

EPITHELIUM AND GLANDS

OBJECTIVES:

After completing this exercise, students should be able to do the following:

1. Identify glands.
2. Classify glands based on secretory type.

ASSIGNMENT FOR TODAY'S LABORATORY

GLASS SLIDES - <https://medmicroscope.uc.edu/>

SL 111 (Trachea) cilia and unicellular glands (goblet cells)

SL 019 (Jejunum, PAS) unicellular glands

SL 092 (Submandibular gland) serous, mucous and demilune secretory units

SL 093 (Sublingual gland) mucous secretory units

POSTED ELECTRON MICROGRAPHS

7 Organelles

11 Desmosomes

12 Epithelium

13 Freeze-fracture

[Lab 5 Posted EMs](#); [Lab 5 Posted EMs with some yellow labels](#)

SUPPLEMENTAL MATERIAL:

SUPPLEMENTARY ELECTRON MICROGRAPHS

Rhodin, J. A.G., An Atlas of Histology.

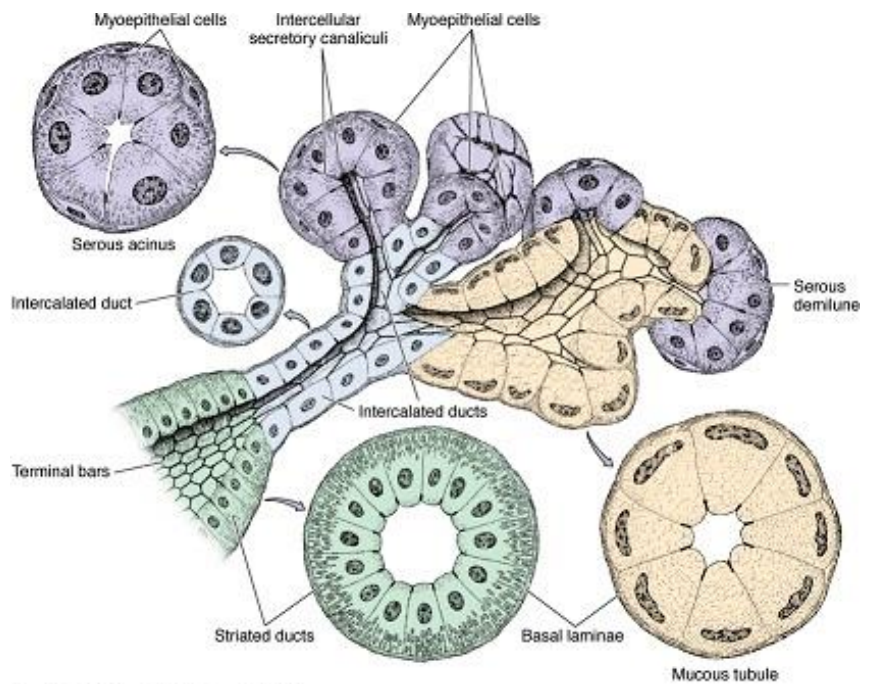
Glands pp. 46 - 52

Copies of this text are on reserve in the HSL.

Glandular epithelium is specialized for the production and secretion of products. The cells that form glands are usually cuboidal or columnar in shape. In this exercise we are emphasizing morphological differences in glands with respect to secretory products.

- A. **UNICELLULAR GLANDS:** [SL 111 \(low, high\)](#), (Trachea, H&E); [SL 019 \(oil\)](#), (Jejunum, PAS), for review. Goblet cells may be few or numerous and are found in epithelia of the respiratory and alimentary systems. The secretory product is emptied into the lumen of the organ rather than into ducts (J. Fig. 4-18, 15-24; R. 5.38, Plate 60)
- B. **MULTICELLULAR GLANDS:** In general these glands are formed by invagination, proliferation, and differentiation of the epithelium from which they are derived. Glands that maintain a connection with the surface epithelium through ducts are termed exocrine glands, whereas glands that have lost this connection, and secrete instead to blood vessels, are called endocrine glands (see J. 4-19). At this time we will consider only exocrine glands. The secretory products of glands are quite varied. In simplest form, we will distinguish between the morphology of mucus-secreting and serous-secreting cells by studying salivary glands (J. Fig. 4-24, 4-25; R. Fig. 5.40, 5.41).

- [SL 092: \(Submandibular gland\)](#). (J. Fig. 16-5a, R. Plate 51) The submandibular gland is composed mainly of groups of serous-secreting cells arranged in acini (from Latin for berry, because the cluster of secretory cells resembles a bunch of berries or grapes). The "stems" of the clusters are the ducts, which carry the secretory product (acini within blue circles). This acinar structure was discussed previously when we looked at the pancreas (see figure). Each acinus contains a number of serous-secreting cells that have a round nucleus located in the basal half of the cell; the secretory granules occupy the apical portion of the cell. Scattered among these serous acini are mucous-secreting acini which have these characteristics: the nucleus is flattened against the basal membrane, and the remainder of the cell appears "empty" or washed out because mucus is often partially removed by tissue preparation and does not stain well with H & E. Some of these mucous acini are covered at their periphery by serous-secreting cells that appear as a row of cells in cross-section. These are called serous demilunes, (serous demilunes, outlined by blue lines; mucous acinus, green circle, serous acinus, red circle). Thus, the ducts in this gland carry mixed serous and mucous secretions.



- [SL 093: \(Sublingual gland\)](#). (J. Fig. 16-5b; R. Plate 53) This gland consists primarily of mucous acini. Compare the appearance of the two types of acini. This tissue also has fat-storing cells, which appear empty with a very thin, flat nucleus against the cell membrane; these are not arranged in acini, and you will readily distinguish them from the mucous-secreting (red circles) cells.

SPECIFIC OBJECTIVES FOR EPITHELIUM AND GLANDS

1. Using the light microscope or digital slides, identify:

- Unicellular glands
- Multicellular glands
 - Mucus glands
 - Serous glands
 - Serous demilunes

2. Understand the freeze-fracture technique

REVIEW QUESTIONS ON EPITHELIA AND EPITHELIAL SPECIALIZATIONS

1. Suggest a major function for each of the following types of epithelium:
 - a. simple squamous epithelium
 - b. simple columnar epithelium
 - c. stratified squamous epithelium
2. Compare the structure of pseudostratified columnar epithelium with stratified columnar epithelium.
3. What is the difference between basal lamina and basement membrane?
4. What components of the junctional complex, a) prevent(s) flow of material through the epithelium? b) have the primary function of adhesion between cells?
5. In an electron micrograph how could one tell that a free surface projection was a cilium, a microvillus or a stereocilium?
6. In a section with mixed serous and mucous glandular epithelium, which secretory cells should be more basophilic?