



College of Dentistry

Second year

Academic year 2019-2020

HISTOLOGY

TITLE:- OVERVIEW OF HISTOLOGY

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Secone lecture

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OVERVIEW

- The objective of a histology course is to lead the student to understand the microanatomy of cells, tissues, and organs and to correlate structure with function.
- **TISSUE PREPARATION** will be explained in the first Lab.

Tissues: Concept and Classification

- **Tissues** are aggregates or groups of cells organized to perform one or more specific functions.
- Despite the variations in **general appearance, structural organization, and physiologic properties** of the various body organs, the tissues that compose them are classified into four basic types.
 - I. **Epithelium (epithelial tissue)** covers body surfaces, lines body cavities, and forms glands.
 - II. **Connective tissue** underlies or supports the other three basic tissues.
 - III. **Muscle tissue** is made up of **contractile cells** and is responsible for movement.
 - IV. **Nerve tissue** receives, transmits, and integrates information from outside and inside the body to control the activities of the body.

Epithelial Tissues

- Epithelium covers body surfaces, lines body cavities.
- Epithelium also forms the **secretory portion (parenchyma) of glands** and their ducts.
- **Functions:-**
 1. Absorption
 2. Protection
 3. Lubrication
 4. Filtration
 5. Gases exchange
 6. Secretion

Method of Classification

- Classification by number of layers
 - *Simple epithelium/ only one layer thick* . All cells rest on the basement membrane (basal surface) and all cells face the free surface.
 - *Stratified epithelium/ more than one layer thick*. Only the deepest layer of cells contact the **basement membrane** and only the superficial cells have a free surface. **Named according** to the **shape of the cells** at the free surface.

■ Classification by shape of surface cells

➤ *Squamous*

Cells are much wider than tall, resembling a “fried egg.” Nucleus is highly flattened.

➤ *Cuboidal*

Cells are of equal height and width. Nucleus is spherical.

➤ *Columnar*

Cells are much taller than they are wide.

Nucleus is oval shaped, generally located toward the base of the cell.

Types of Lining and Covering Epithelium

➤ Simple epithelial tissues

Simple squamous Epithelium.

- Endothelium;- is the epithelial lining of the blood and lymphatic vessels.
- Mesothelium:- is the epithelium that lines the walls and covers the contents of the c.losed cavities of the body (i.e.the abdominal, pericardial, and pleural).
- **Endocardium** is the epithelial lining of ventricles and atria of the heart.

➤ **Simple Cuboidal Epithelium**

- Single layer of round cells
- Lines small ducts and kidney tubules, transports and absorbs filtered material in kidney tubules

➤ **Simple Columnar Epithelium**

- Lines and absorbs.
- Forms the lining of the intestines and gall bladder

- Stratified epithelial tissues

Stratified squamous, Protects from physical abrasion.

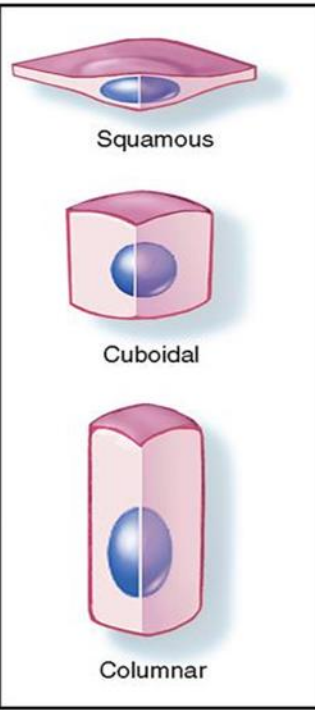
- Types

- ***Nonkeratinized***. Lining of wet cavities, including the mouth, esophagus, rectum, and anal canal; surface cells are nucleated and living.

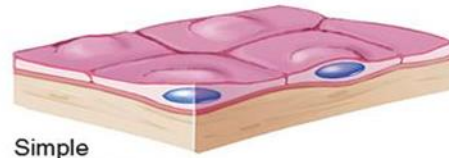
- ***Keratinized***. Epidermis of the skin; surface cells are nonliving.

- *Stratified cuboidal/columnar*. Lines the larger ducts of exocrine glands.

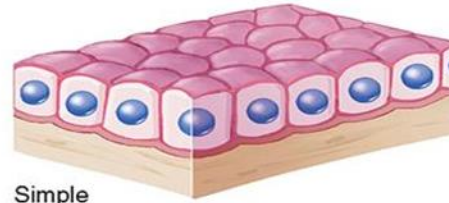
Cell shapes



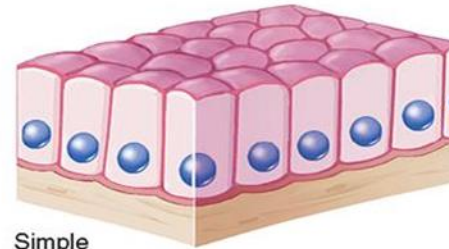
Simple



Simple squamous



Simple cuboidal



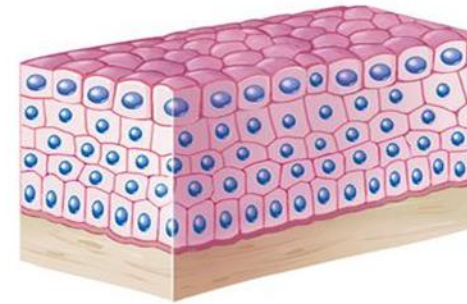
Simple columnar

Stratified



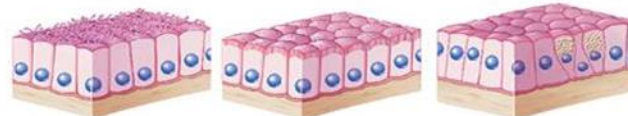
Stratified squamous

Basement membrane



Stratified cuboidal

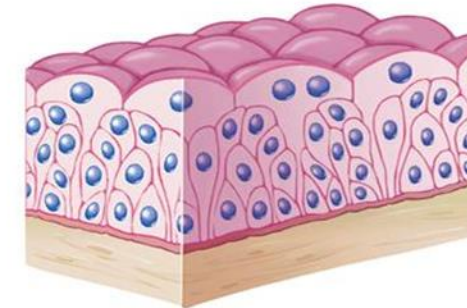
Examples of columnar tissue



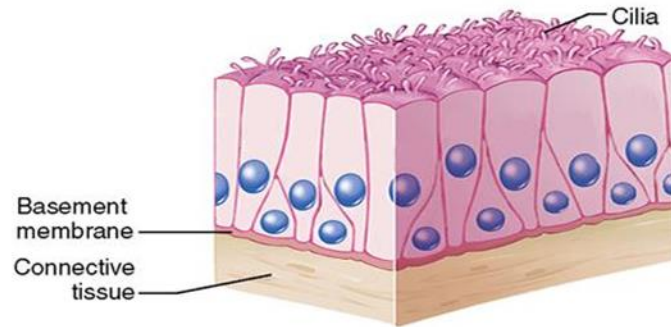
Ciliated

With microvilli (brush/striated border)

With goblet cells

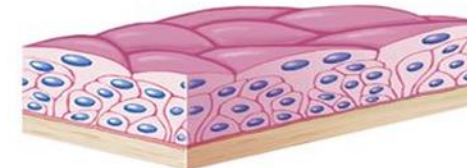


Transitional, relaxed



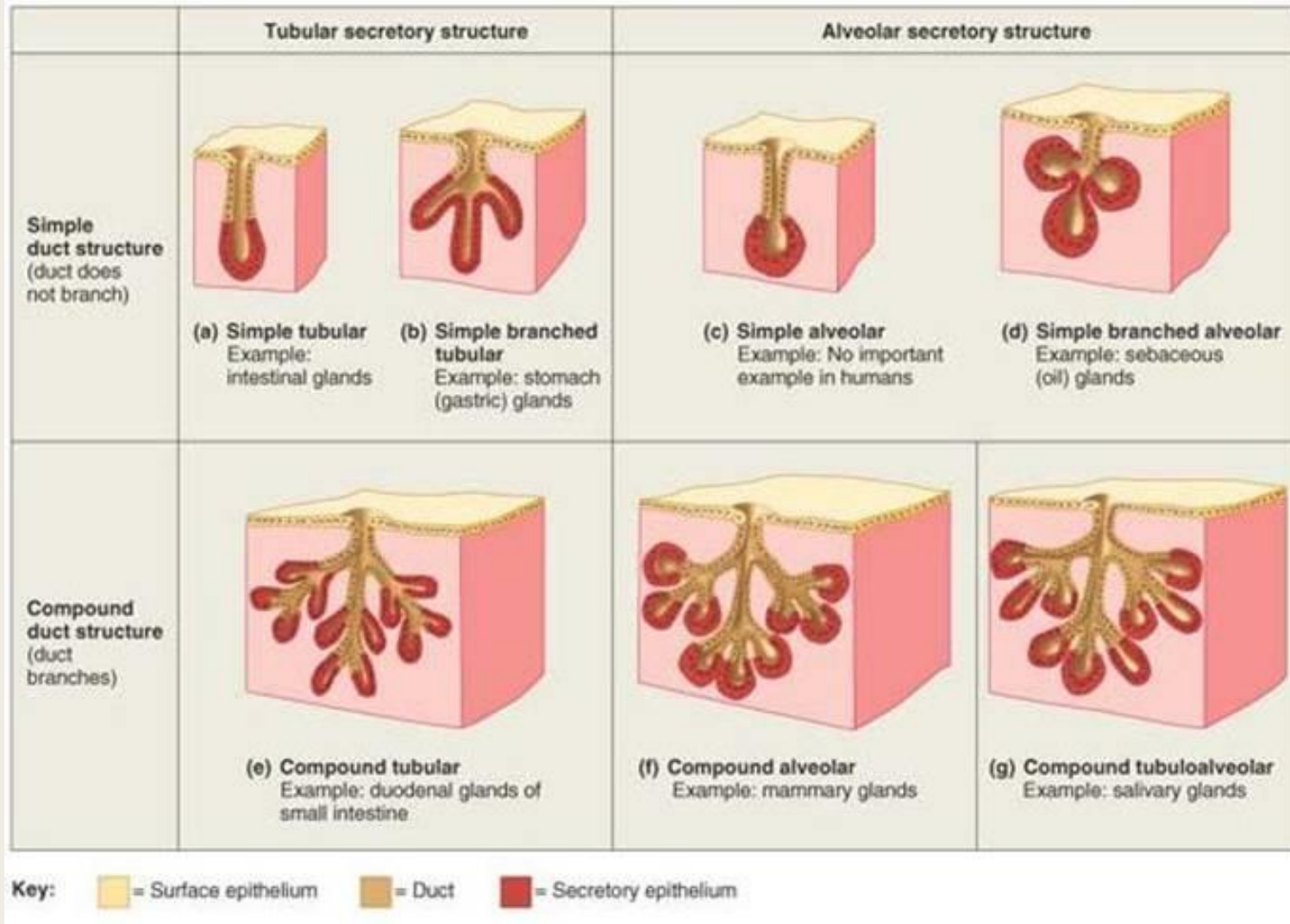
Basement membrane
Connective tissue

Pseudostratified columnar



Transitional, stretched

Glandular



- **Merocrine Glands**

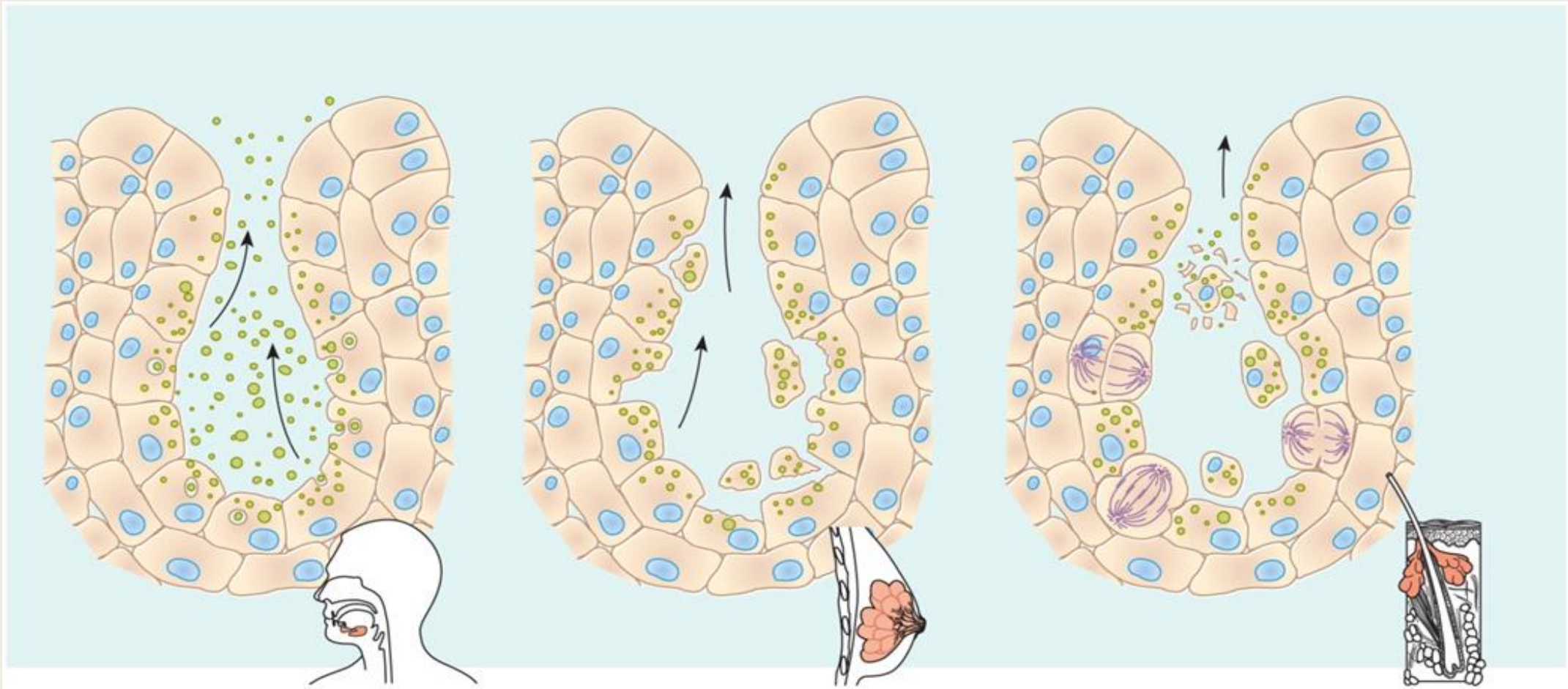
- Salivary glands
- Pancreas gland
- Sweat glands

- **Apocrine Glands**

- Portions of cells
- Mammary glands

- **Holocrine Glands**

- Whole cells
- Sebaceous glands



Connective Tissue

Composition

- I. **Cells.** (Resident and Transient cells).
- II. **Extracellular matrix.** Synthesized and secreted by resident “blast” cells specific for each connective tissue type (e.g., fibroblasts and chondroblasts); the matrix is composed of:
 - A. ***Fibers.*** Collagen, elastic and reticular.
 - B. ***Ground substance.*** An amorphous substance that can exist as a liquid, gel, or flexible or rigid solid, conferring unique structural properties to each connective tissue.

Classification

EMBRYONIC CONNECTIVE TISSUE

Mesenchyme CNT;- present in embryo.

Mucus CNT:- present in umbilical cord

CONNECTIVE TISSUE PROPER

- **Loose CNT:-** Loose connective tissue, sometimes called **areolar tissue**.
- **Dense CNT:-** which can be further subcategorized into two basic types based on the organization of its collagen fibers: **dense irregular connective tissue** and **dense regular connective tissue**.
- **Specialized CNT**

Adipose CNT

Blood

Cartilage

Bone

Muscle

- Three types of muscle are recognized based on their distinctive structural and functional features: skeletal, cardiac and smooth muscle.
- **Skeletal and cardiac appear** striated because of the parallel arrangement of **contractile filaments** appear as an alternating series of **transverse bands**.
- **Smooth muscle appears** non-striated because of the less ordered array of **contractile filaments**.
- The terms muscle fiber and muscle cell are synonymous.