

Classification of Tissues:

Epithelial Tissue

Tissue: a collection of similar cells working together

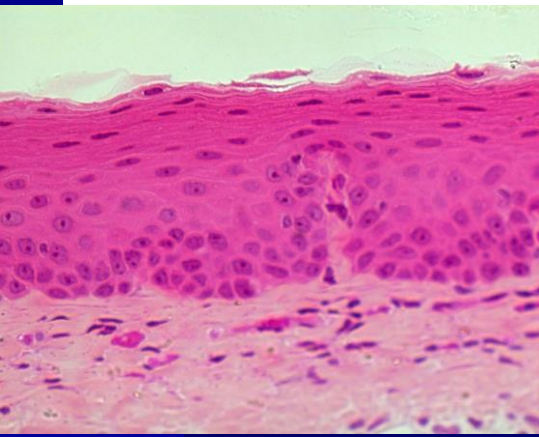
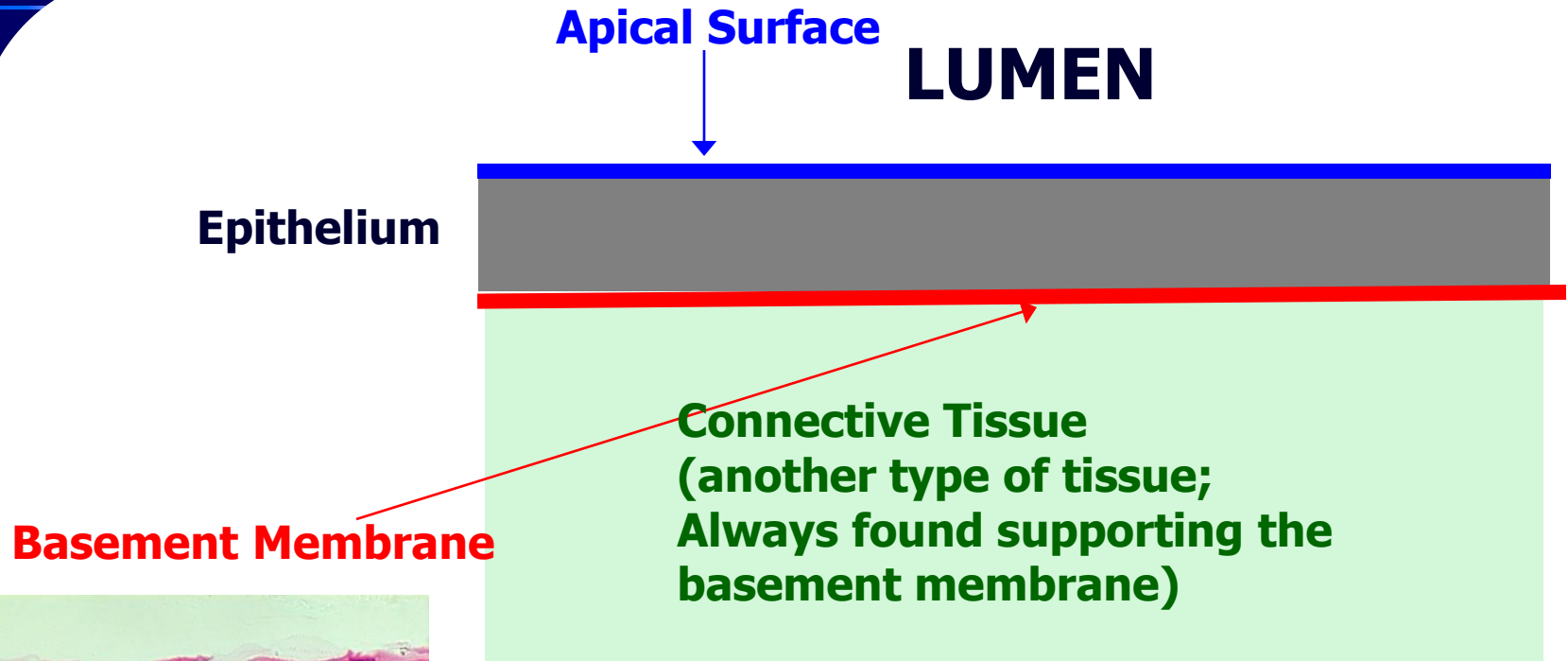
Epithelial Tissue: cells that cover the surfaces of organs or form a lining within a cavity

Turn to: page 56 of the lab book and page 12-14 of the lab packet

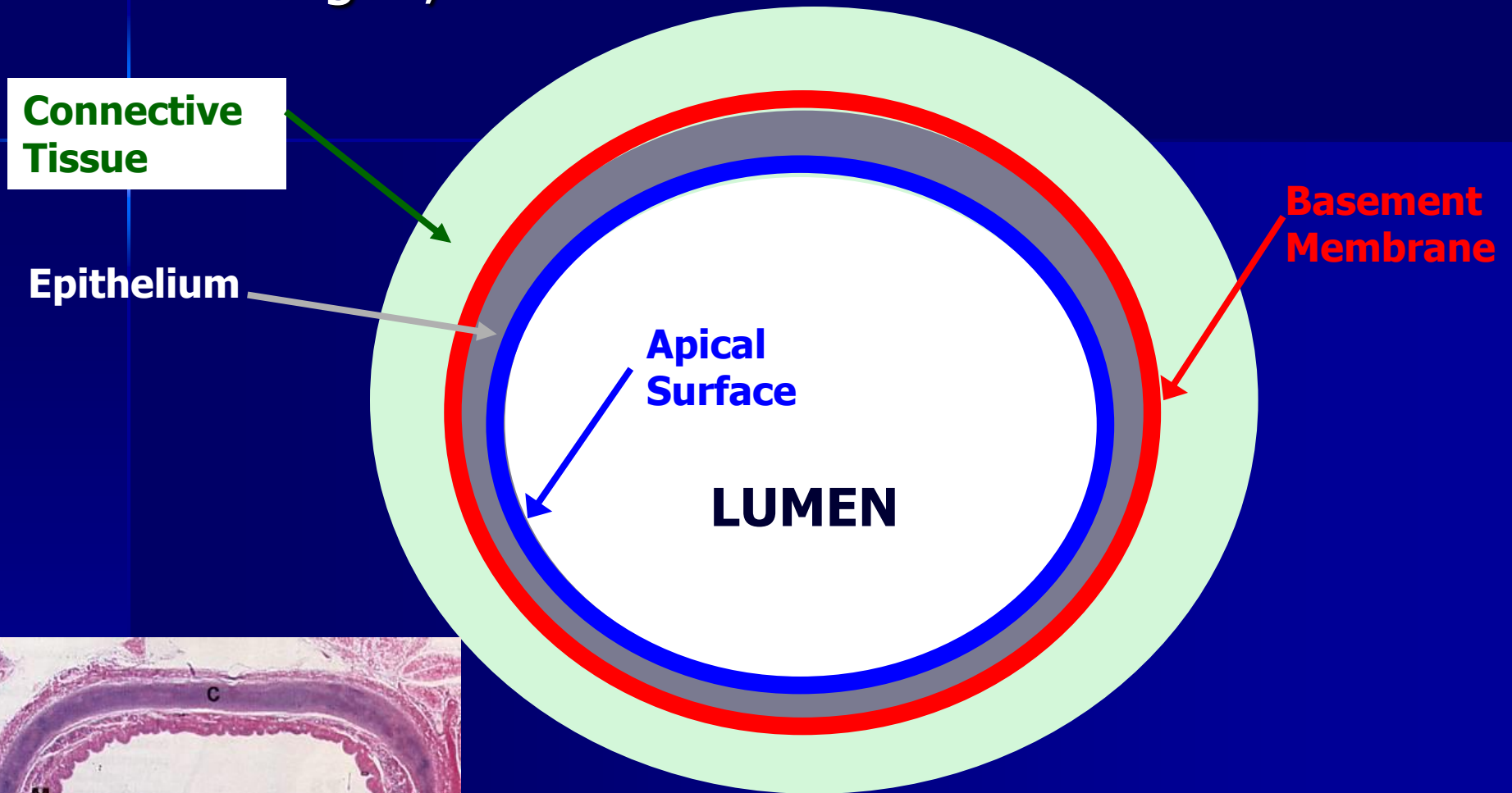
Apical surface: the very top surface of epithelium

Basement membrane (basal surface): the very bottom surface of epithelium

Lumen: The open space above the apical surface of a structure

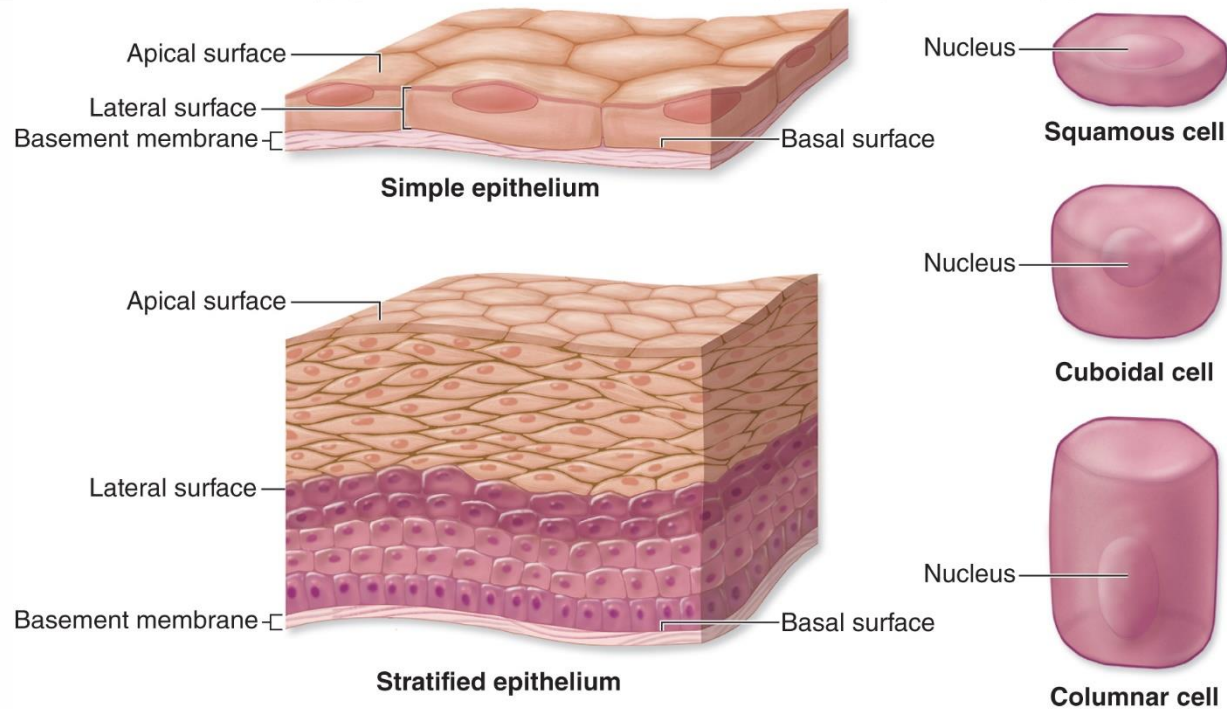


Lumen: The inner open space or cavity of a tubular organ, as of a blood vessel or an intestine.



Classification of Epithelia

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(a) Epithelium classified by layers

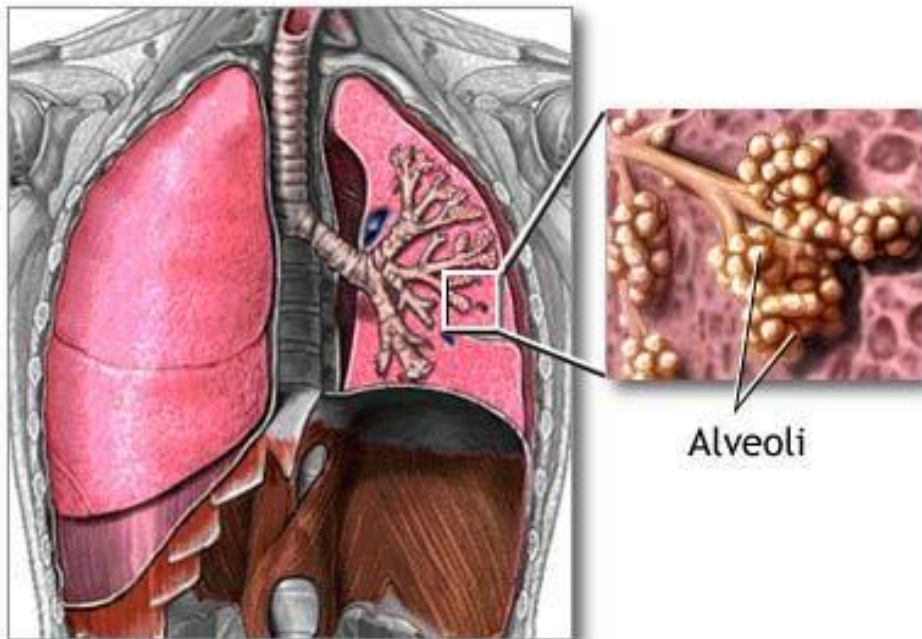
(b) Epithelium classified by shapes

1. Number of cell layers

2. Shape of Cell

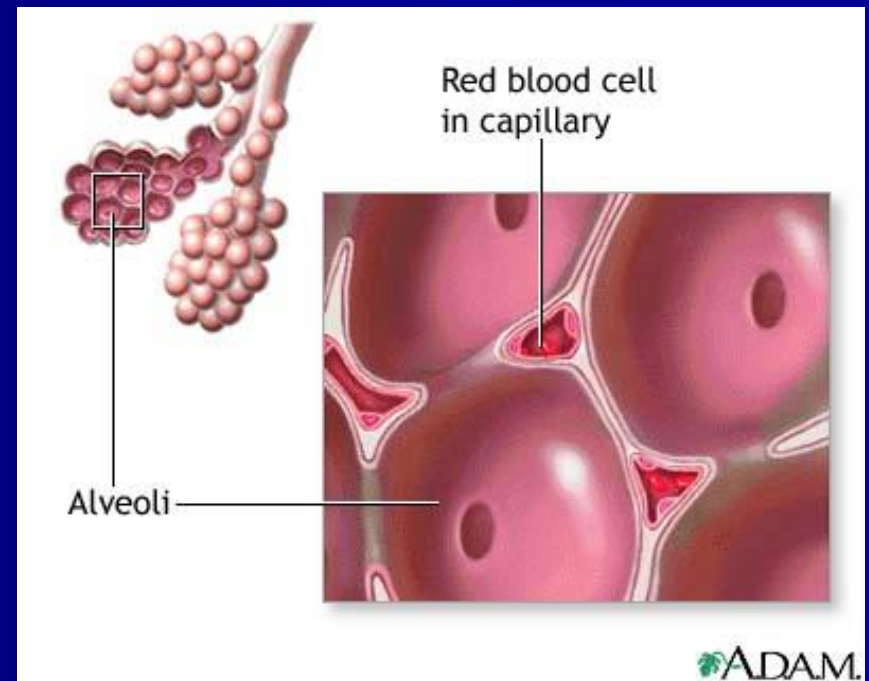
Simple Squamous Epithelium

Alveoli (air sacs) of Lungs



Younger lungs

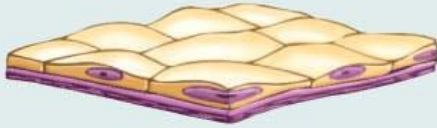
ADAM.



ADAM.

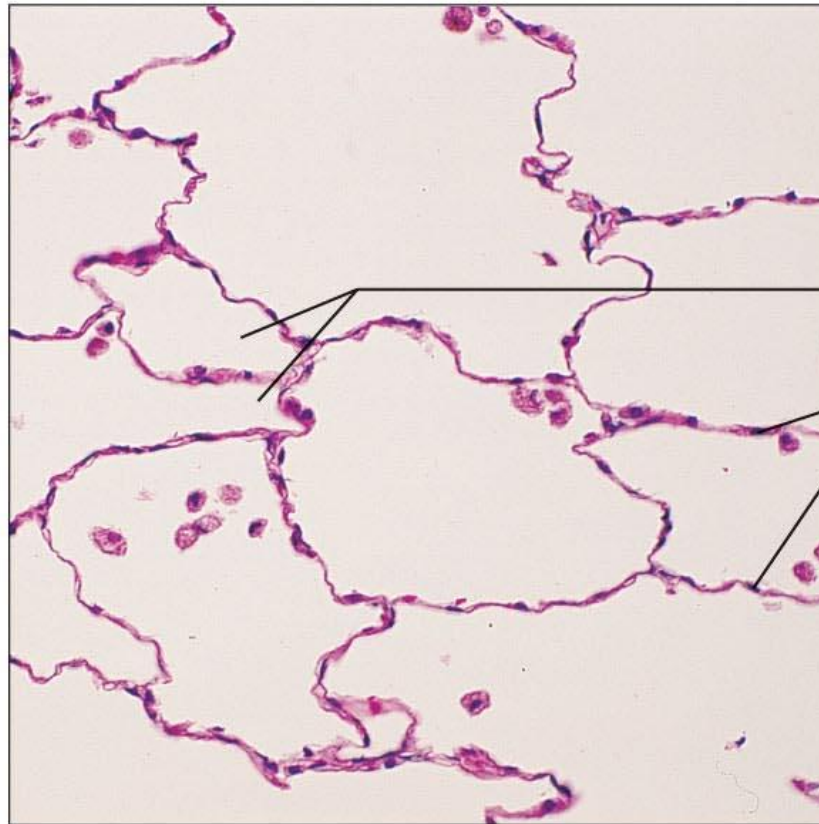
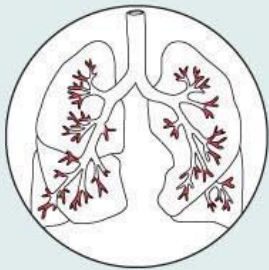
(a) Simple squamous epithelium

Description: Single layer of flattened cells with disc-shaped central nuclei and sparse cytoplasm; the simplest of the epithelia.



Function: Allows passage of materials by diffusion and filtration in sites where protection is not important; secretes lubricating substances in serosae.

Location: Kidney glomeruli; air sacs of lungs; lining of heart, blood vessels, and lymphatic vessels; lining of ventral body cavity (serosae).

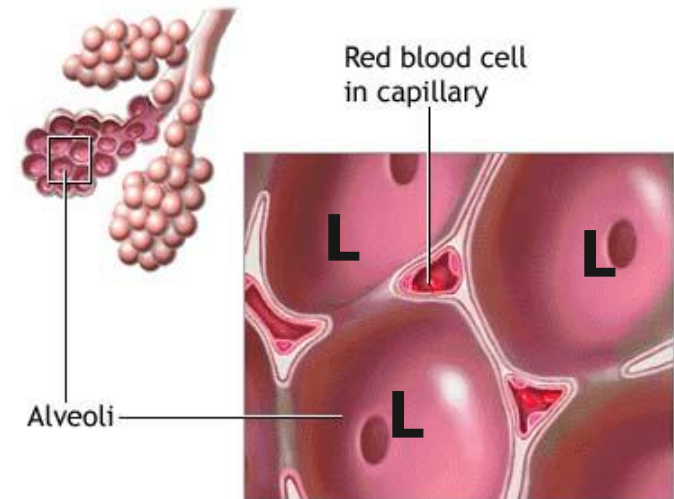
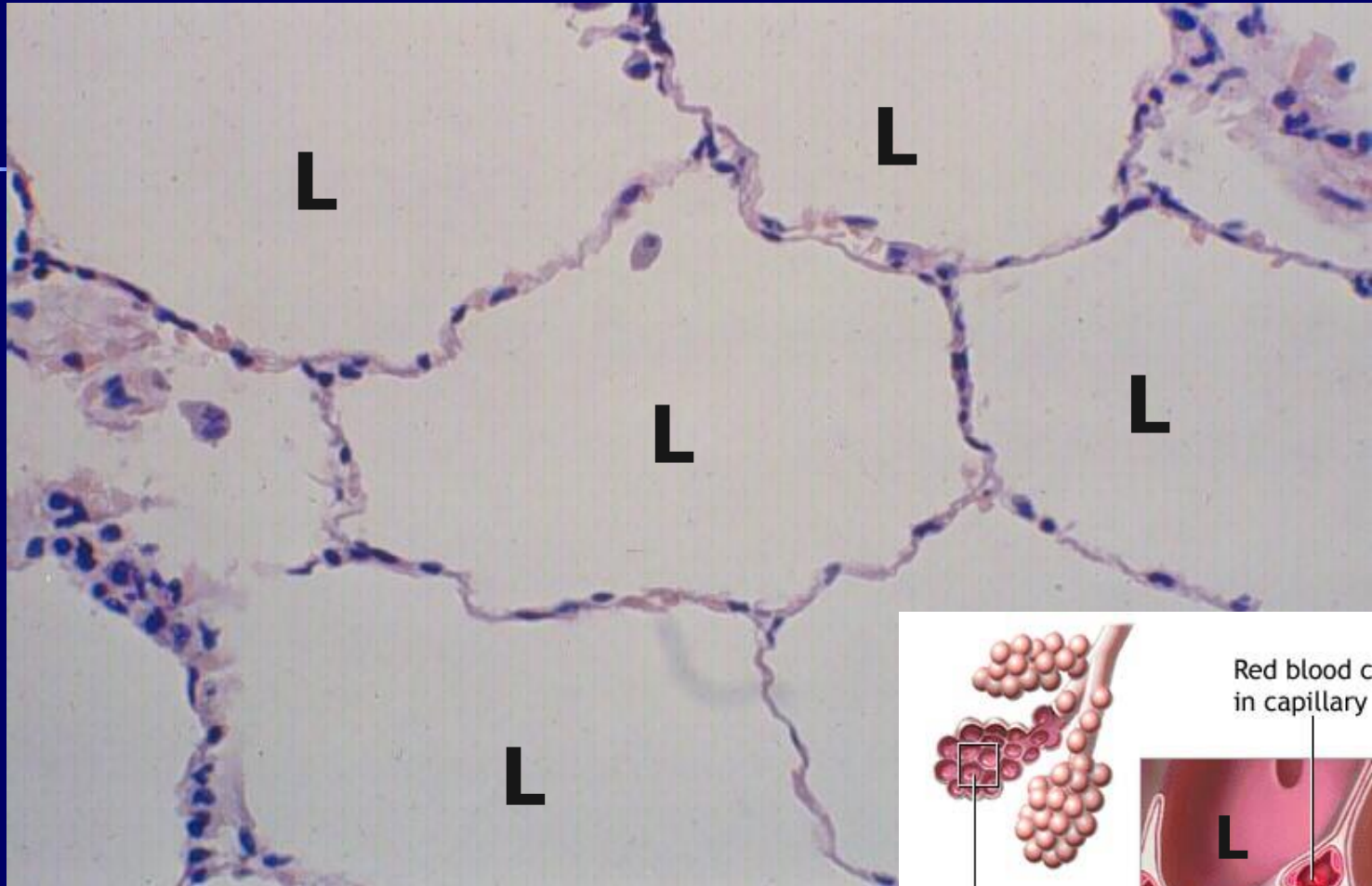


Air sacs of lung tissue

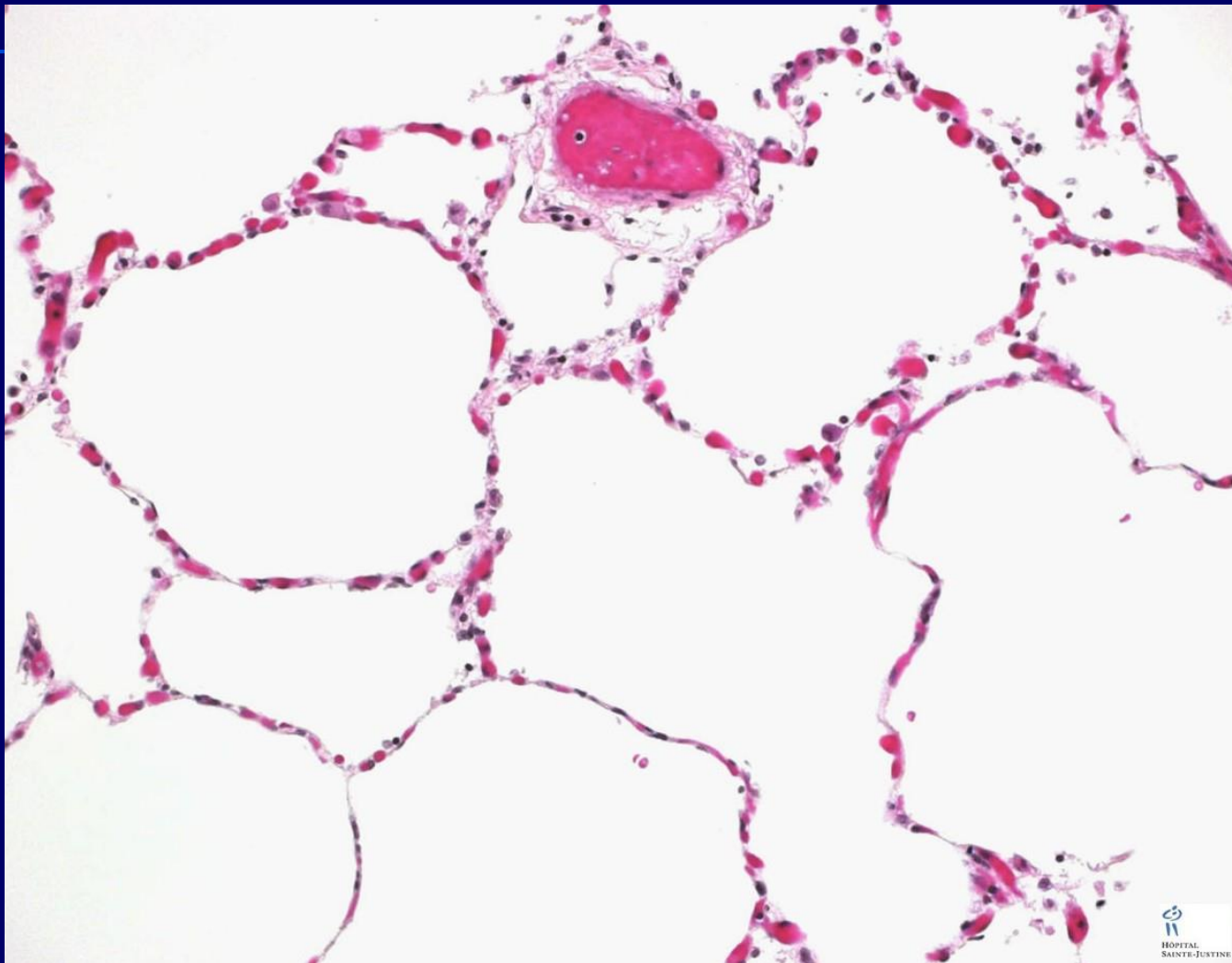
Nuclei of squamous epithelial cells

Photomicrograph: Simple squamous epithelium forming part of the alveolar (air sac) walls (125x).

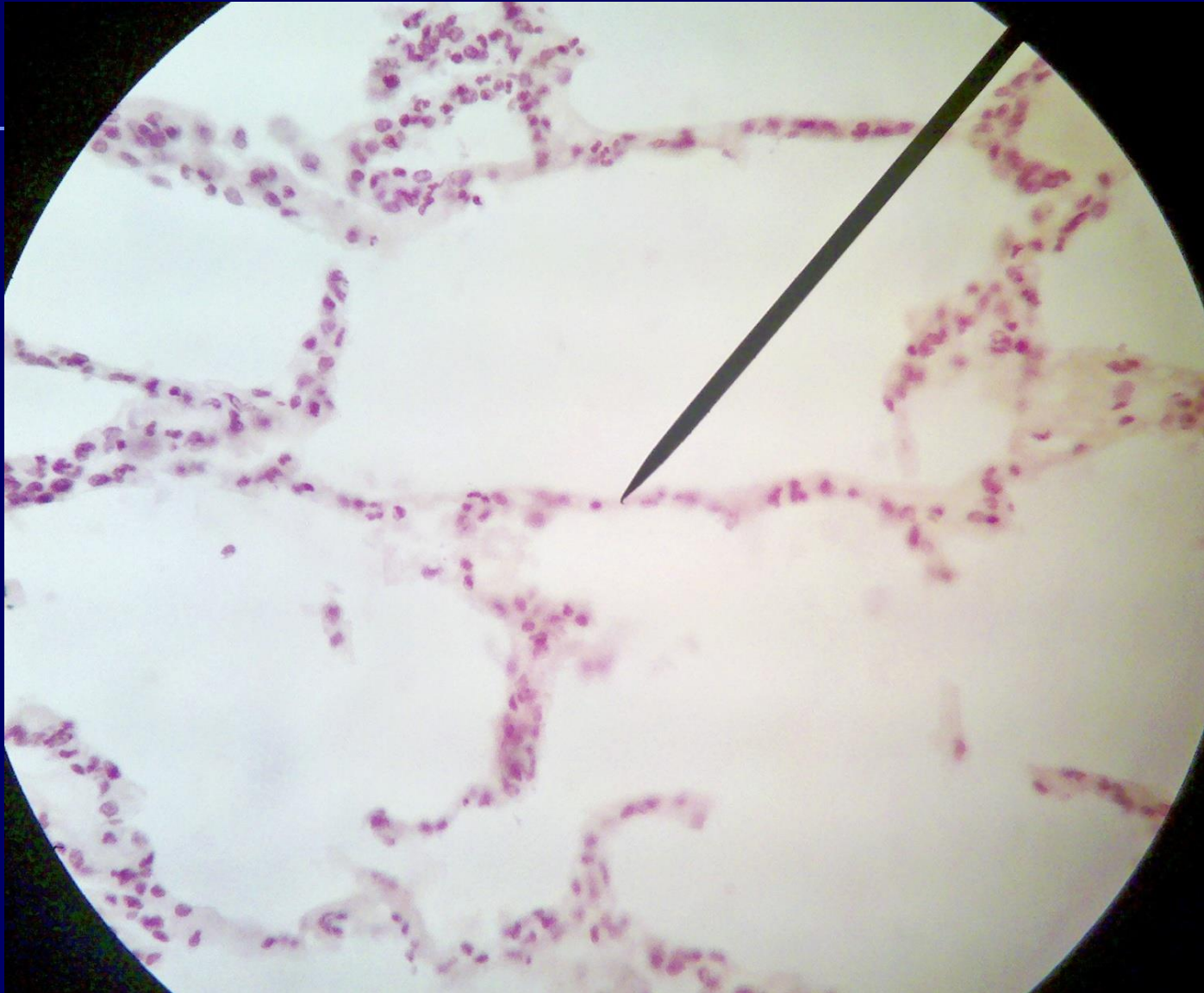
Simple Squamous Epithelium



Simple Squamous Epithelium

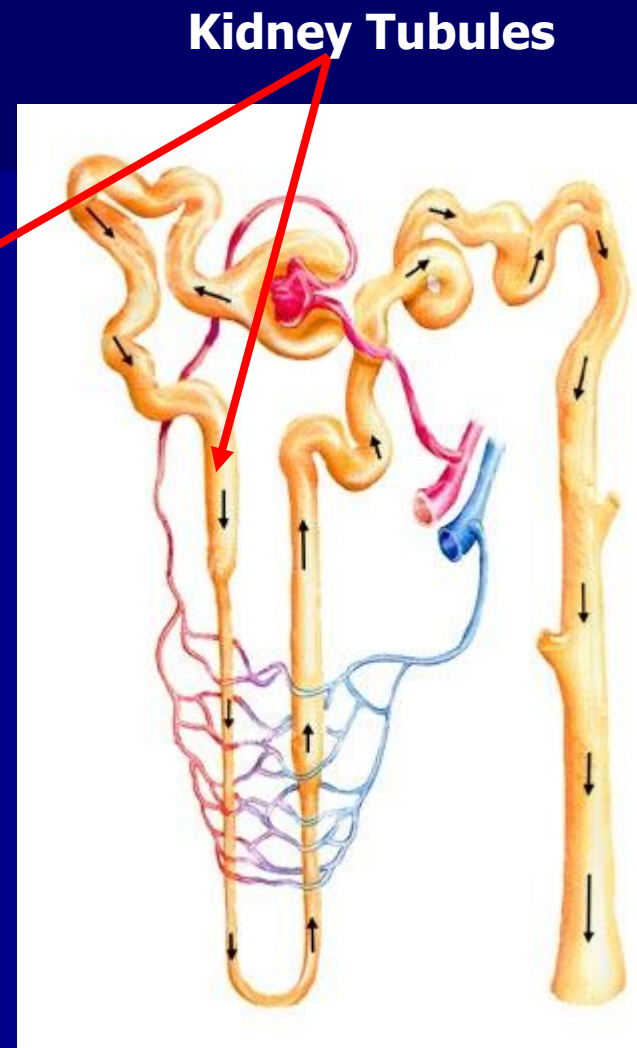
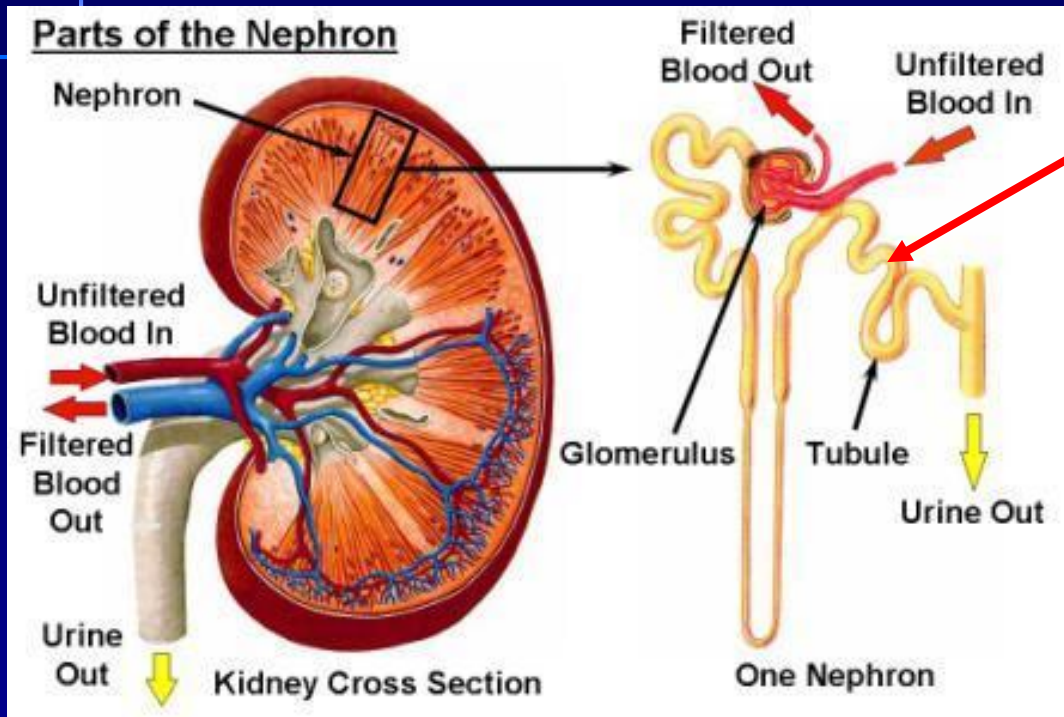


Simple Squamous Epithelium



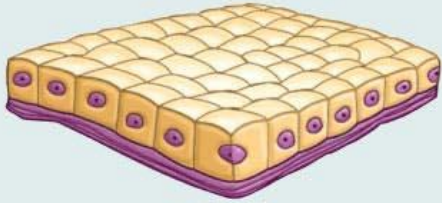
Simple Cuboidal Epithelium

Kidney Tubules



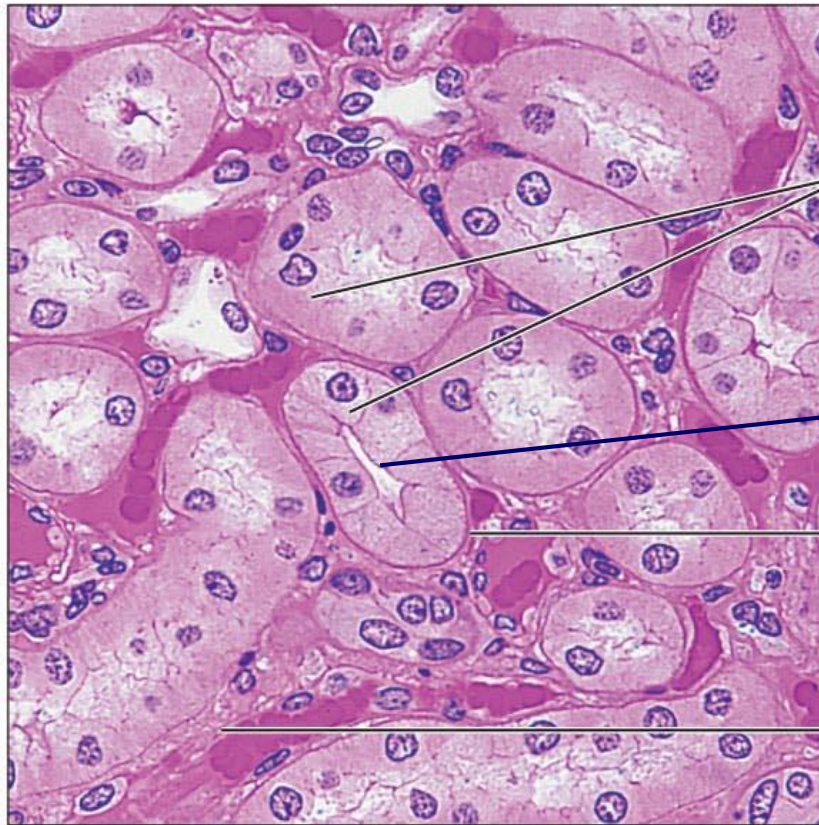
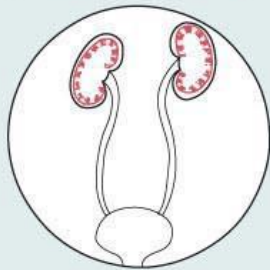
(b) Simple cuboidal epithelium

Description: Single layer of cubelike cells with large, spherical central nuclei.



Function: Secretion and absorption.

Location: Kidney tubules; ducts and secretory portions of small glands; ovary surface.



Simple cuboidal epithelial cells

Apical surface

Basement membrane

Connective tissue

Photomicrograph: Simple cuboidal epithelium in kidney tubules (430x).

This histological image shows a cross-section of a glandular structure, likely a duct or acinus. The central feature is a cluster of cells, each containing a large, clear, circular space labeled 'L', representing a lumen. The cells are arranged in a circular pattern around this central space. The apical surface of the cells, which is the surface closest to the lumen, is highlighted by a blue line and labeled 'Apical Surface'. The entire cluster of cells is enclosed by a red line, which represents the basement membrane, labeled 'Basement Membrane'. The surrounding tissue, which is less dense and more fibrous, is labeled 'Connective Tissue'.

Connective Tissue

Apical Surface

Basement Membrane

L

L

L

L

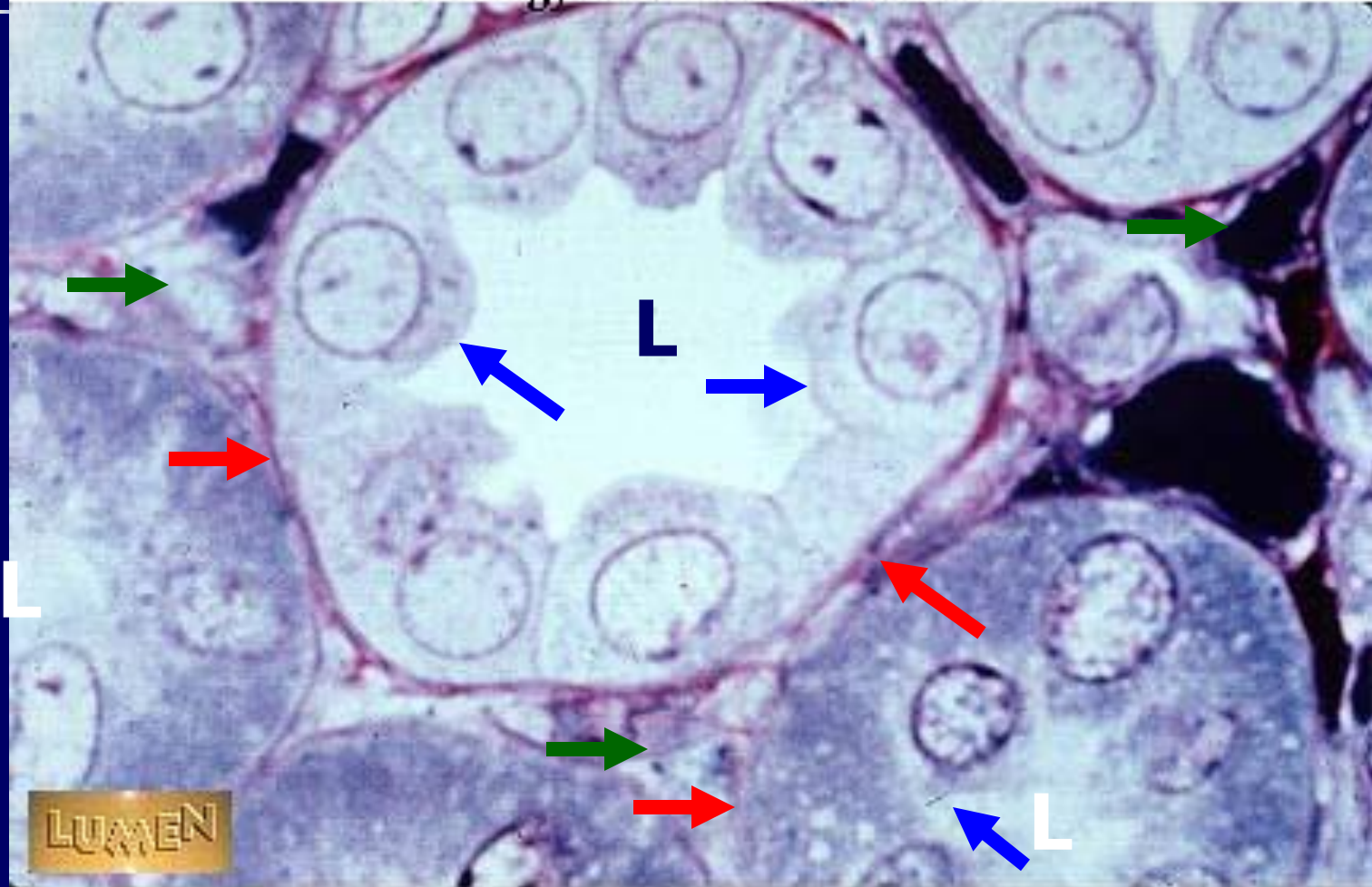
L

L

L

Simple Cuboidal Epithelium

Histology Lab Part 1: Slide 7

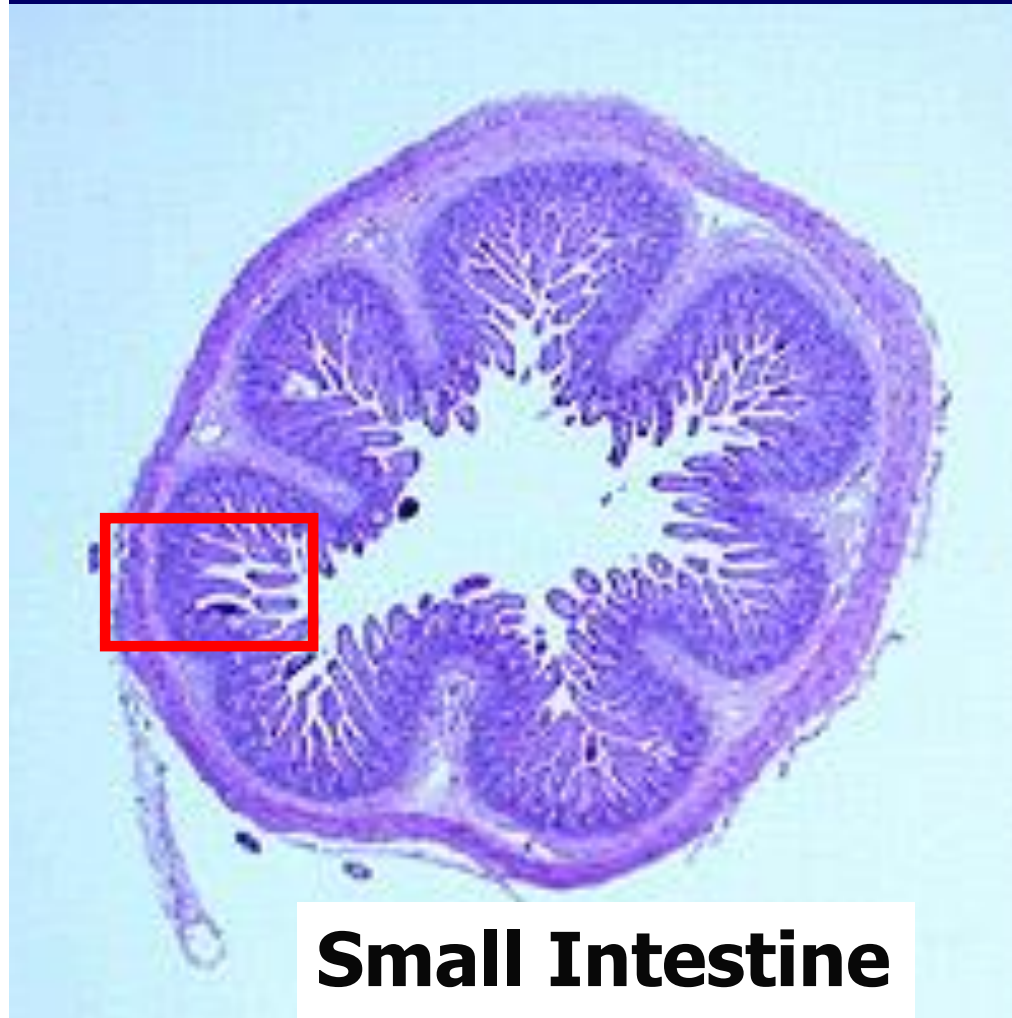


Simple Cuboidal Epithelium



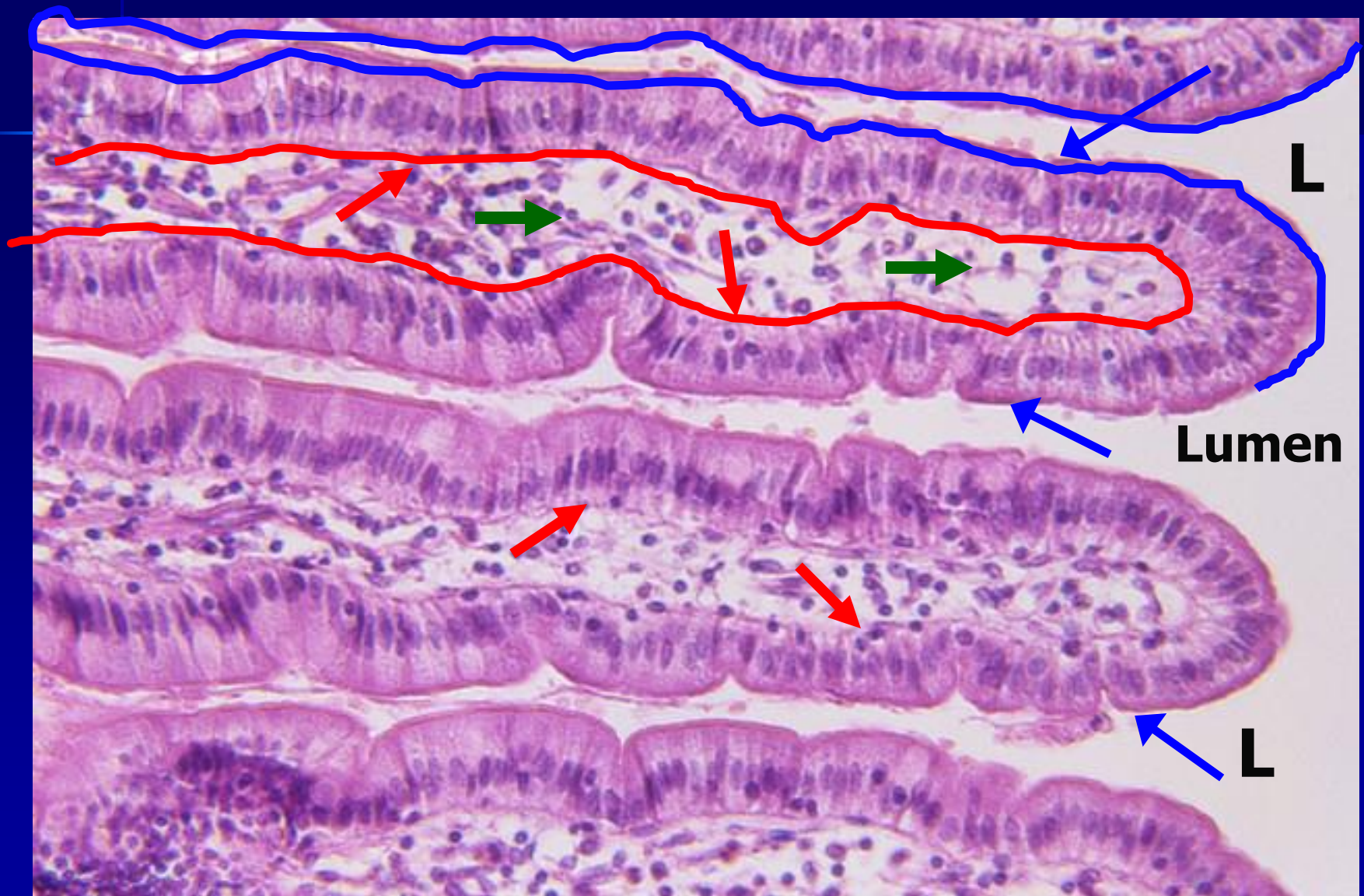
Simple Columnar Epithelium

Small Intestine

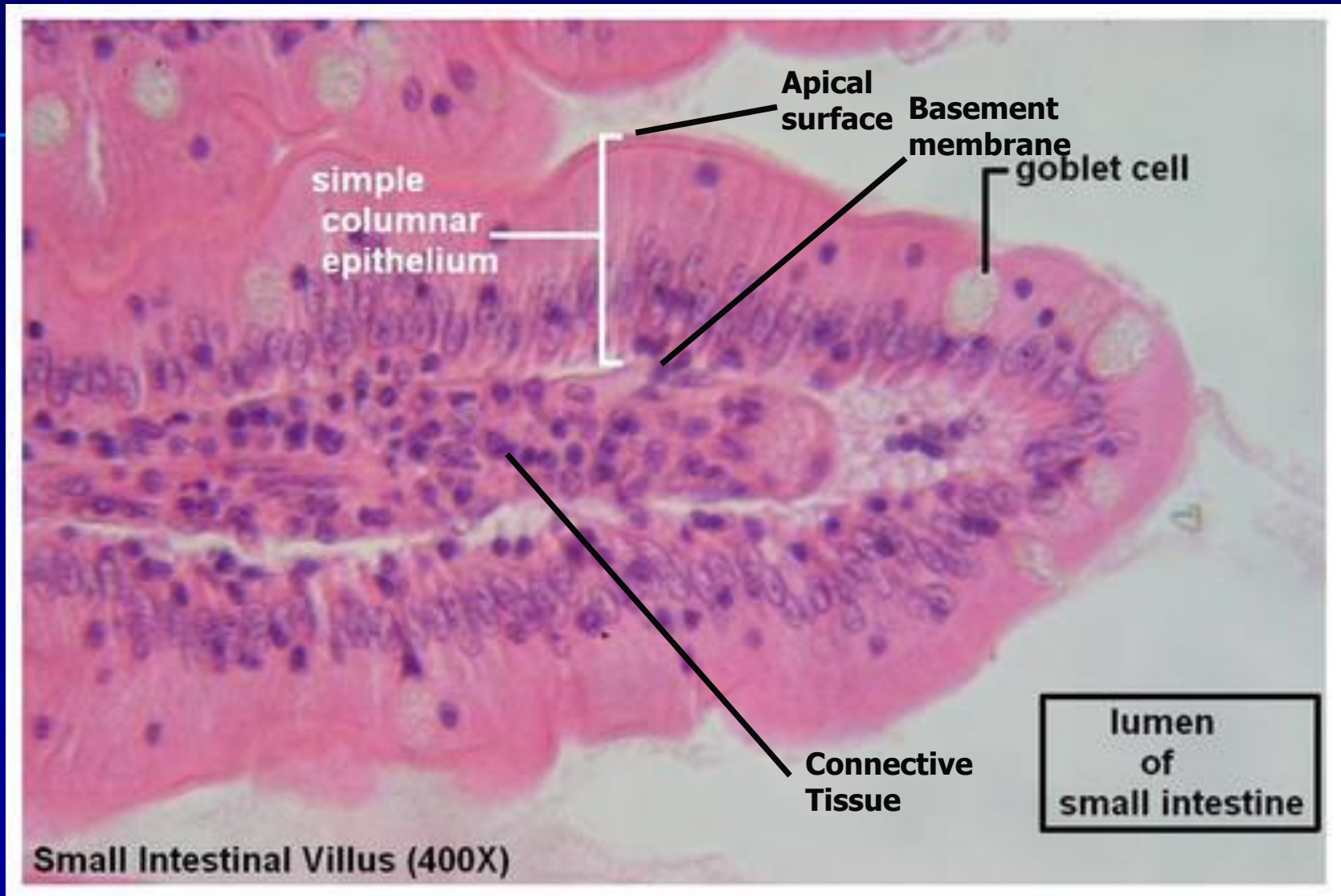


**Small Intestine
Cross Section**

Simple Columnar Epithelium

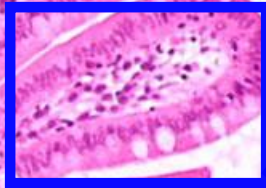


Simple Columnar Epithelium

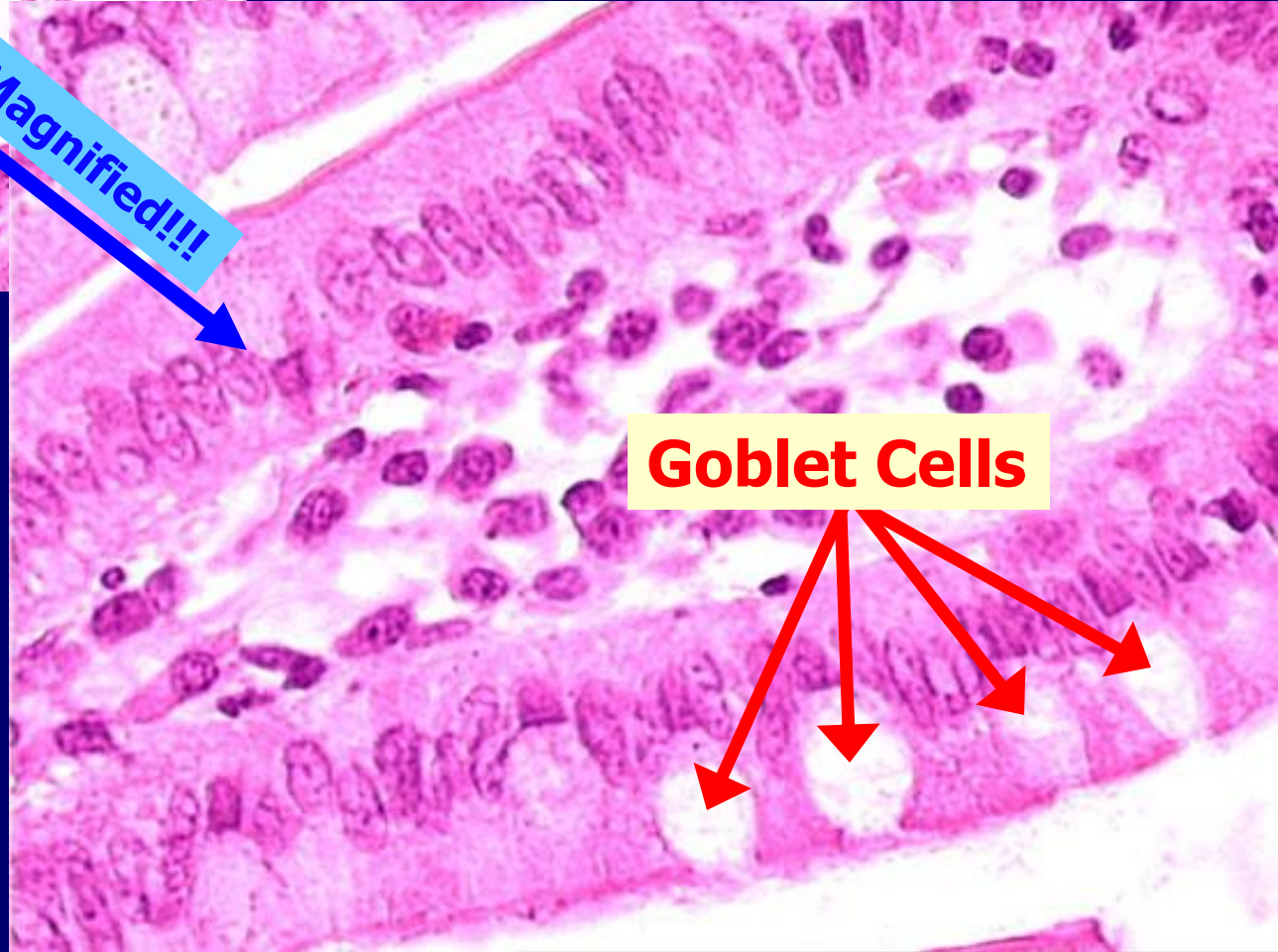


Goblet Cells

(mucus producing cell)



Magnified!!!



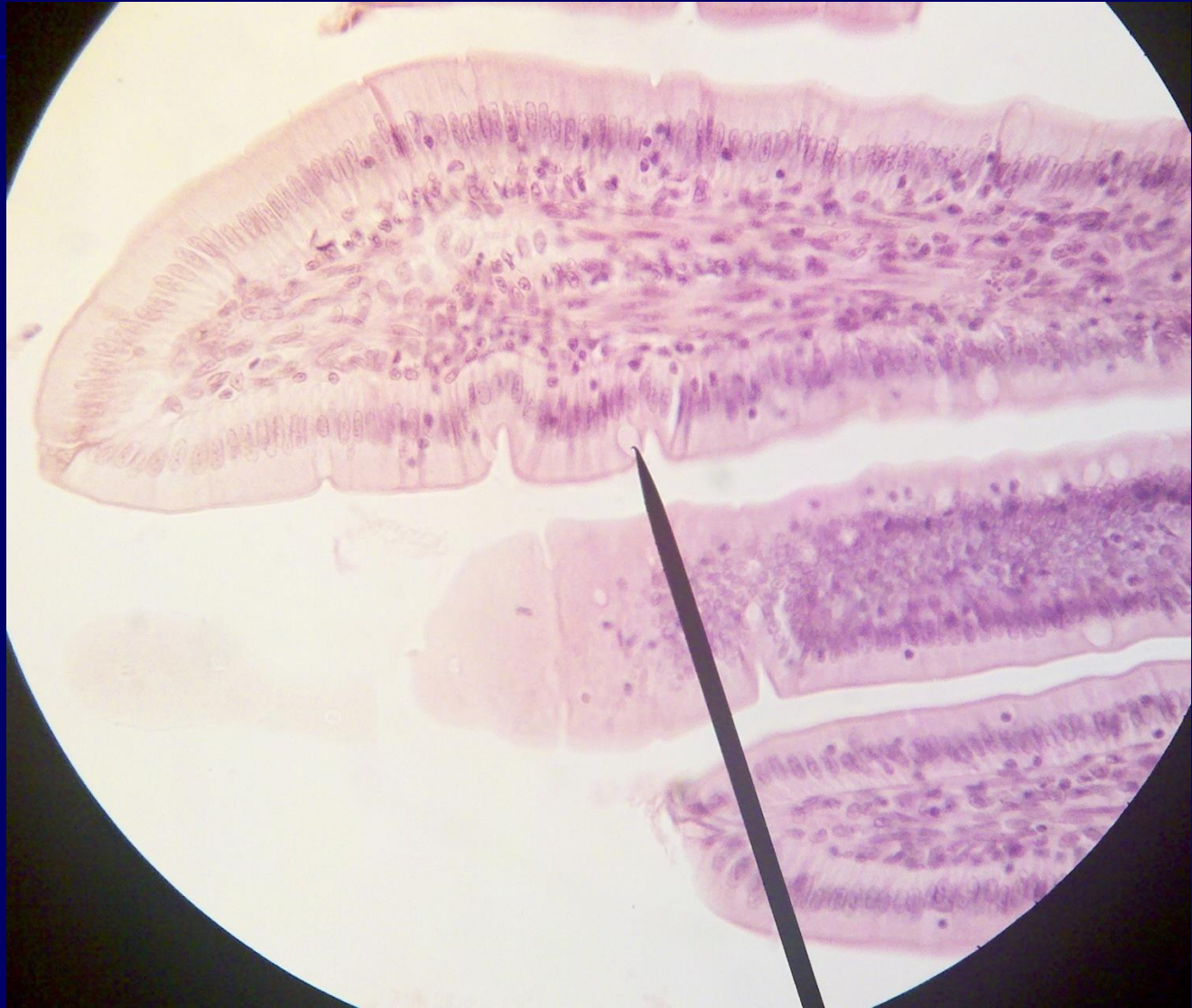
Goblet Cells



Simple Columnar Epithelium: pointer is on the basement membrane

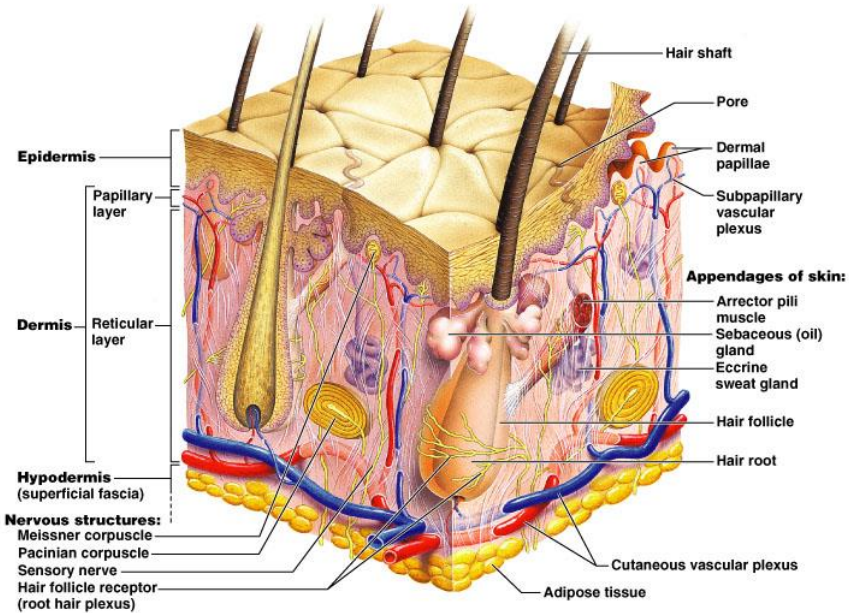


Simple Columnar Epithelium: pointer is on a goblet cell

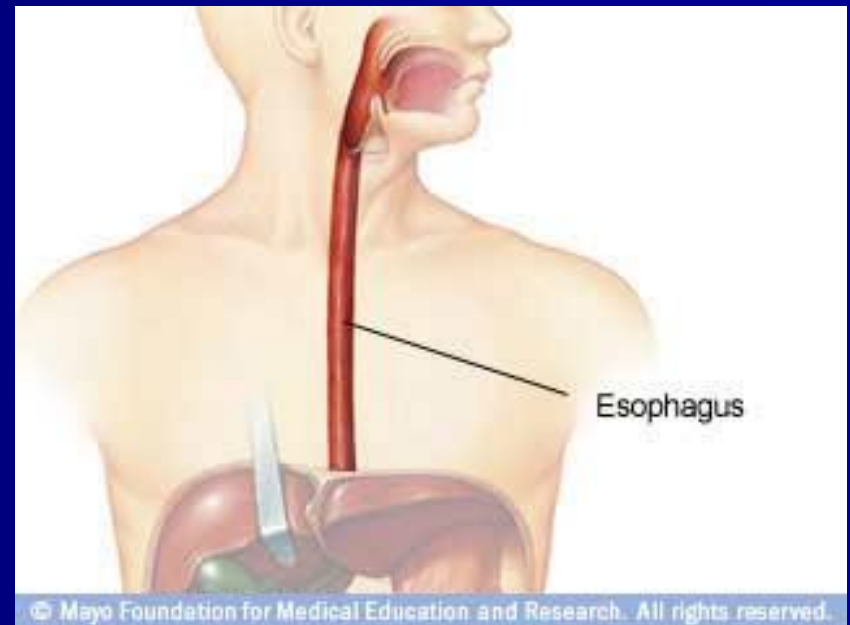


Stratified Squamous Epithelium

Skin

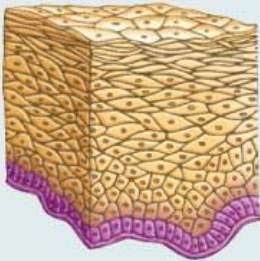


Mouth & Esophagus



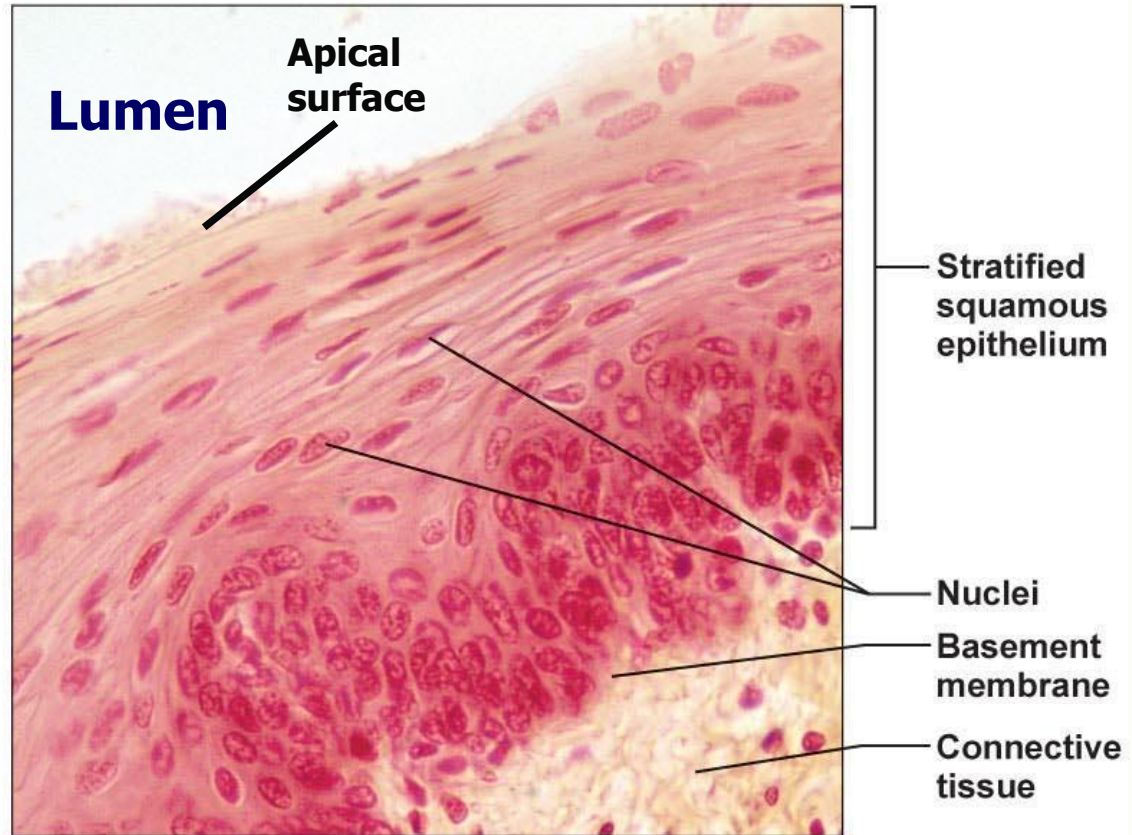
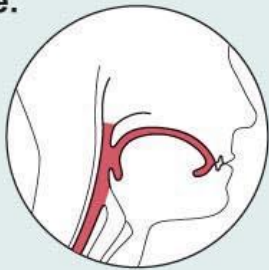
(e) Stratified squamous epithelium

Description: Thick membrane composed of several cell layers; basal cells are cuboidal or columnar and metabolically active; surface cells are flattened (squamous); in the keratinized type, the surface cells are full of keratin and dead; basal cells are active in mitosis and produce the cells of the more superficial layers.



Function: Protects underlying tissues in areas subjected to abrasion.

Location: Nonkeratinized type forms the moist linings of the esophagus, mouth, and vagina; keratinized variety forms the epidermis of the skin, a dry membrane.

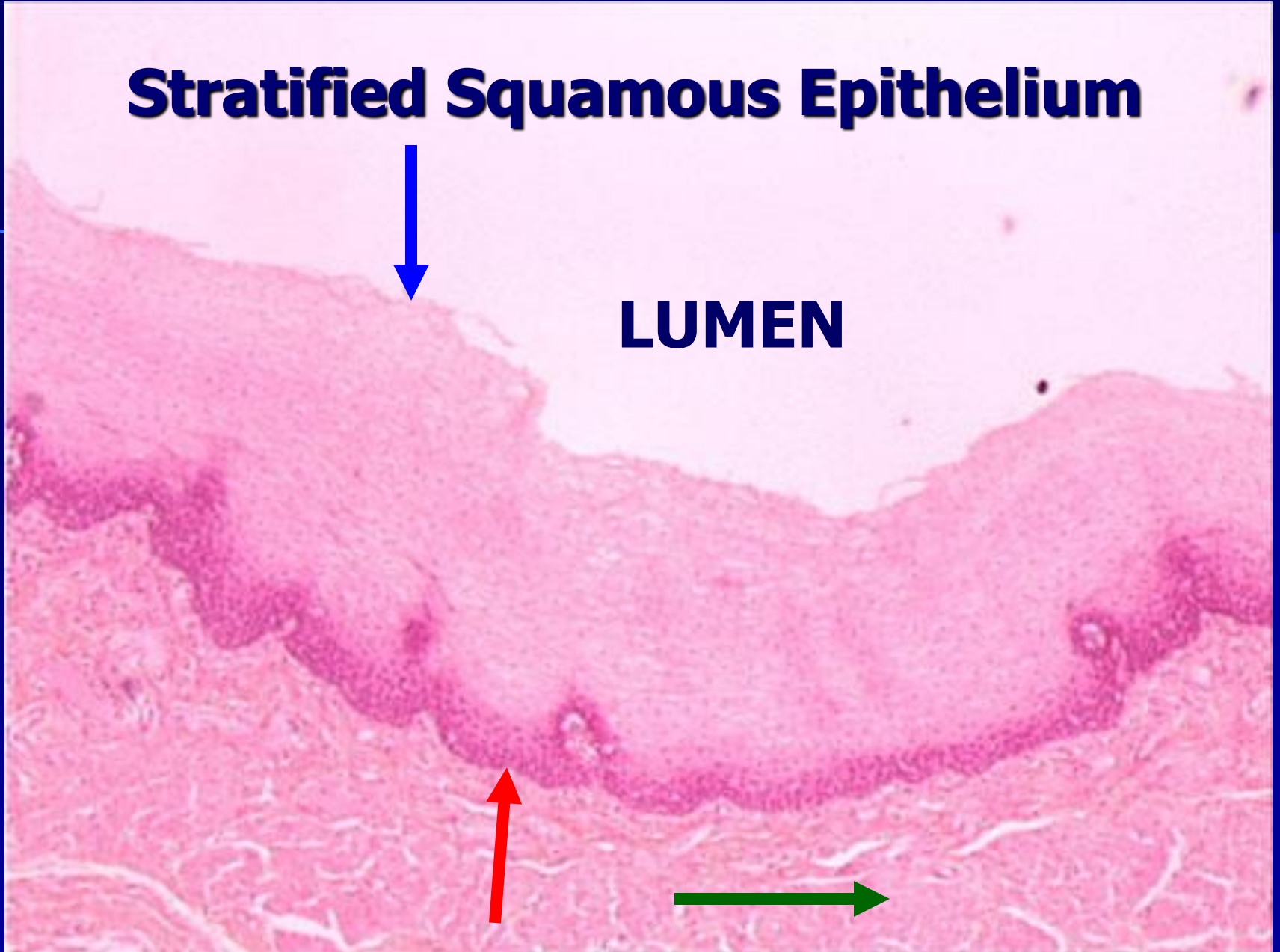


Photomicrograph: Stratified squamous epithelium lining the esophagus (285x).

Stratified Squamous Epithelium

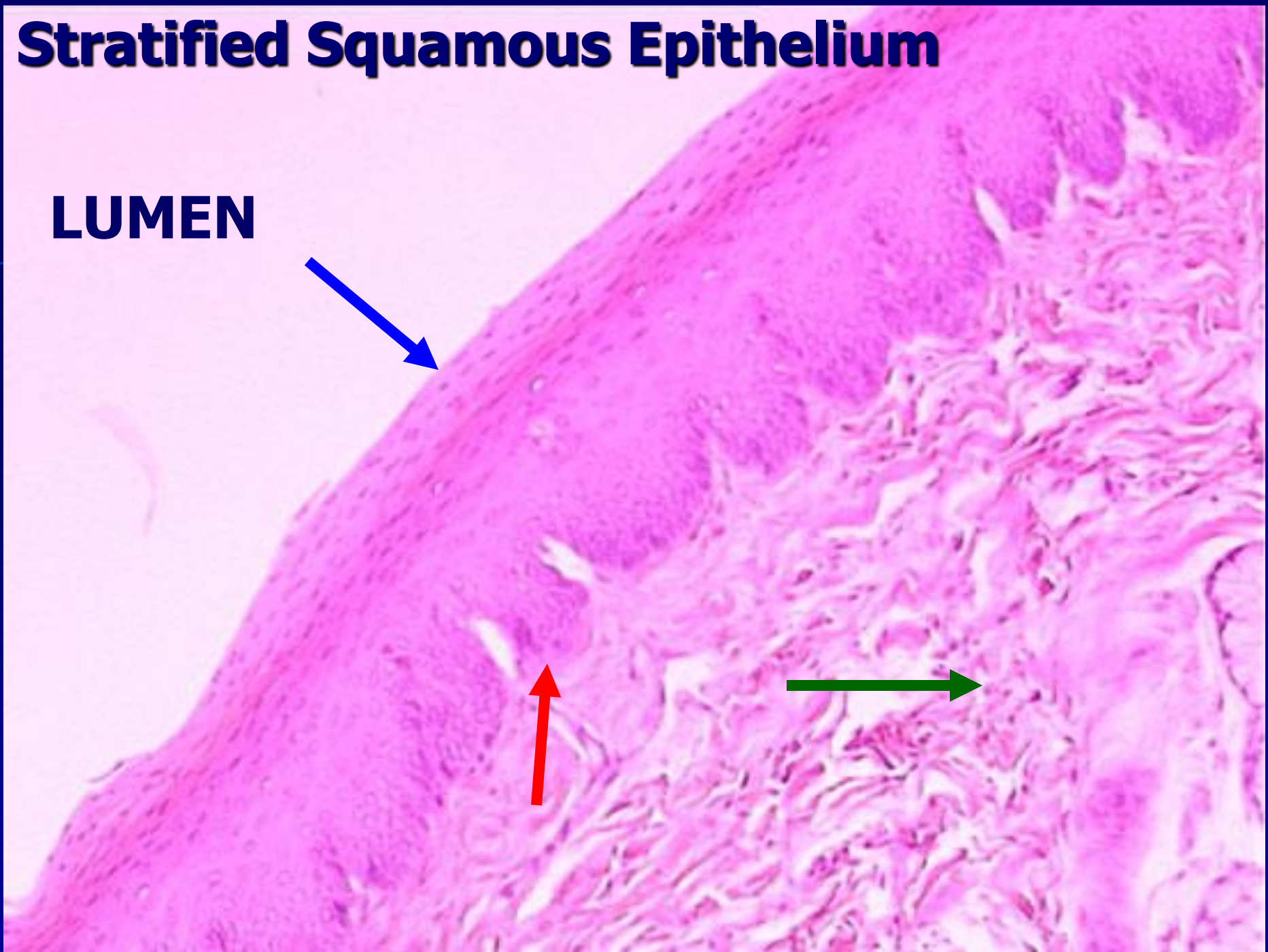


LUMEN

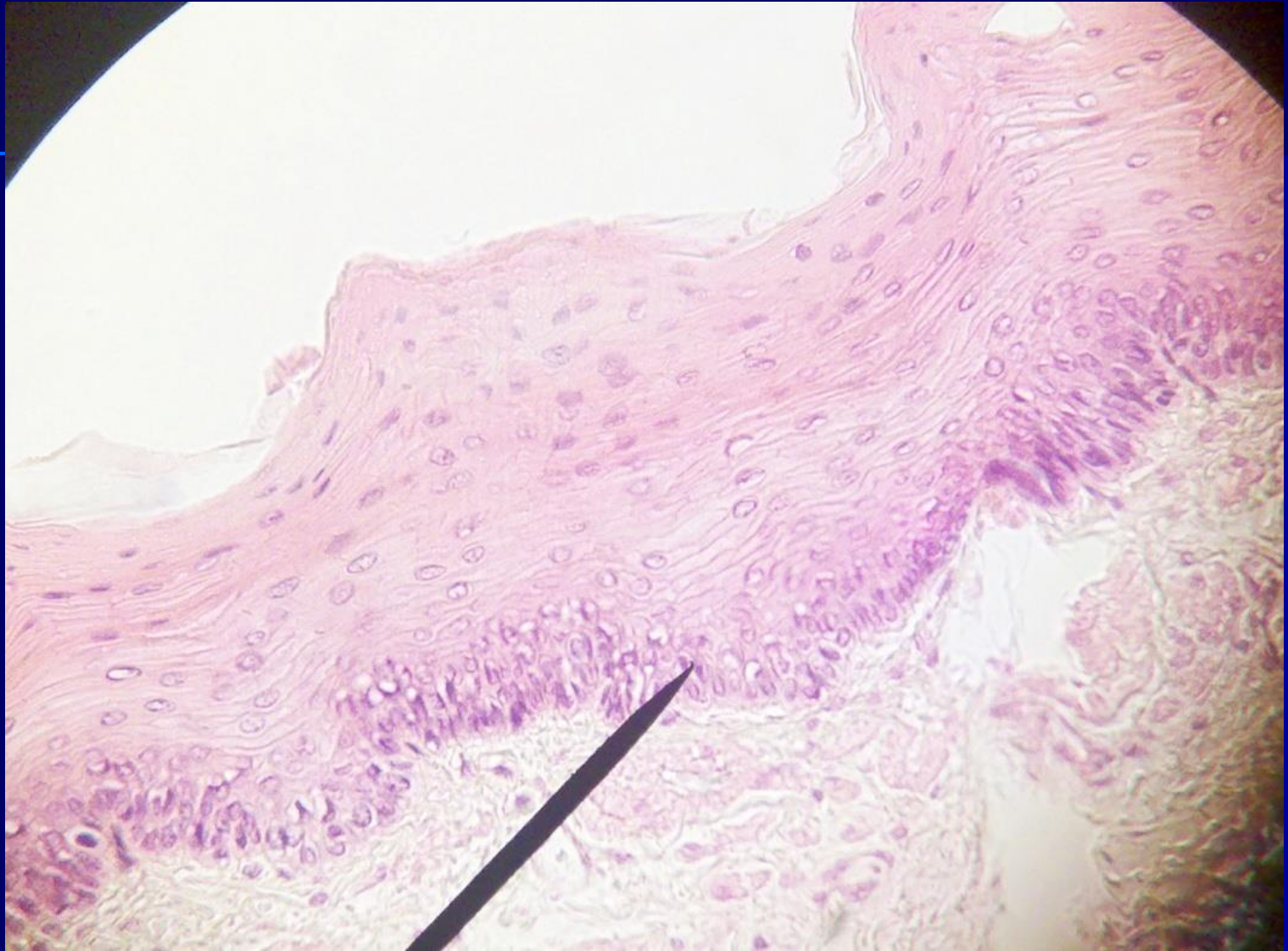


Stratified Squamous Epithelium

LUMEN

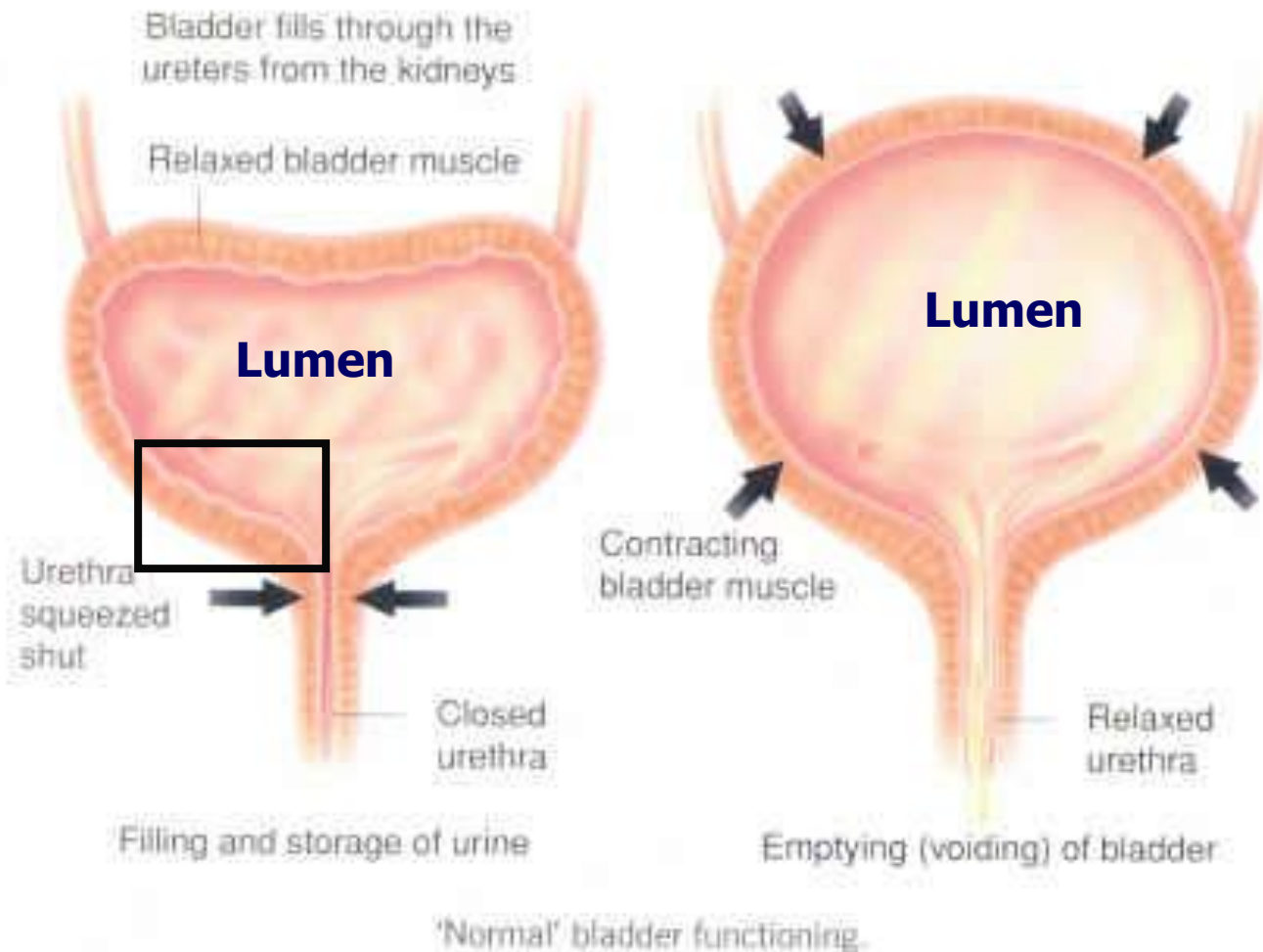


Stratified Squamous Epithelium



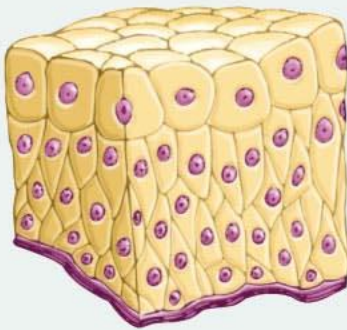
Transitional Epithelium

Urinary Bladder



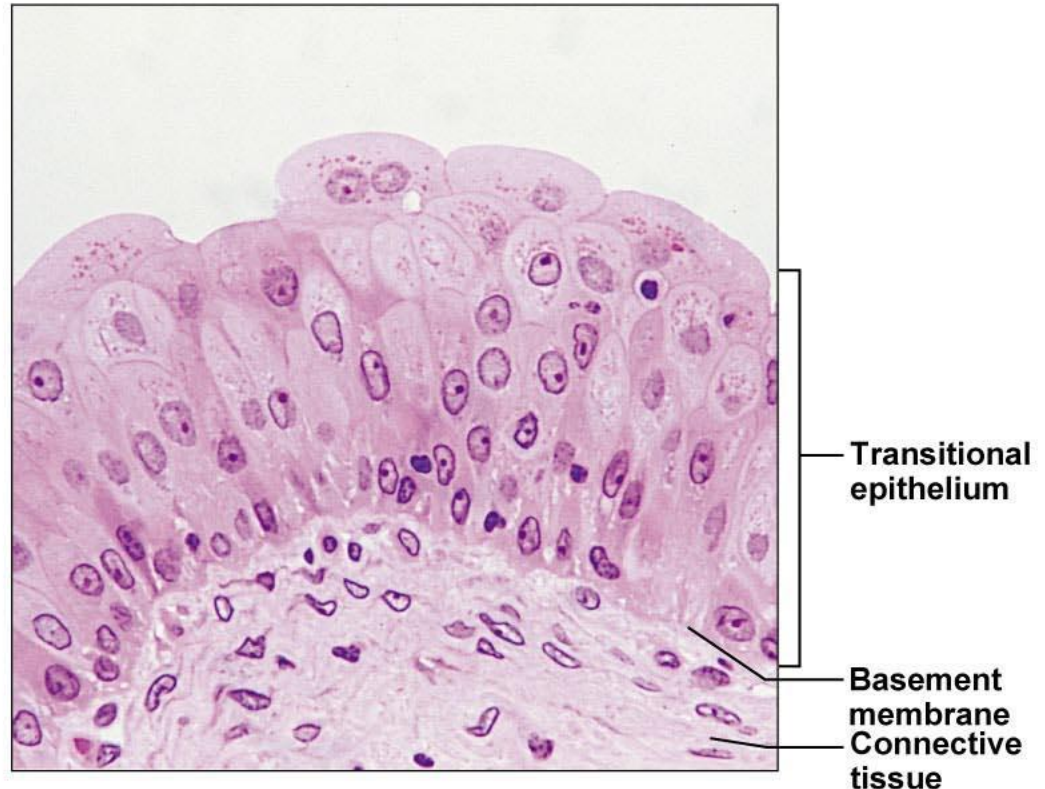
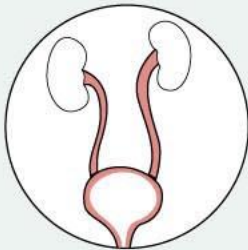
(f) Transitional epithelium

Description: Resembles both stratified squamous and stratified cuboidal; basal cells cuboidal or columnar; surface cells dome shaped or squamouslike, depending on degree of organ stretch.



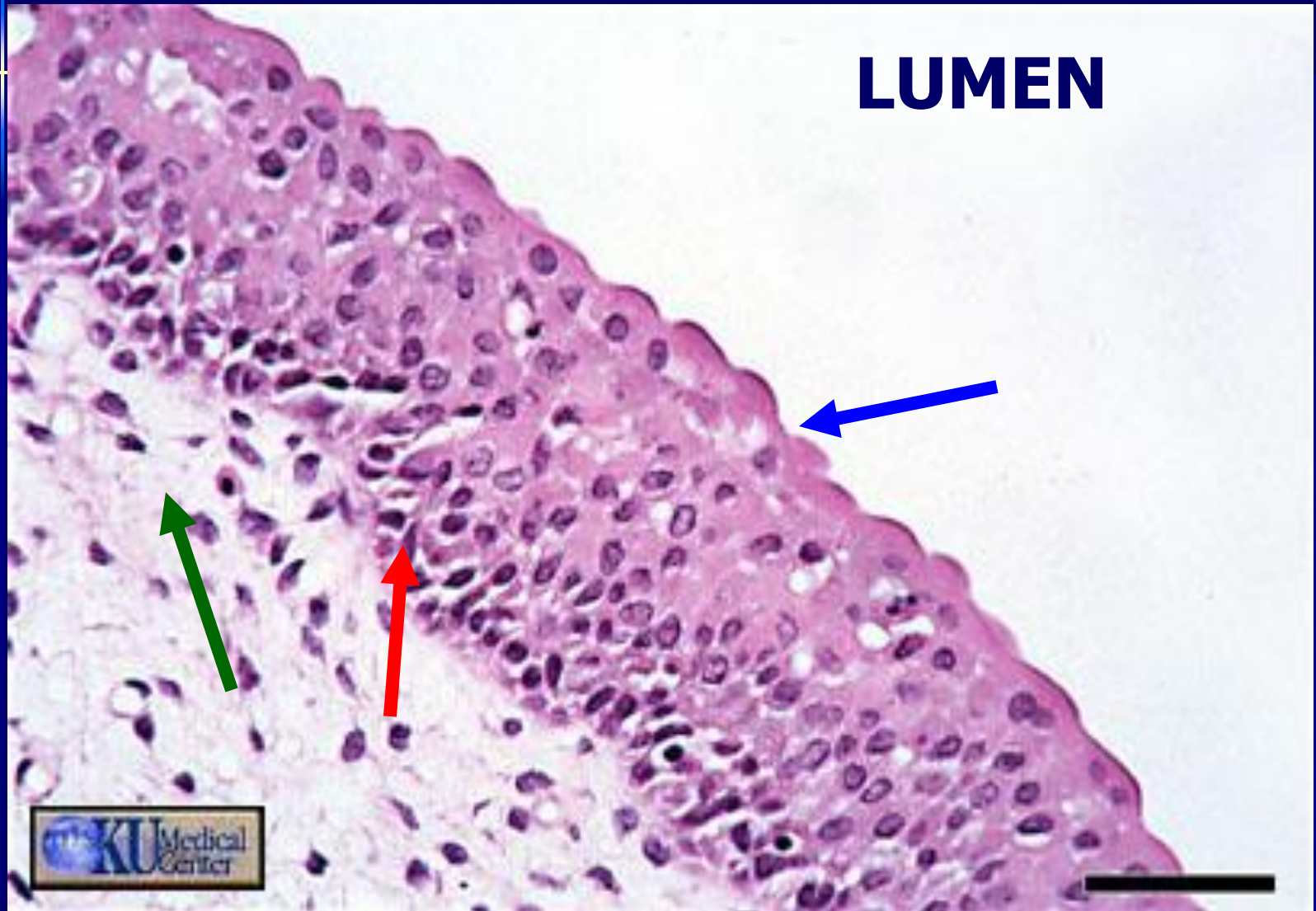
Function: Stretches readily and permits distension of urinary organ by contained urine.

Location: Lines the ureters, urinary bladder, and part of the urethra.

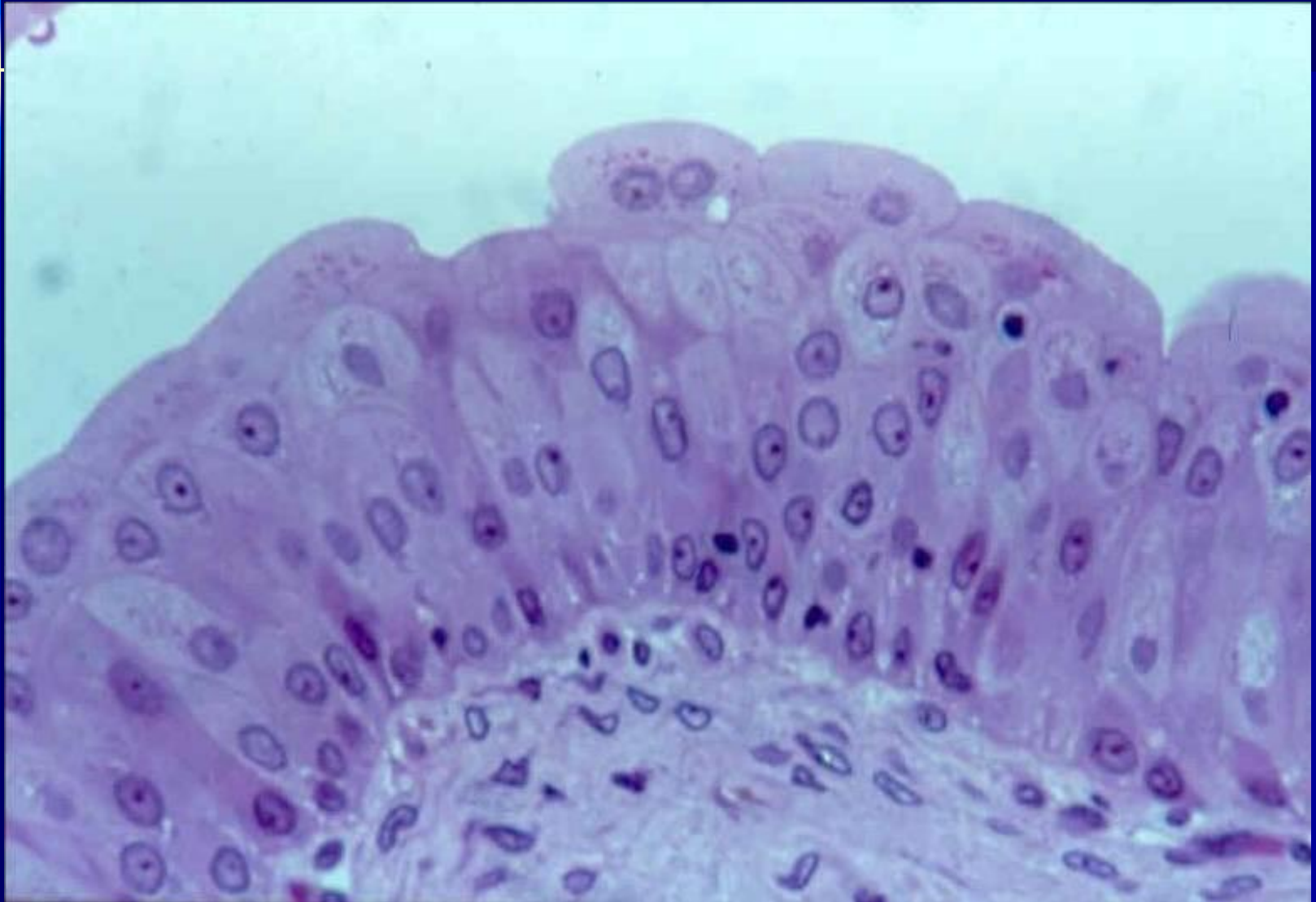


Photomicrograph: Transitional epithelium lining the urinary bladder, relaxed state (360X); note the bulbous, or rounded, appearance of the cells at the surface; these cells flatten and become elongated when the bladder is filled with urine.

Transitional Epithelium



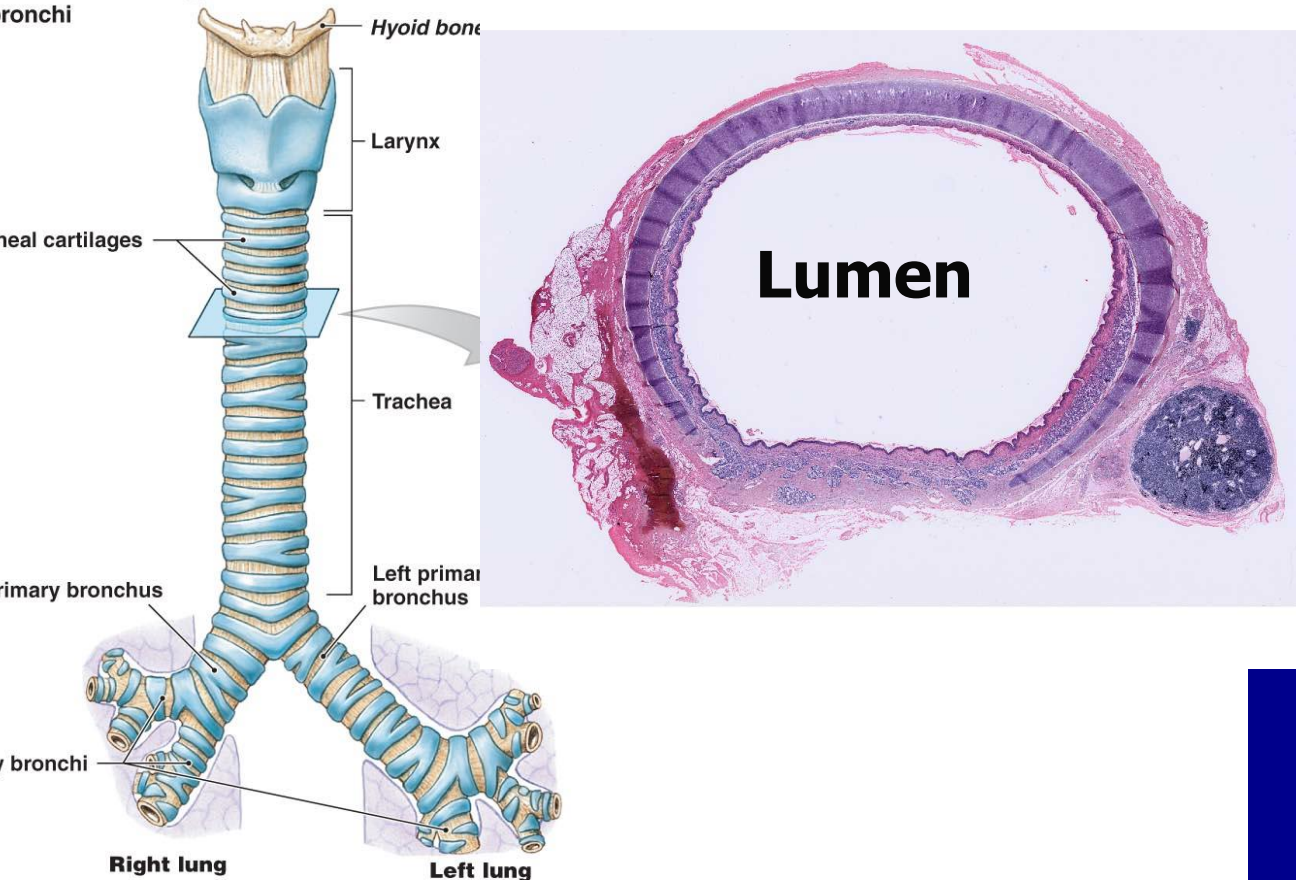
Transitional Epithelium



Pseudostratified Ciliated Columnar Epithelium

The structure of the trachea and primary bronchi

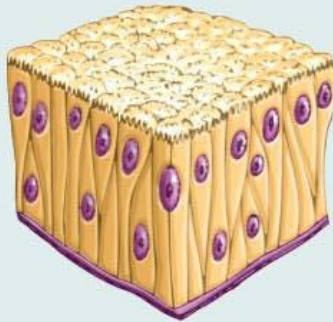
Division of the trachea within the
thorax to form the right and left
primary bronchi



Trachea

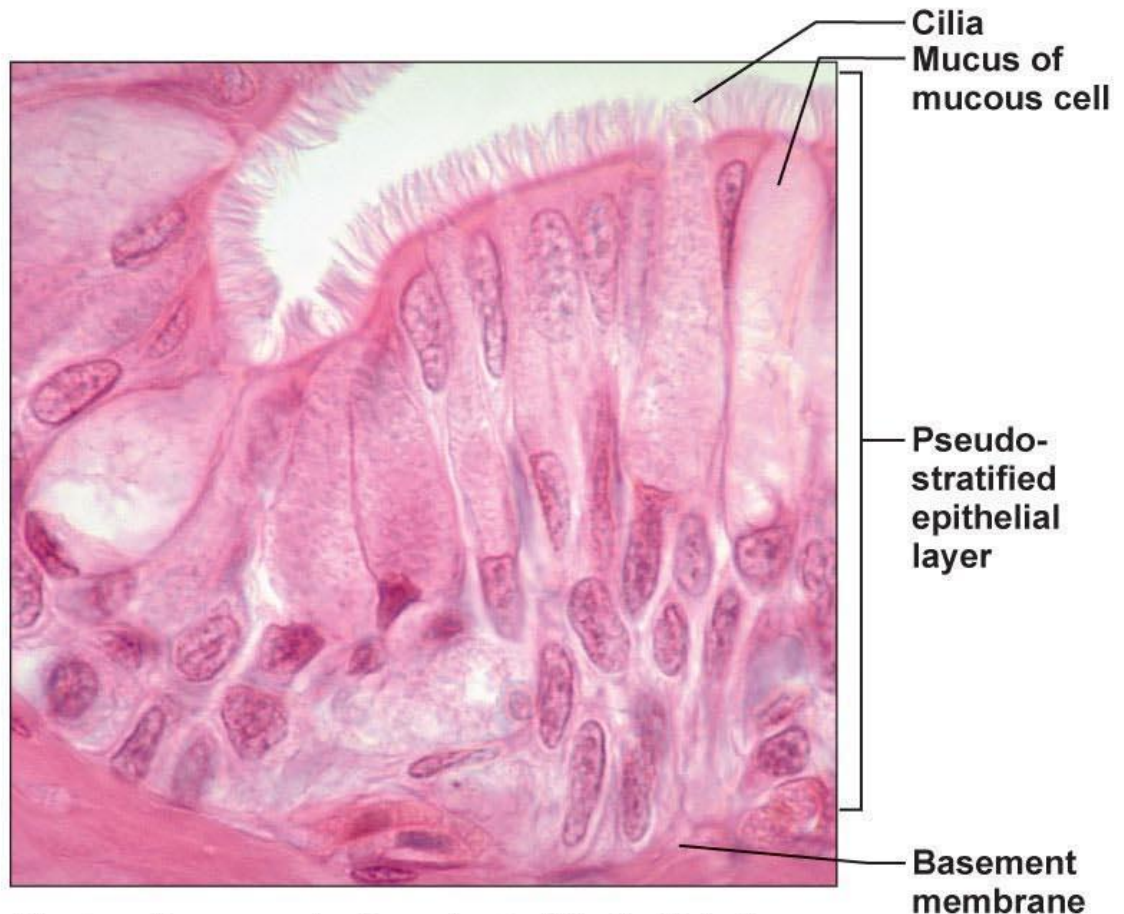
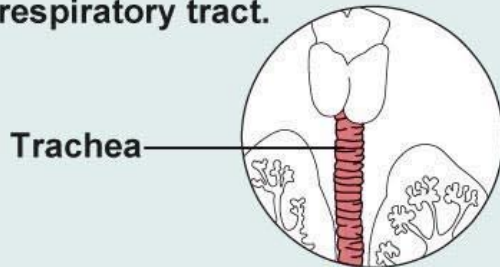
(d) Pseudostratified columnar epithelium

Description: Single layer of cells of differing heights, some not reaching the free surface; nuclei seen at different levels; may contain mucus-secreting cells and bear cilia.



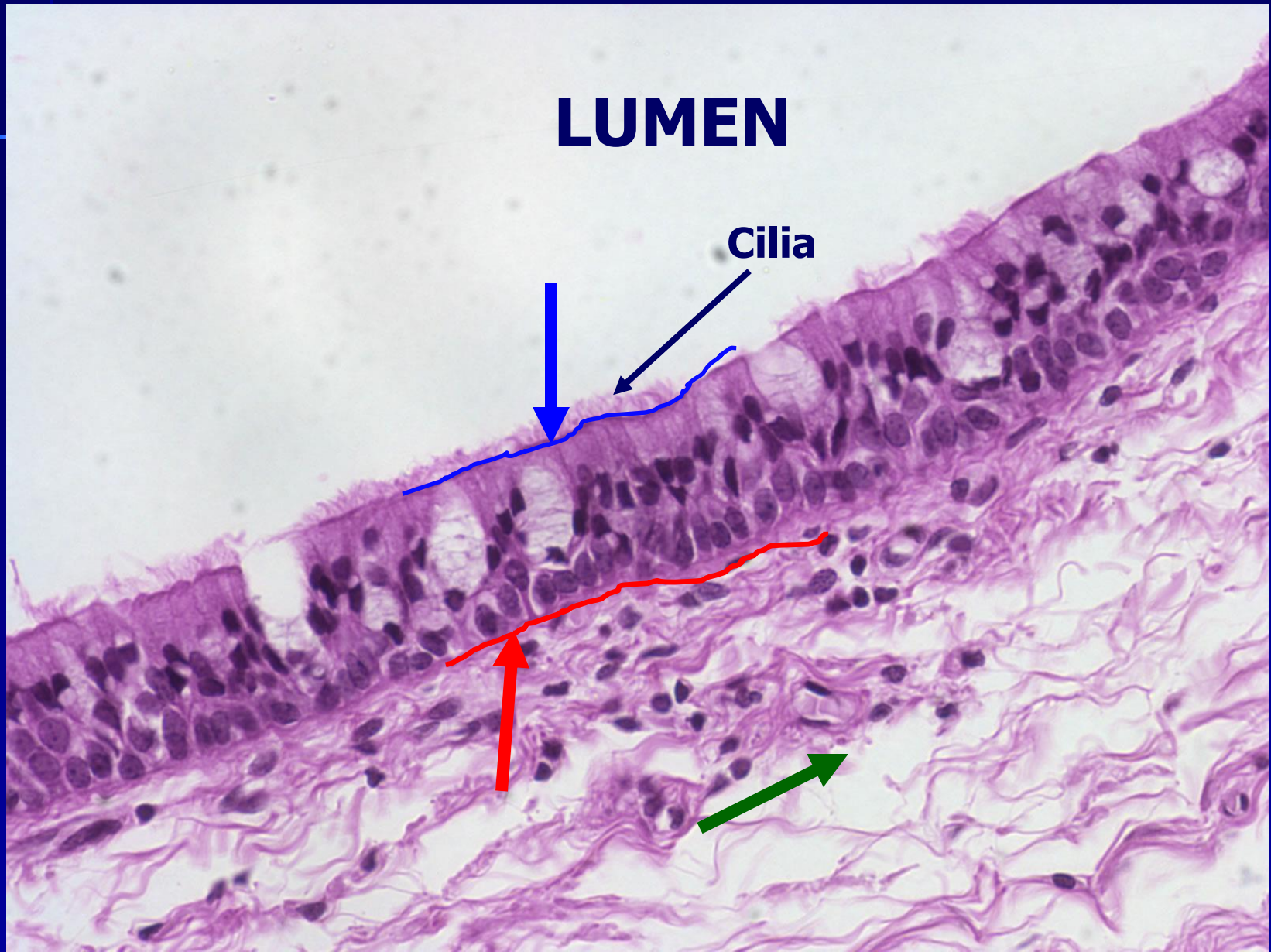
Function: Secretion, particularly of mucus; propulsion of mucus by ciliary action.

Location: Nonciliated type in male's sperm-carrying ducts and ducts of large glands; ciliated variety lines the trachea, most of the upper respiratory tract.

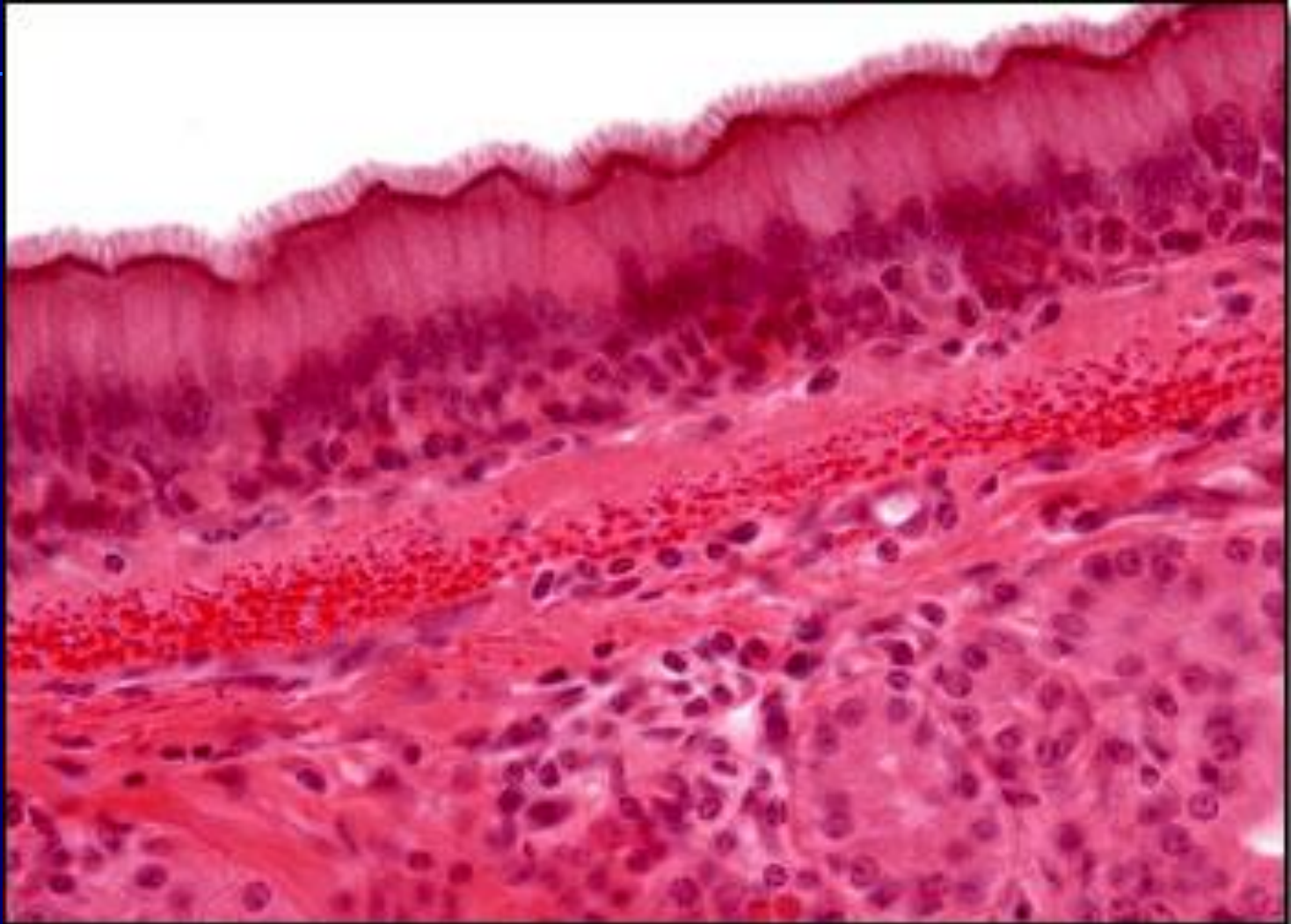


Photomicrograph: Pseudostratified ciliated columnar epithelium lining the human trachea (570x).

Pseudostratified Ciliated Columnar Epithelium



Pseudostratified Ciliated Columnar Epithelium



Pseudostratified Ciliated Columnar Epithelium

