Epithelial tissues

- Cell to tissue
- Function of Epithelial tissue
- Characteristics of Epithelial tissue
- Classification of Epithelial Tissue
- Tyaps Squamous Epithelium
- Glands
- Shapes of Exocrine glands

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Cell to tissue

- As human body develops from single to multicellular, cells specialize.
- Body is interdependent system, malfunction of one group of cells is catastrophic.
- Cells specialize into types of tissues, then interspersed into organs.

Tissues = groups of cells that are similar in structure and function.

- **Epithelium**
  - Coverings
  - Linings of surfaces
- **Muscle**
  - Movement
- **Connective**
  - Support
  - Bone, ligaments, fat
- **Nervous**
  - Control
  - Brain, nerves, spinal cord

Function of Epithelial tissue

Protection

■ Skin protects from sunlight & bacteria & physical damage.

Absorption

■ Lining of small intestine, absorbing nutrients into blood

Filtration

■Lining of Kidney tubules filtering wastes from blood plasma

Secretion

■ Different glands produce perspiration, oil, digestive enzymes and mucus

Characteristics of Epithelial tissue

- Form continuous sheets (fit like tiles)
- Apical Surface
  - All epithelial cells have a top surface that borders an open space - known as a lumen
- Basement Membrane
  - Underside of all epithelial cells which anchors them to connective tissue
- Avascularity (a = without)
  - Lacks blood vessels
  - Nourished by connective tissue
- Regenerate & repair quickly

Classification of Epithelial Tissue

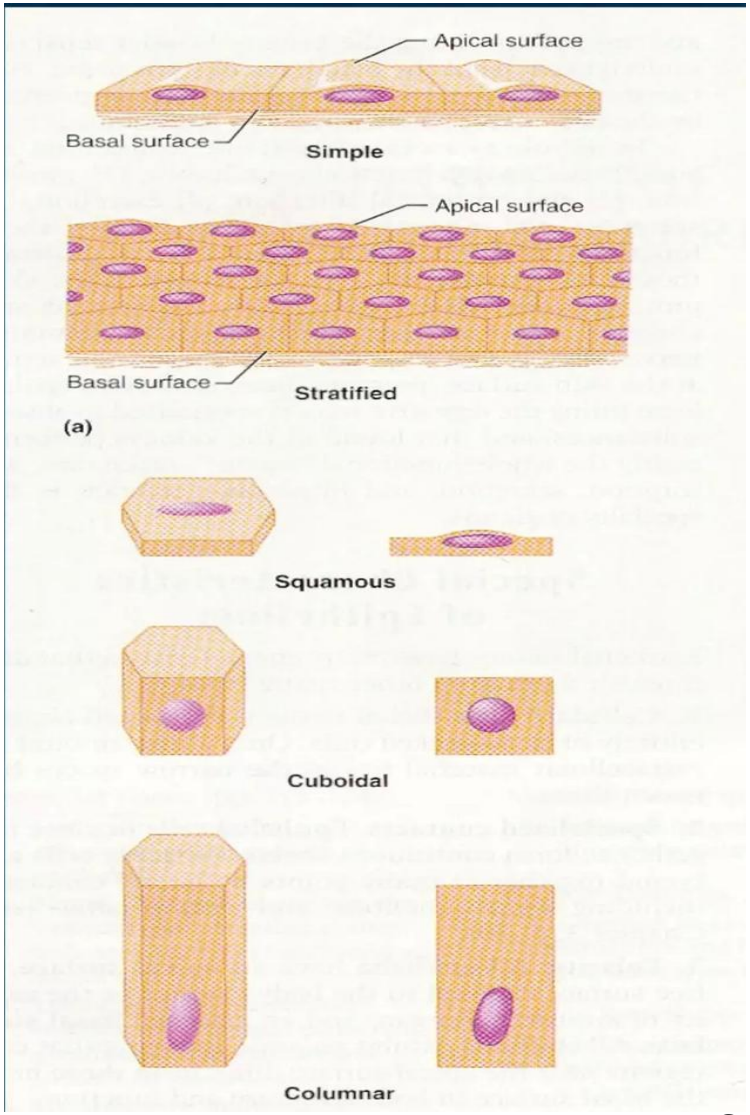
■ **Cell Shape**

- Squamous - flattened like fish scales
- Cuboidal – cubes
- Columnar-columns

■**Cell Layers**

- Simple (one layer)
- Stratified (many layers)

■ **Named for the type of cell at the apical surface**.



Types Squamous Epithelium

Simple Squamous Epithelium

■ Structure

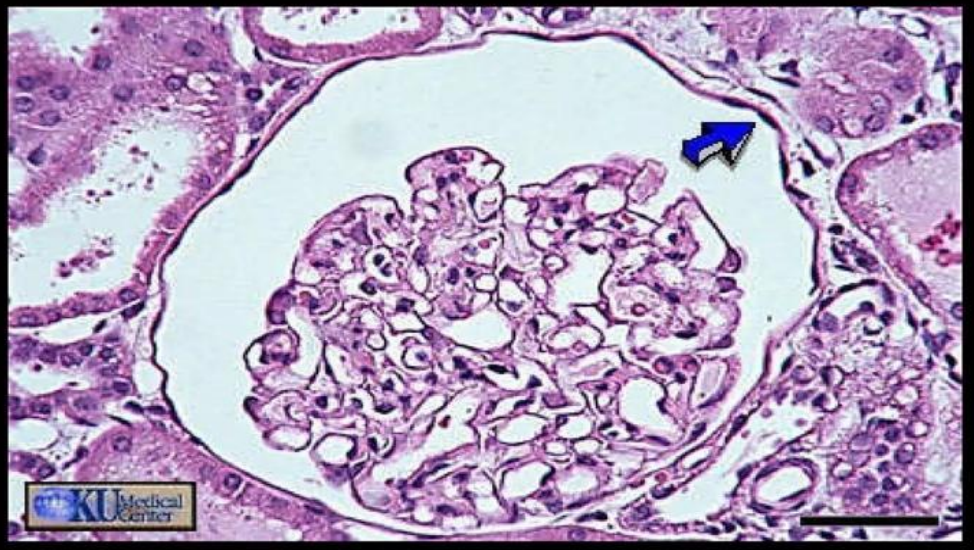
- Single Layer of flattened cells

■ Function

- Absorption, and filtration
- Not effective protection - single layer of cells.

■Location

- Walls of capillaries, air sacs in lungs
- Form serous membranes in body cavity



Simple Cuboidal Epithelium

Structure

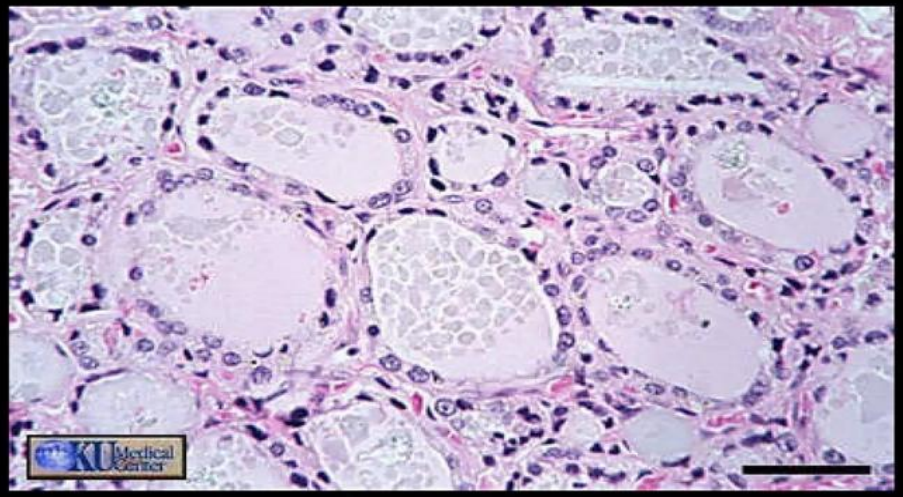
■ Single layer of cube shaped cells

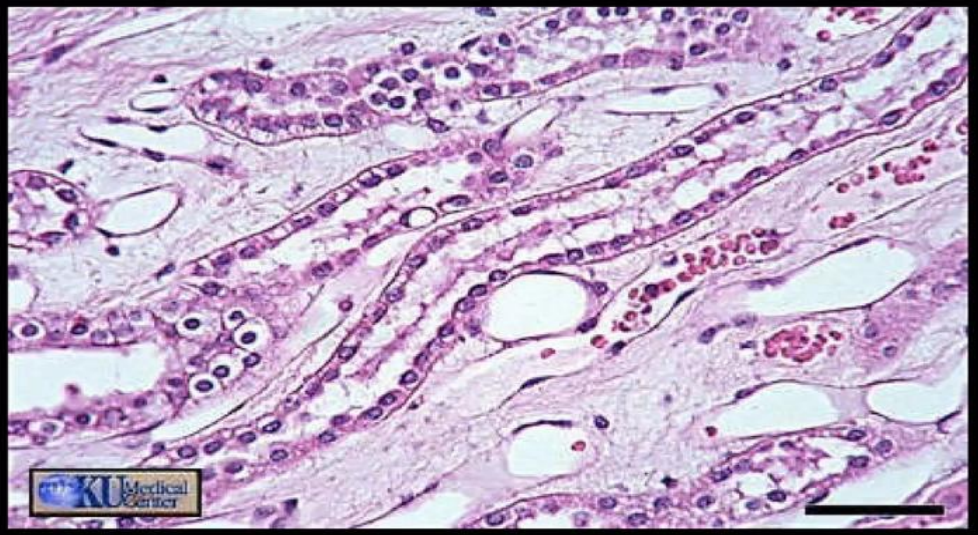
Function

■ Secretion and transportation in glands, filtration in kidneys

Location

■ Glands and ducts (pancreas & salivary), kidney tubules, covers ovaries





Simple Columnar Epithelium

■*Structure*

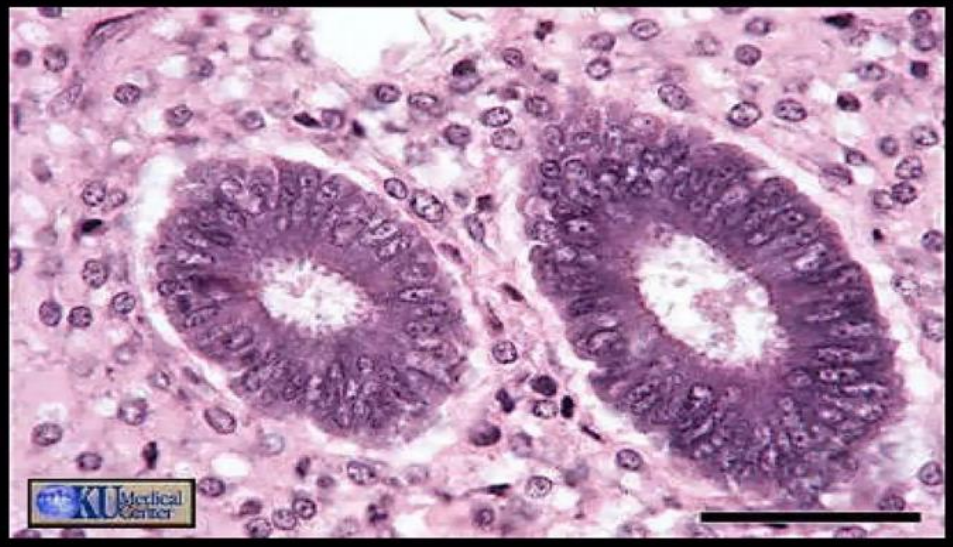
- *Elongated layer of cells with nuclei at same level*

■ *Function*

- *Absorption, Protection & Secretion*
- *When open to body cavities – called mucous membranes*

■*Special Features*

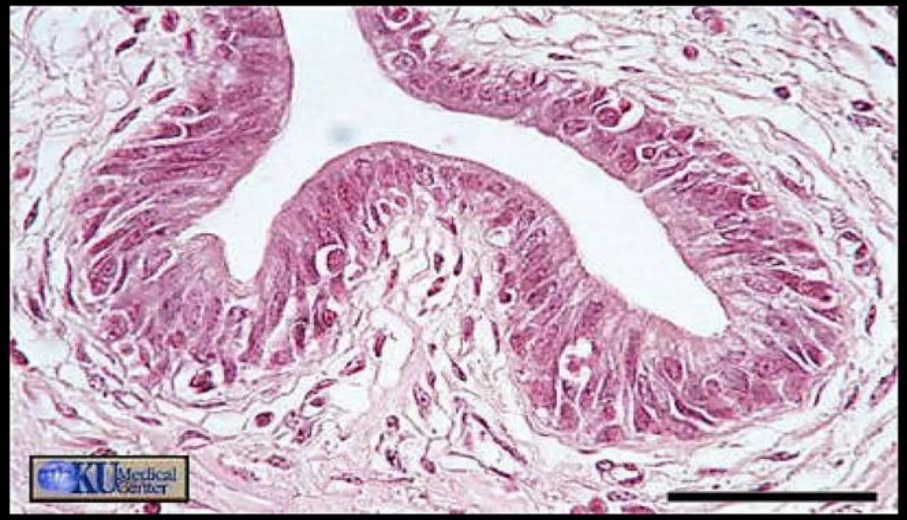
- *Microvilli, bumpy extension of apical surface, increase surface area and absorption rate.*
- *Goblet cells, single cell glands, produce protective mucus.*
- ■*Location*
- *Linings of entire digestive tract*



Pseudostratified Epithelium

■ Structure

- Irregularly shaped cells with nuclei at different levels - appear stratified , but aren't.
- All cells reach basement membrane
- ■Function
- Absorption and Secretion
- Goblet cells produce mucus
- Cilia (larger than microvilli) sweep mucus
- ■Location
- Respiratory Linings & Reproductive tract




Cilia
Basement Membrane

Stratified Squamous Epithelium

■ Structure

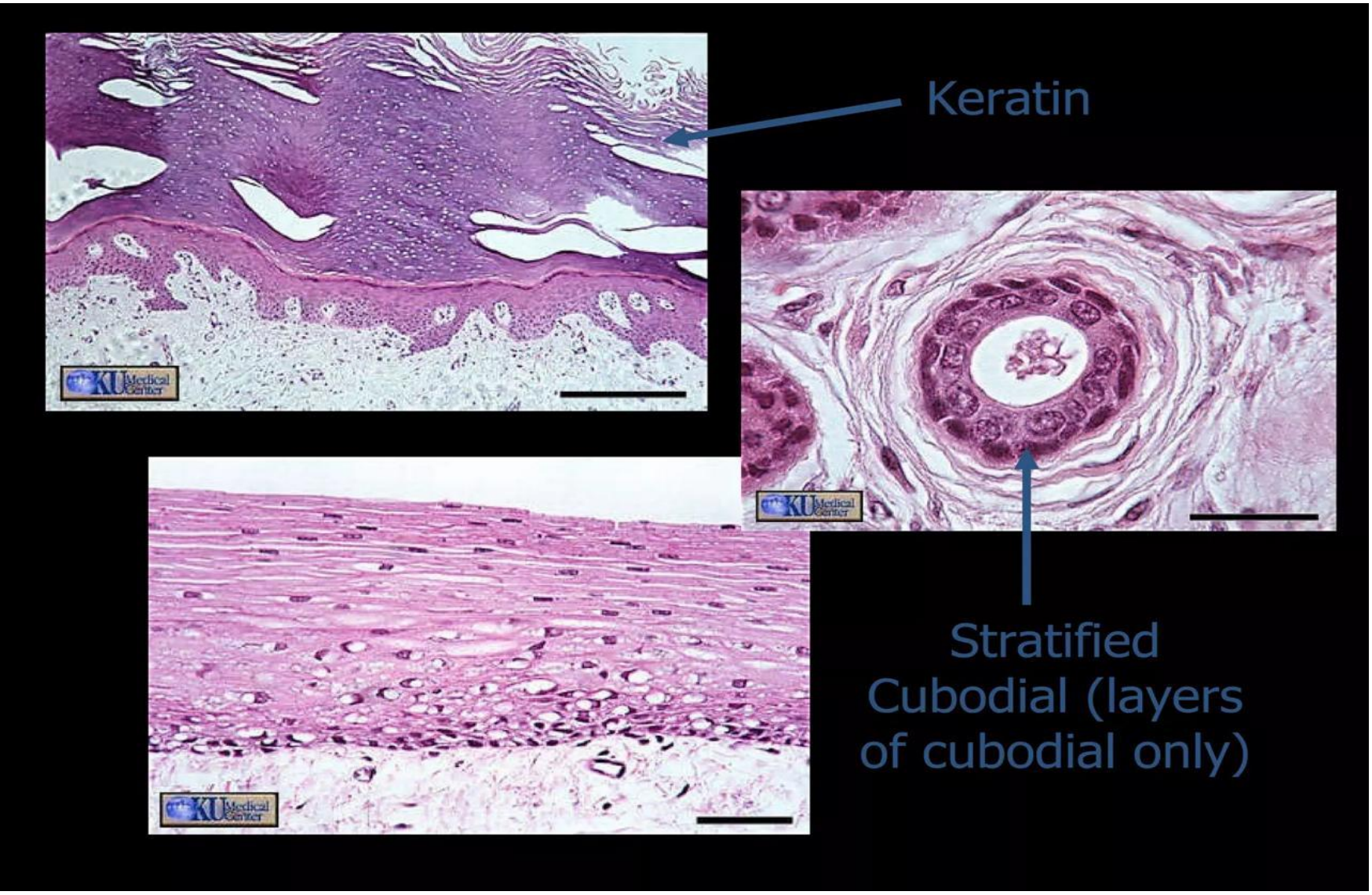
- Many layers (usually cuboidal /columnar at bottom and squamous at top)

■Function

- Protection
- Keratin (protein) is accumulated in older cells near the surface - waterproofs and toughens skin.

■ Location

- Skin (keratinized), mouth & throat


Keratin
Stratified
Cubodial (layers
of cubodial only)

Transitional Epithelium

■ Structure

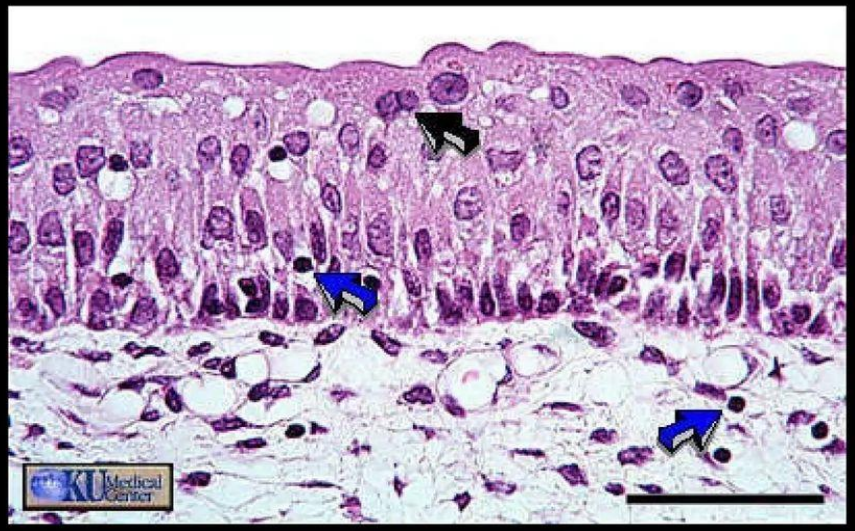
- Many layers
- Very specialized – cells at base are cuboidal or columnar, at surface will vary.
- Change between stratified & simple as tissue is stretched out.

■Function

- Allows stretching (change size)

■Location

- Urinary bladder, ureters & urethra



Glands

■ One or more cells that make and secrete a product.

■ Secretion = protein in aqueous solution: hormones, acids, oils.

■Endocrine glands

- No duct, release secretion into blood vessels
- Often hormones
- Thyroid, adrenal and pituitary glands

■Exocrine glands

- Contain ducts, empty onto epithelial surface
- Sweat, Oil glands, Salivary glands, Mammary glands.

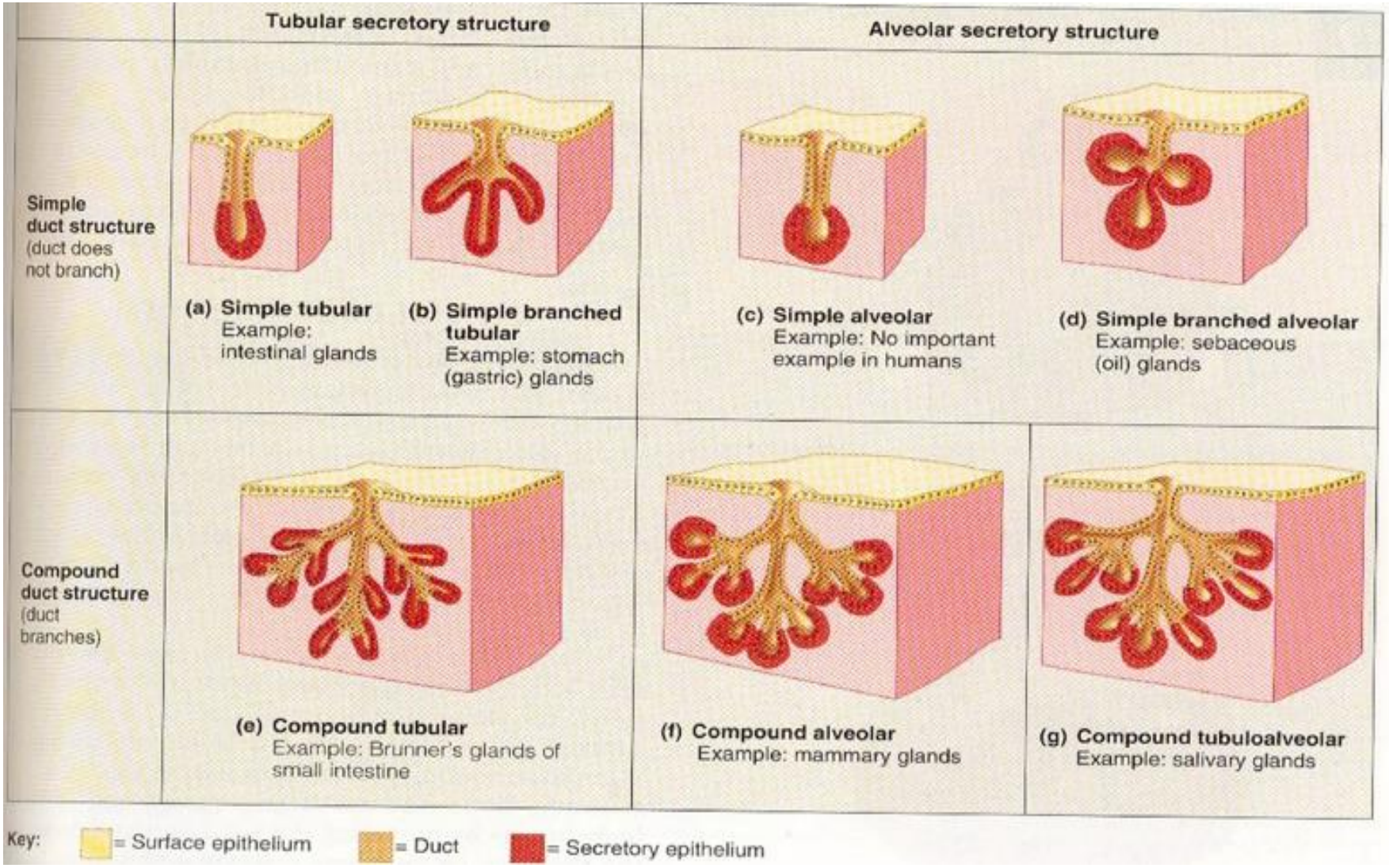
Shapes of Exocrine glands

Branching

- Simple - single, unbranched duct
- Compound – branched.

Shape: tubular or alveolar

- Tubular – shaped like a tube
- Alveolar – shaped like flasks or sacs
- Tubuloalveolar – has both tubes and sacs in gland


Tubular secretory structure
Alveolar secretory structure
Simple duct structure (duct does not branch)
(a) Simple tubular
Example: intestinal glands
(b) Simple branched tubular
Example: stomach (gastric) glands
(c) Simple alveolar
Example: No important example in humans
(d) Simple branched alveolar
Example: sebaceous (oil) glands
Compound duct structure (duct branches)
(e) Compound tubular
Example: Brunner's glands of small intestine
(f) Compound alveolar
Example: mammary glands
(g) Compound tubuloalveolar
Example: salivary glands
Key:
= Surface epithelium
= Duct
= Secretory epithelium

Modes of Secretion

■**(How the gland's product is released)**

■ **Merocrine**

- Just released by exocytosis without altering the gland at all.
- Ex: Sweat glands and salivary glands

■ **Holocrine**

- The gland ruptures and releases secretion and dead cells as well.
- Sebaceous (oil glands on the face) only example


THANK
YOU