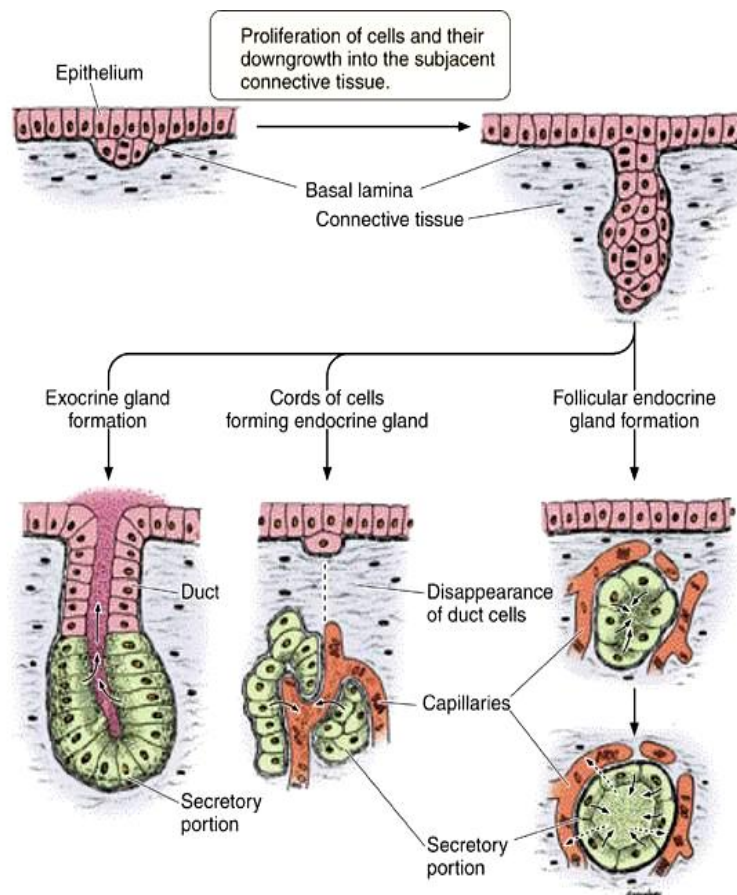


## GLANDULAR EPITHELIUM

- formed by cells specialized to produce a fluid secretion
- they synthesize, store and secrete extracellular products that are not used by the cell itself but are of importance to other parts of organism
- complex aggregates of glandular epithelial cells – **parenchyma** form the larger **multicellular glands** (e.g. salivary glands, pancreas) or **unicellular glands** consist of isolated epithelial cells (e.g. goblet cells)
- glands always arise during development (fetal life) from covering epithelium by means of cell proliferation and invasion of subjacent connective tissue followed by further differentiation:

### Development of glandular epithelium



**A) EXOCRINE GLANDS** – maintain connection with the surface epithelium via the tubular ducts through which the secretory product passes to reach the surface (skin, digestive tract)

**B) ENDOCRINE GLANDS** are ductless – the connection with the surface was obliterated during development and they release their secretory product (hormones) into the bloodstream

## **A. EXOCRINE GLANDS**

Histologically, composed from two parts:

**a. secretory portion** (lat. *portio secretoria*) – contains the cells responsible for the secretory process

**b. system of ducts** (lat. *ductus glandulae*) – transport the secretion to the exterior of the gland

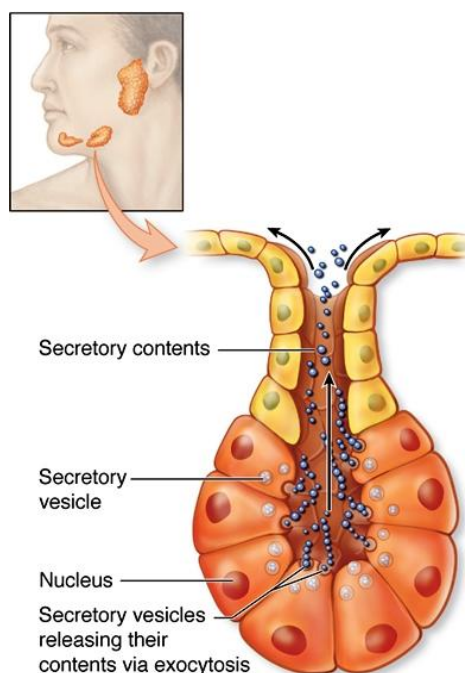
### **Classification of exocrine glands**

#### **(1) Functional classification according to secretory mechanisms:**

- on the basis how the secretory product is released

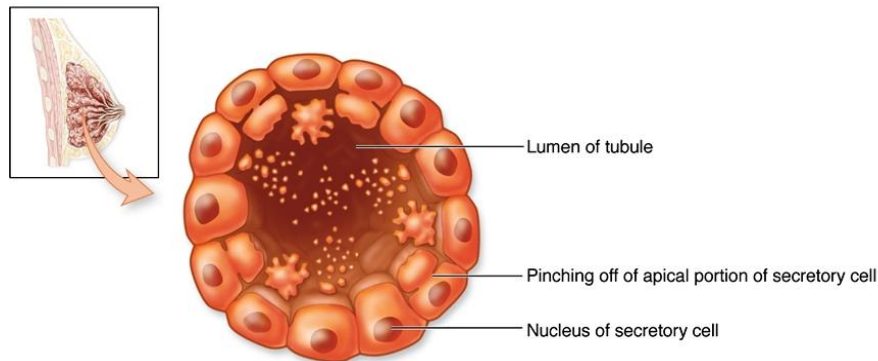
#### **A- MEROCRINE/ECCRINE SECRETION**

► the secretory product is released by **exocytosis** = secretory granules leave the cell without any further loss of cell substance; (e.g. pancreas, salivary glands)



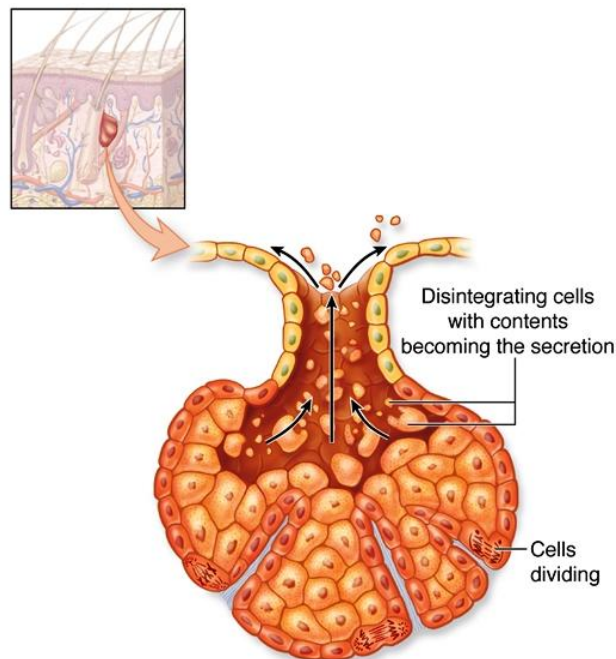
## B- APOCRINE SECRETION

► the apical part of cytoplasm of the cells is lost together with the secretory product; (e.g. female mammary gland)



## C- HOLOCRINE SECRETION

► breakdown and discharge of the entire secretory cell and its product; (e.g. sebaceous glands of the skin)

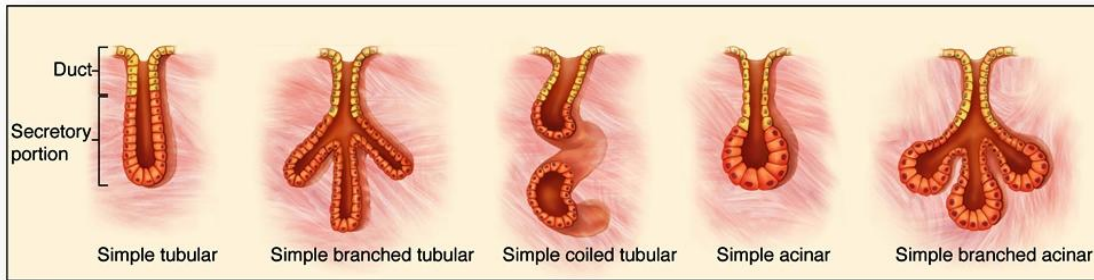


### (2) Histological classification according to duct system:

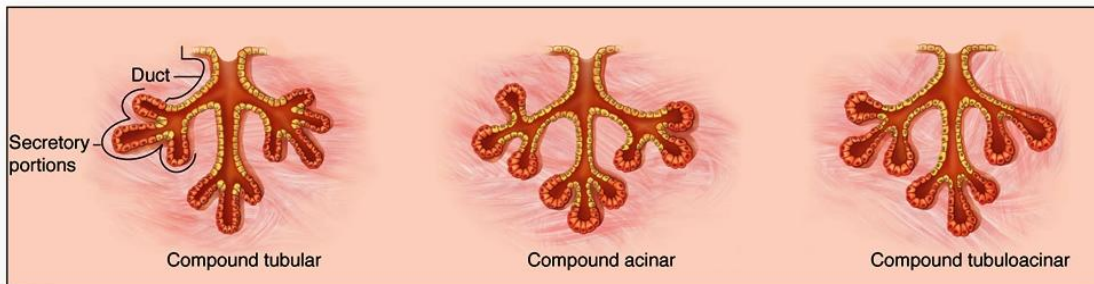
- a- **Simple** (the ducts are not branched);
- b- **Compound** (with a branching duct system)

### (3) Histological classification according to secretory portion:

- a- **Tubular** (shaped like a tube); e.g. glands of intestine, stomach
- b- **Acinar** or **alveolar** (flask-shaped with narrow centrally placed lumen); e.g. pancreas, parotid salivary gland
- c- **Tubuloacinar** (combination of the tube ends with a sac-like dilatation); e.g. submandibular and sublingual salivary glands



a Simple glands



b Compound glands

## B. ENDOCRINE GLANDS

- endocrine glands have not any ducts - **ductless**
- their connection with surface epithelium is lost during embryonic development
- their specific products – **hormones** are released directly into the bloodstream
- each epithelial cell of endocrine gland is in direct contact with blood capillary

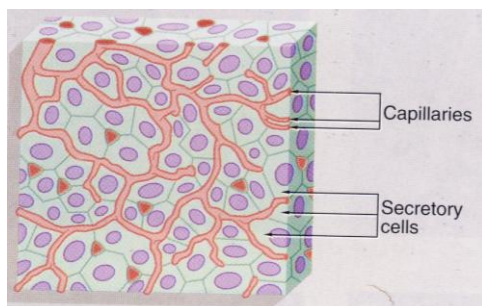
### ► Major morphological features of endocrine glands:

1. Missing of the duct system
2. Rich vascularization as well as innervation
3. Special histological structure

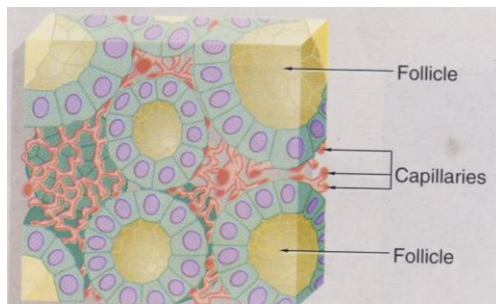
### ► According to histological structure - 3 main types of endocrine glands:

- (1) Trabecular
- (2) Follicular
- (3) Disseminated

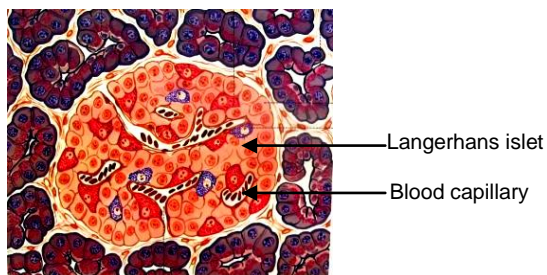
**1. Trabecular type** – made from the cords of the cells – e.g. adenohypophysis, parathyroid gland, adrenal glands



**2. Follicular type** – the cells form spherical structures – e.g. thyroid gland



**3. Disseminated type** – the endocrine cells are placed in groups or separately in another organ – e.g. Leydig cells in testis, Langerhans islets of pancreas



Recommended textbooks:

1. *Adamkov*: Introduction to functional histology
2. *Junqueira*: Basic histology. Text and atlas