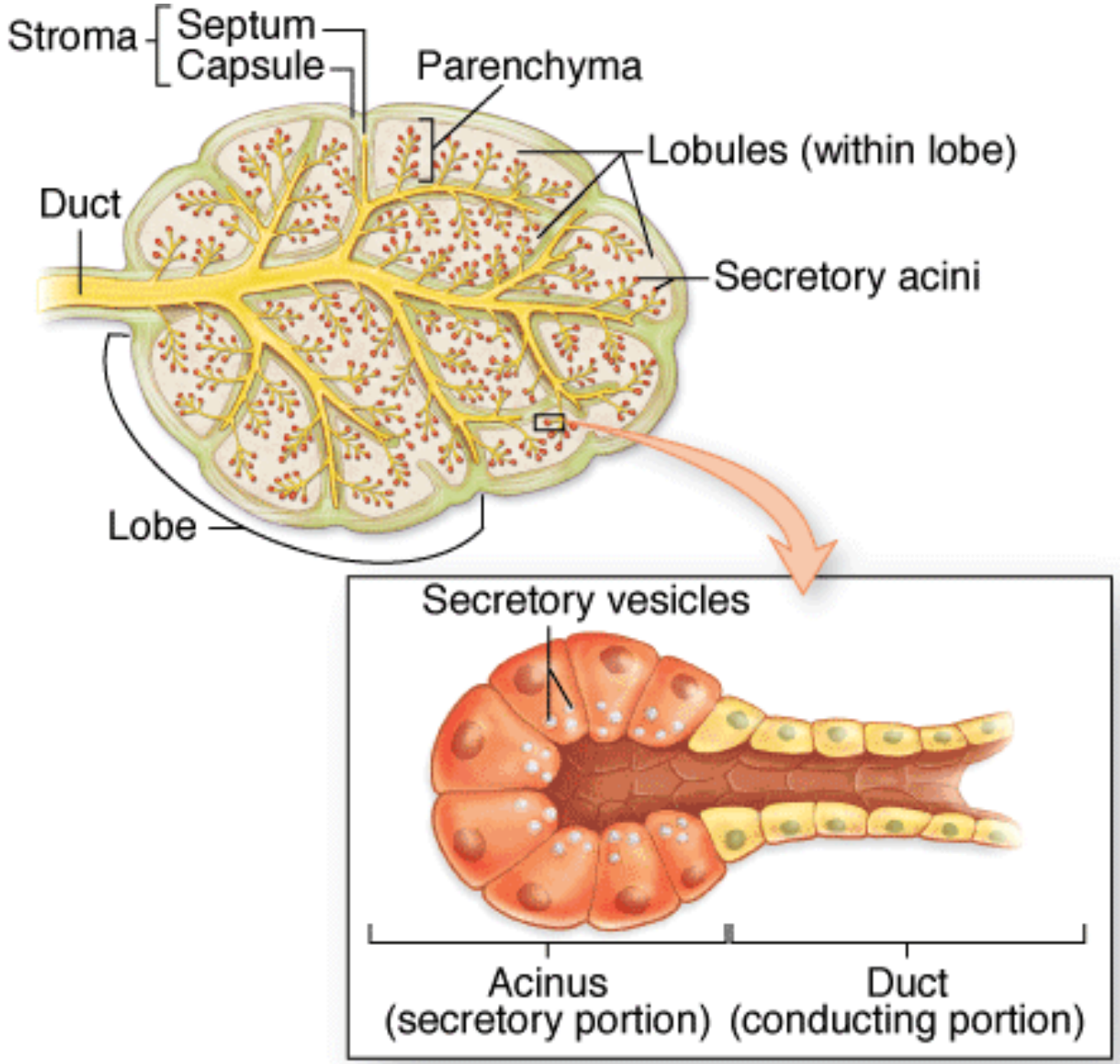
Gland Categories

1. Exocrine - glands that exude secretions into a ductule system. with two parts, acinous = secretory bulb and ductule.

2. Endocrine - glands that exude secretions directly into blood vessels (capillaries), the transport in blood to target cells throughout the body.

3. Mixed - glands combining both the above characteristics (e.g. liver) in the same cell

4. Paracrine - tissue secretions affecting own cells



Source: Mescher AL: *Junqueira's Basic Histology: Text and Atlas, 12th Edition:* http://www.accessmedicine.com

Endocrine vs. Exocrine

Endocrine Glands	Exocrine Glands
Secrete into the internal environment	Secrete into the external environment
No ducts	Have ducts
Secrete hormones	Secrete other stuff (sweat, oil, wax, enzymes etc.)
Travel through blood and long	Short distance (liver and pancreases)

Cellular Composition

1) Unicellular - single cell gland, **Goblet cell**;

   mucous secreting. GI tract, respiratory ducts. Secretion process alters cell and nucleus shape.

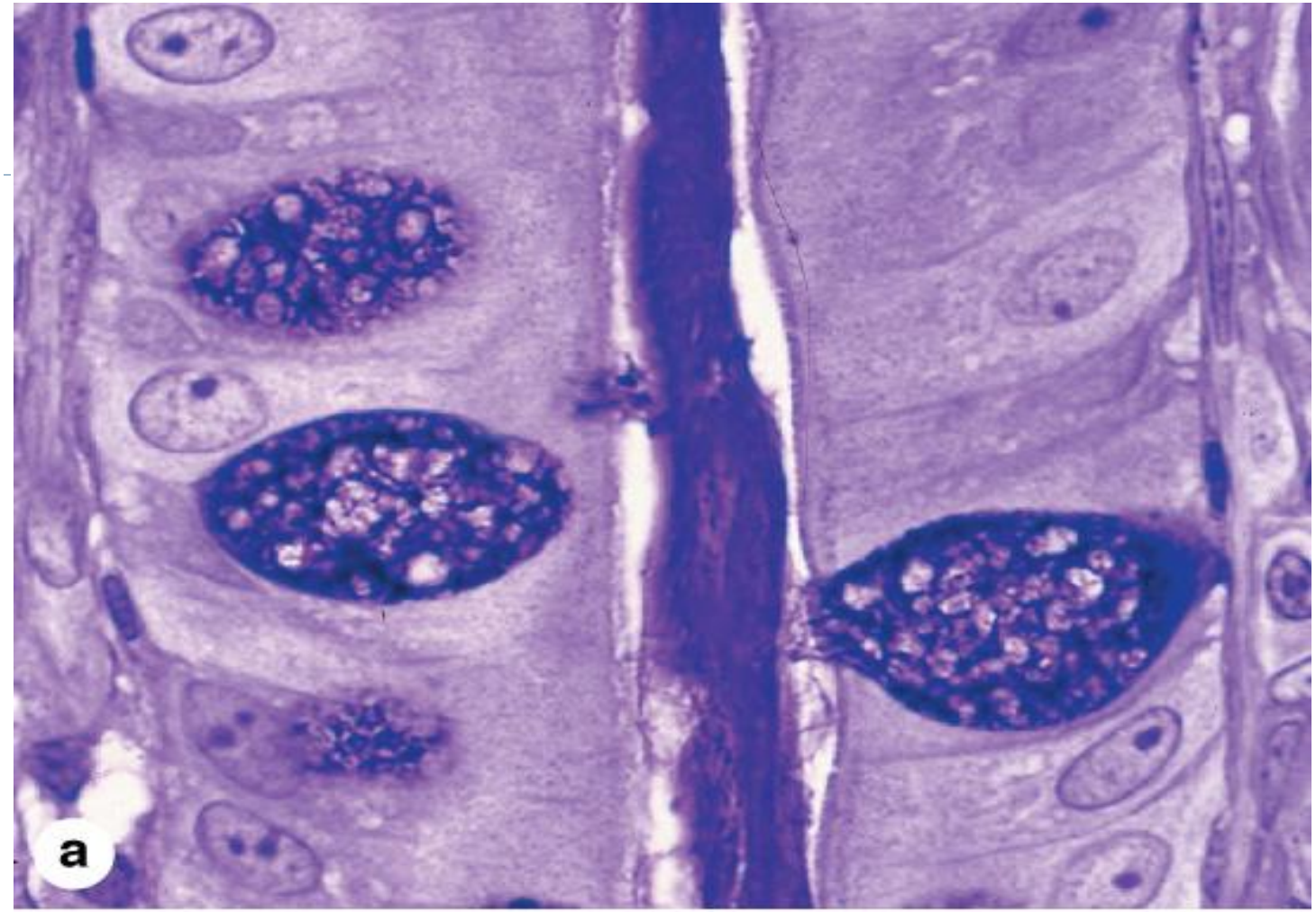
2. Multicellular - More than one cell gland

   a) Intra epithelial gland -

      gland is entirely within a layer of epithelium.

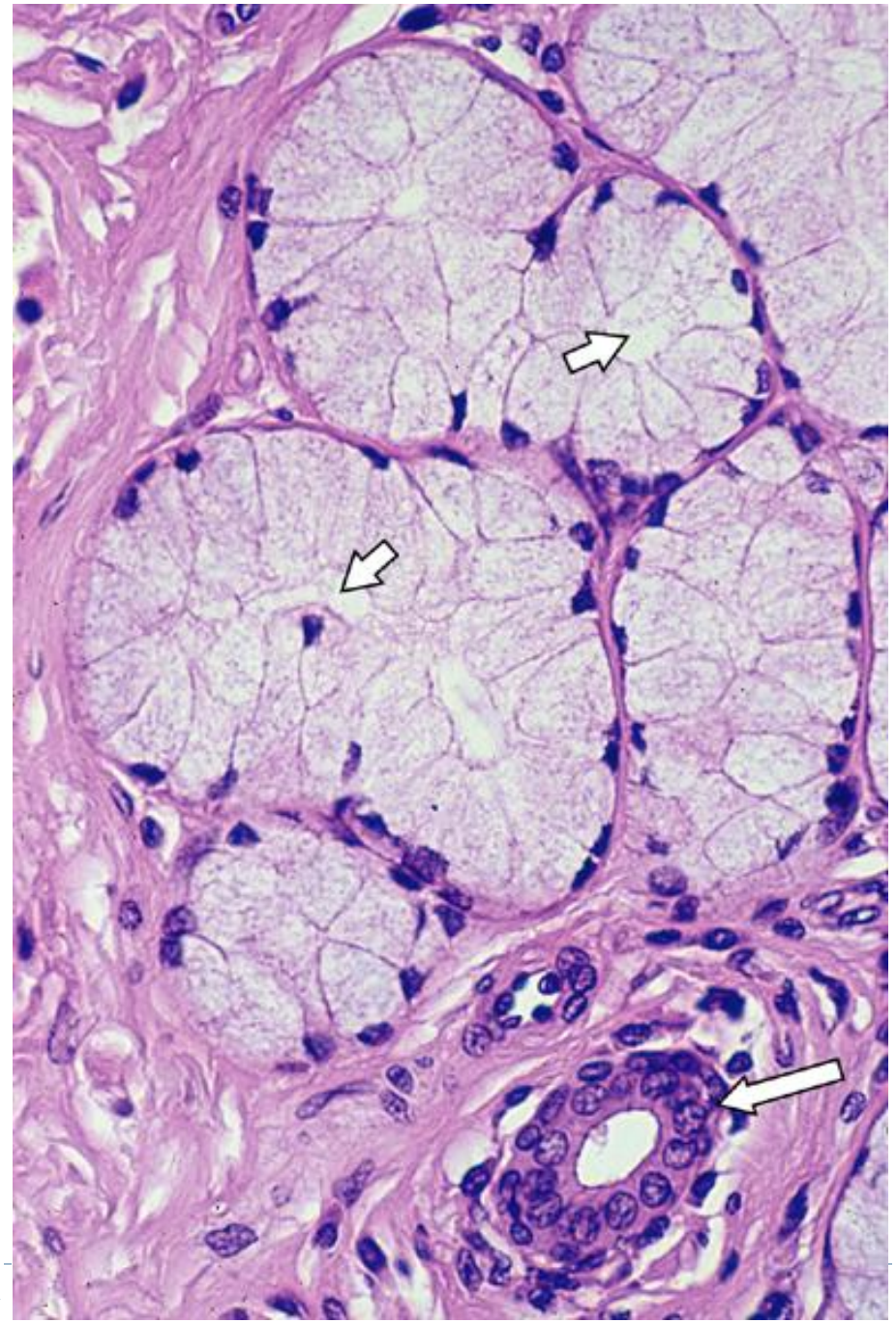
      Common in pseudostratified columnar epithelial.

   b) Extra epithelial gland - in connective tissue below epithelium; may have different shapes; tubular and saccular (acinar).

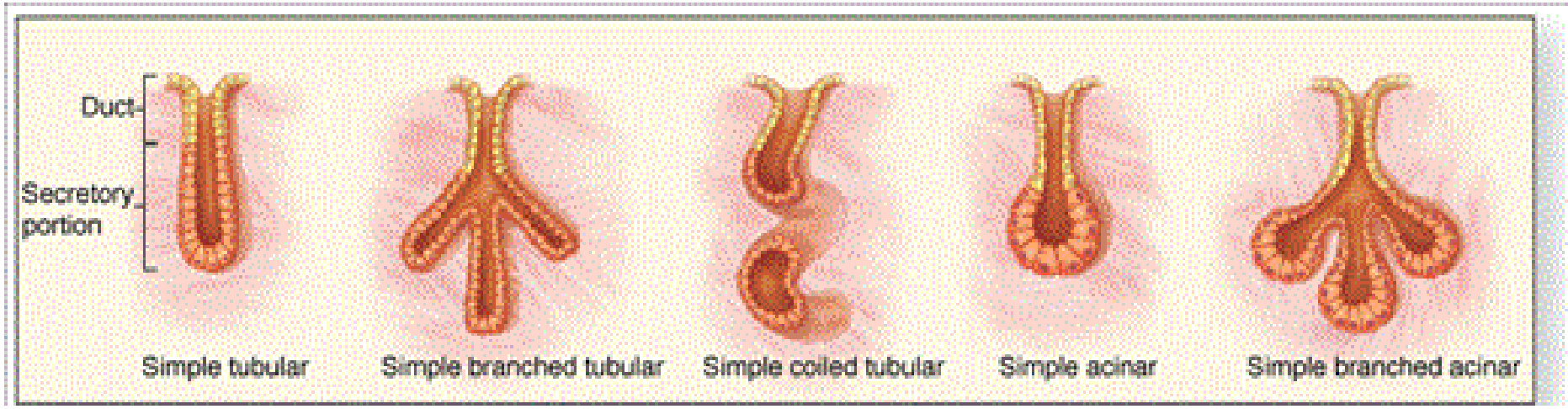


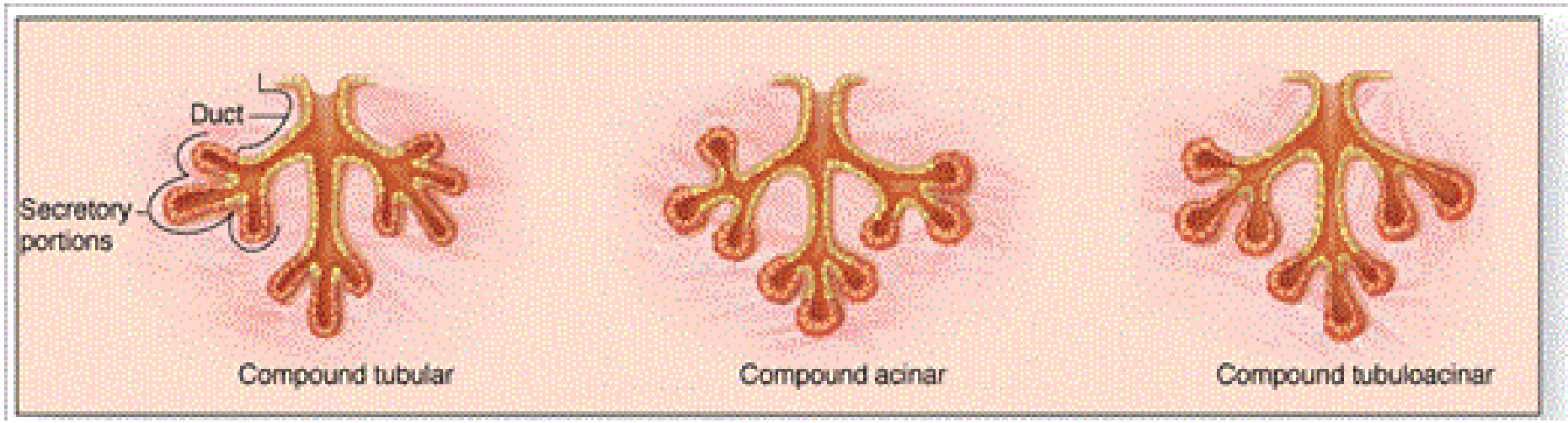
Goblet cells: unicellular glands.

A section of epithelial lining of the large intestine shows scattered goblet cells secreting mucus to the extracellular space



Mucous cells of salivary glands


Duct
Secretory portion
Simple tubular
Simple branched tubular
Simple coiled tubular
Simple acinar
Simple branched acinar


Duct
Secretory portions
Compound tubular
Compound acinar
Compound tubuloacinar

Gland Categories

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B) Uni- or multicellular

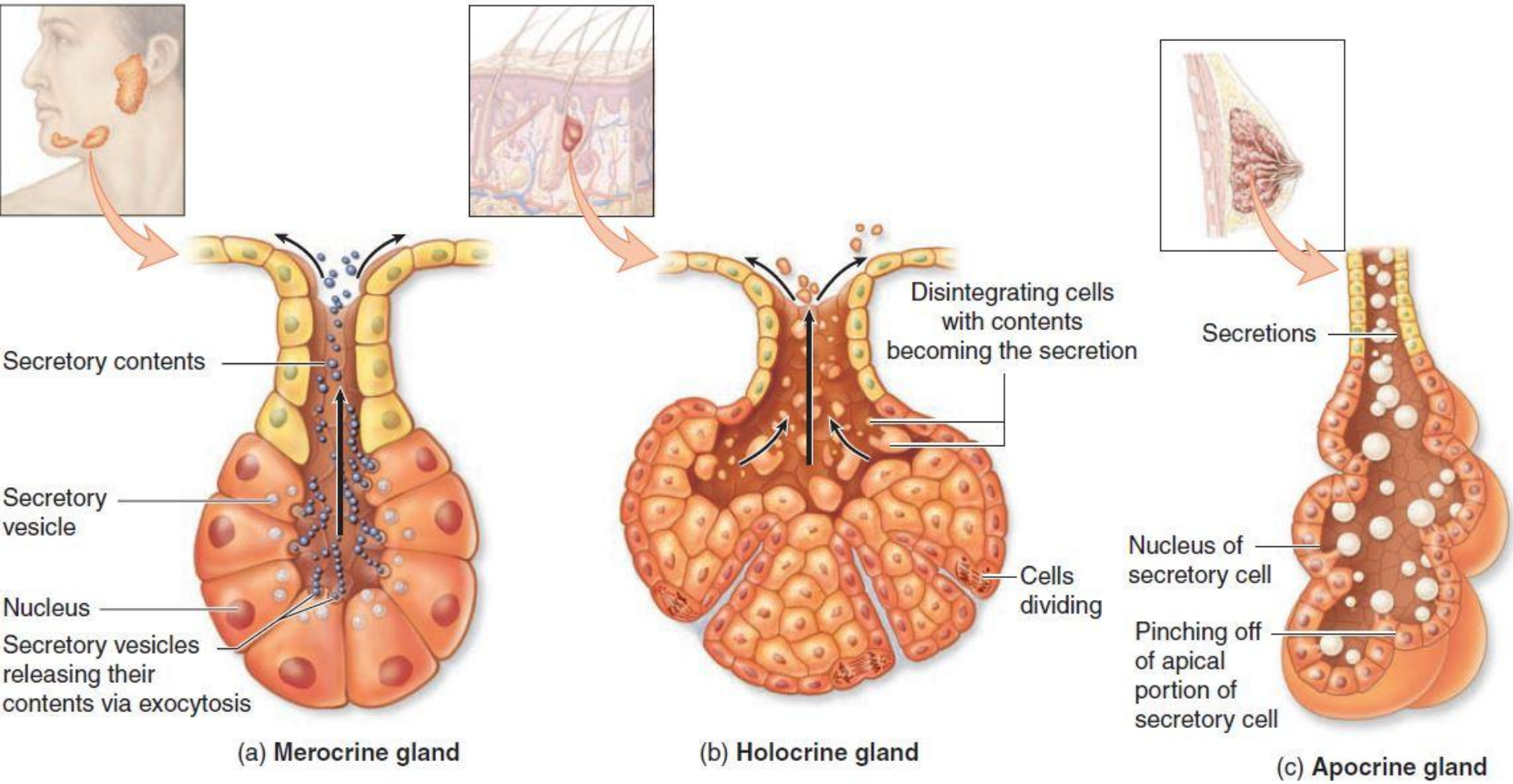
C) Mode of secretion

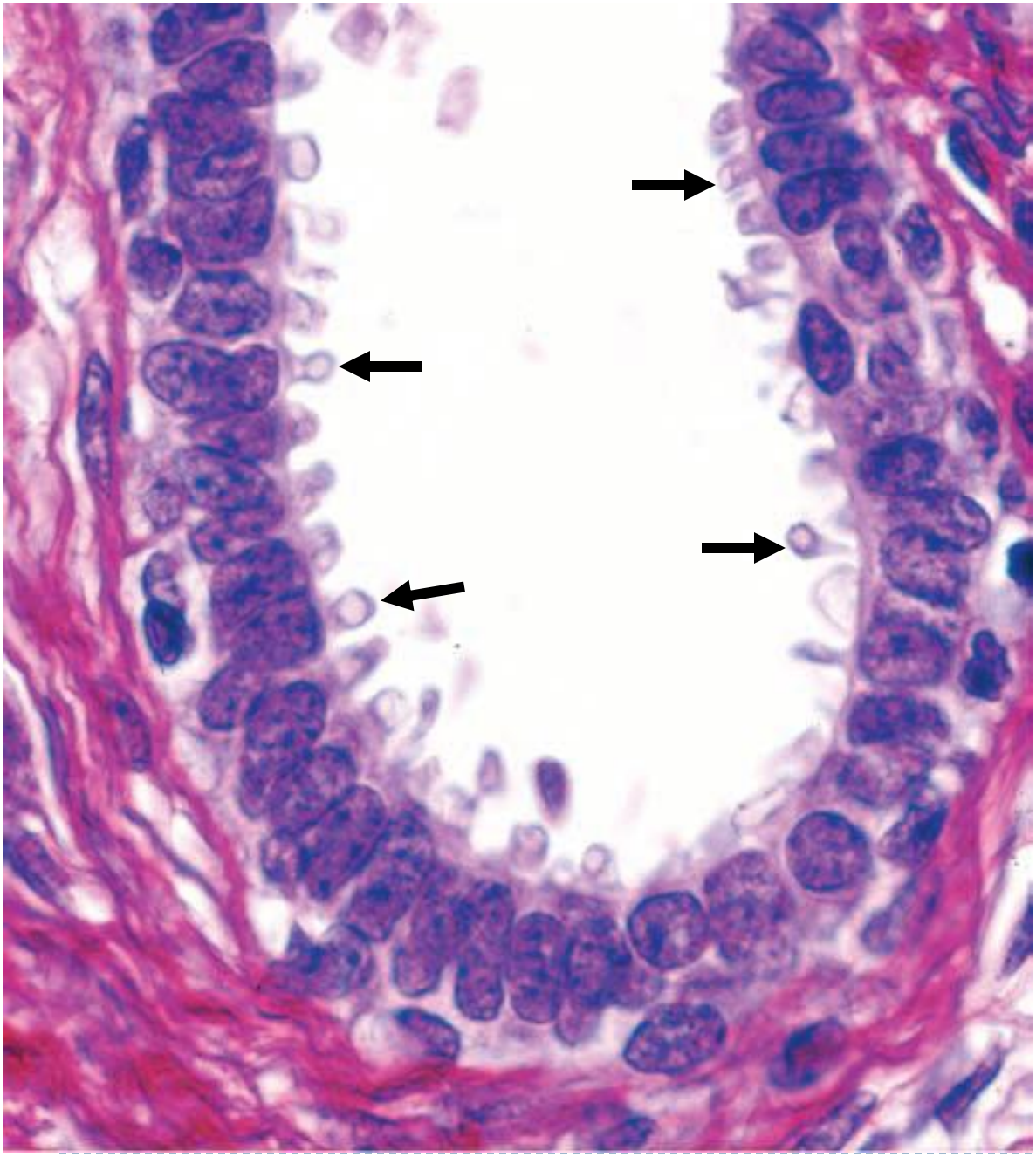
D) Secretion products

Modes of Secretion

1. Merocrine - secretion does not affect the well-being of the cell = sweat glands.
2. Apocrine - small part of the cell cytoplasm is lost with the secretion; the cell is damaged but not killed = mammary glands.
3. Holocrine - great deal of cytoplasm is lost with the secretion; the cell dies. Sebaceous glands.

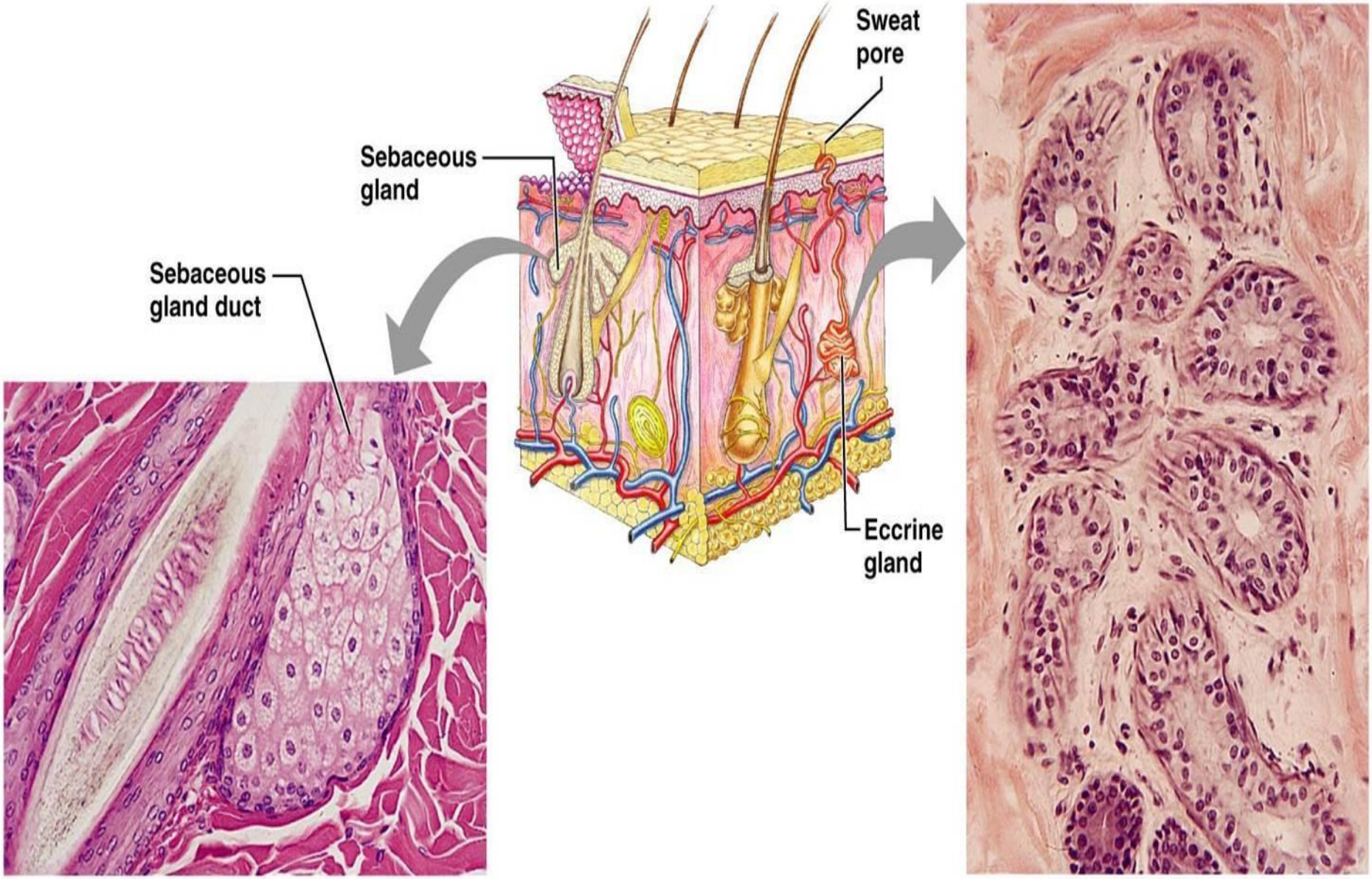
FIGURE **4–21** **Mechanisms of exocrine gland secretion.**





Apocrine Secretion Mammary Gland

The secretory portions of a mammary gland demonstrate apocrine secretion, characterized by extrusion of the secretion product along with a bit of apical cytoplasm (arrows).



(a) Sectioned sebaceous gland

(b) Sectioned eccrine gland

Secretion Products

- **Serous** - thin, watery fluid, product of serous cells, small pink staining cuboidal cells with spherical to elliptical nuclei; salivary glands, sweat glands, pancreatic acinar.
- **Mucous** - thicker, viscous secretion, product of mucous cells, large blue staining cuboidal cells with flat, elongate nuclei; GI tract, oral cavity.
- **Mixed serous-mucous** - oral cavity, salivary.
- **Sebaceous** - thick, lipid rich secretions of cuboidal cells in certain skin regions - face, nose, axillary and pubic regions.

Myoepithelium

- Myoepithelium - specialized squamous epithelial cells with powers of contraction;
- Surround glandular acini and ducts of many glands, contain actin, myosin, cytotokeratin = definitely epithelial in origin, not muscle.

Activities

- Explain the Thyroid gland structure?

Reference

http://www.youtube.com/watch?v=bAaqOIzyaaA

http://www.histology.leeds.ac.uk/index.php