Lecture four (Glands)

Glands are composed of epithelial tissue and can be classified as **endocrine , exocrine and mix gland (endocrine , exocrine)** according to how the secretory product leaves the gland. Endocrine glands release their products into interstitial fluid or directly into the bloodstream. Exocrine glands are secrete their products either through ducts into the lumen of an organ or directly onto the body surfaces. Exocrine glands can be classified into several categories according to various criteria.

Endocrine glands

Their secretions go directly into the blood without the need for ducts. They secrete hormones that regulate body functions. examples **Pituitary gland** Located below the brain, about 1 cm in diameter, surrounded by a membrane. It has a stalk that extends downward and lies in front of the midbrain, behind the optic chiasm, and above the sphenoid bone.

Exocrine Glands Classified by Product

(1) **Serous glands**, secrete a watery proteinaceous fluid.(ex: The parotid gland, the pancreas, and sweat glands).

(2) **Mucous glands** ,secrete mucus, a viscous mixture of glycoprotein and water.(ex: Goblet cells in the small and large intestines, respiratory epithelium, and stomach epithelium).

(3) **Mixed glands** have both serous and mucous secretions (ex: the submandibular gland, sublingual gland, and glands in the trachea and esophagus.

(4) **Sebaceous glands** produce lipids. (ex: The sebaceous glands in the skin)

Exocrine Glands Classified by Morphology

The exocrine glands also can be classified depending upon the number of cells that form the gland into :-

1. **Unicellular glands** are composed of only single cells. The secretory products are released directly onto the surface of an epithelium.(ex: Goblet cells)

2. **Multicellular glands** consist of numbers of secretory cells arranged in different organizations.

Mixed glands

are glands that perform both exocrine and endocrine functions.They secrete substances externally through ducts (like enzymes or gametes) and internally into the bloodstream (like hormones).

1. Ovaries:

The ovary is a mixed gland in the female body that performs two types of secretion:

1. External secretion: Production of ova (eggs).

2. Internal secretion: Secretes hormones responsible for the appearance of secondary female sexual characteristics, such as less body hair, soft voice, and the development of mammary glands (breasts)

2. Testes:

They are two glands in the male body that perform two types of secretion:

1. External secretion: Formation of sperm.

2. Internal secretion: Production of hormones responsible for the development of secondary male sexual characteristics, such as a deep voice, dense body hair, and muscle growth.

3. Pancreas:

A gland that has both external secretion (digestive enzymes) and internal secretion (hormones).

Its internal secretion is insulin, which is secreted from clusters of cells in the pancreas called the Islets of Langerhans.

***The multicellular glands also can be classified using a combination of duct shape and the shape of secretory units.**

(1) Simple tubular glands have no ducts. The secretory cells are arranged in straight tubules. (ex: small and large intestines).

(2) Simple branched tubular glands do not have ducts, and their secretory cells are split into two or more tubules. (ex: stomach).

(3) Simple coiled tubular glands have a long duct, and secretory cells are formed by coiled tubules. (ex:Sweat glands).

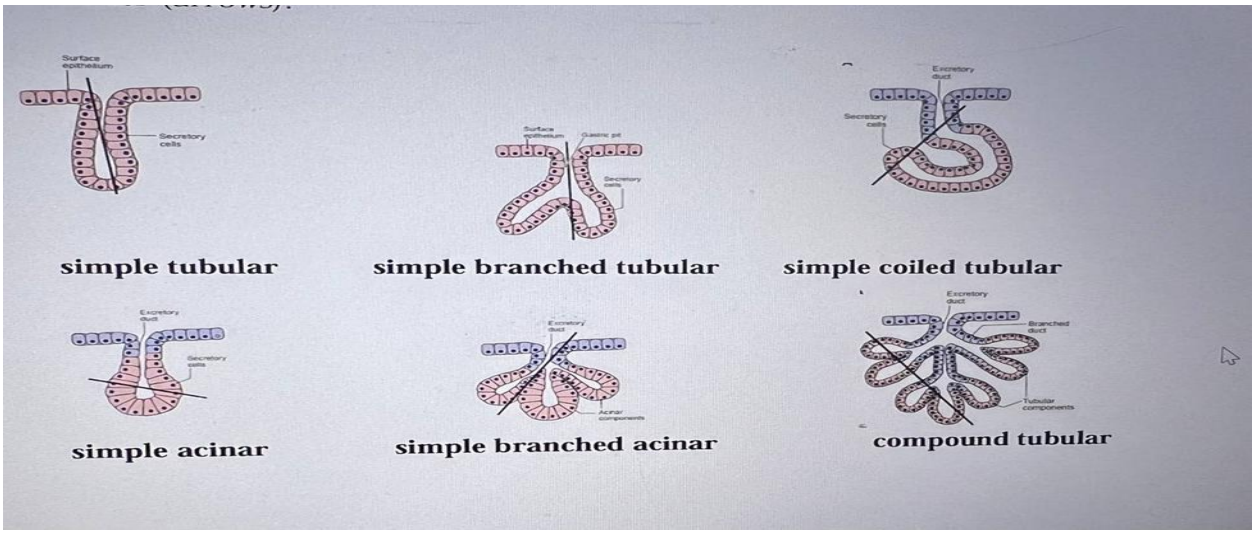
(4) Simple acinar glands have a short, unbranched duct;the secretory cells are arranged in acini form.(ex: The mucus-secreting glands in the submucosa of the penile urethra).

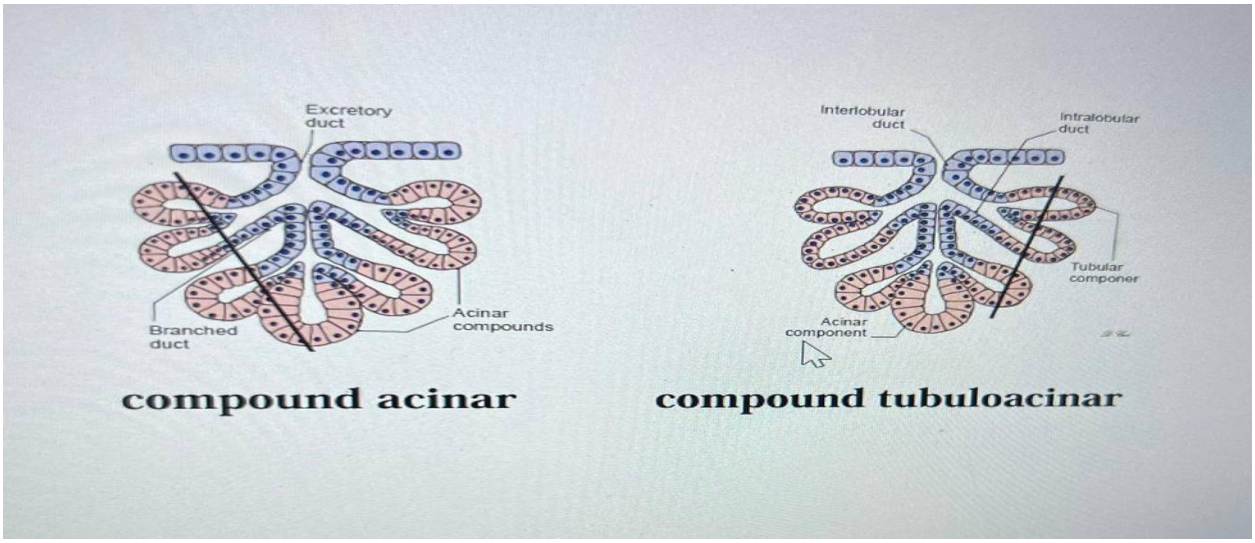
(5) Simple branched acinar glands have a short, unbranched duct, and their secretory cells are formed into branched acini.(ex: The sebaceous glands of the skin)

(6) Compound tubular glands have branched ducts. Their secretory cells are formed into branched tubules (ex: Brunner glands of the duodenum)

(7) Compound acinar glands have branched ducts, and the secretory units are branched acini.(ex: The pancreas and mammary glands).

(8) Compound tubuloacinar glands have branched ducts, and the secretory units are formed by both an acinar component and a tubular component.(ex: The submandibular and sublingual glands).





Duct System

The compound glands often have complex duct systems. The secretory acini or tubules are arranged in lobules. The secretory cells empty their products into small ducts called small intralobular ducts, which are referred to as intercalated ducts. The small intralobular ducts drain secretory products into larger intralobular ducts, which in salivary glands are called striated ducts. The striated ducts are so named because the basal cytoplasm of these cells often appears “striped” under the microscope.

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