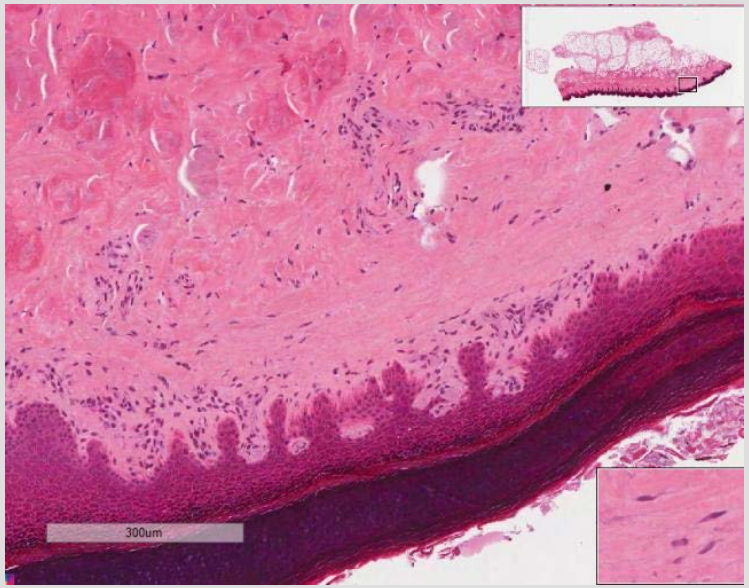
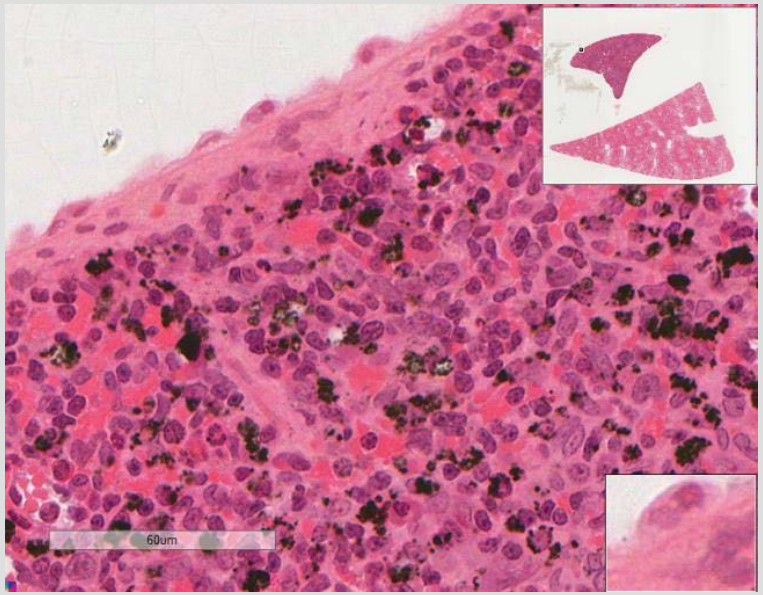
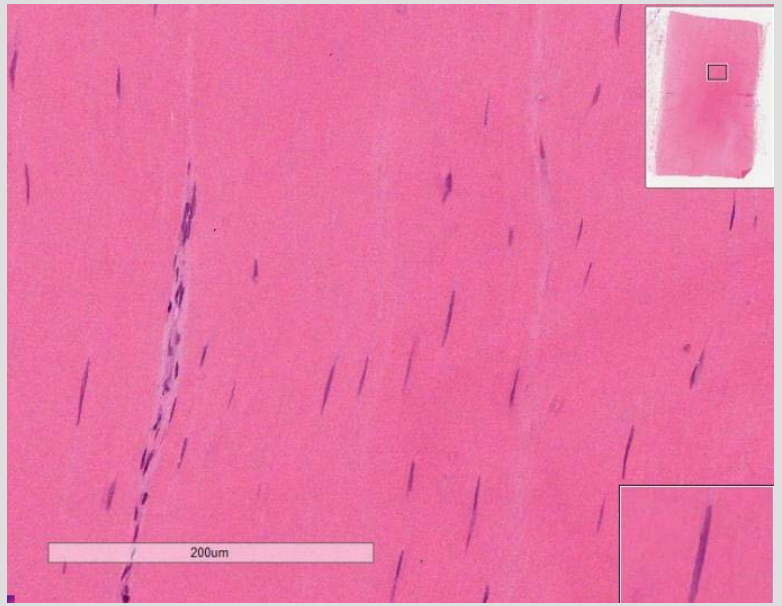
Medical School Histology Basics: Connective Tissue

VIBS 243

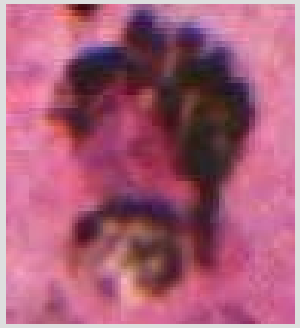






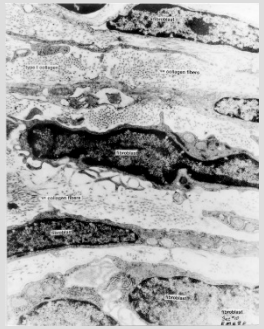
Mast cell

Macrophage



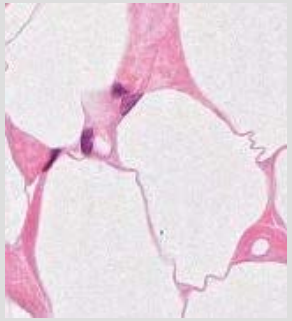
Fibroblasts

Fibroblasts



Plasma cell

Fat cells



Larry Johnson

Texas A&M University

Function of Connective Tissue

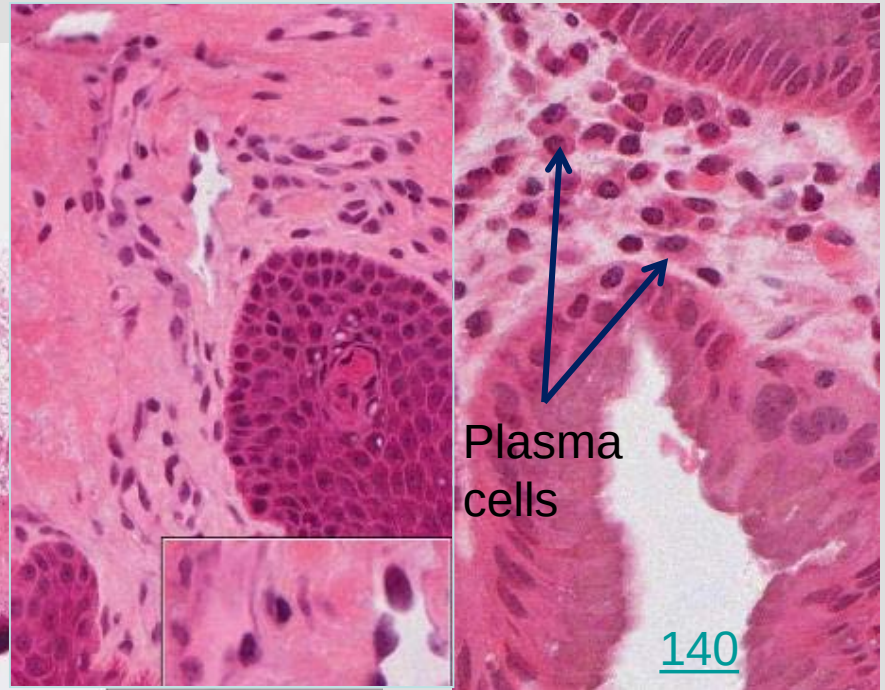
The histological glue which binds the other tissues together to form organs

Mechanical support - stroma below epithelium, skeleton

Metabolite exchange - vascular beds

Energy storage - adipose tissue

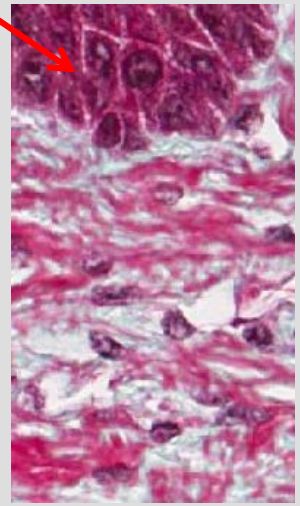
Inflammation - site of action for blood borne immune cells



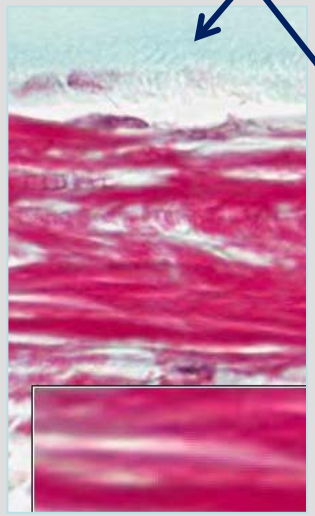
Distinguishing features and histological identification

- Loose connective tissue – sparse collagen and elastic fibers, plentiful cells including fibroblasts, leukocytes
- Dense connective tissue – concentrated collagen, few cells
- Cartilage – avascular homogeneous matrix of collagen and protein-polysaccharides with few cells
- Bone – calcified collagen matrix with few cells trapped in the caves of bone

Epithelium



Loose connective tissue



Dense connective tissue

Cartilage

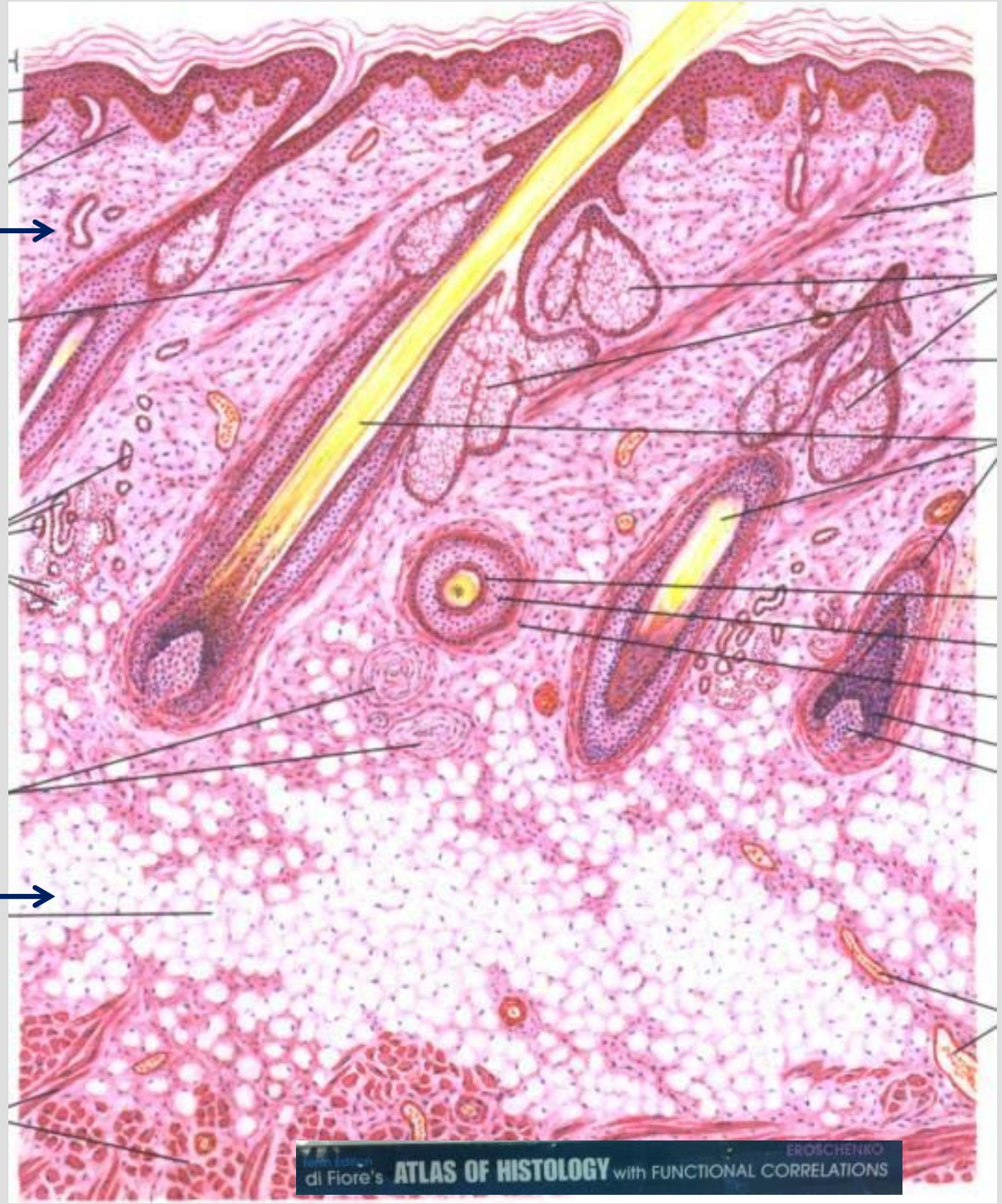
Bone

SKIN

Ref code # 5

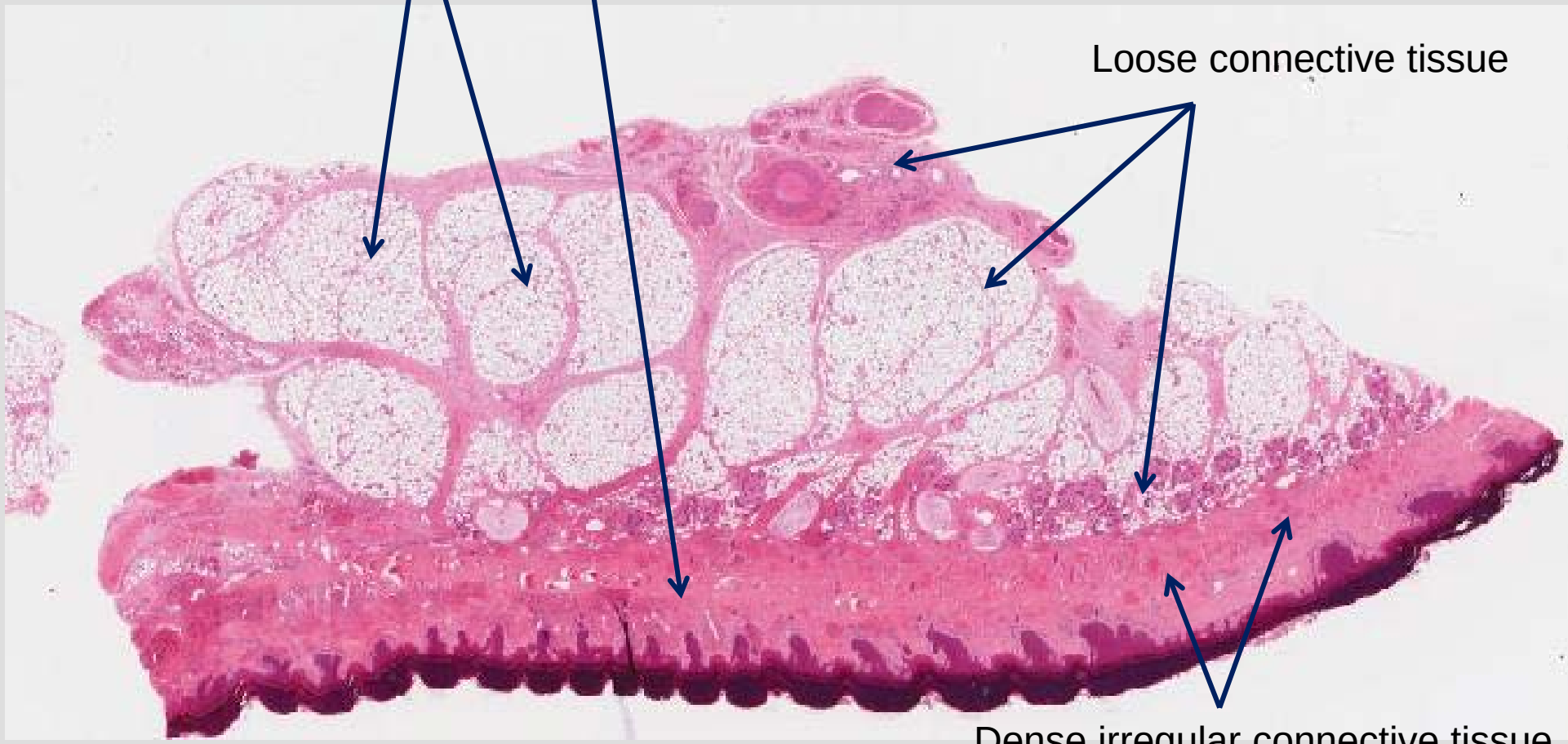
Dense irregular connective tissue
(few cells and lots of fibers)

Loose connective tissue
(lots of cells and few fibers)

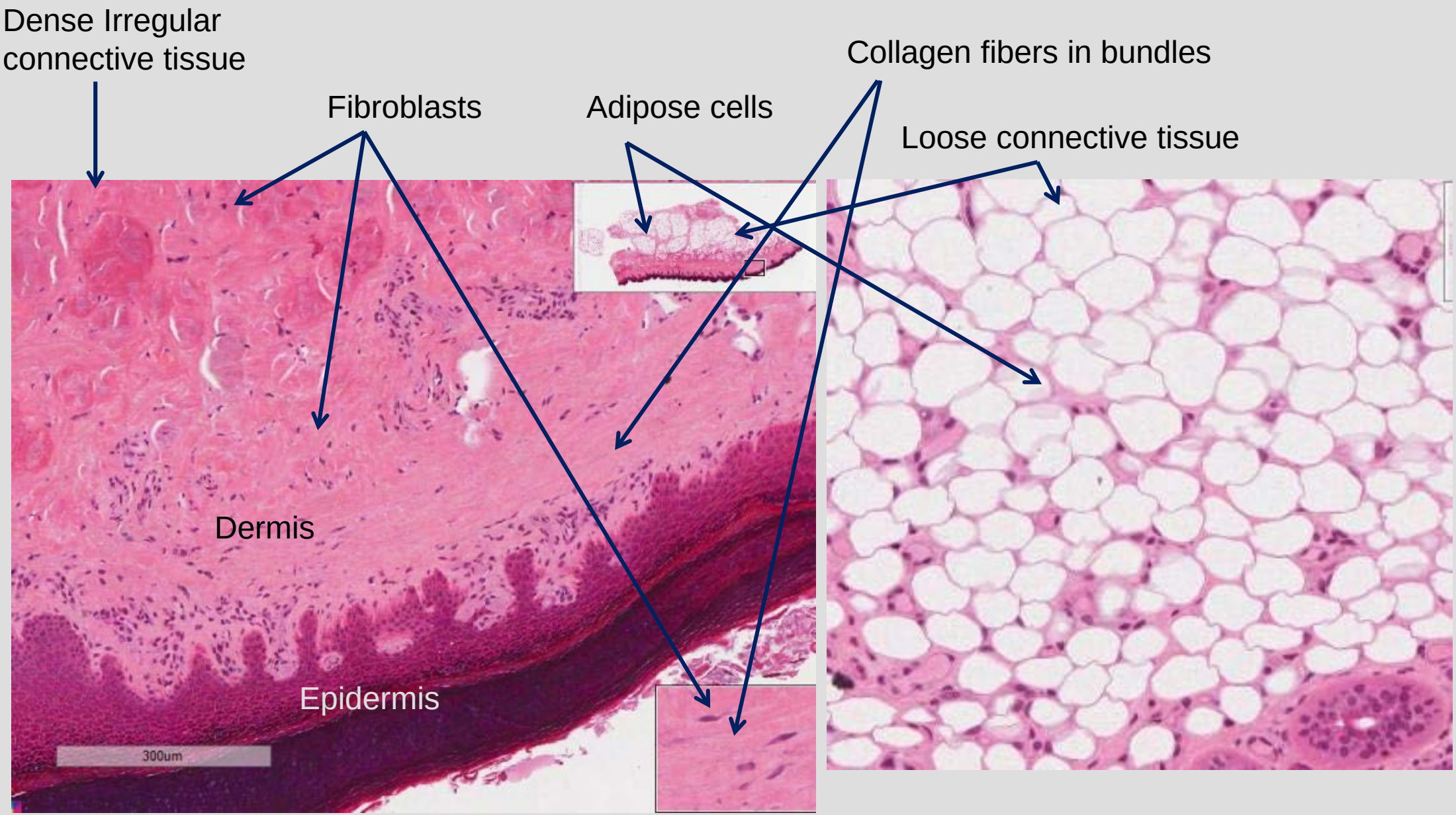


Slide 109: Skin, hand, monkey

– Irregular connective tissue, dense surface region and loose subdermal region



Slide 109: Skin, hand, monkey



Skin, hand, monkey

Slide 109

Fibroblasts

Nerve

Slide 109

Bundles of collagen fibers

Endothelium

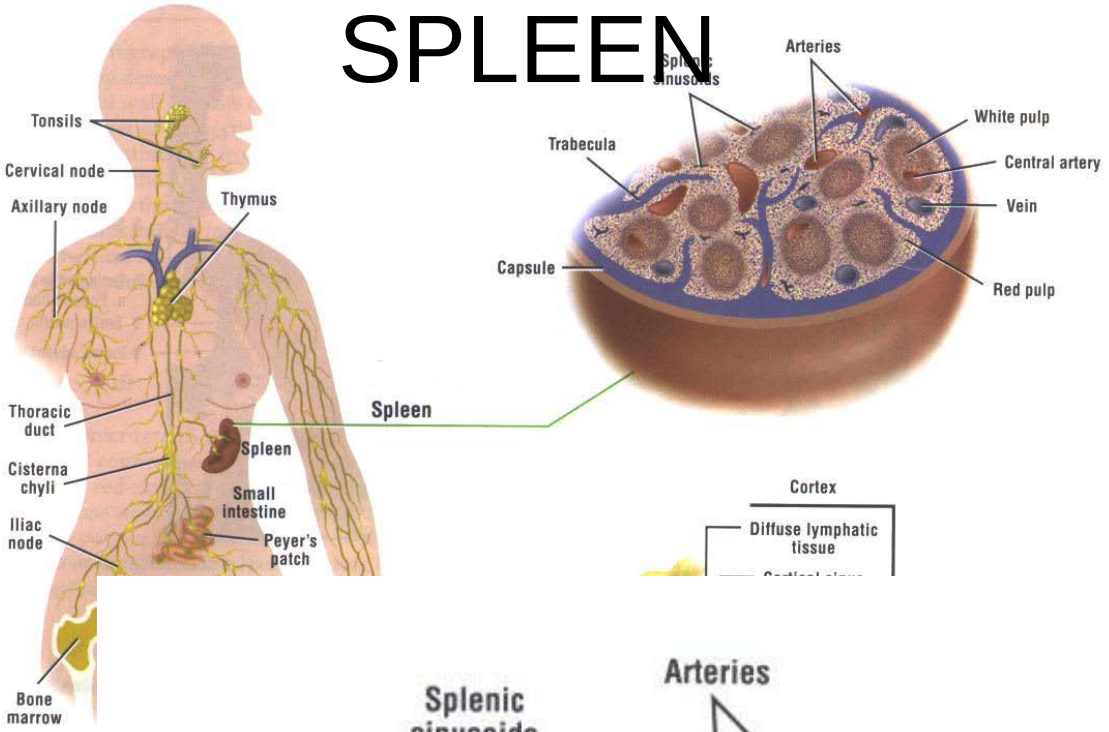
Dense Irregular connective tissue

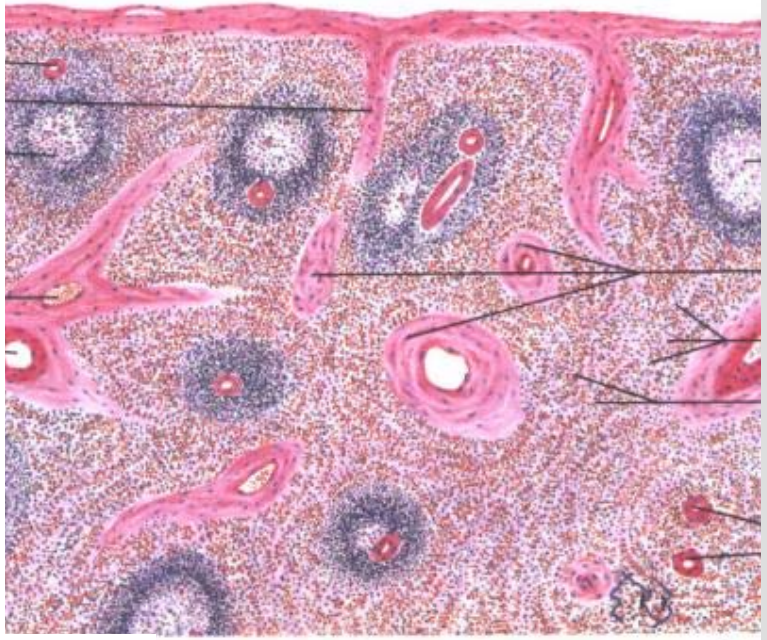
Epithelium of the epidermis

200um

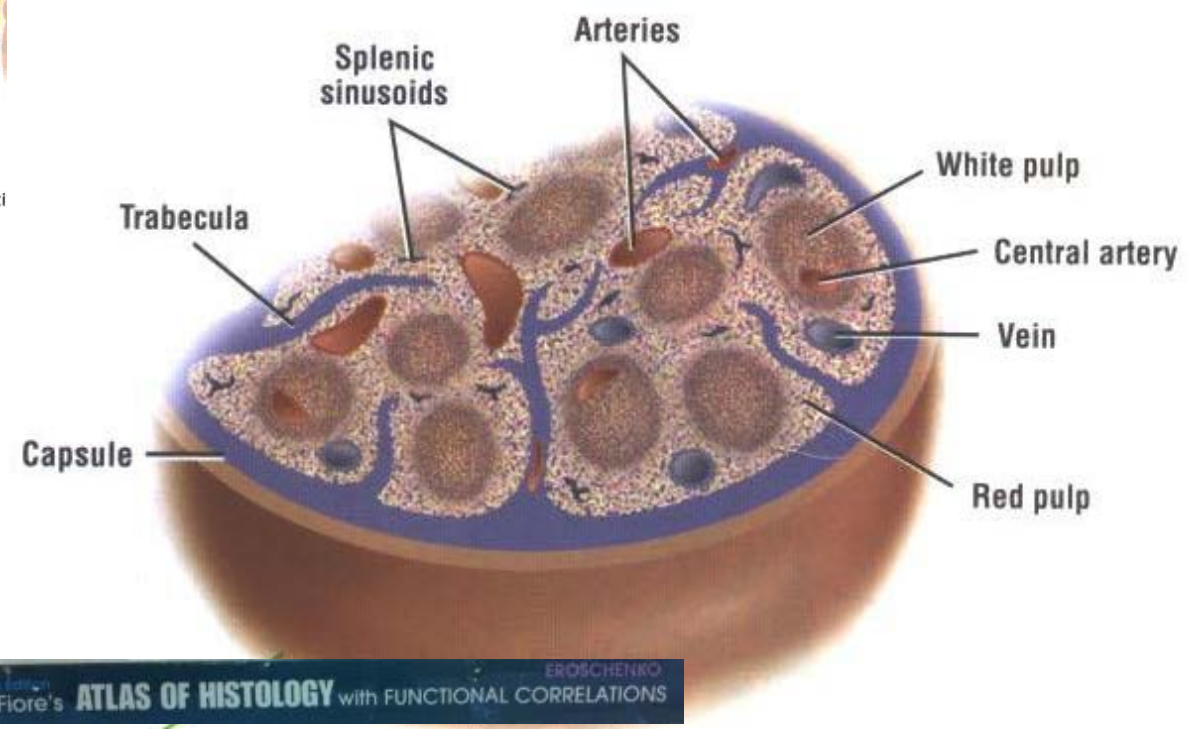
Dense surface region of dermis

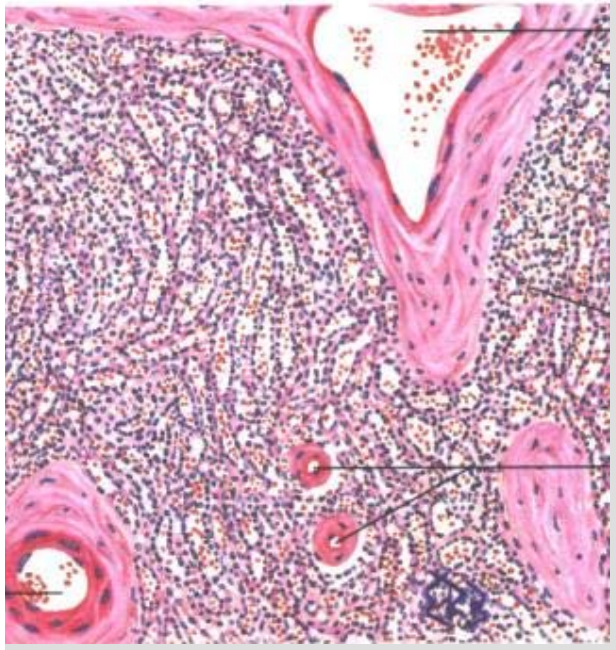
SPLEEN





ıic view). Stain: hematoxylin-eosin. Low magnifica



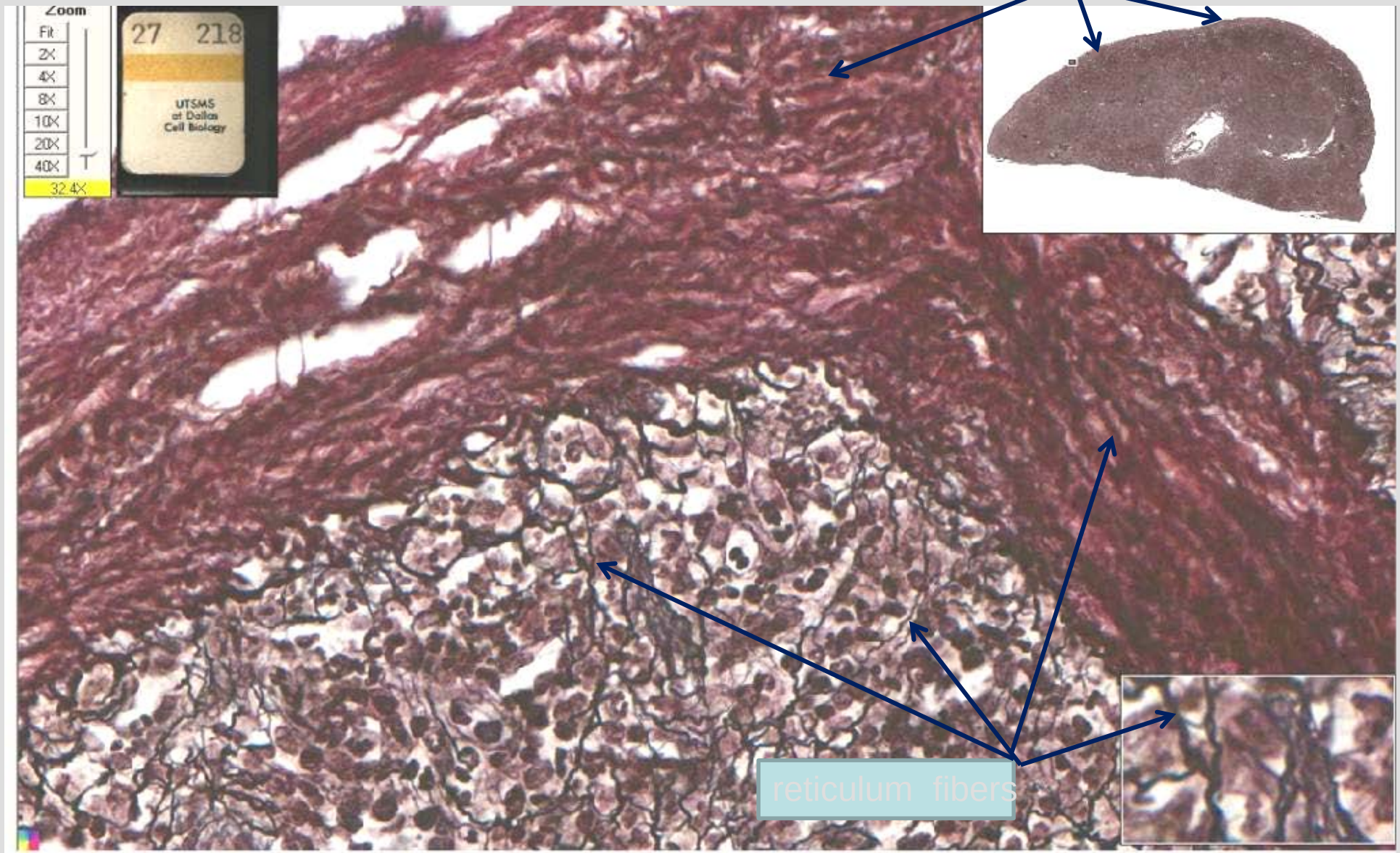


di Fiore's ATLAS OF HISTOLOGY with FUNCTIONAL CORRELATIONS

EROSCHENKO

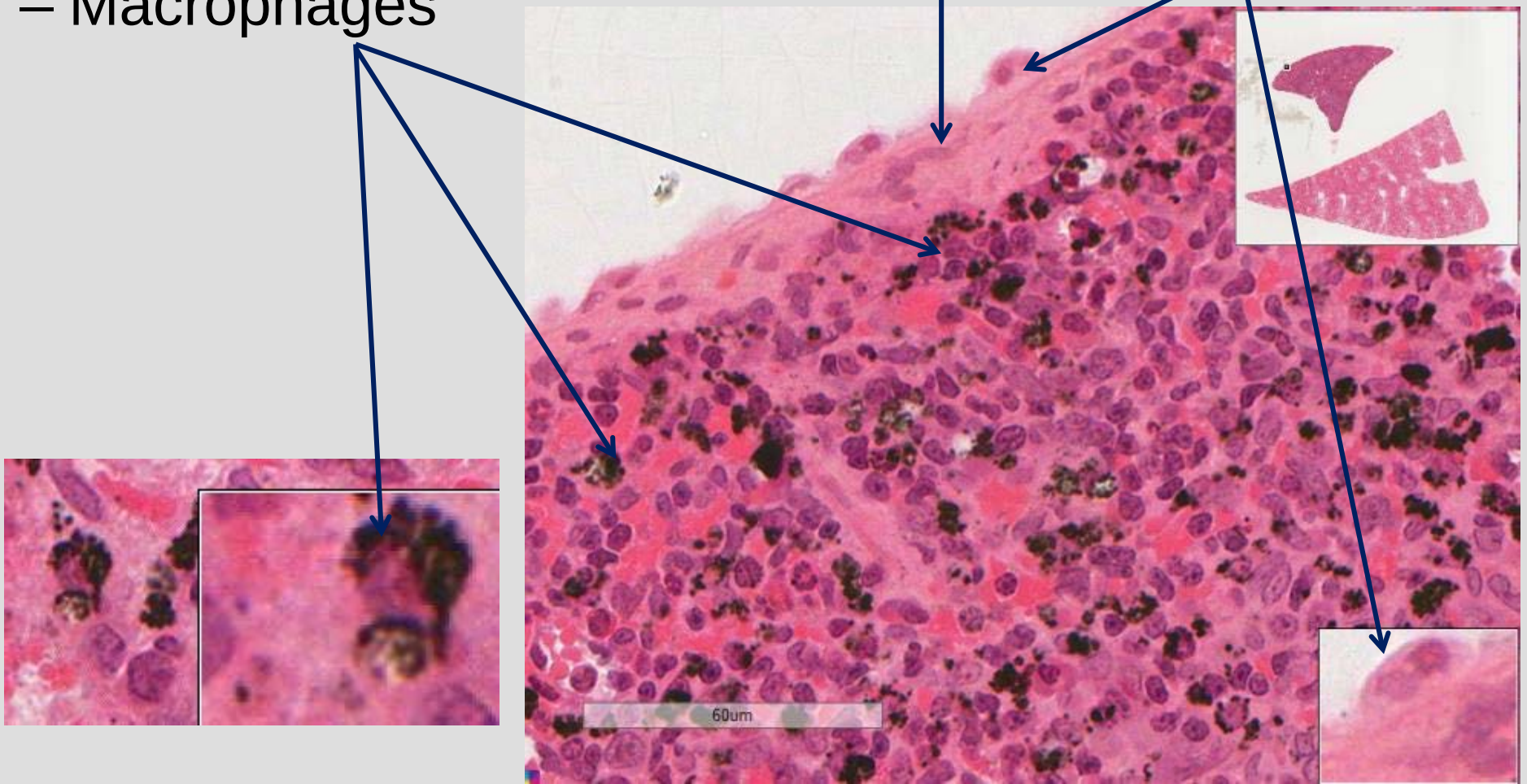
Ref code # 5

218 Spleen (reticulum stain)- capsule and reticulum fibers

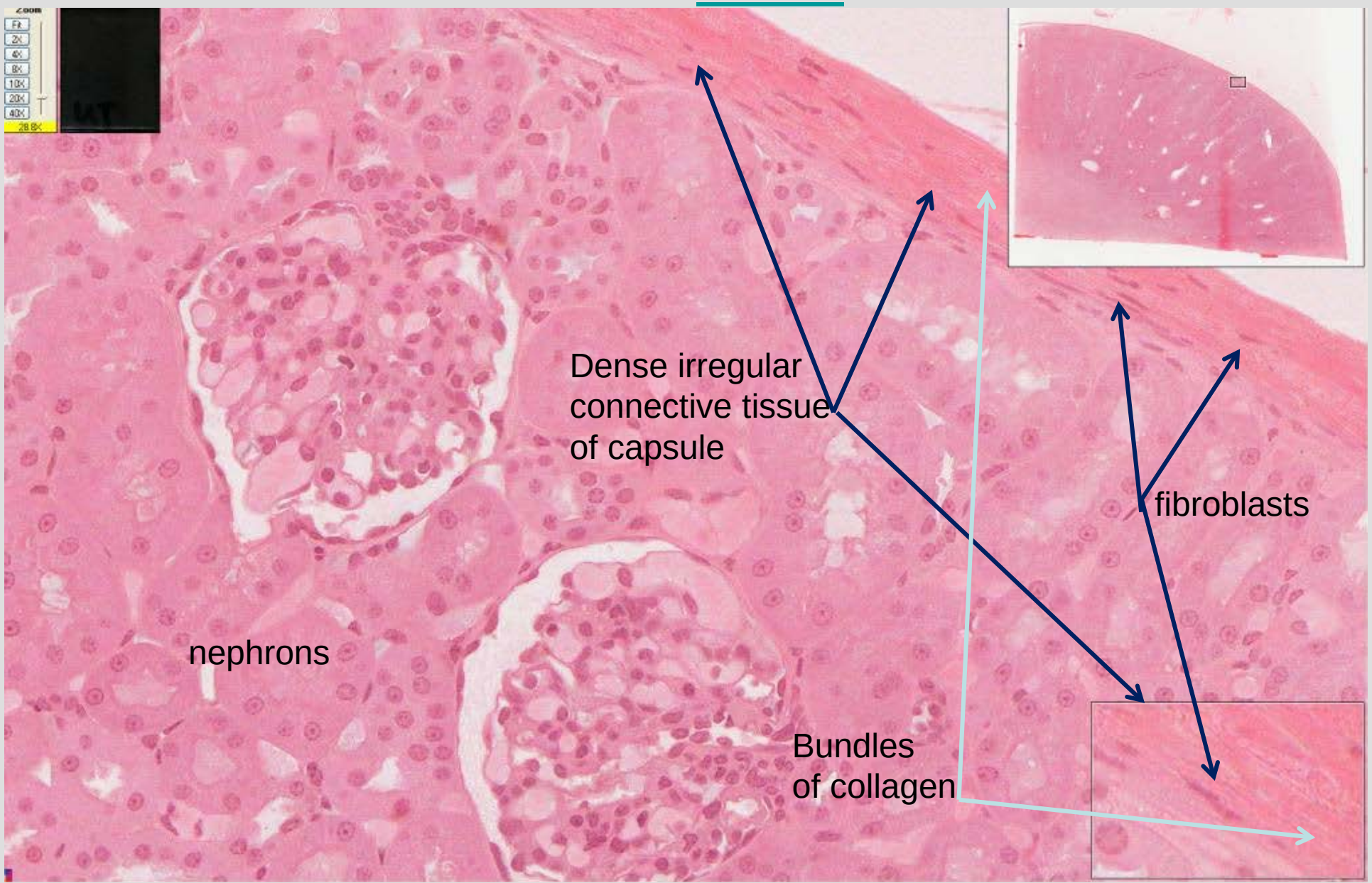


Slide 118: Liver & spleen with colloidal carbon, rat

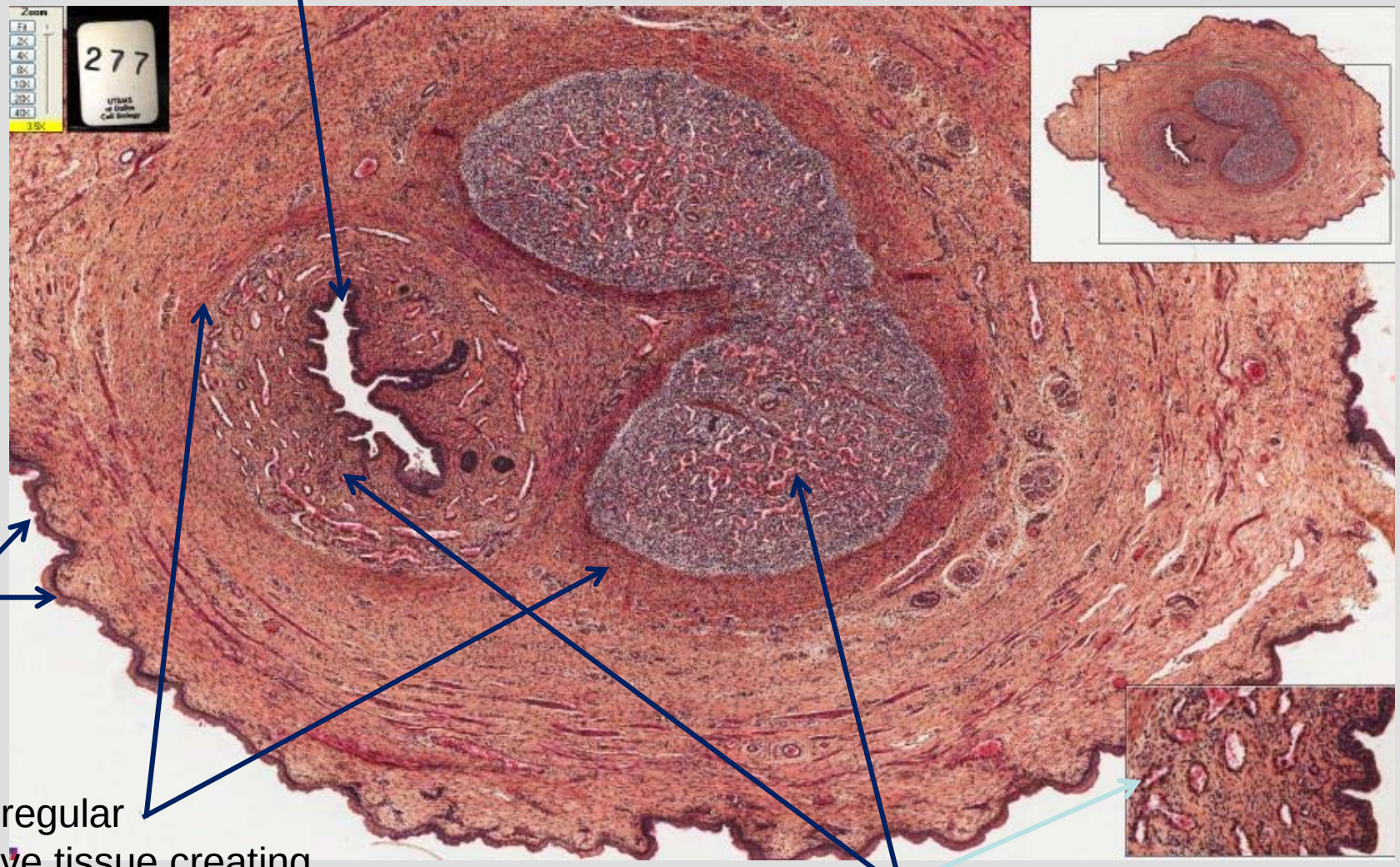
– Dense irregular connective tissue capsule
– Macrophages

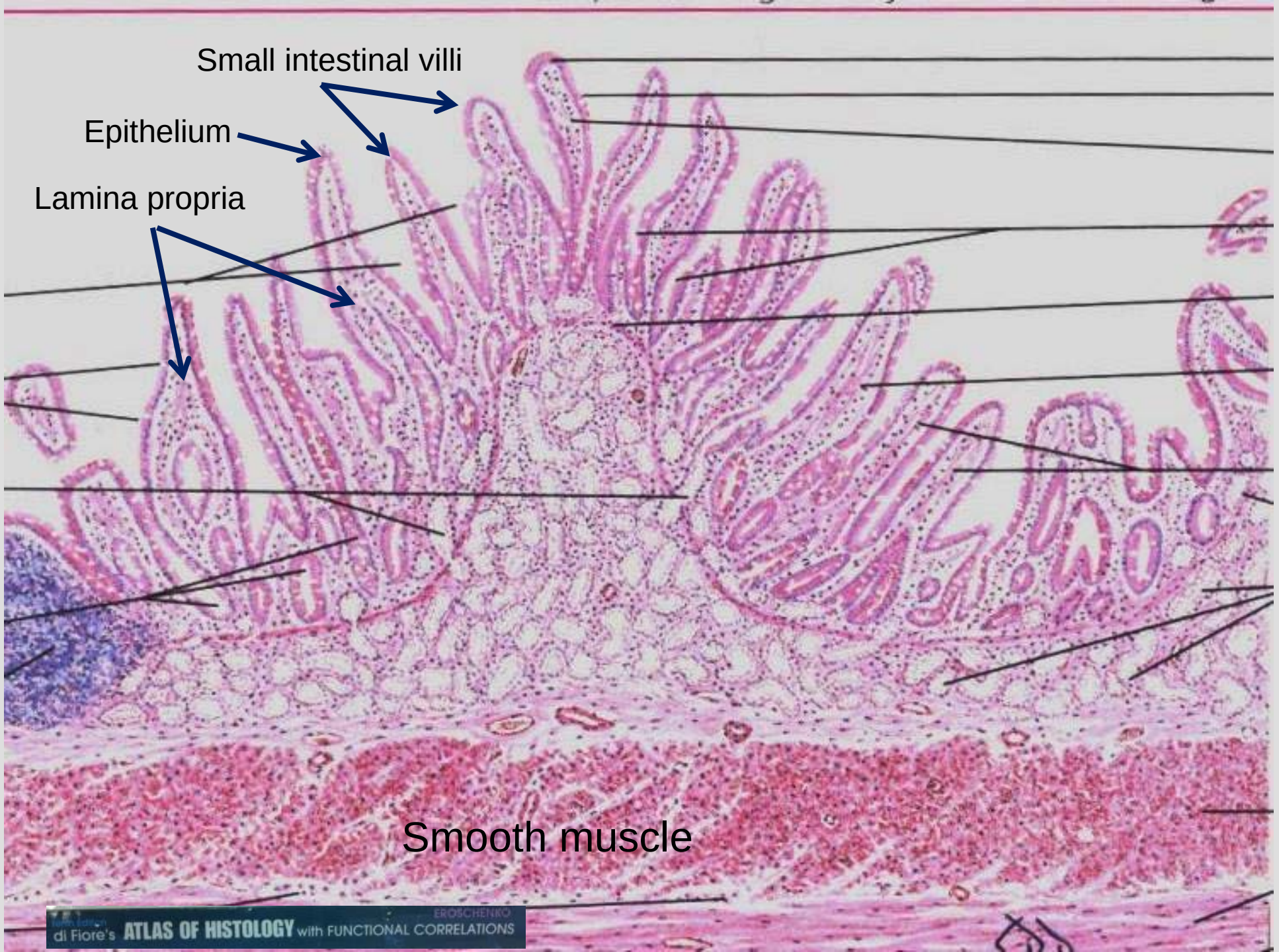


Kidney Capsule, urinary vascular poles
slide #19713



Penis – transitional epithelium and surrounding slide 277 spongy cavernous of penal urethra

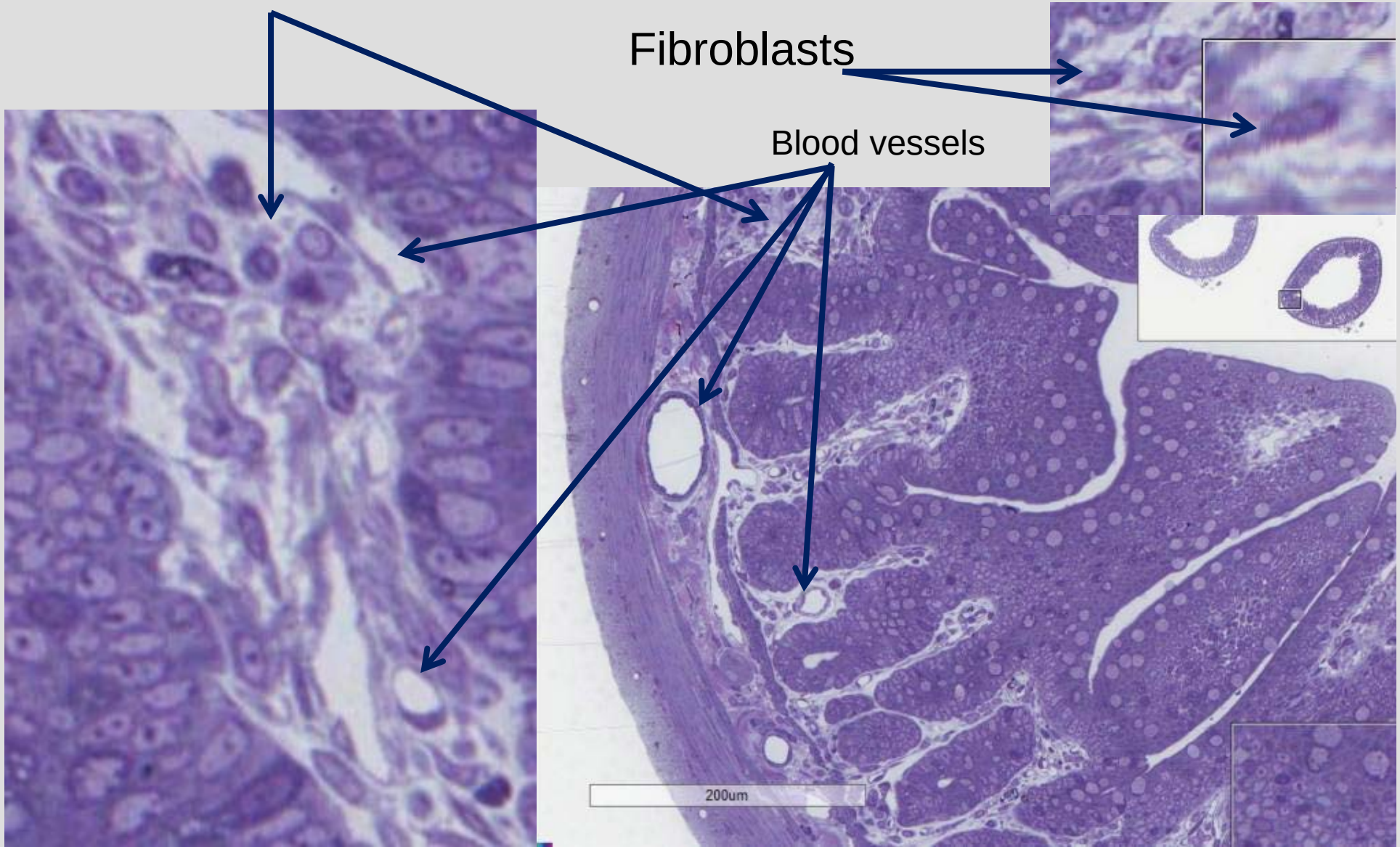


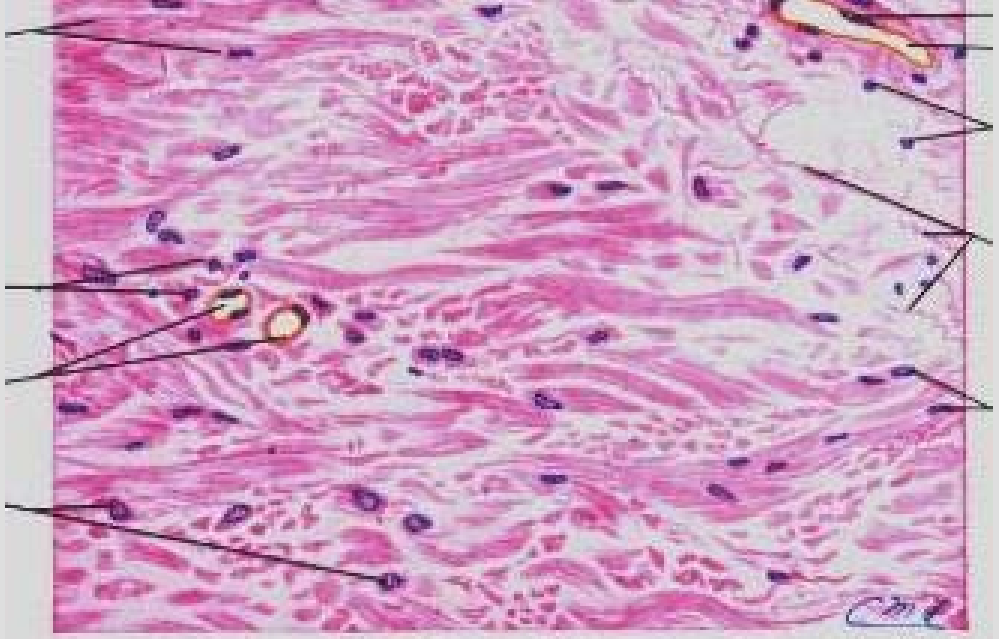

Small intestinal villi
Epithelium
Lamina propria
Smooth muscle
di Fiore's ATLAS OF HISTOLOGY with FUNCTIONAL CORRELATIONS
EROSCHENKO

Ref code
5

Slide 32409: Rat intestine (toluidine blue)

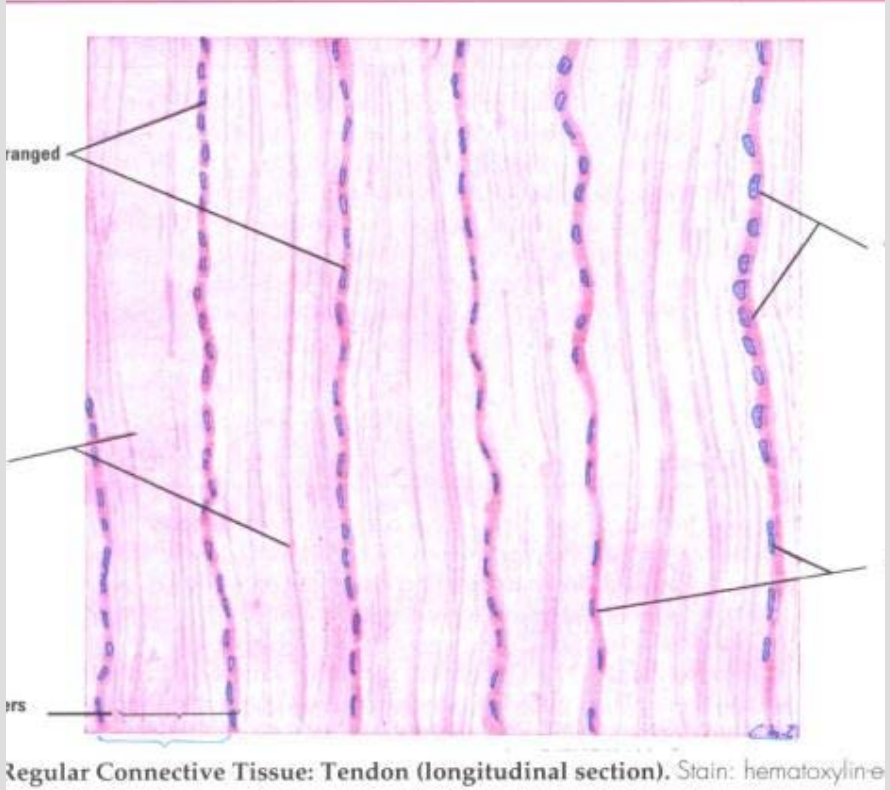
– Loose connective tissue (e.g., lamina propria)





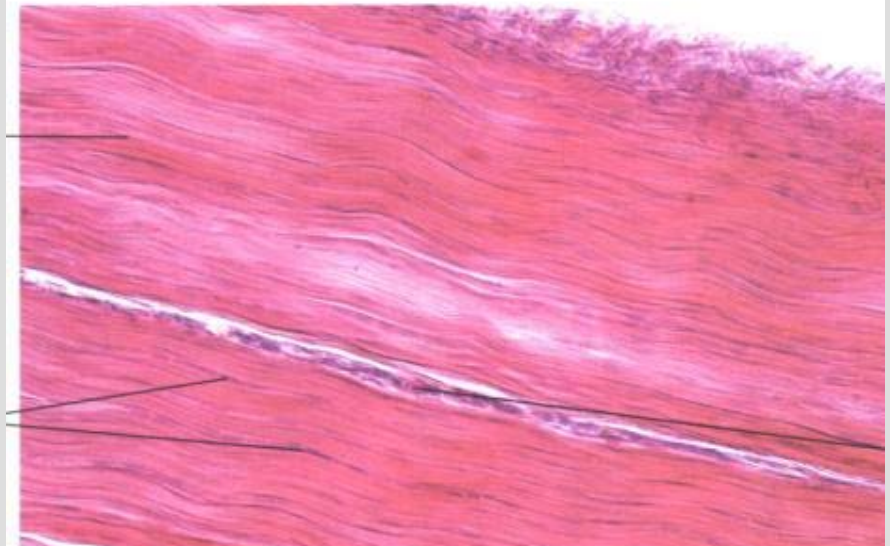
Dense Irregular Connective Tissue. Stain: hematoxylin-eosin. High mag

Dense irregular connective tissue



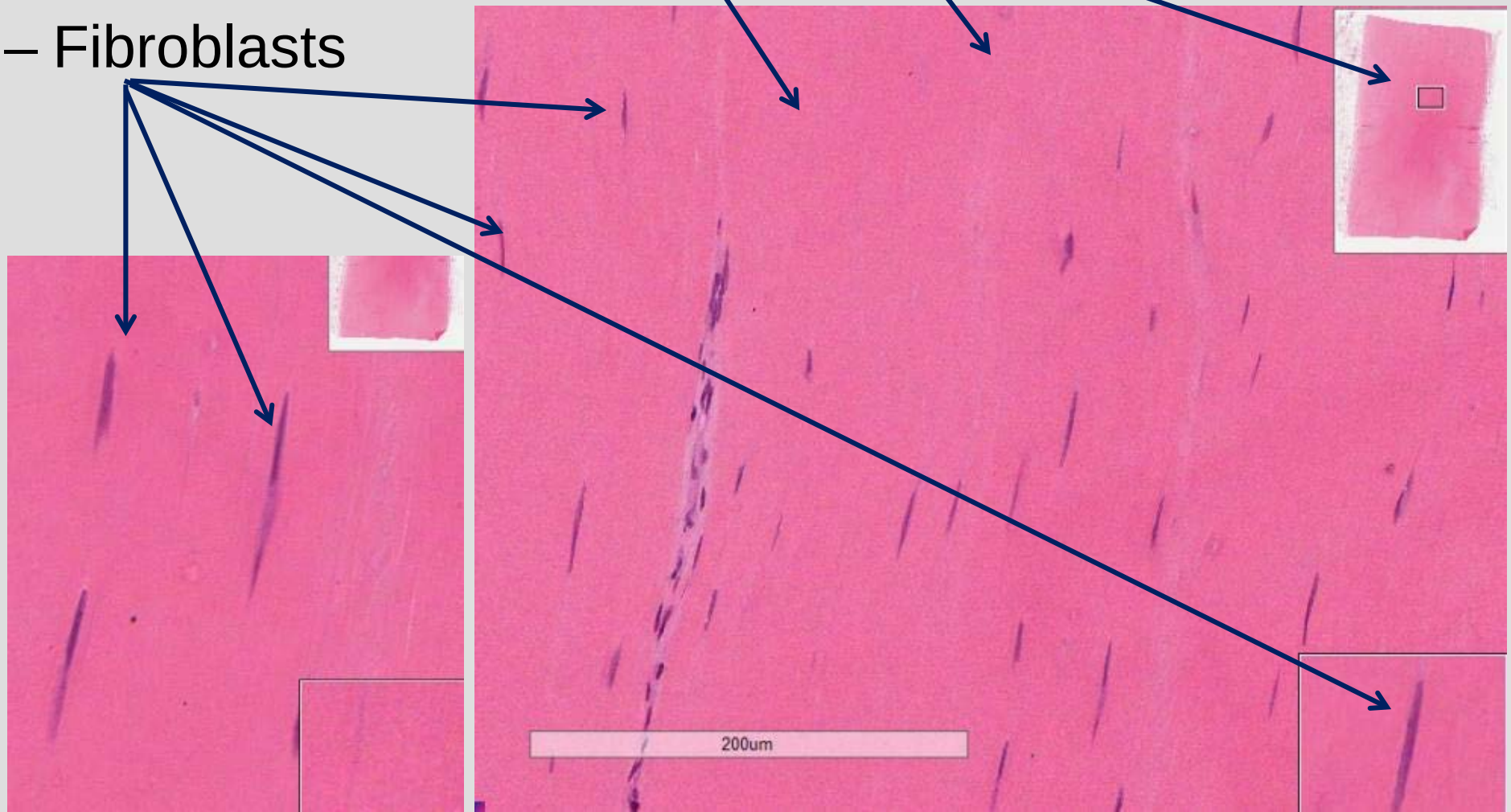
Regular Connective Tissue: Tendon (longitudinal section). Stain: hematoxylin-e

Dense regular connective tissue



Slide 202: Tendon

– Dense regular connective tissue
– High density of collagen fibers
– Fibroblasts

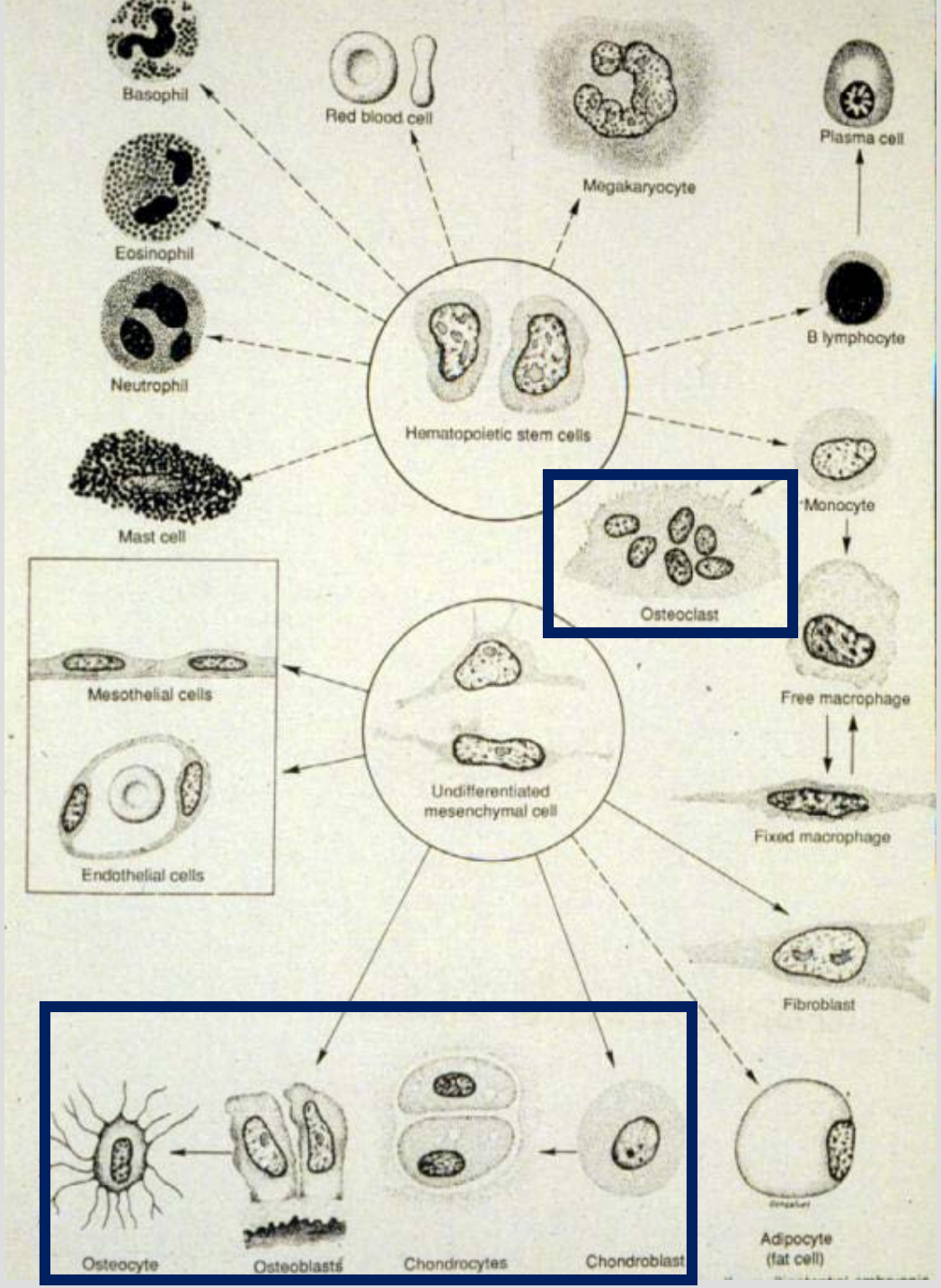


CELLS OF CT

FIBROBLASTS
MESENCHYMAL CELLS and RBC
ADIPOSE CELLS
MACROPHAGE
PLASMA CELLS
MAST CELLS and WBC

CHONDROBLASTS
CHONDROCYTES

OSTEOBLASTS
OSTEOCYTES
OSTEOCLASTS



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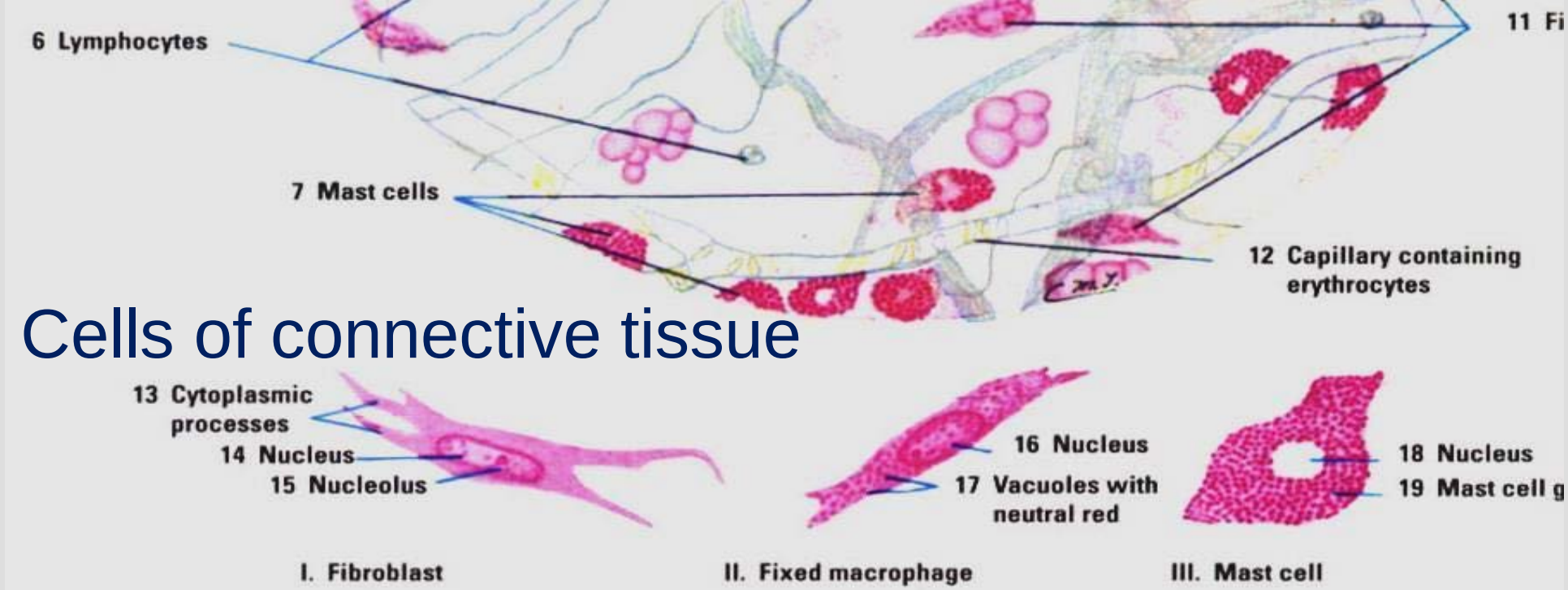


Ref code # 5

Cells of connective tissue

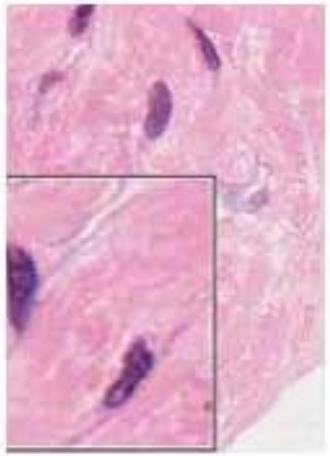
Fig. 2-1 Loose Connective Tissue (spread). Supravital staining with neutral red. Upper: high magnific immersion.

di Fiore's ATLAS OF HISTOLOGY with FUNCTIONAL CORRELATIONS

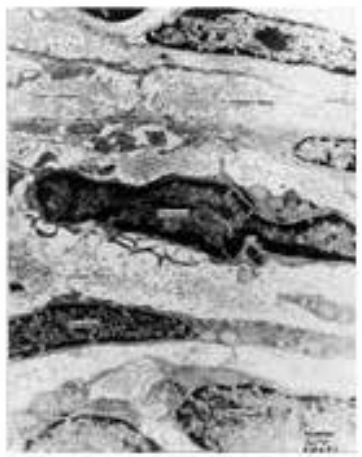
Mast cell

Macrophage

Fibroblasts

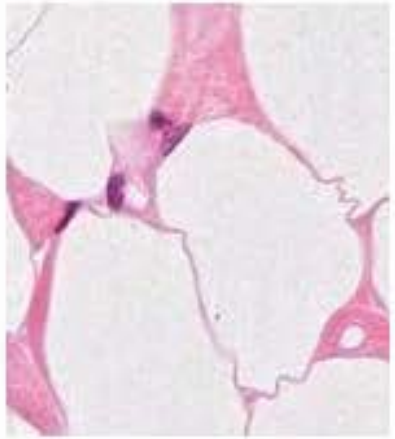


Fibroblasts



Plasma cell

Fat cells



Cells of connective tissue

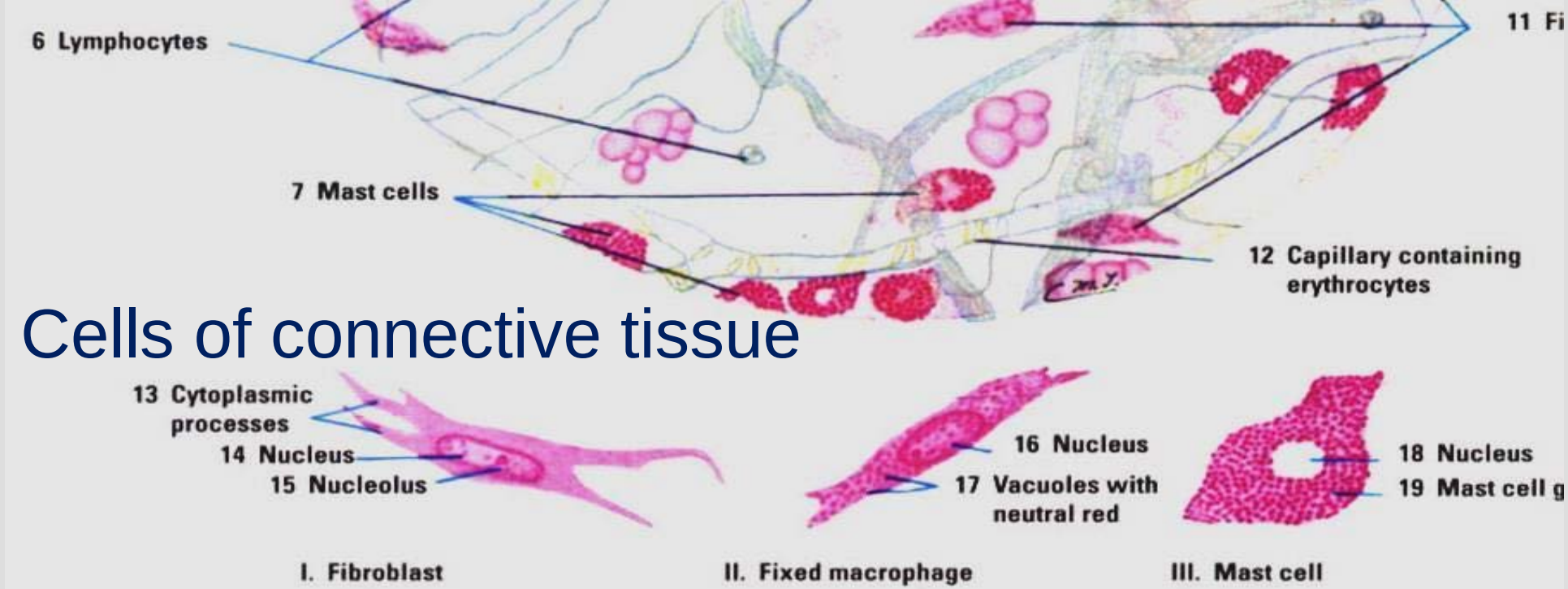
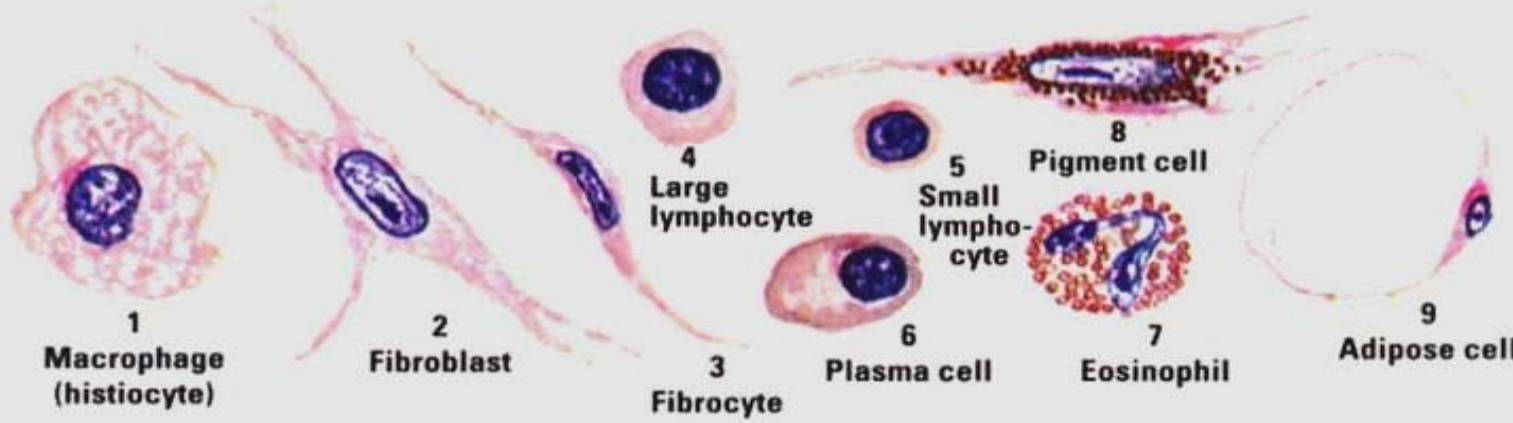


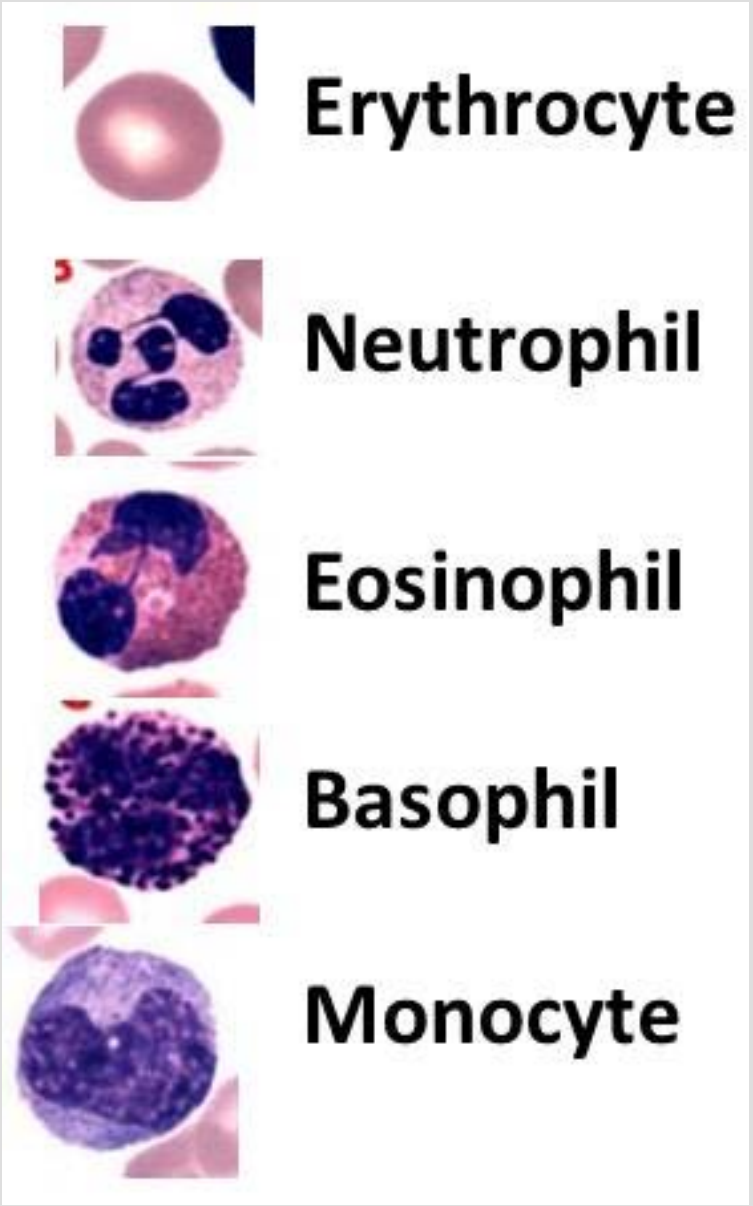
Fig. 2-1 Loose Connective Tissue (spread). Supravital staining with neutral red. Upper: high magnific immersion.



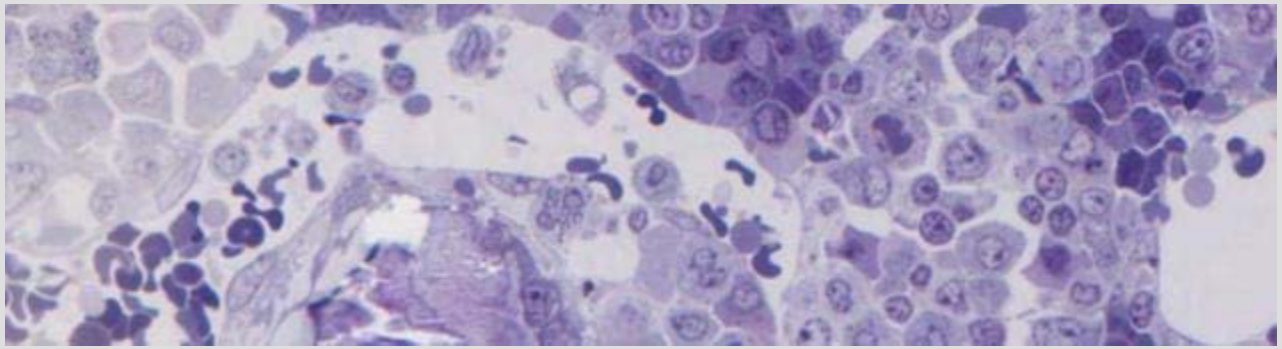
of Connective Tissue. Stain: hematoxylin-eosin. Oil immersic

Blood cells are connective tissue cells

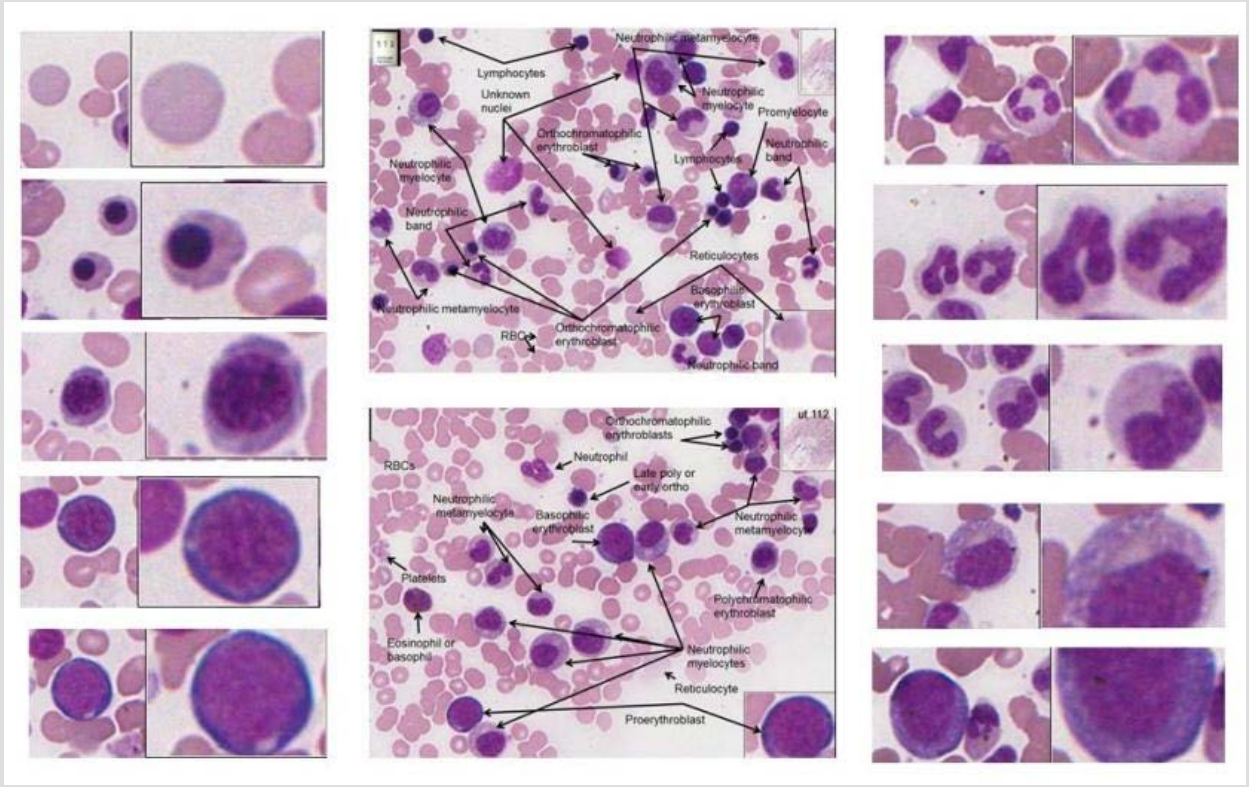
Blood cells



32583

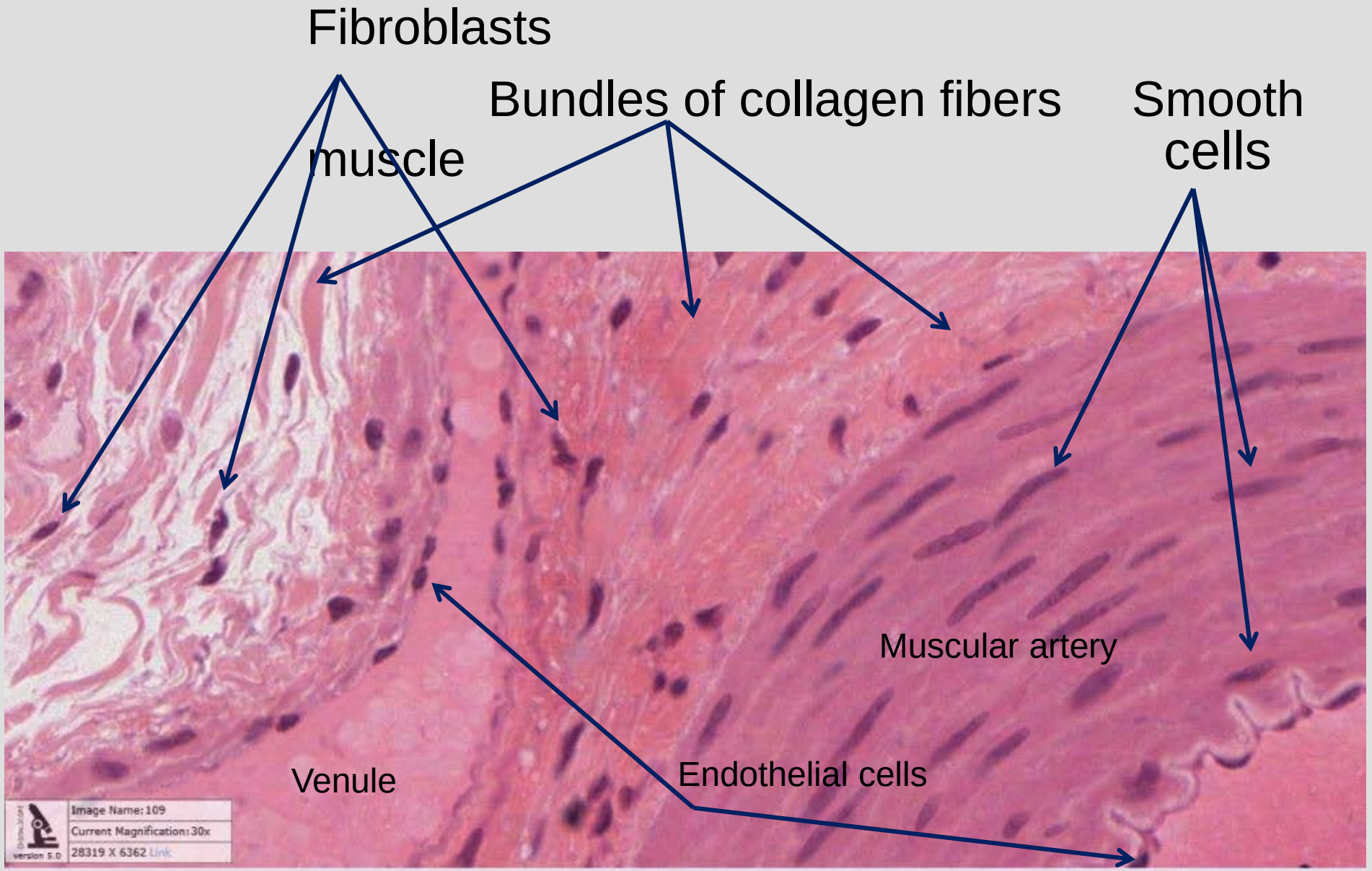


Bone marrow cells

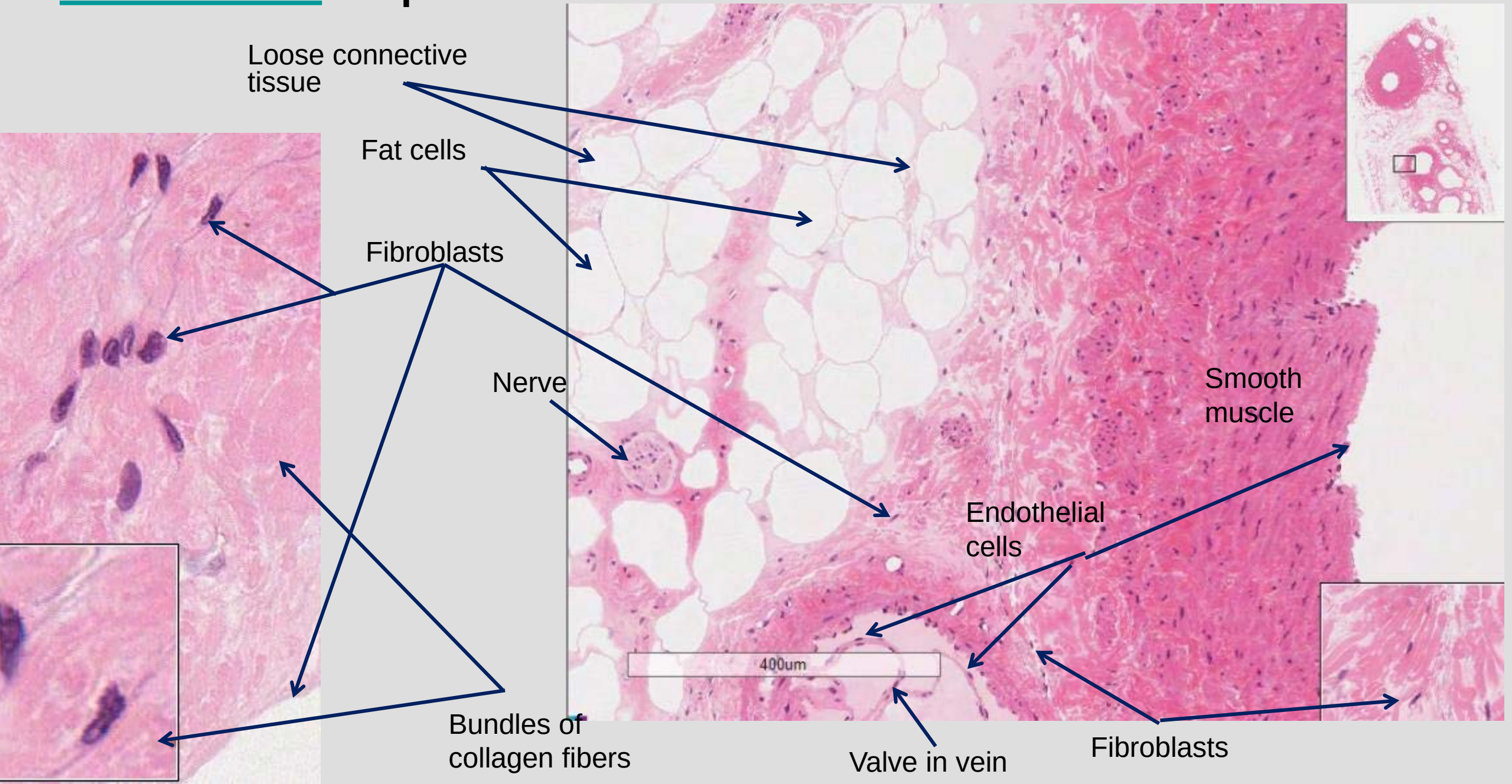


https://www.youtube.com/watch?v=UTo4LnXonTk&list=PLQltfhuKi1sgtel3O9IpDsbgEWMY3JaX5&index=19

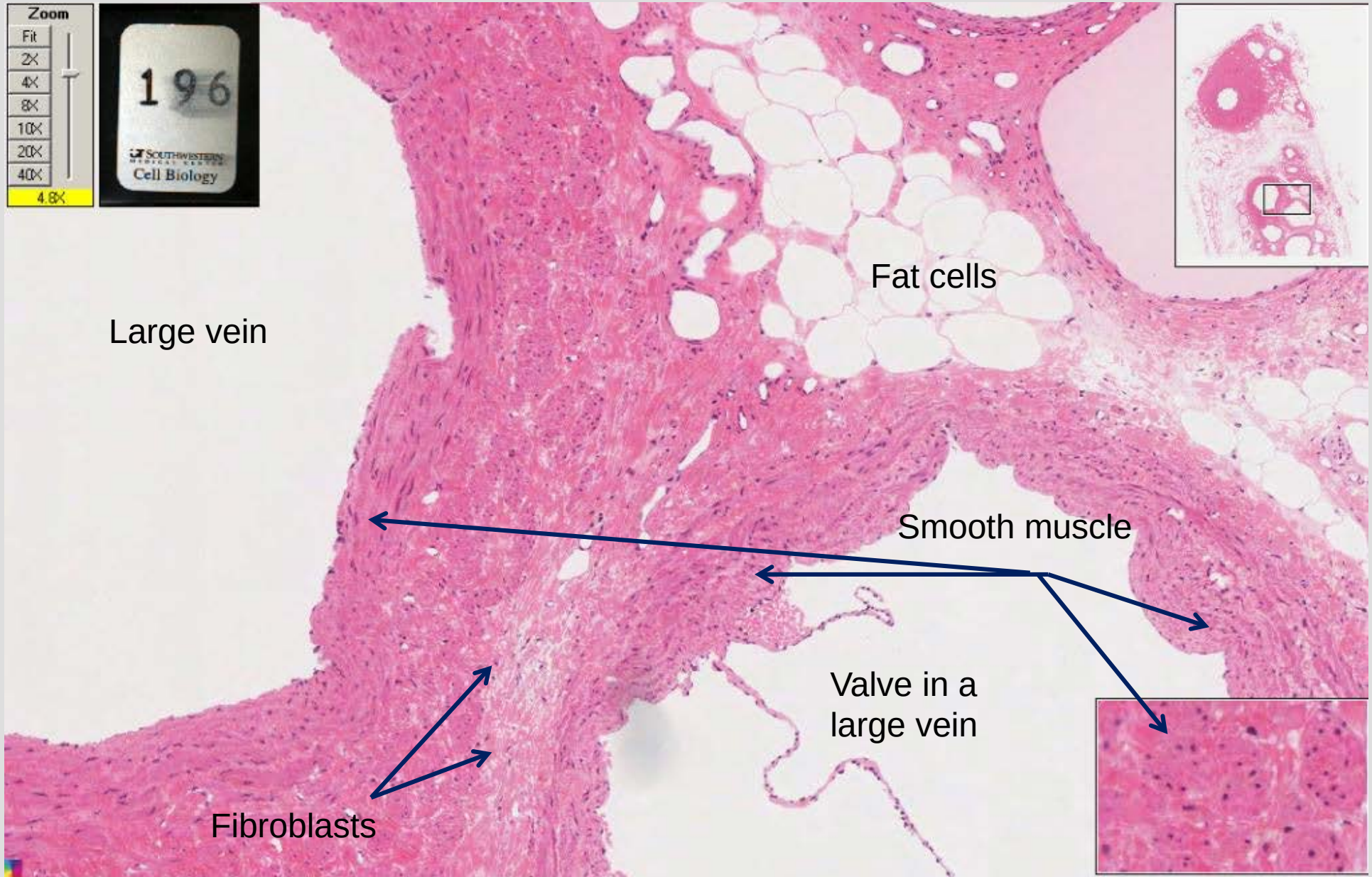
Slide 109: Skin, hand, monkey



Slide 196: Spermatic cord

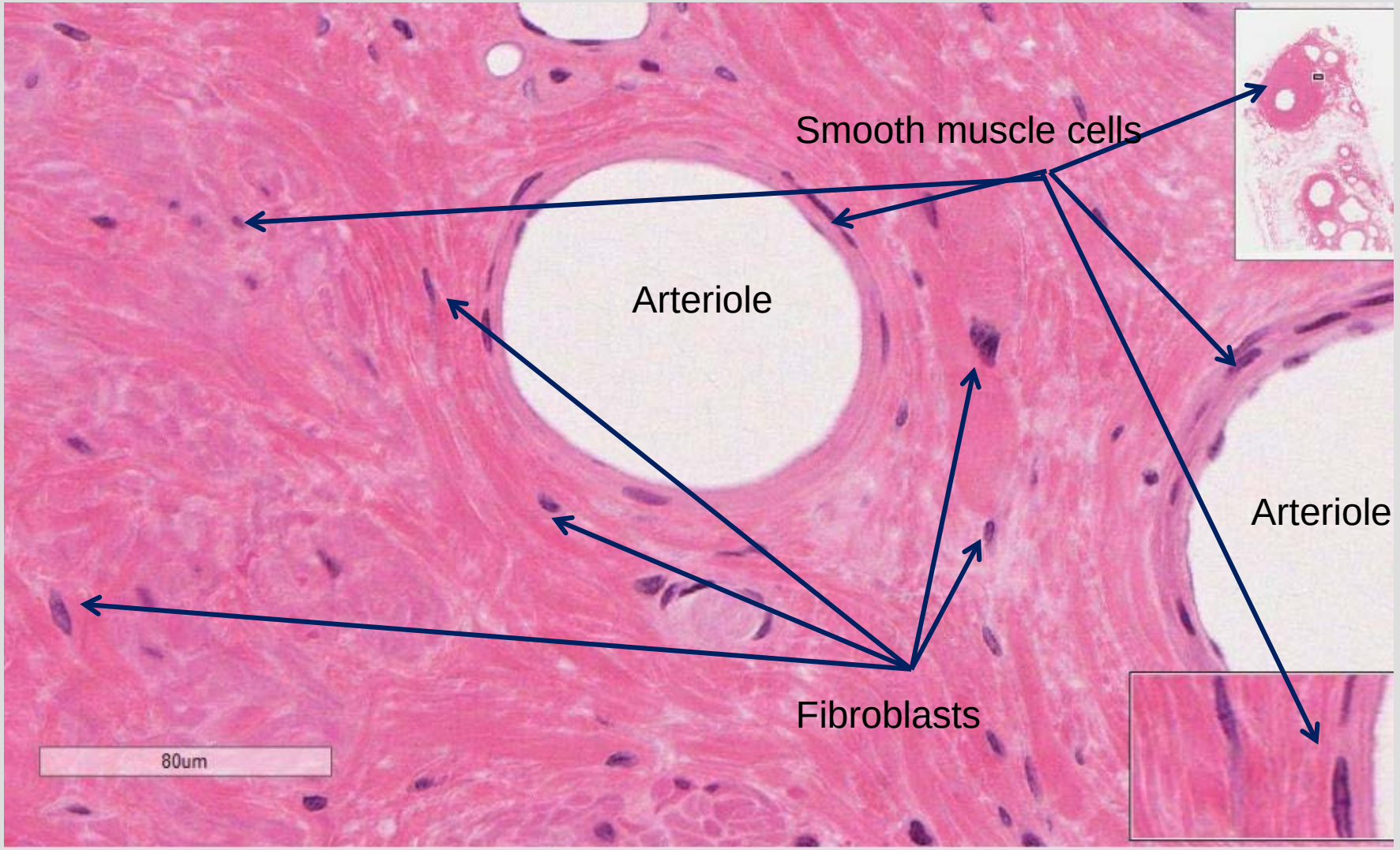


Slide 196 Vein of Spermatic cord

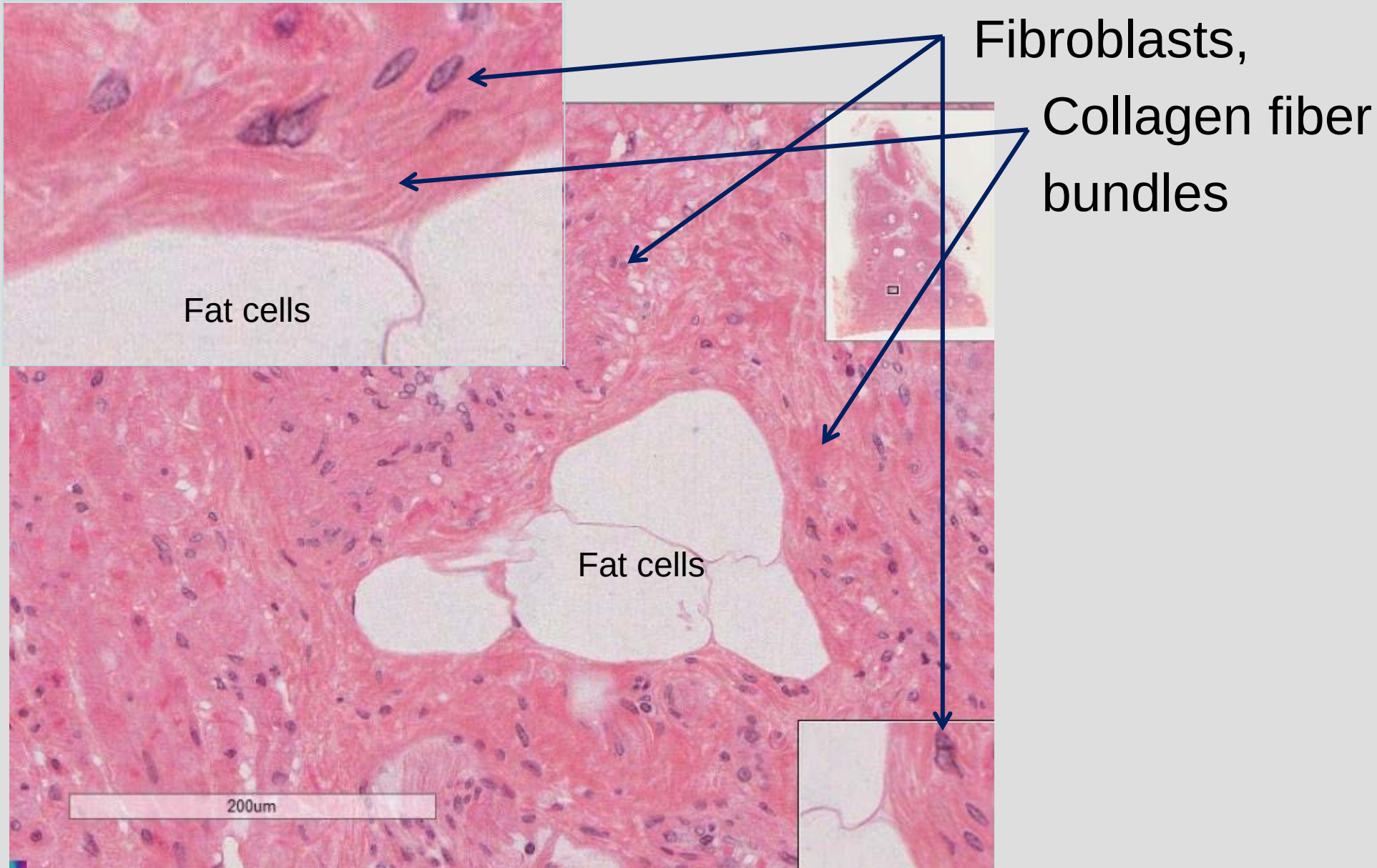


Slide 196

Vein of Spermatic cord



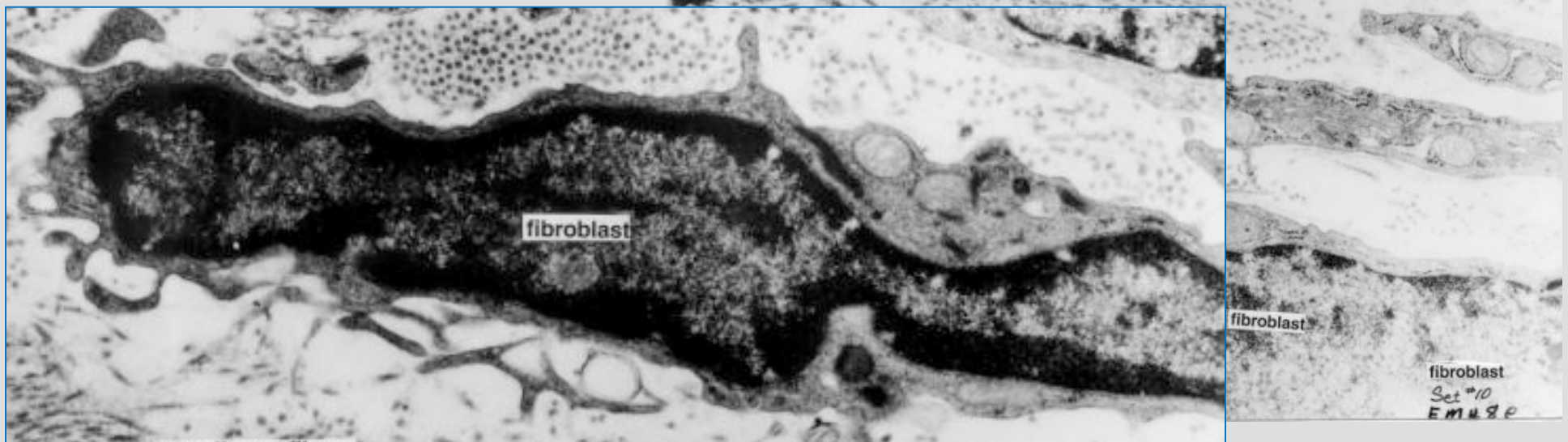
Slide 19716: Tail of epididymis



EM 8e: Fibroblasts

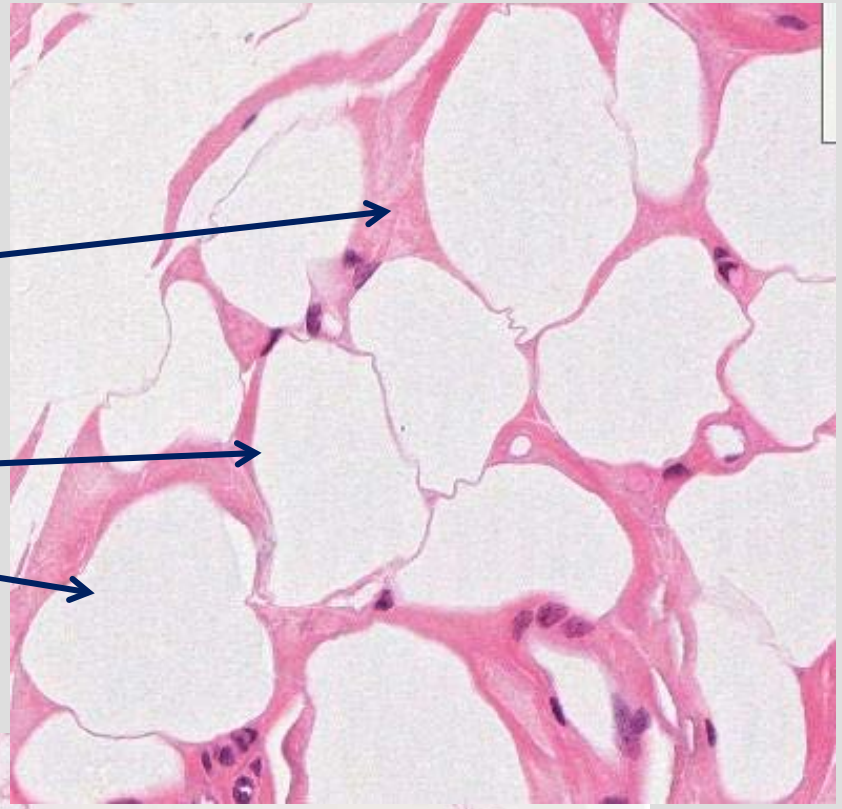
Fibroblasts

Collagen fibers

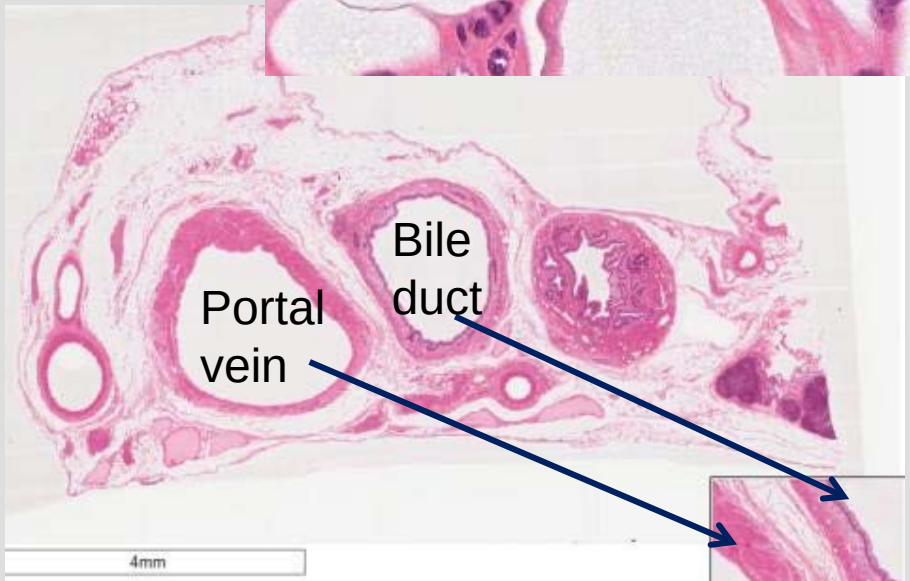


Slide 126:Bile duct with portal vein, monkey

- Loose connective tissue (many cells and few fibers),
- Adipose cells,
- Fibroblasts



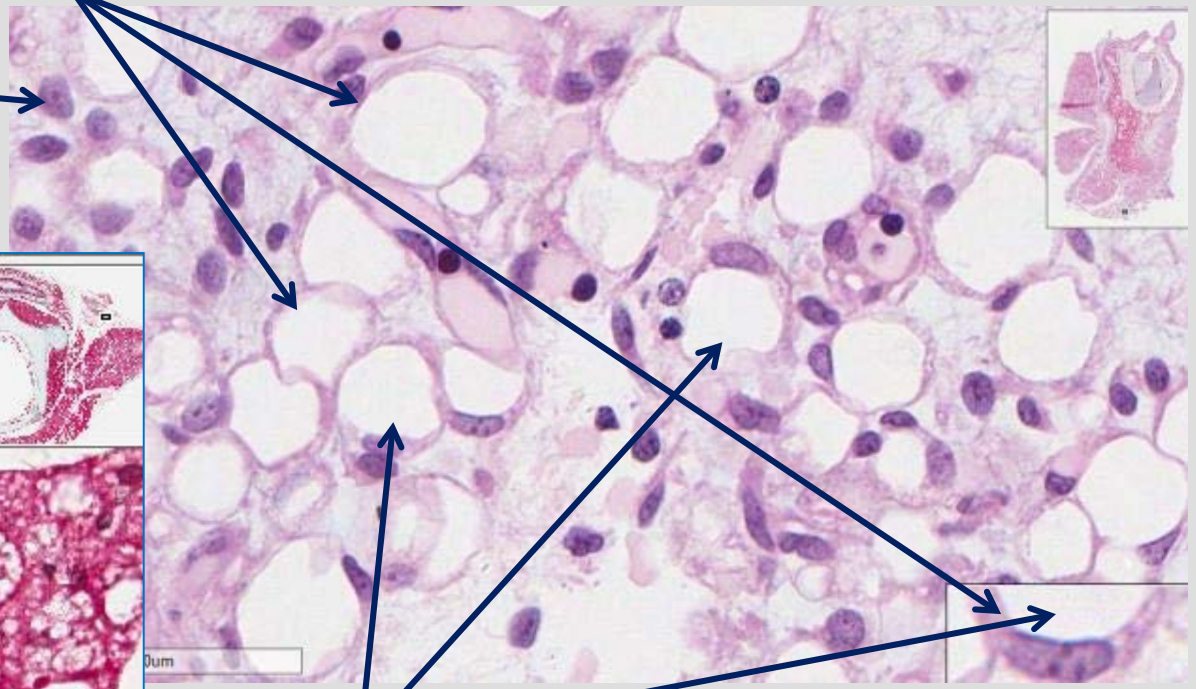
Plasma cells



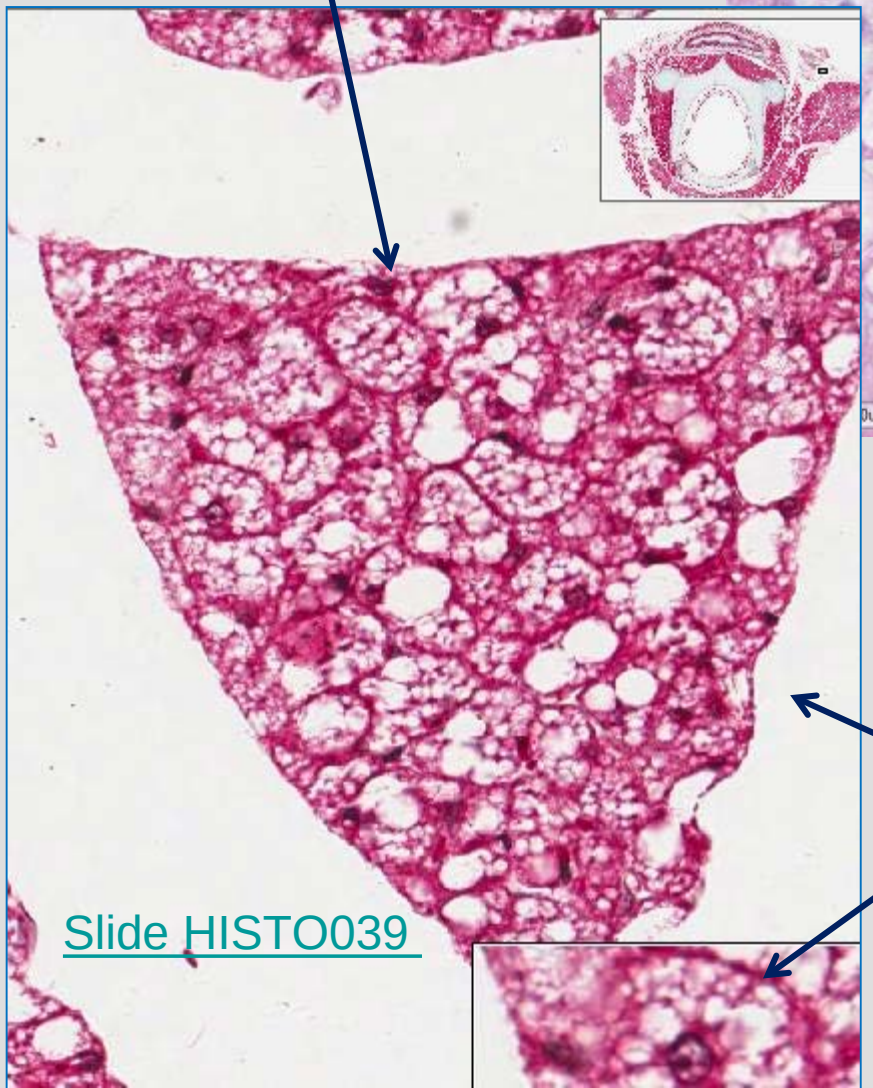
White fat cells

Slide 195 Fetal jaw

Fibroblasts



White fat cell cytoplasm can be seen surrounding the single fat droplet

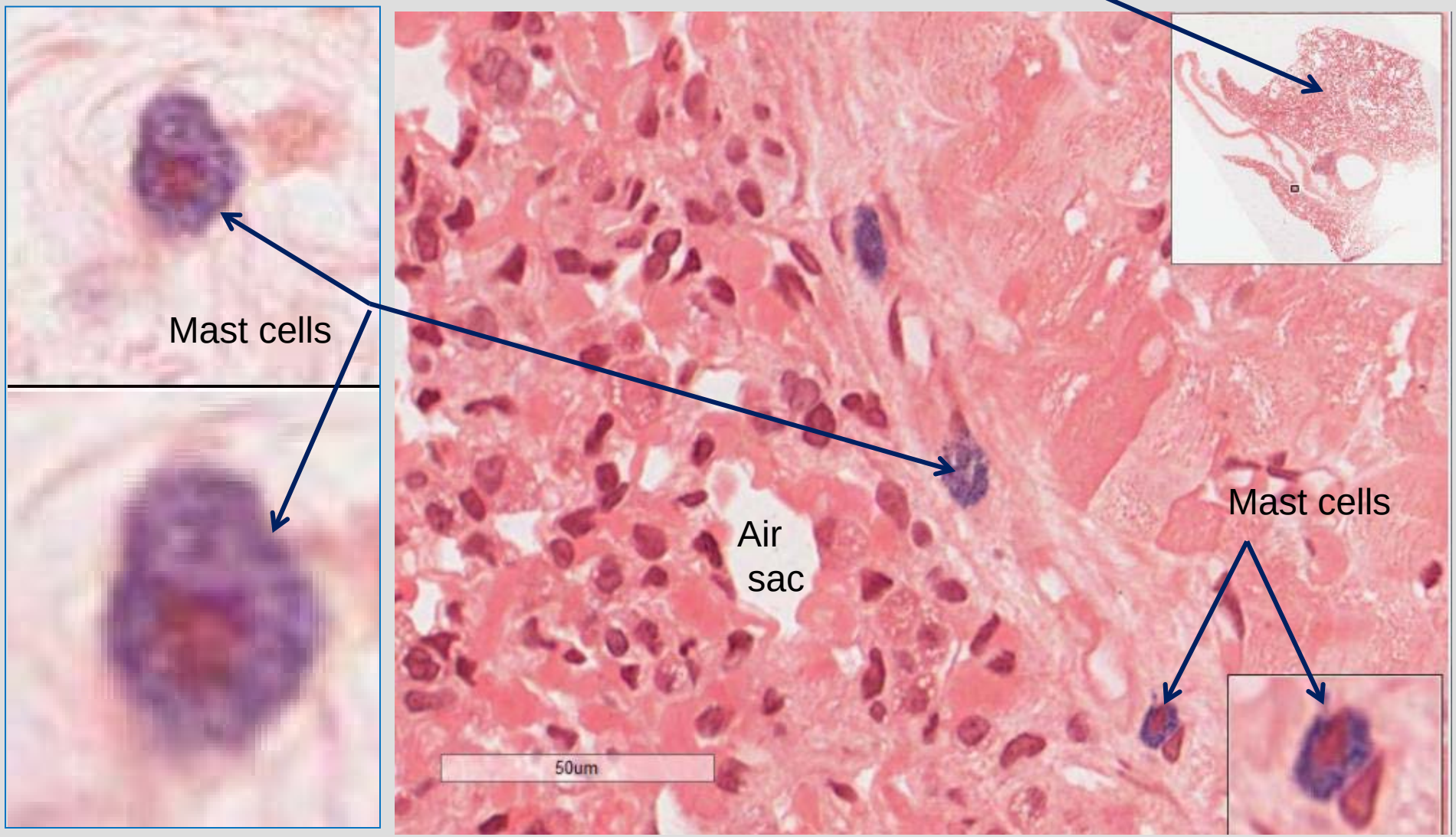


Slide HISTO039

Brown fat cell cytoplasm can be seen surrounding multiple fat droplets

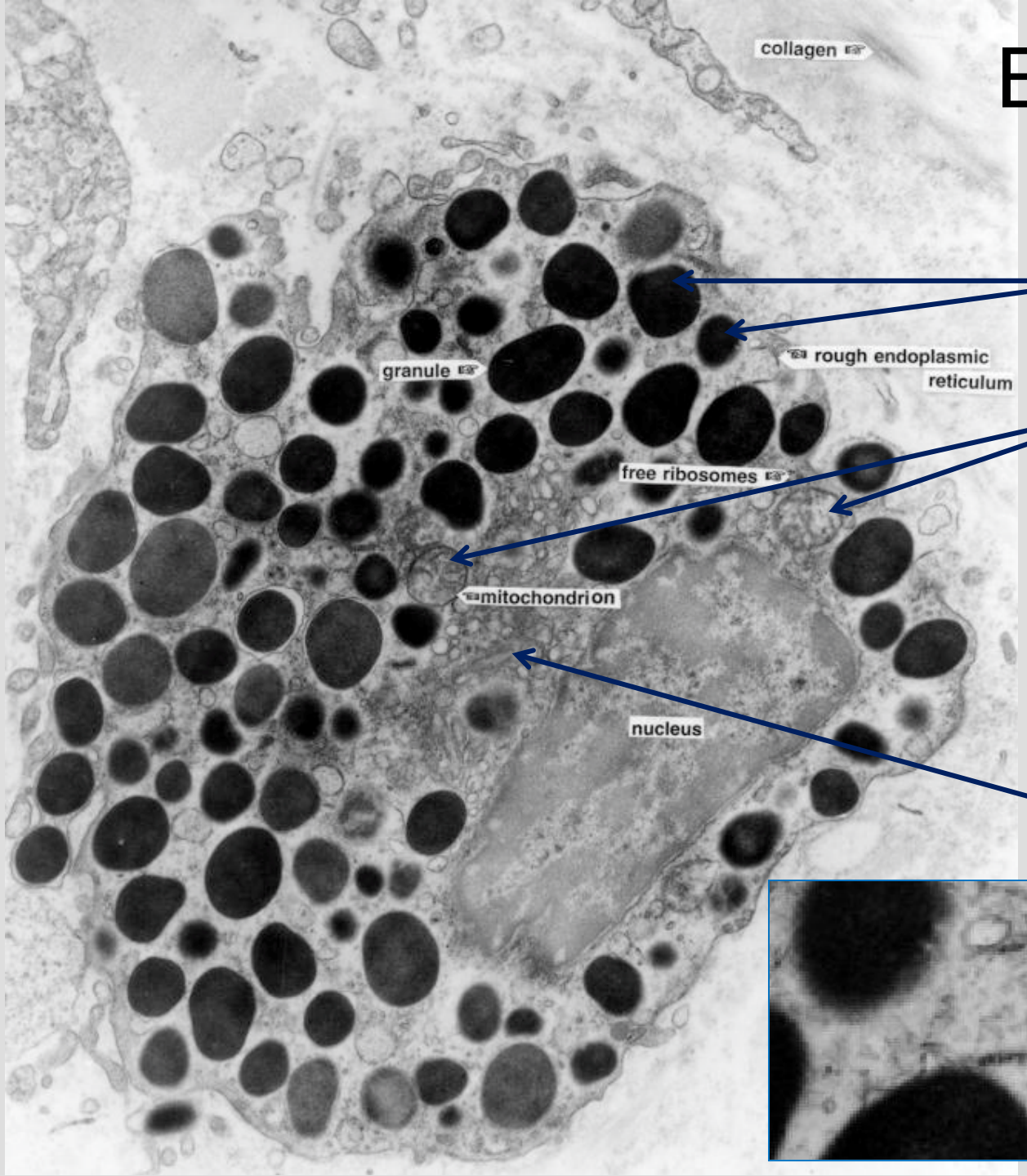
Slide HISTO42: Lung Mast cell

– Light blue granules



140 Cardiac stomach w/chronic infection

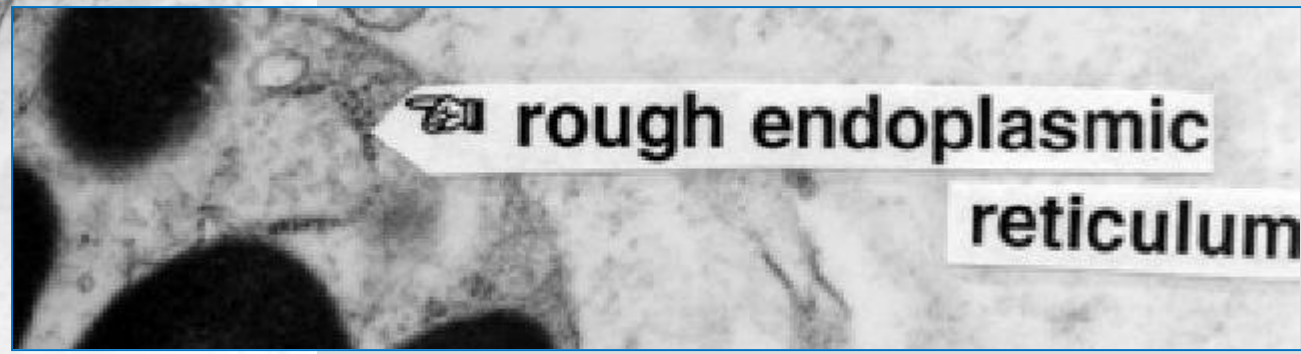
EM 8d: Mast cell



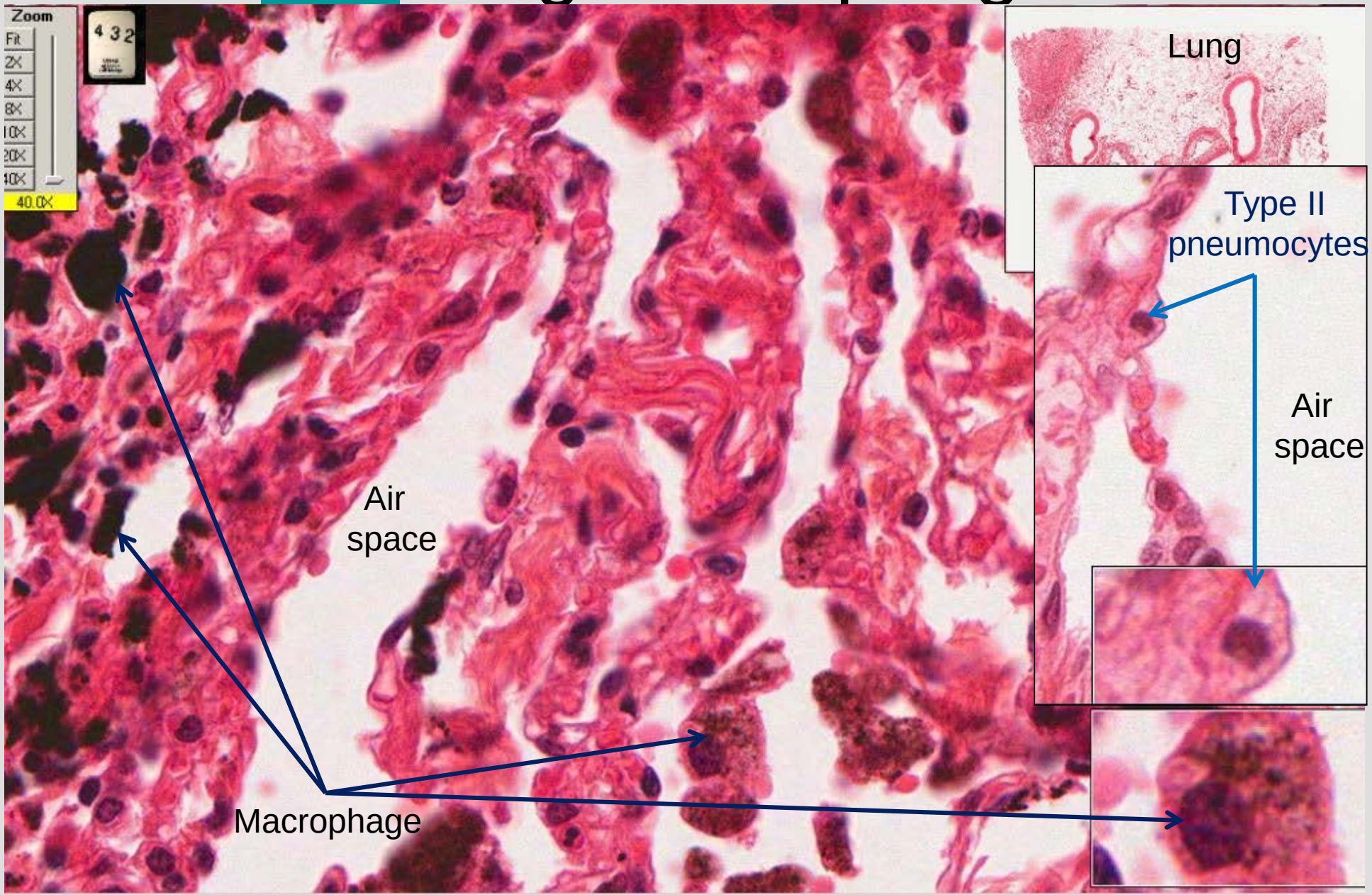
Granules,

Mitochondria,

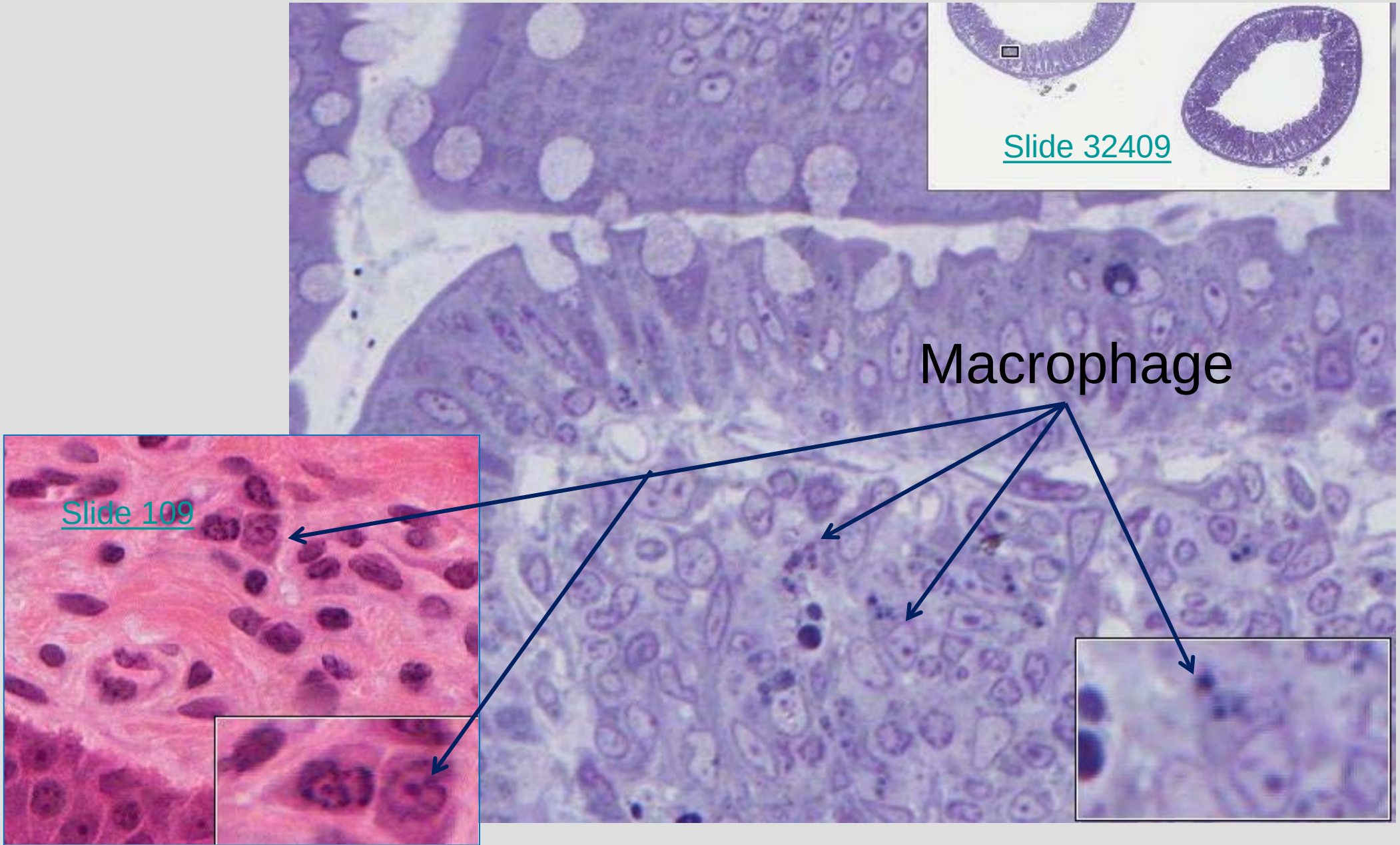
Golgi region

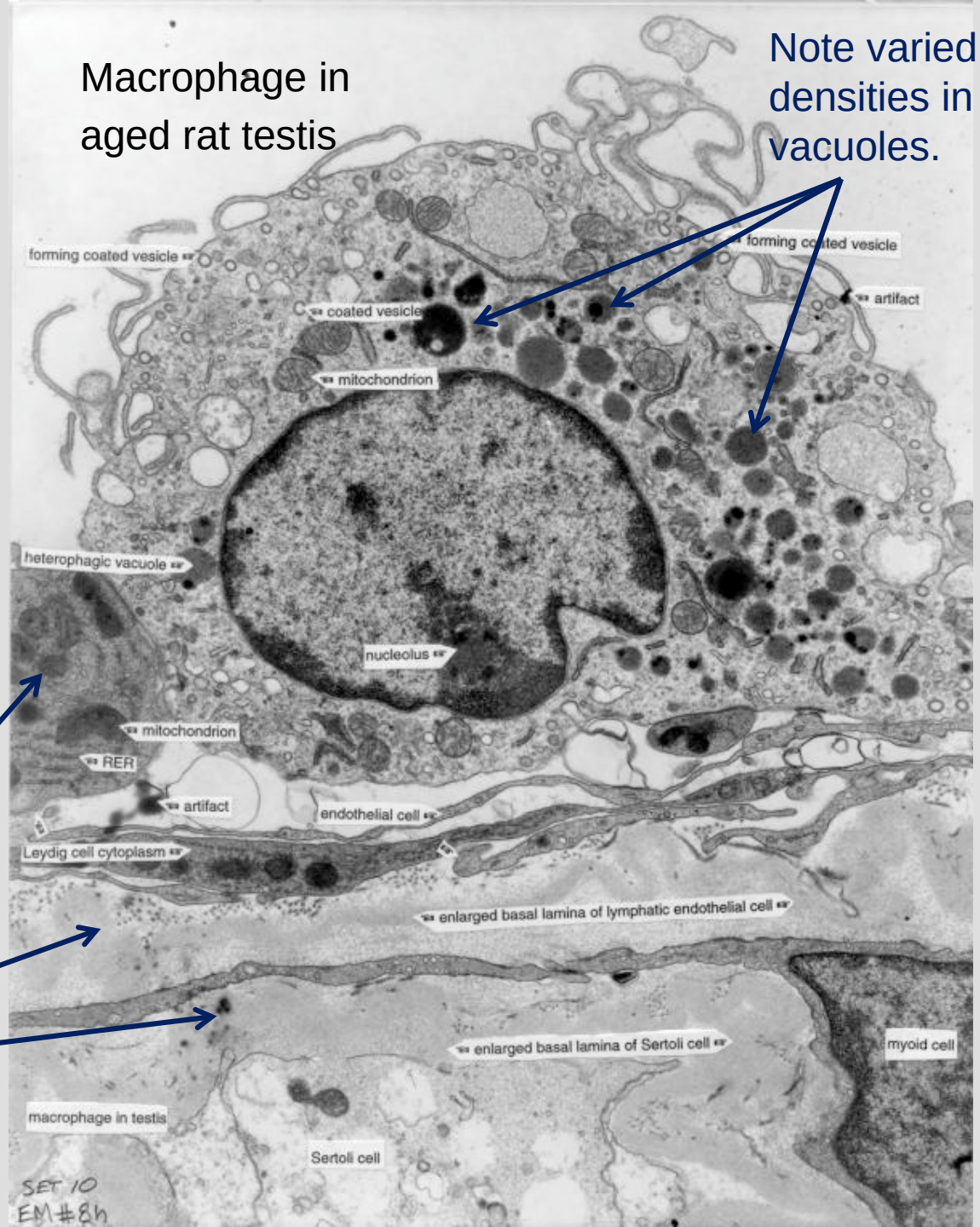


432 lung macrophages



Macrophage in lamina propria of rat intestine





EM 8h: Macrophage in aged testis; 30,000x

Enlarged basal lamina

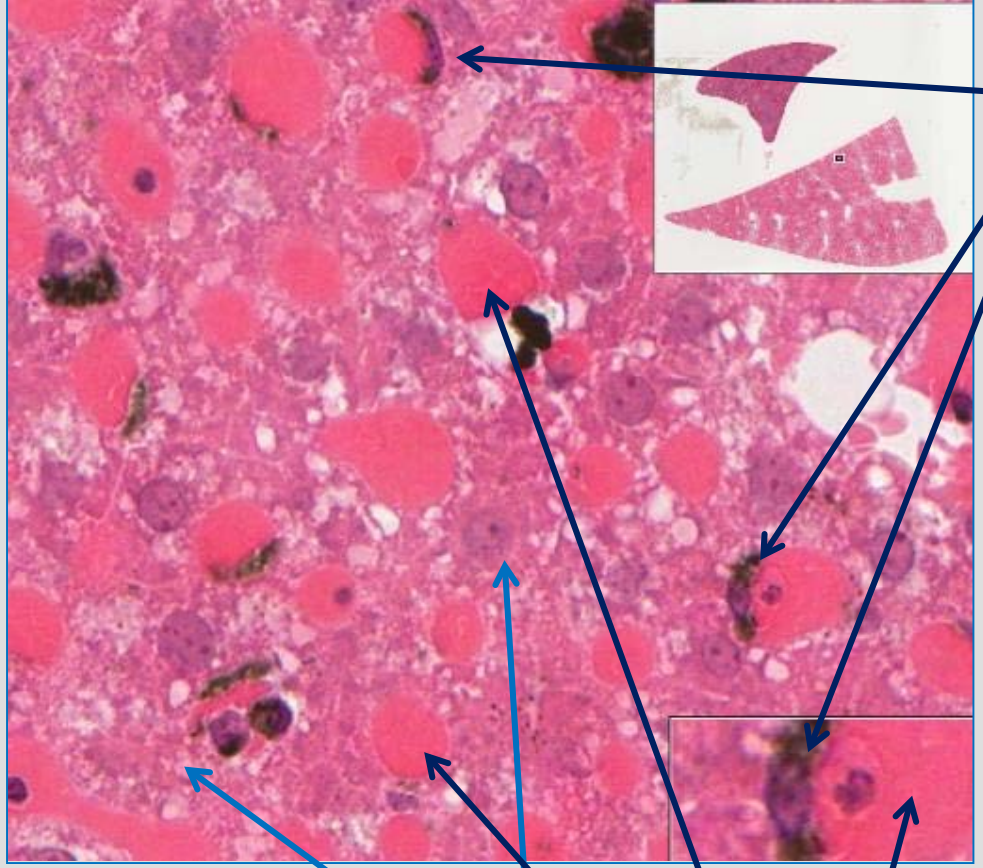
Heterophagic vacuoles

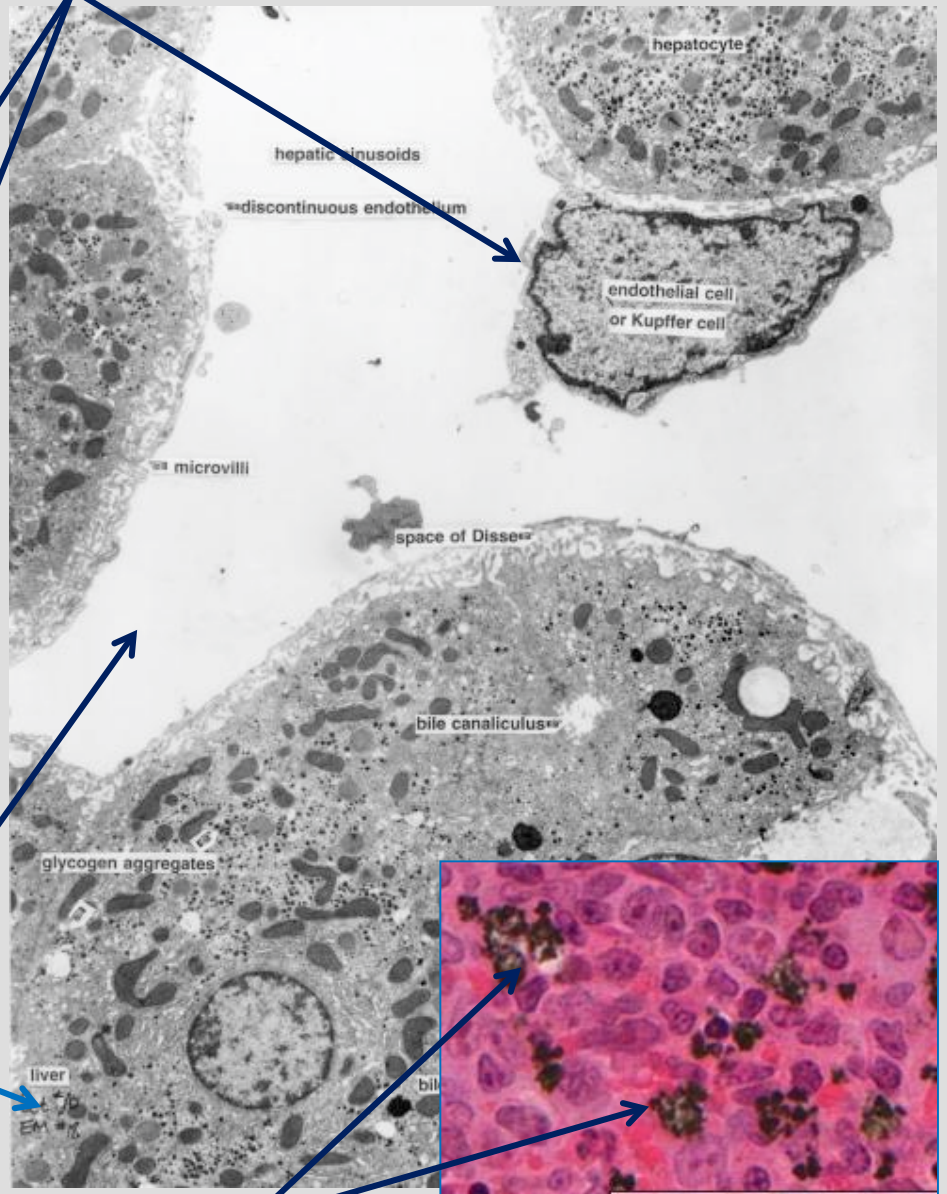
Leydig cell cytoplasm

Myoid cell

Kupffer cells

EM 18





Slide 118 liver

Hepatocytes

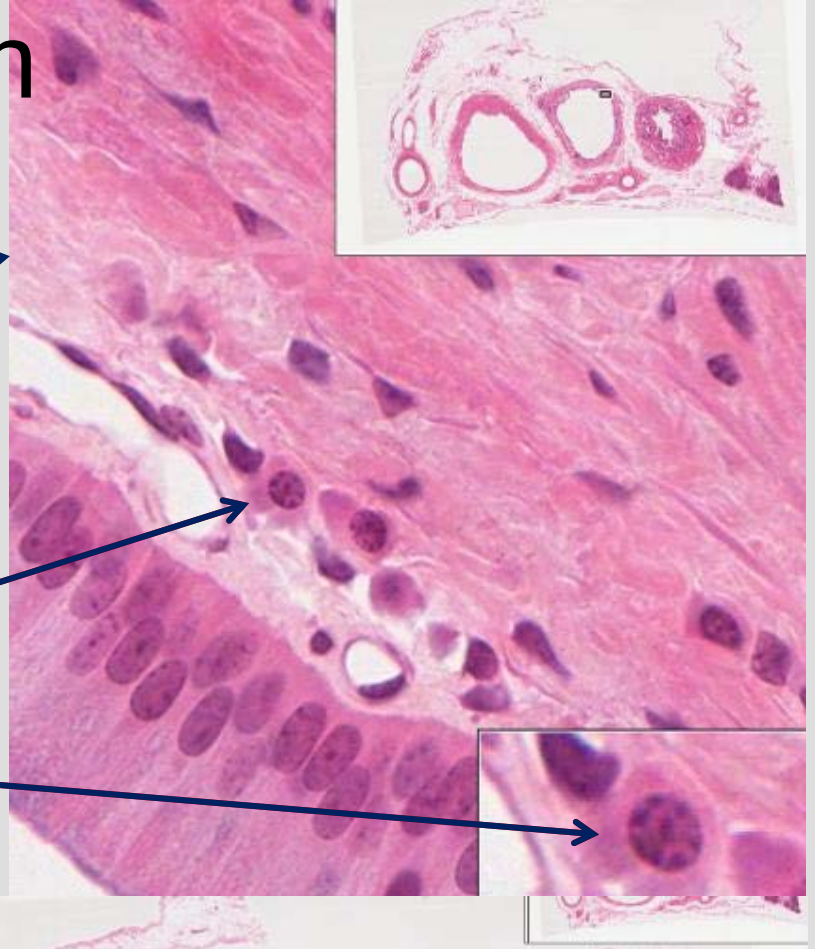
Blood bathing of the
hepatocytes travels through portal sinuses

Slide 118 carbon deposits
in the macrophages in the spleen

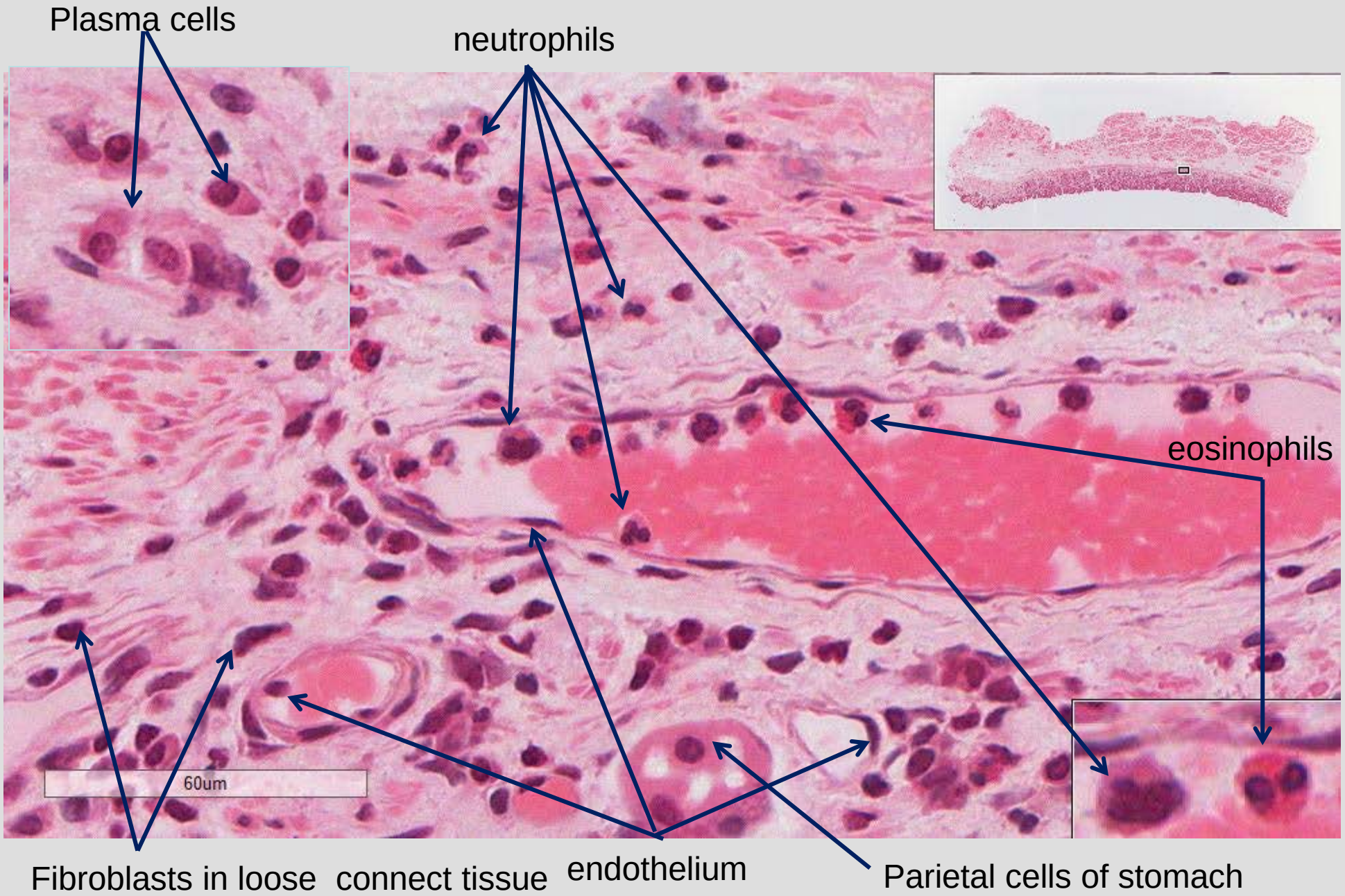
Slide 126: Bile duct with portal vein, monkey

– Loose connective tissue,

– plasma cells

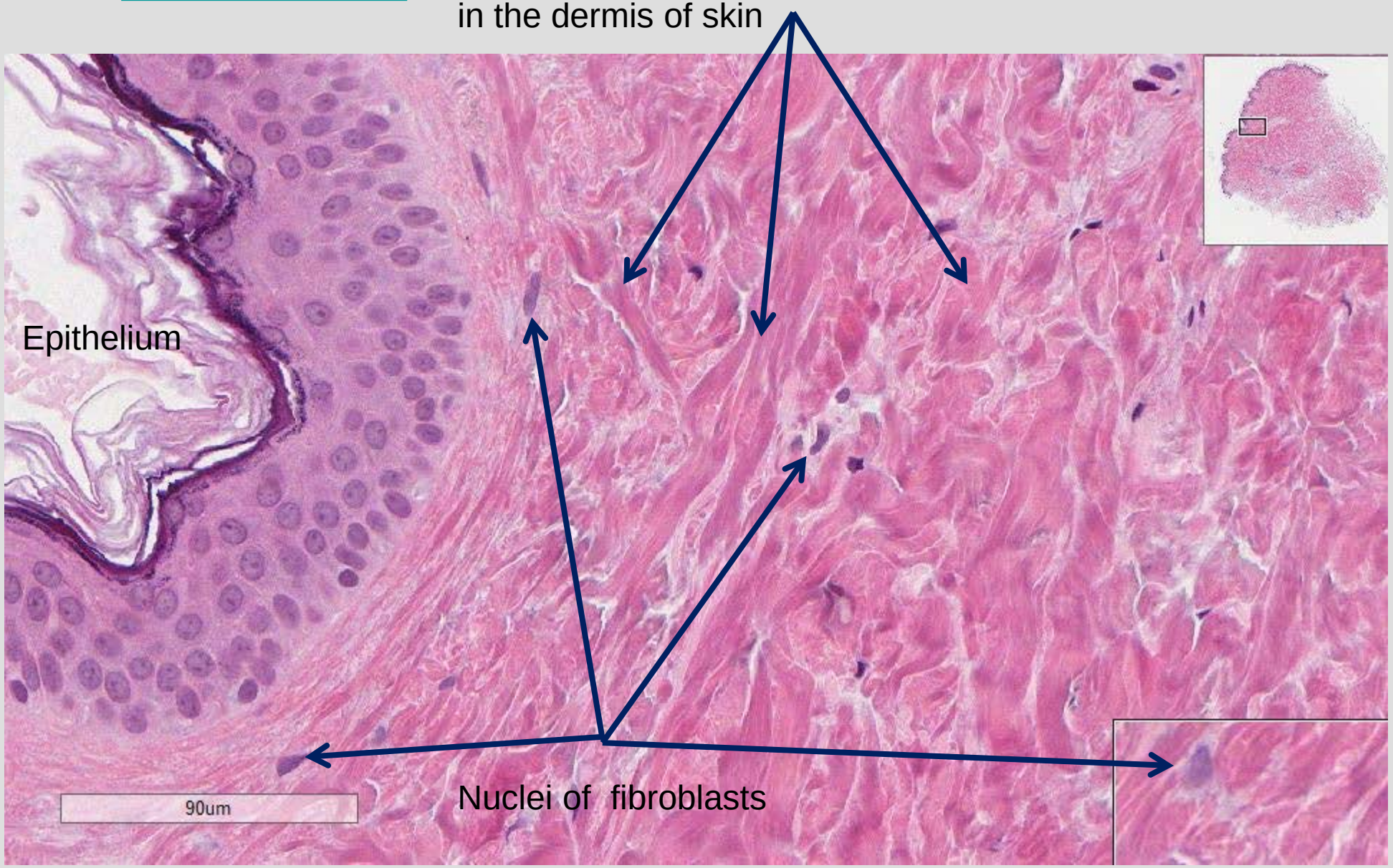


140 Cardiac stomach w/chronic infection

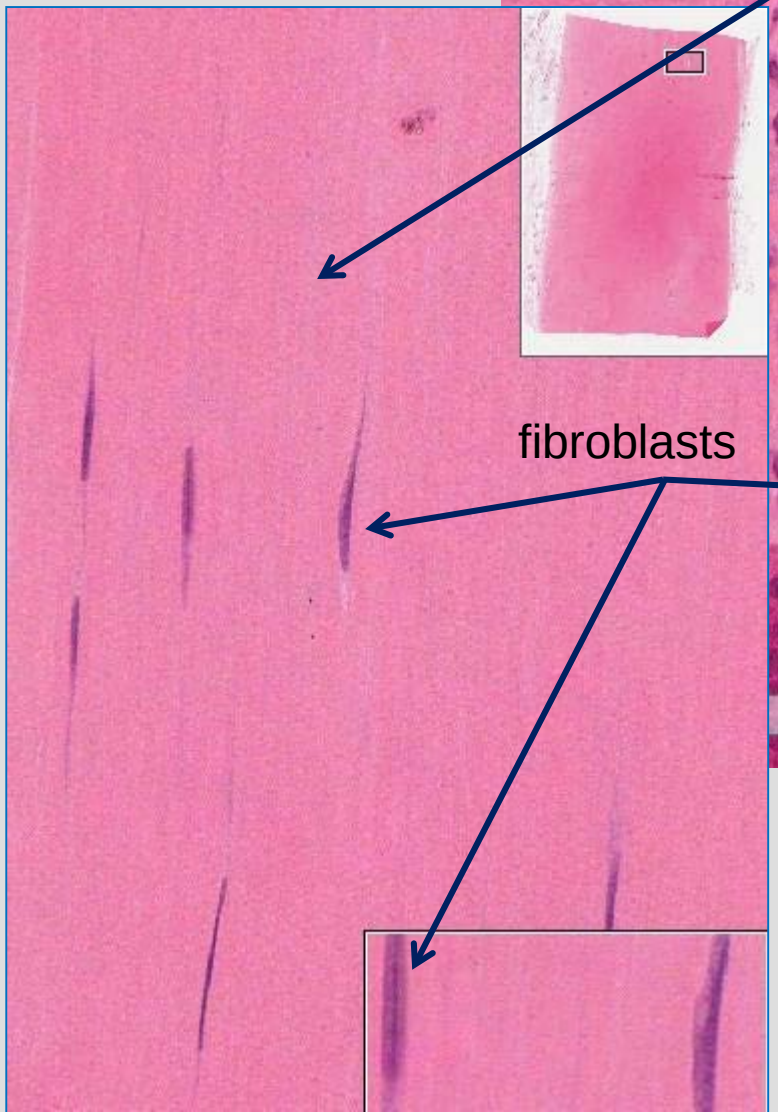


111 Skin

Large bundles of collagen fibers running in different directions (irregular) and of high density (dense) = dense irregular connective tissue in the dermis of skin



Slide 202 tendon



fibroblasts

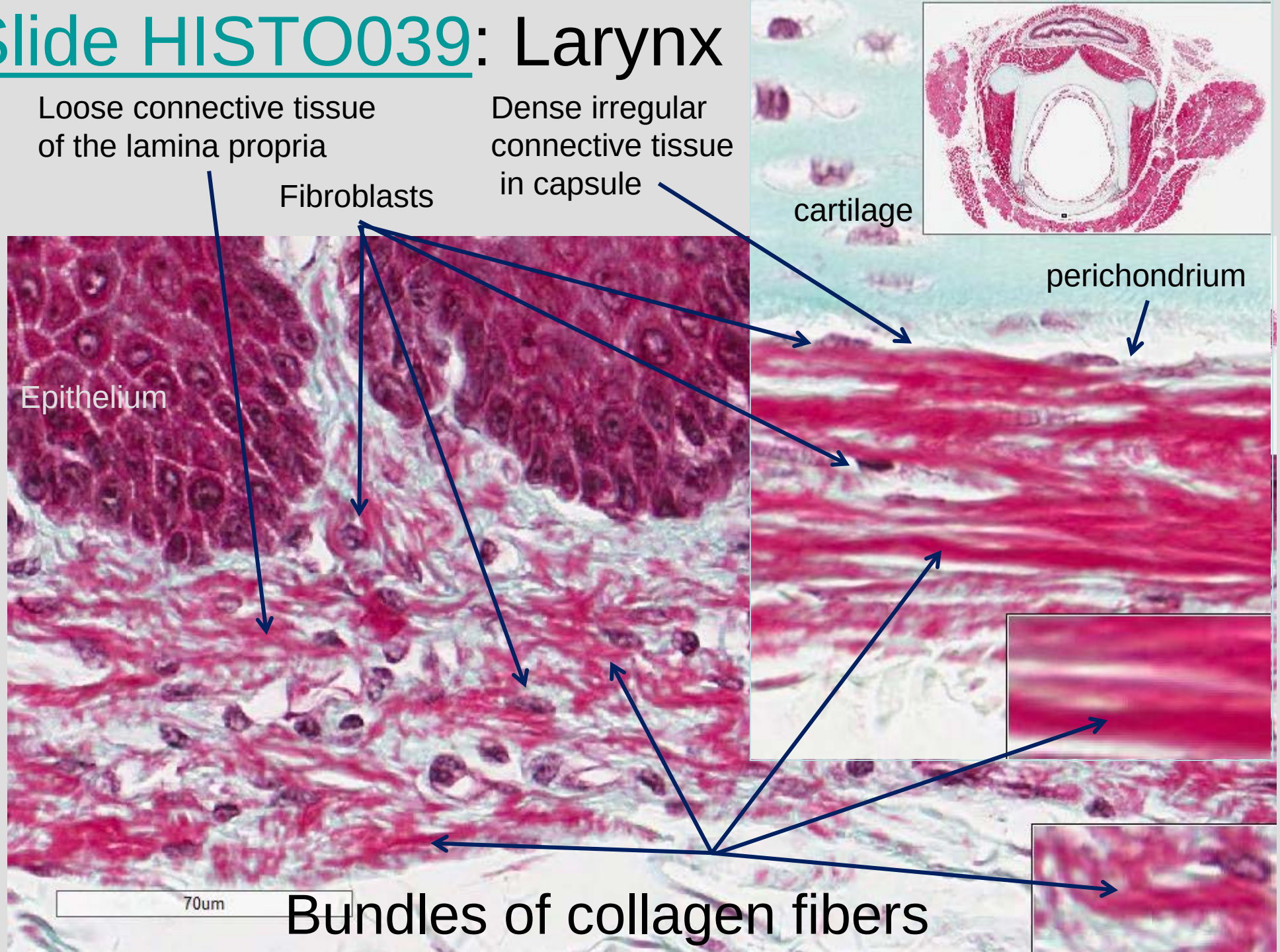
High density of collagen fibers
regularly or irregularly arranged

dermis

Slide 109 skin

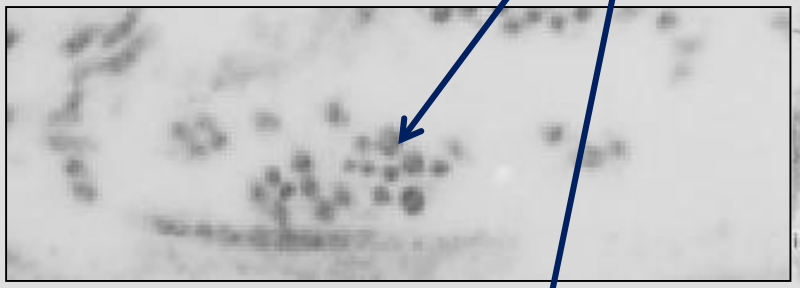
With flexibility, high tensile strength, and impressive resistance to stretch, concentrations of these fibers are found where these attributes are crucially important.

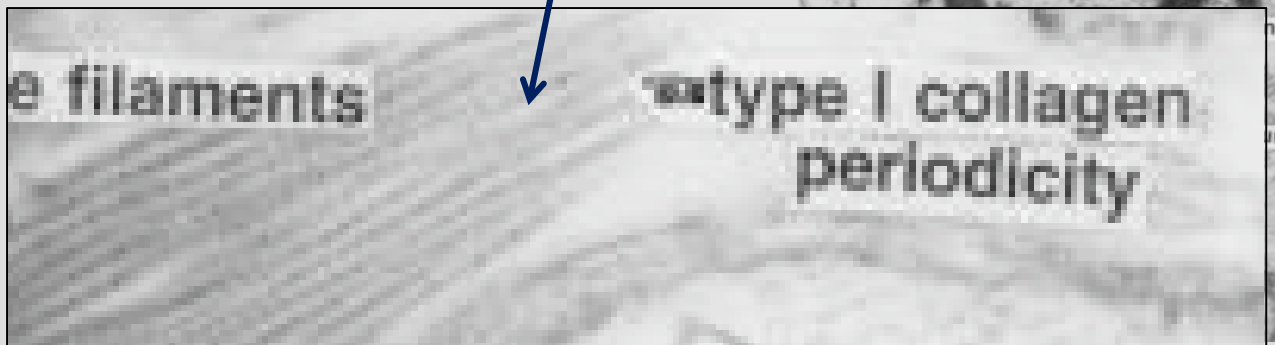
Slide HISTO039: Larynx



EM 10d: Schwann cell

Collagen fibers

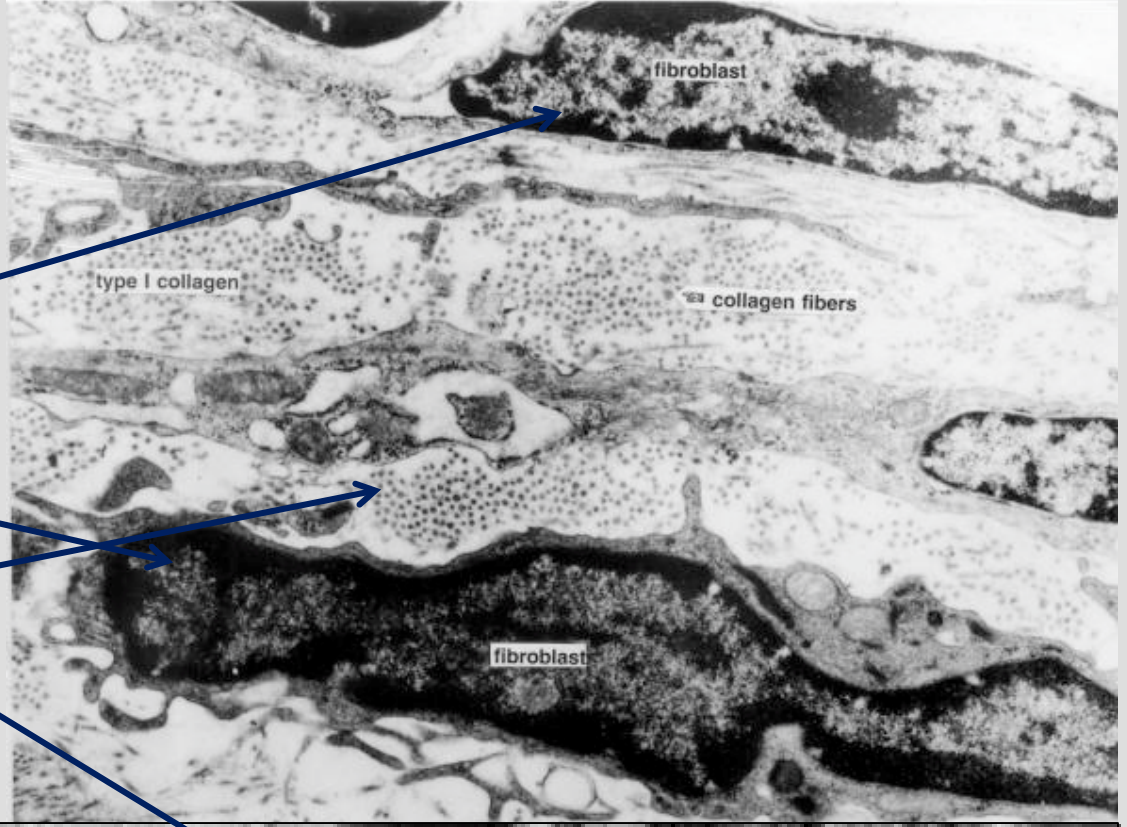


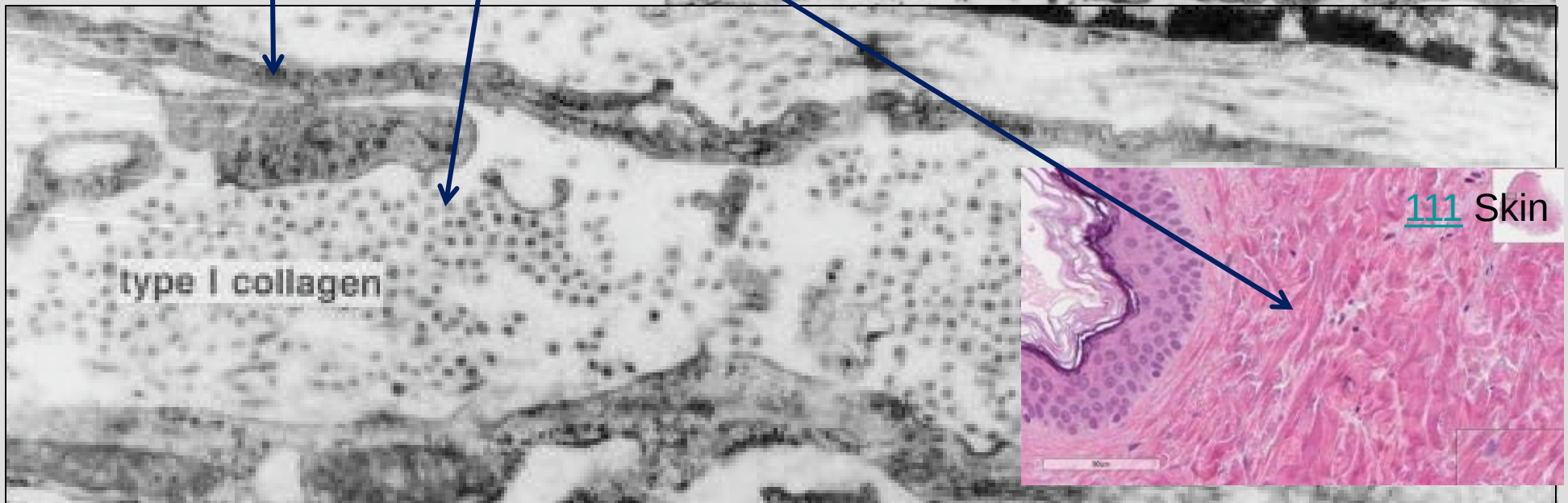


EM 8e: Fibroblasts

Fibroblasts

Bundles of collagen fibers





Slide 218 spleen with dark, branched reticular fibers

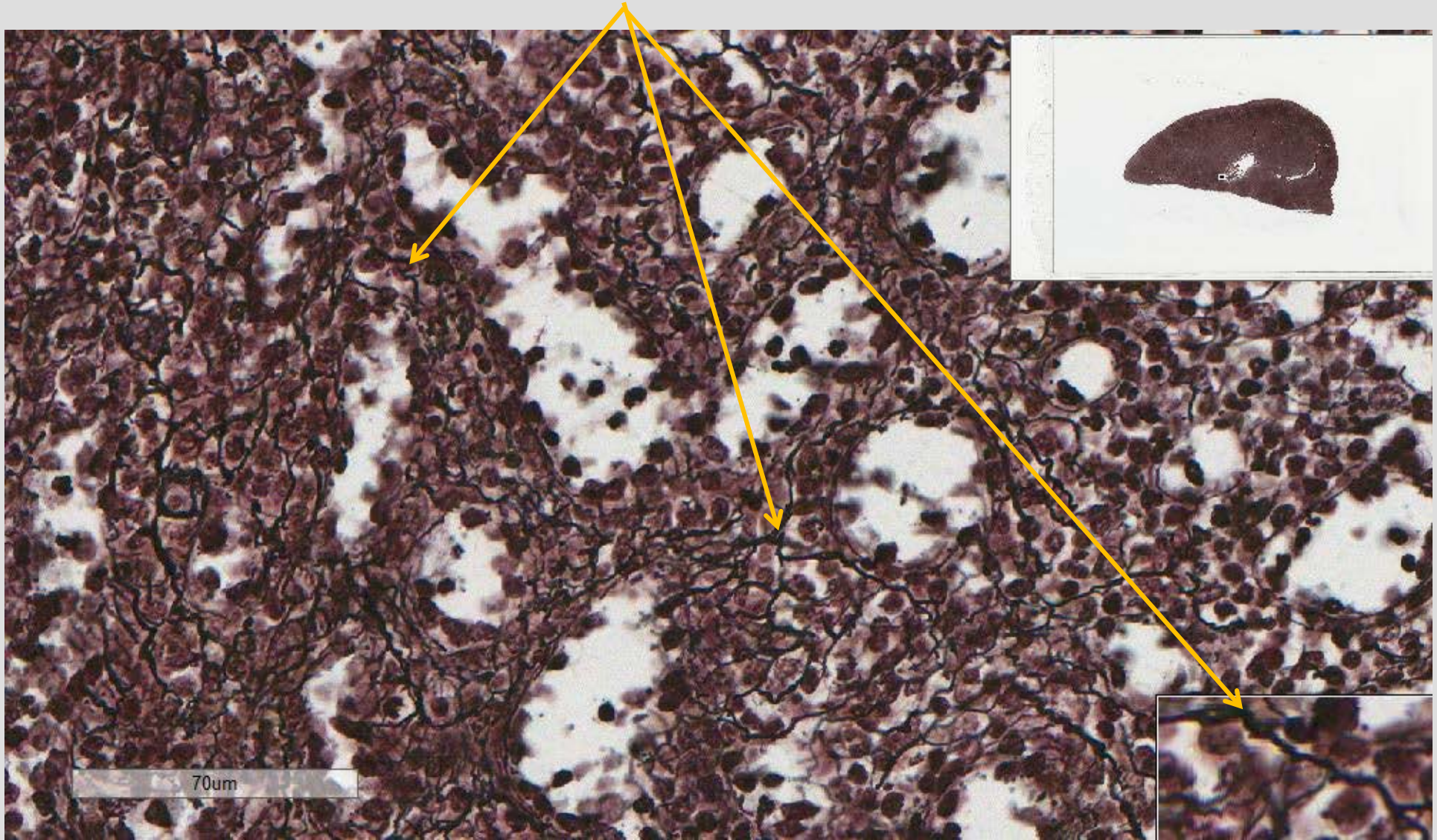
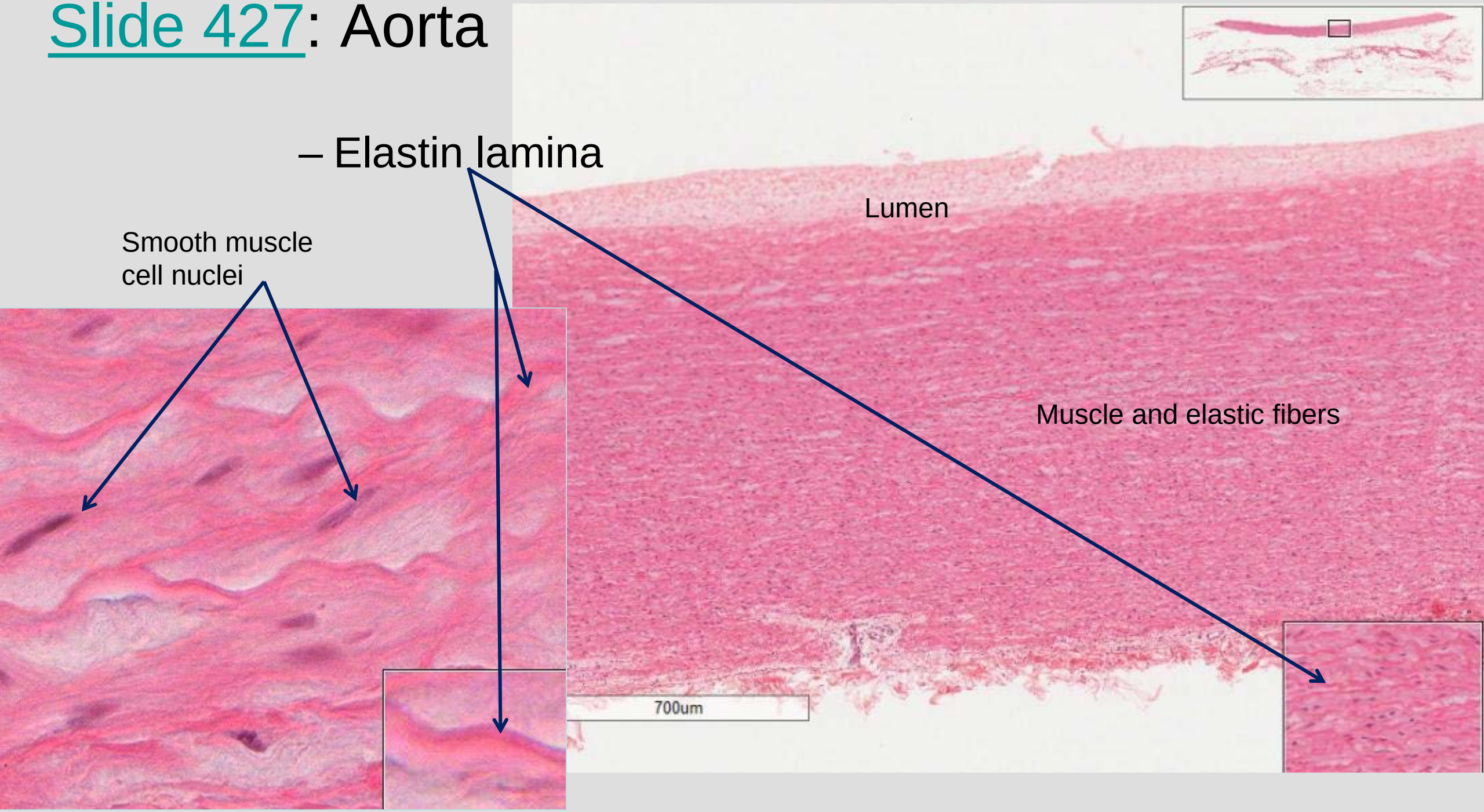


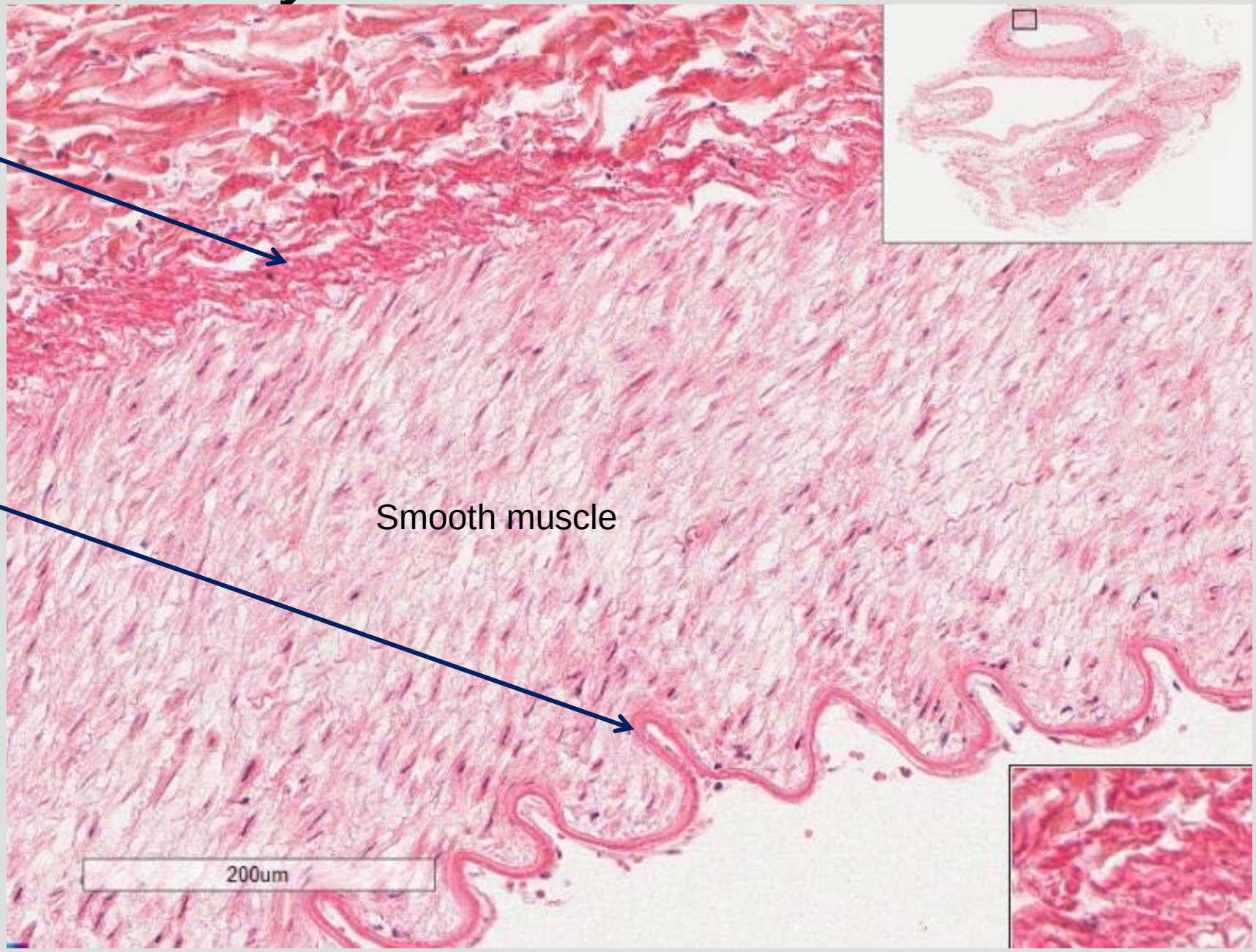
Fig. 2-4 Loose Connective Tissue. Stain: hematoxylin-eosin. High magnification.

Slide 427: Aorta

– Elastin lamina

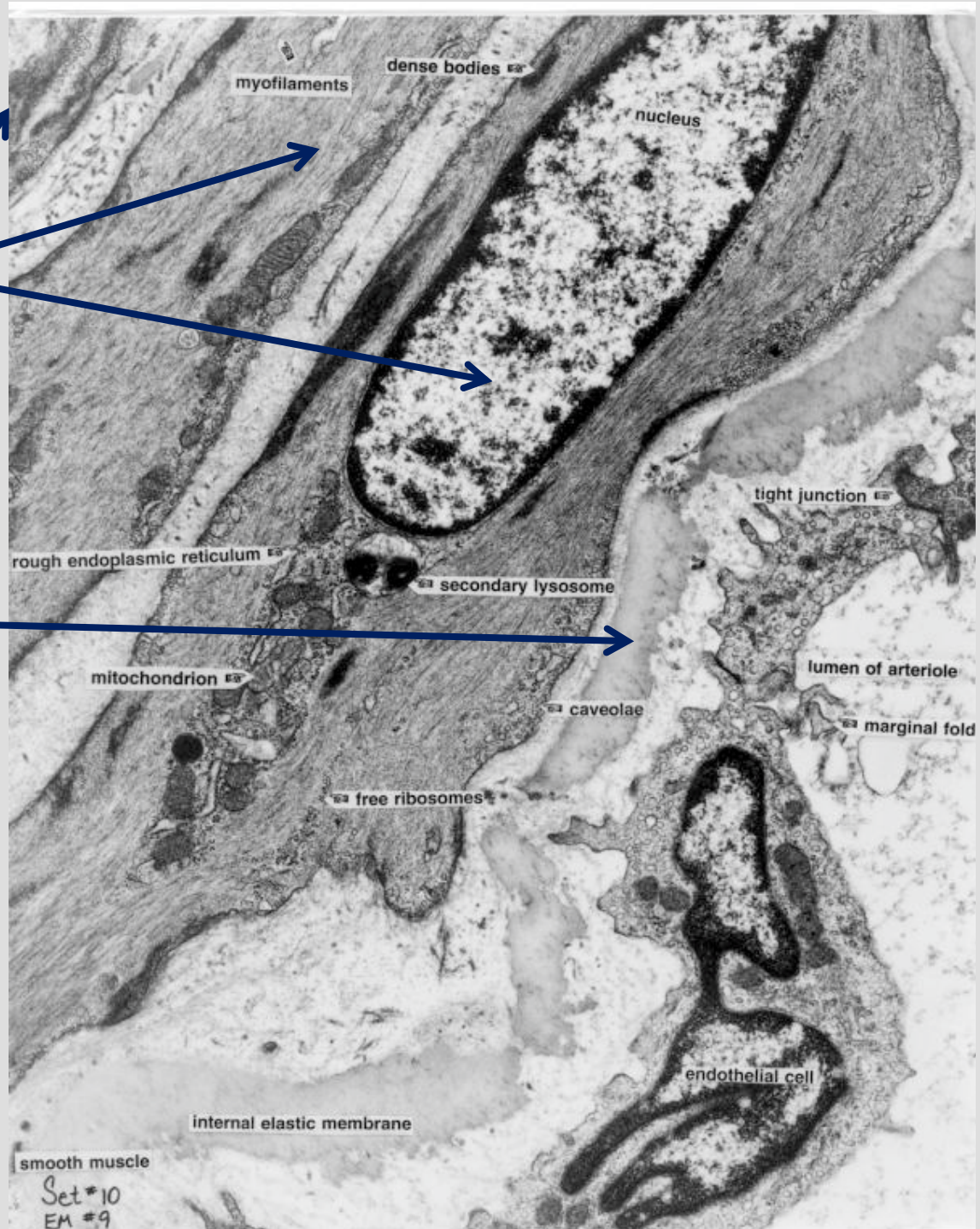


Slide 426: Renal artery and vein with nerves



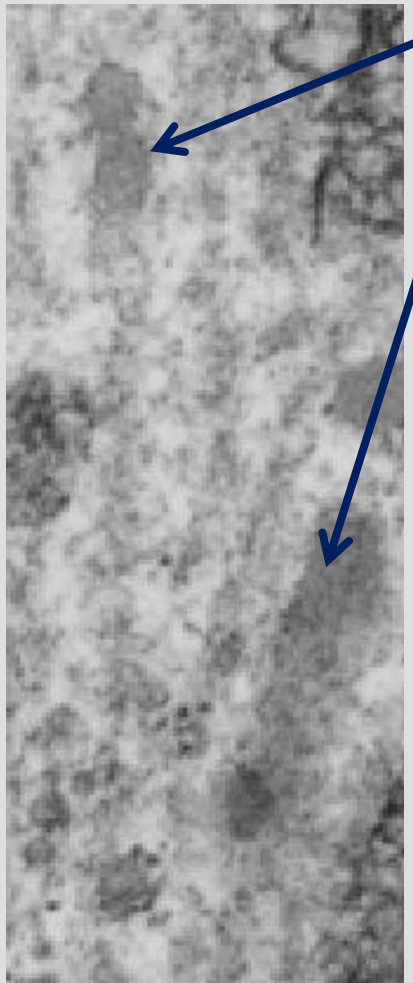
EM 9: Smooth muscle cells

Elastic lamina

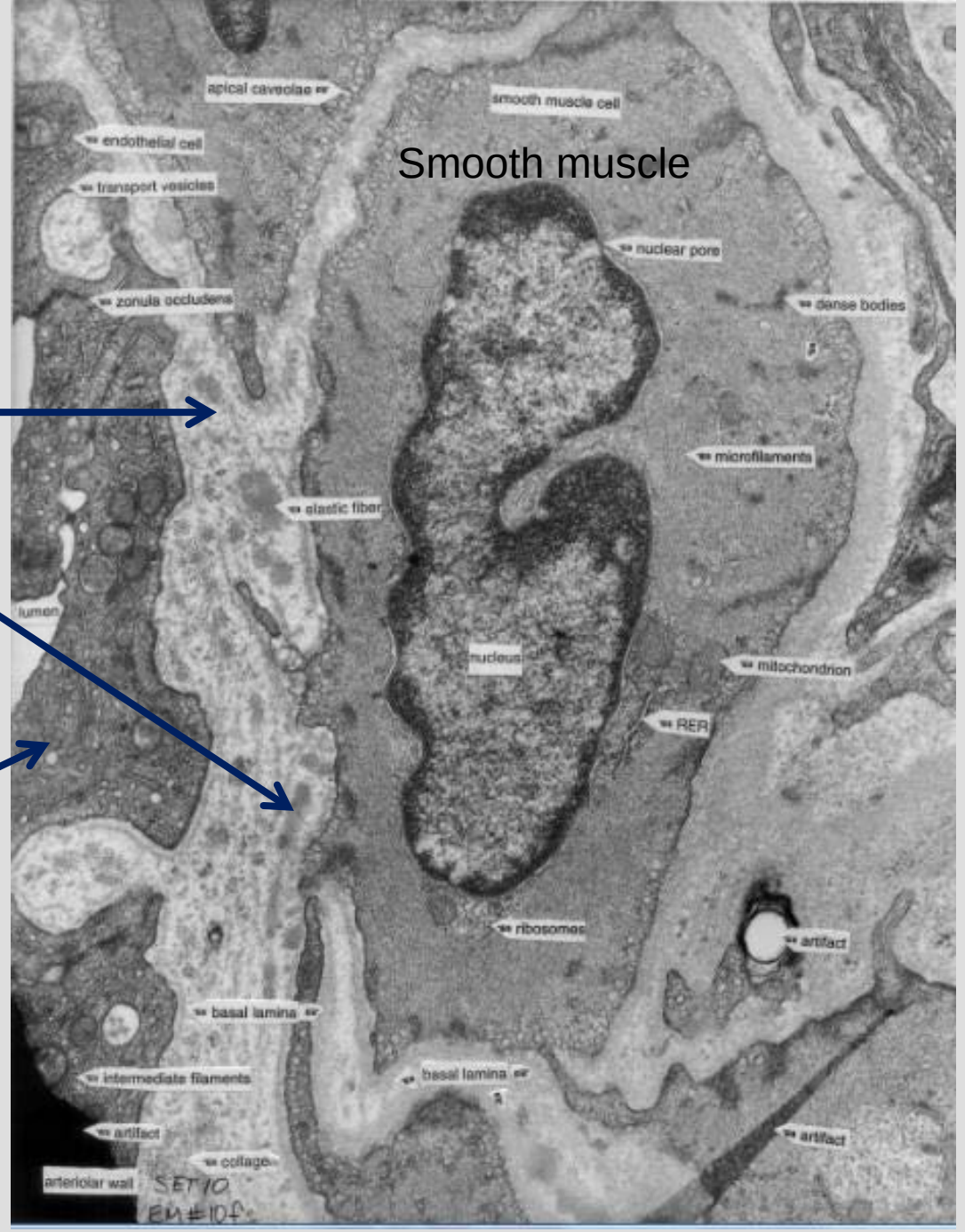


EM 10f: Arteriolar Wall

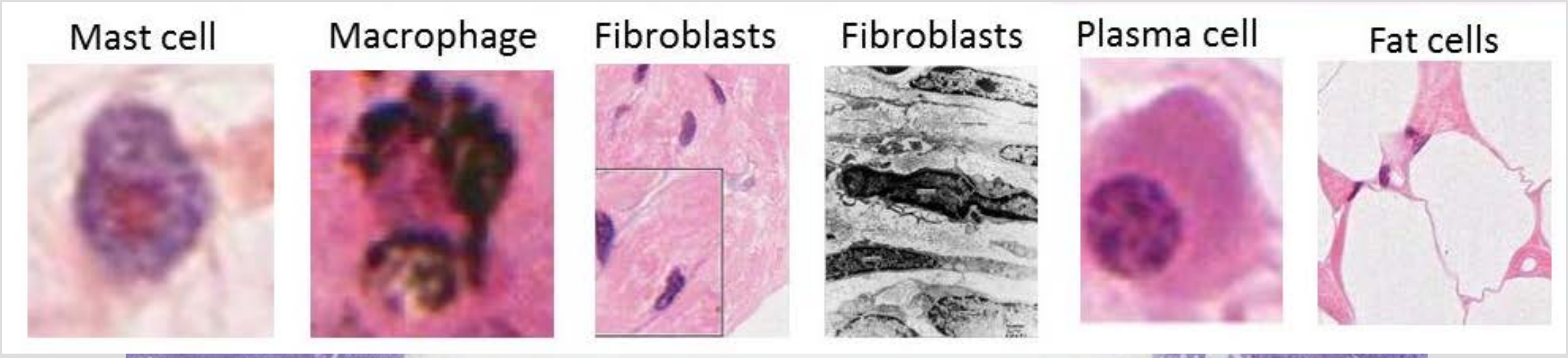
Elastic fibers



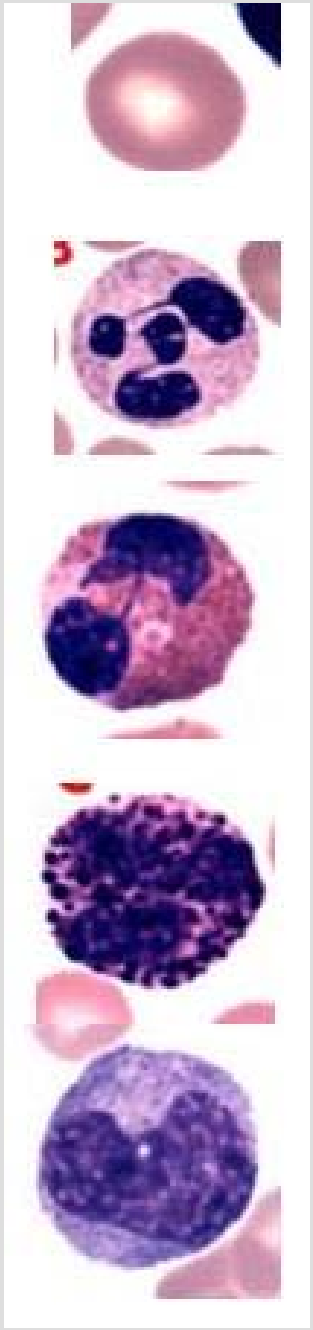
Endothelium



Slide 32409 Intestine: Connective Cells



In summary



Blood cells

Function of Connective Tissue

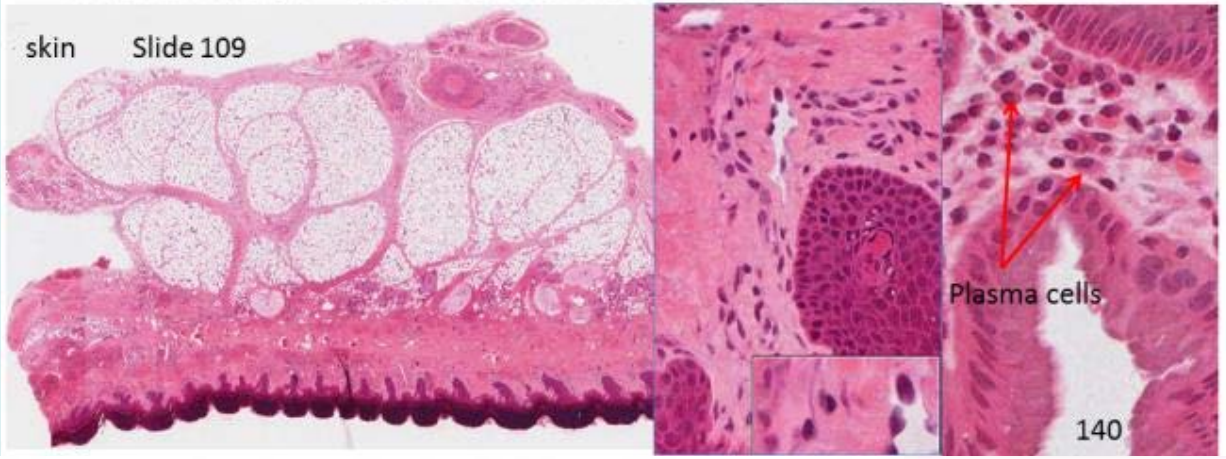
The histological glue which binds the other tissues together to form organs

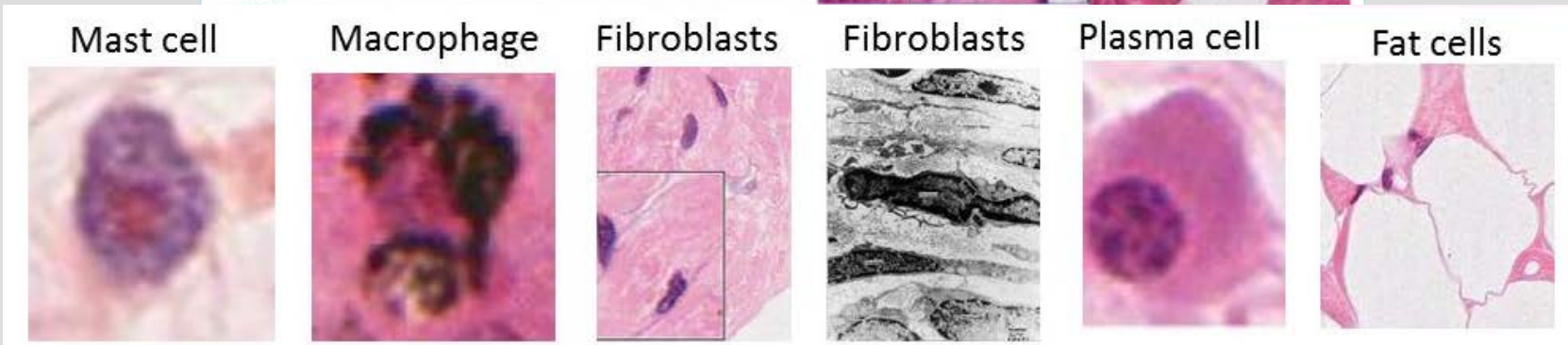
Mechanical support - stroma below epithelium, skeleton

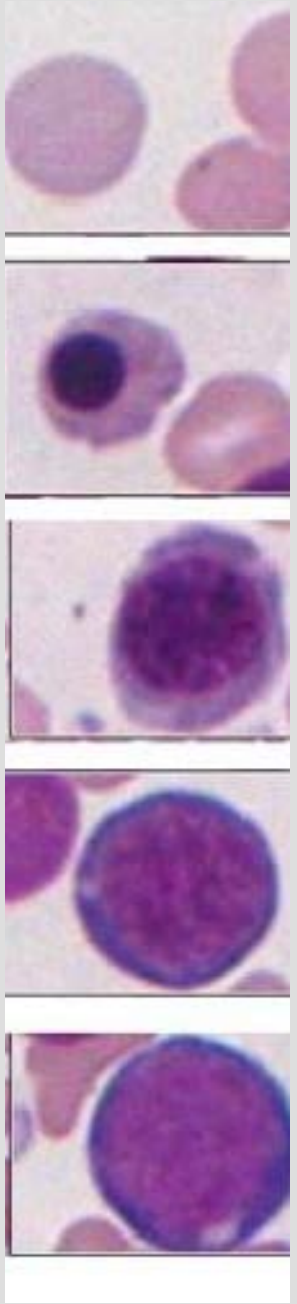
Metabolite exchange - vascular beds

Energy storage - adipose tissue

Inflammation - site of action for blood borne immune cells







Marrow cells

Many illustrations in these VIBS Histology YouTube videos were modified from the following books and sources: Many thanks to original sources!

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Questions on Connective Tissue

Connective tissue:

a. provides mechanical support and metabolic exchange for epithelia
b. provides site of battle for blood borne immune cells
c. stores energy in striated muscle cells
d. **a and b**
e. a, b, and c

Classification of connective tissue proper is based on:

a. ratio of cells to extracellular matrix
b. arrangement of fibers
c. the density of fibers in the extracellular matrix
d. a and b
e. **a, b, and c**

Cells of connective tissue that are progenitor (stem) cells are:

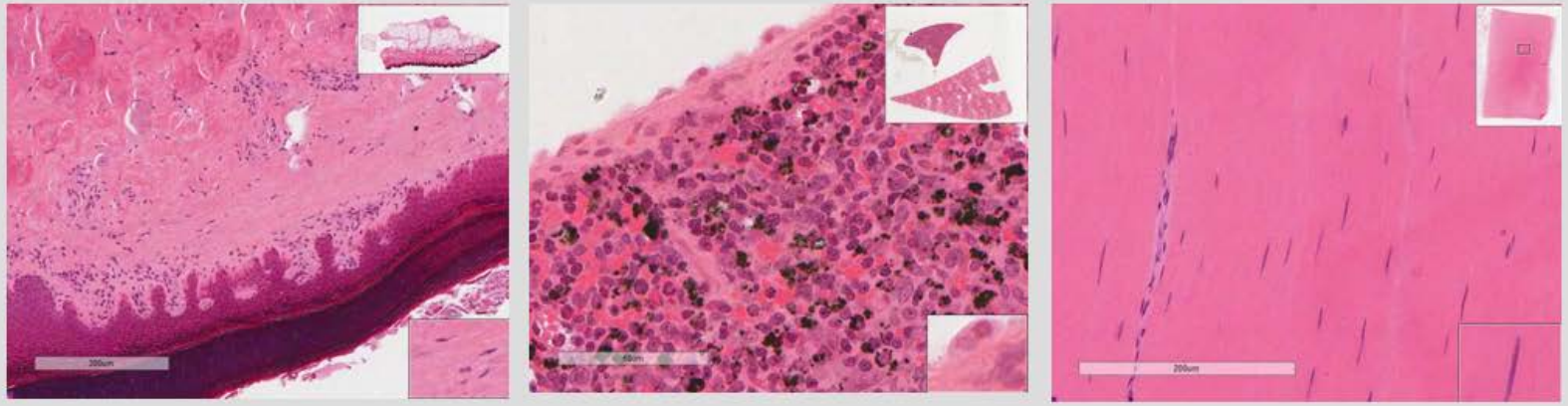
a. adipose cells
b. macrophages
c. plasma cells
d. **fibroblasts**
e. mast cells


Ocotillo plant
Mexico
Big Bend TX, USA

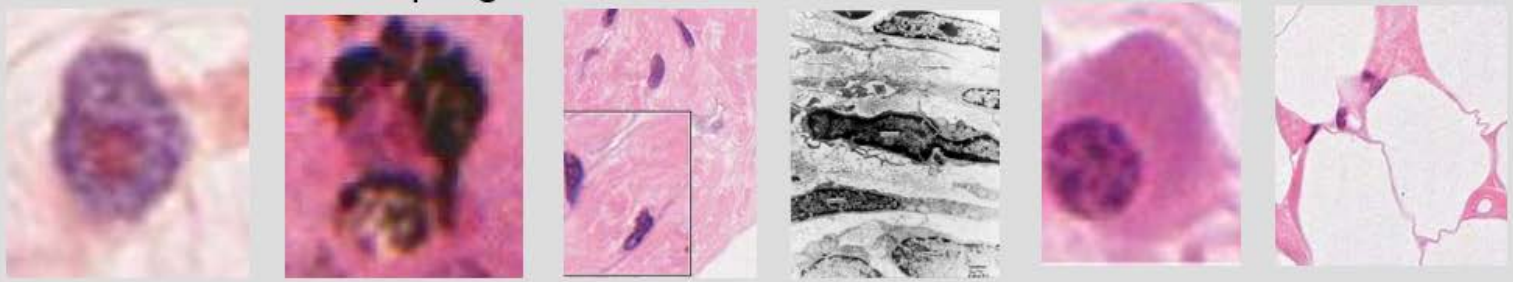
End of

Medical School Histology Basics
Connective Tissue

VIBS 243



Mast cell | Macrophage | Fibroblasts | Fibroblasts | Plasma cell | Fat cells



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