

Microscopic Anatomy Connective Tissue

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VETS30015 / VETS90121



Intended Learning outcomes

At the end of the lecture, you should be able to:

- Explain how the basic tissue types combine to form body systems
- Explain the basic structure of connective tissues
- Identify the cells and extracellular material found in connective tissues

What is histology?

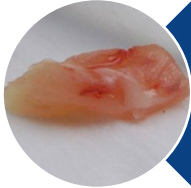


- Histology is the study of the structure of tissues at microscopic level
- The arrangement of cells within the tissue
- Structural levels of organization in the body

Why is it important to study histology?

- To understand the function of the organ, it is important to know how cells are arranged in the organ
- It is the basis of understanding the pathology

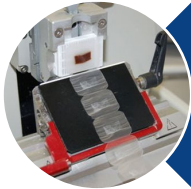
How histological slides are prepared?



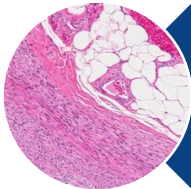
Fixation



Embedding

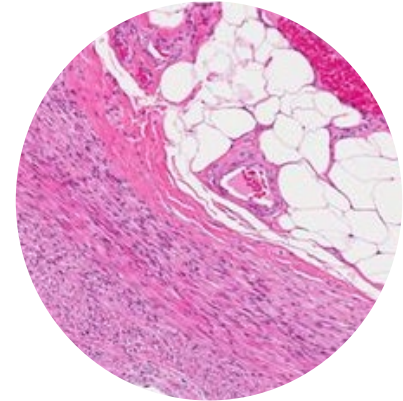
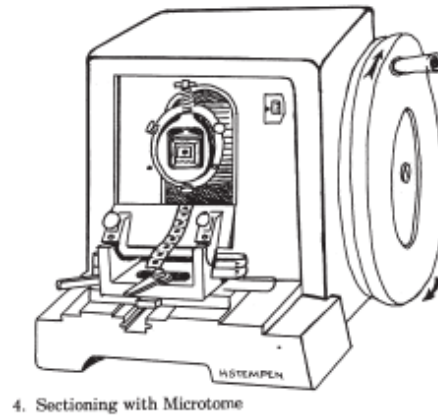
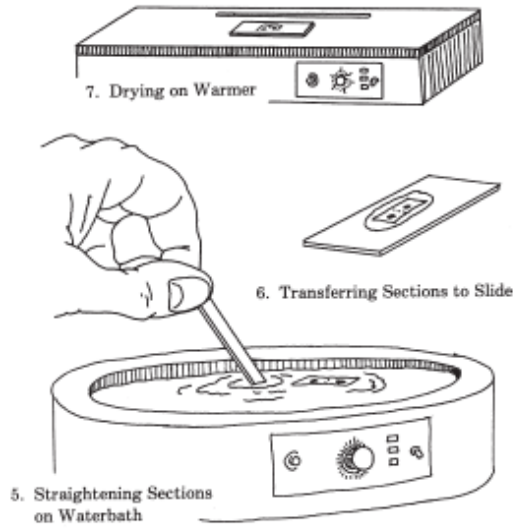
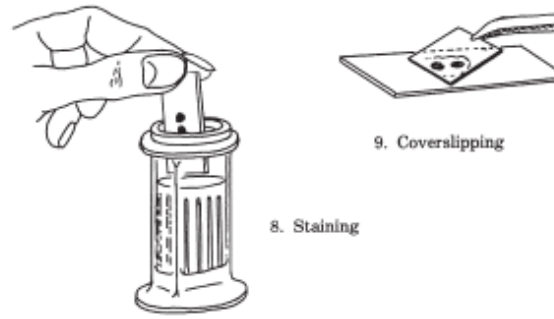
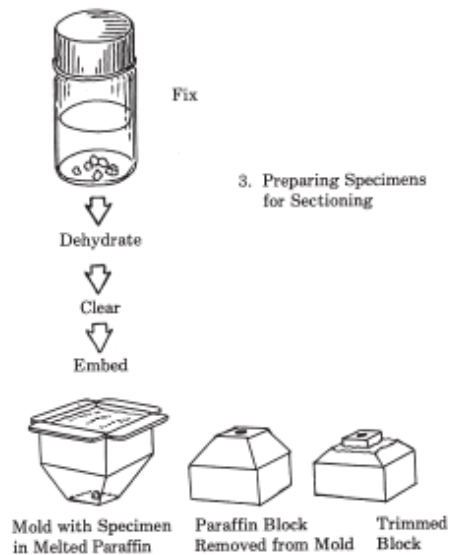
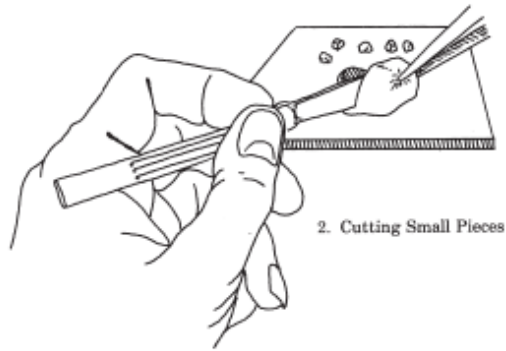
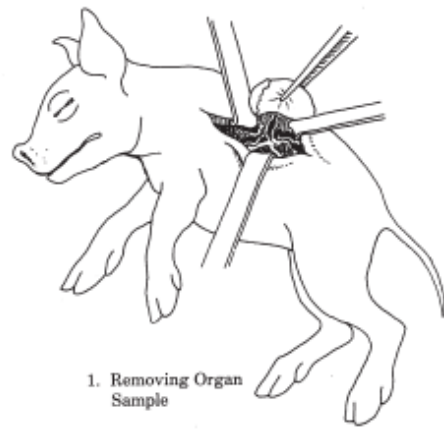


Cutting



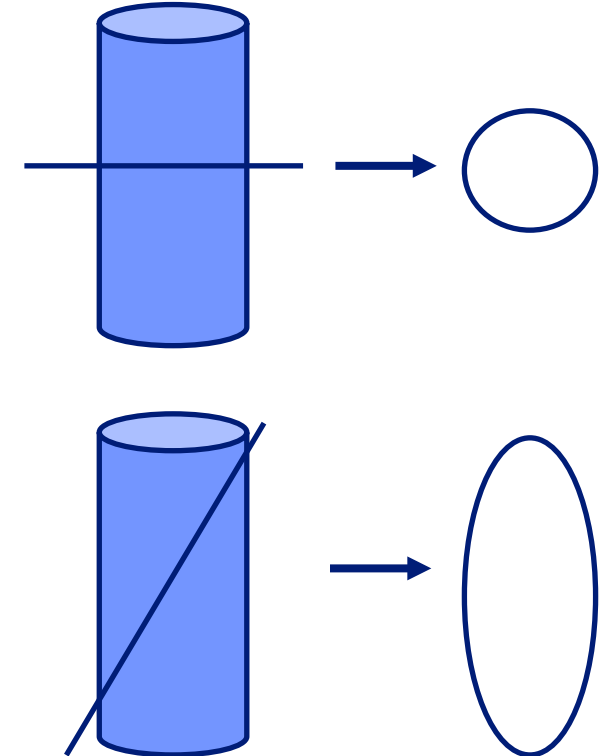
Staining



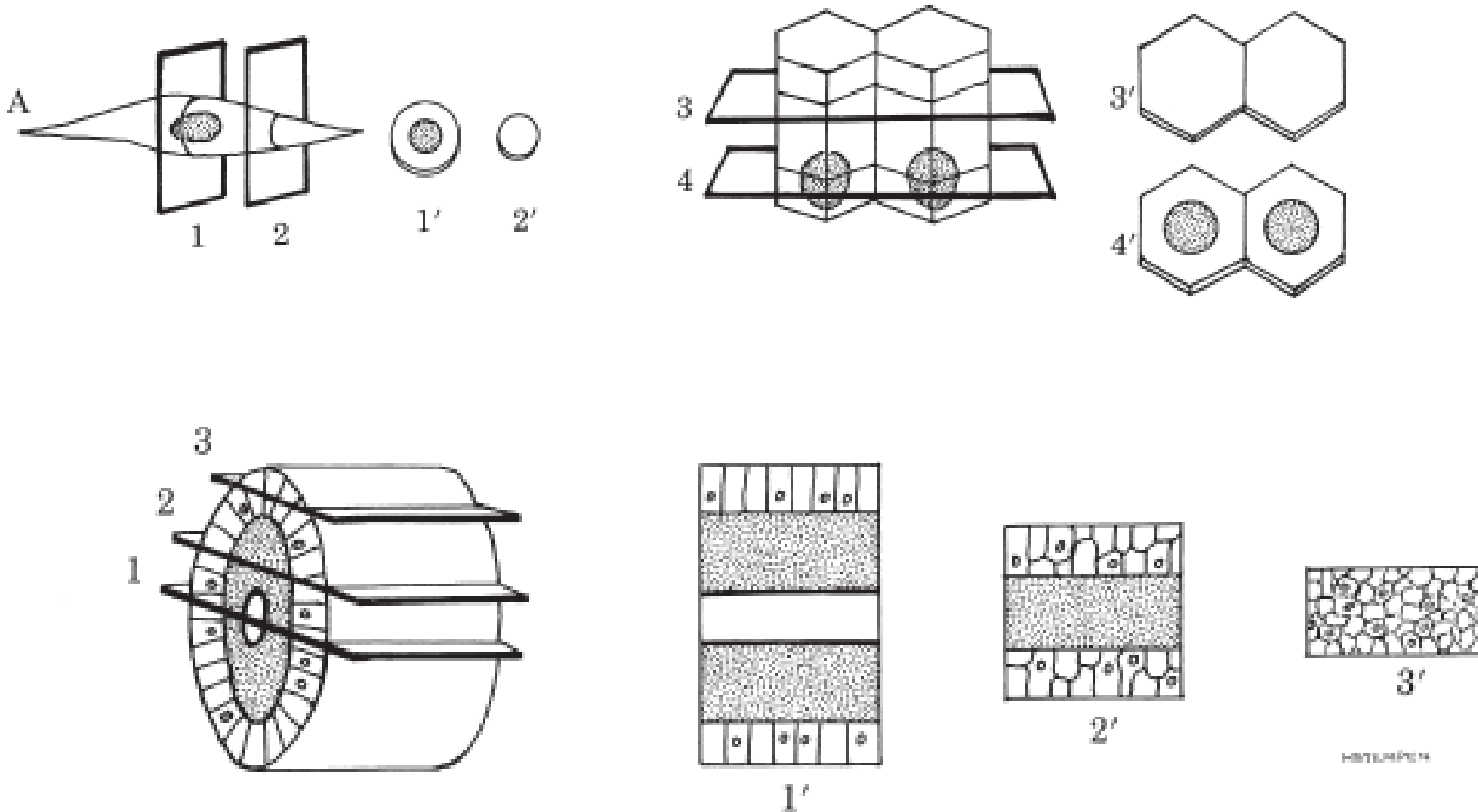


Things to consider while examining slides

- Two-dimensional representation of a three-dimensional structure
- When a tubular structure is cut in different planes the appearance will vary
- Various artifacts
 - Post-mortem change
 - Variation in staining
 - Folds in section
 - Air bubbles in mounting medium
 - Shrinking of tissue

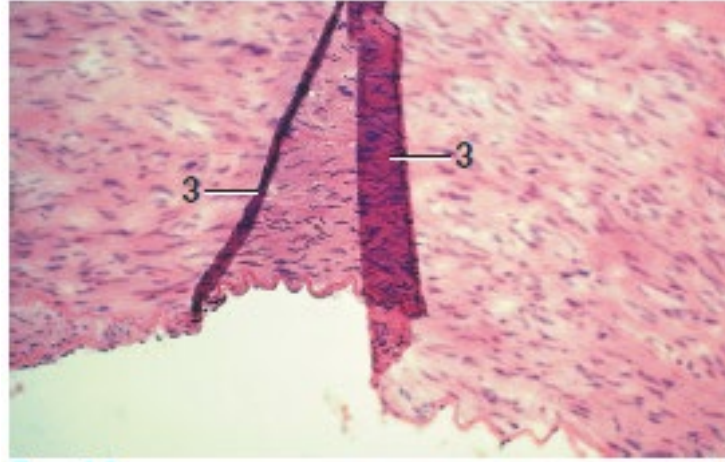


Interpreting sections

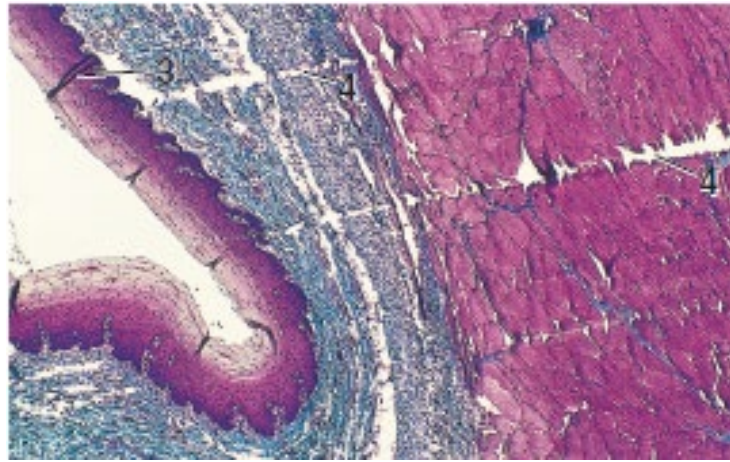
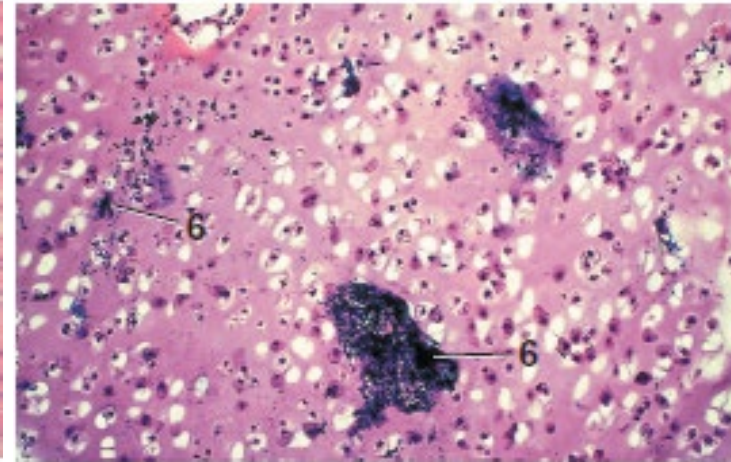


Artifacts

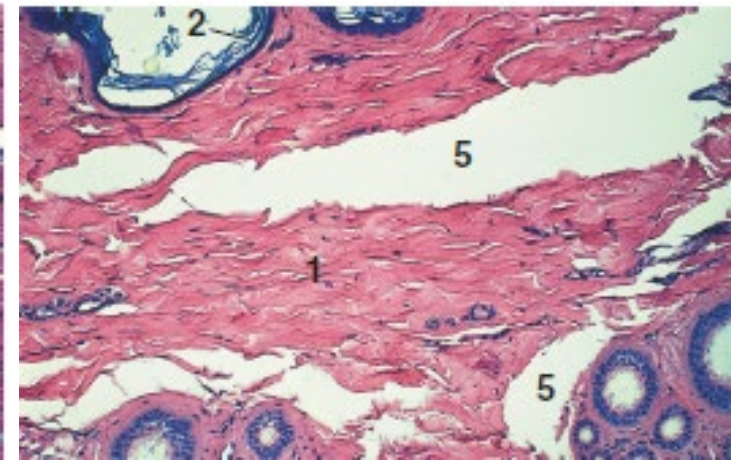
Fold



Stain precipitate



Knife marks



Separation artifact

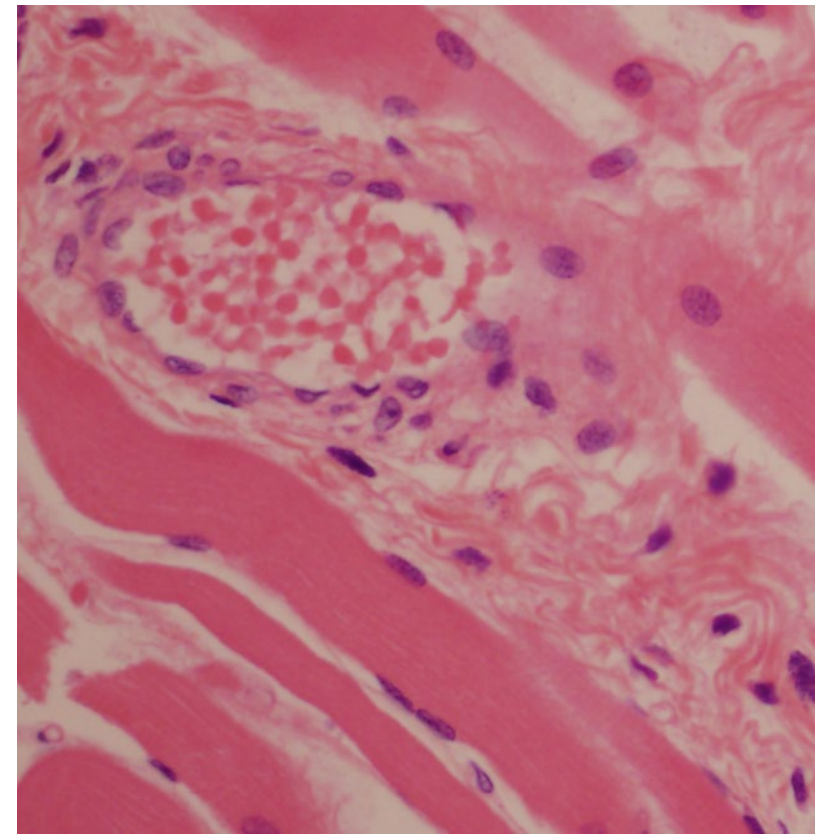
Terminology

Staining Characteristics

- Eosinophilic – pink - cytoplasm
- Basophilic – blue – DNA and RNA

Naming of cells

- Cells with '**blast**' at the end - e.g., Fibroblast
- Cells with '**cyte**' at the end - e.g., Fibrocyte



Tongue, Dog

Types of tissue

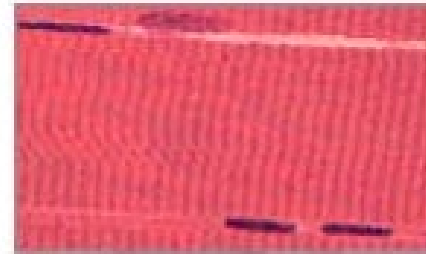
- Connective tissue
- Epithelial tissue
- Muscular tissue
- Nervous tissue



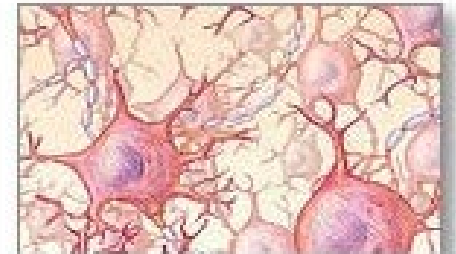
Connective tissue



Epithelial tissue



Muscle tissue



Nervous tissue

<https://medlineplus.gov/ency/imagepages/8682.htm>



Summary

- Introduction to histology
- How to process tissues for histological examination
- Artifacts
- Terminology
- Types of tissue



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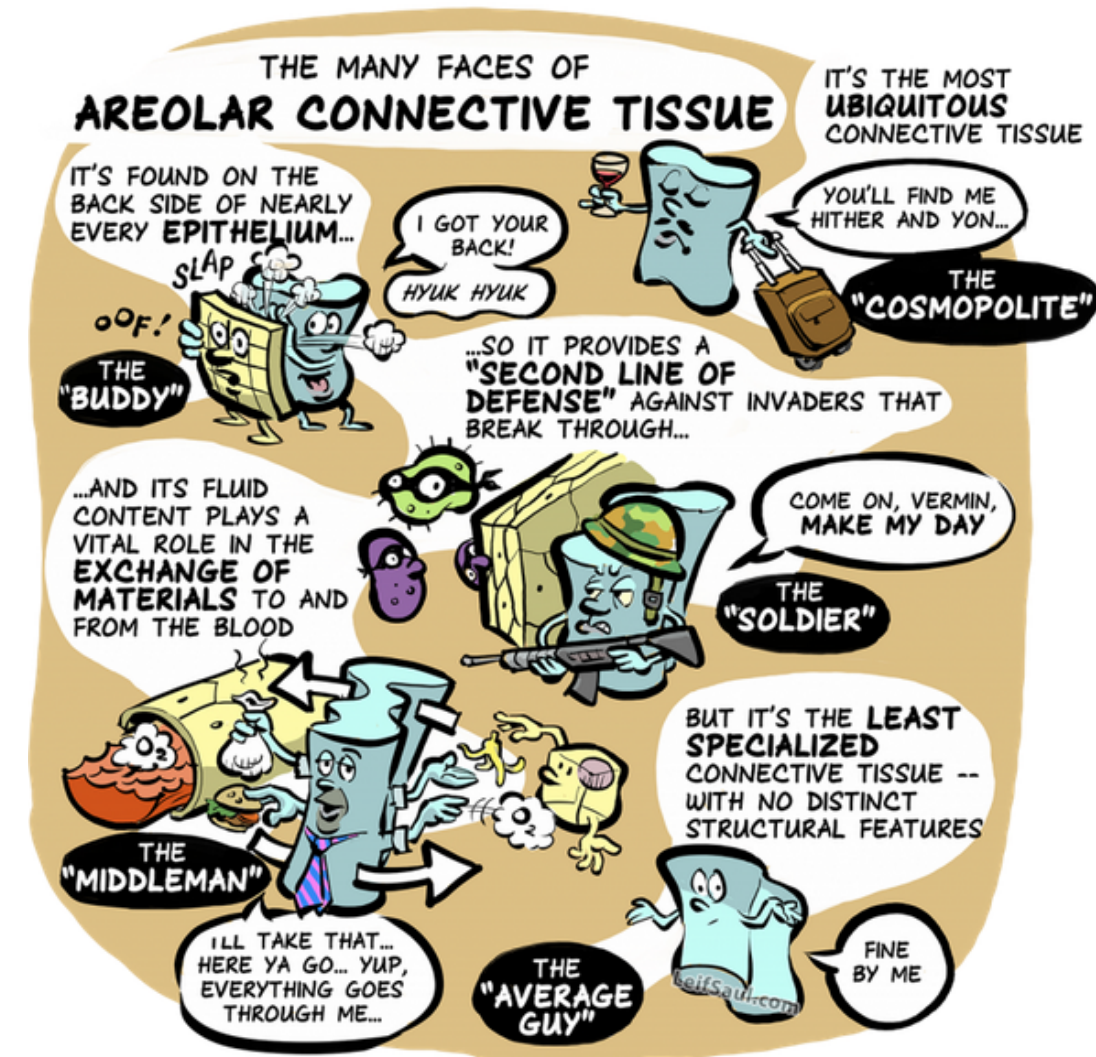


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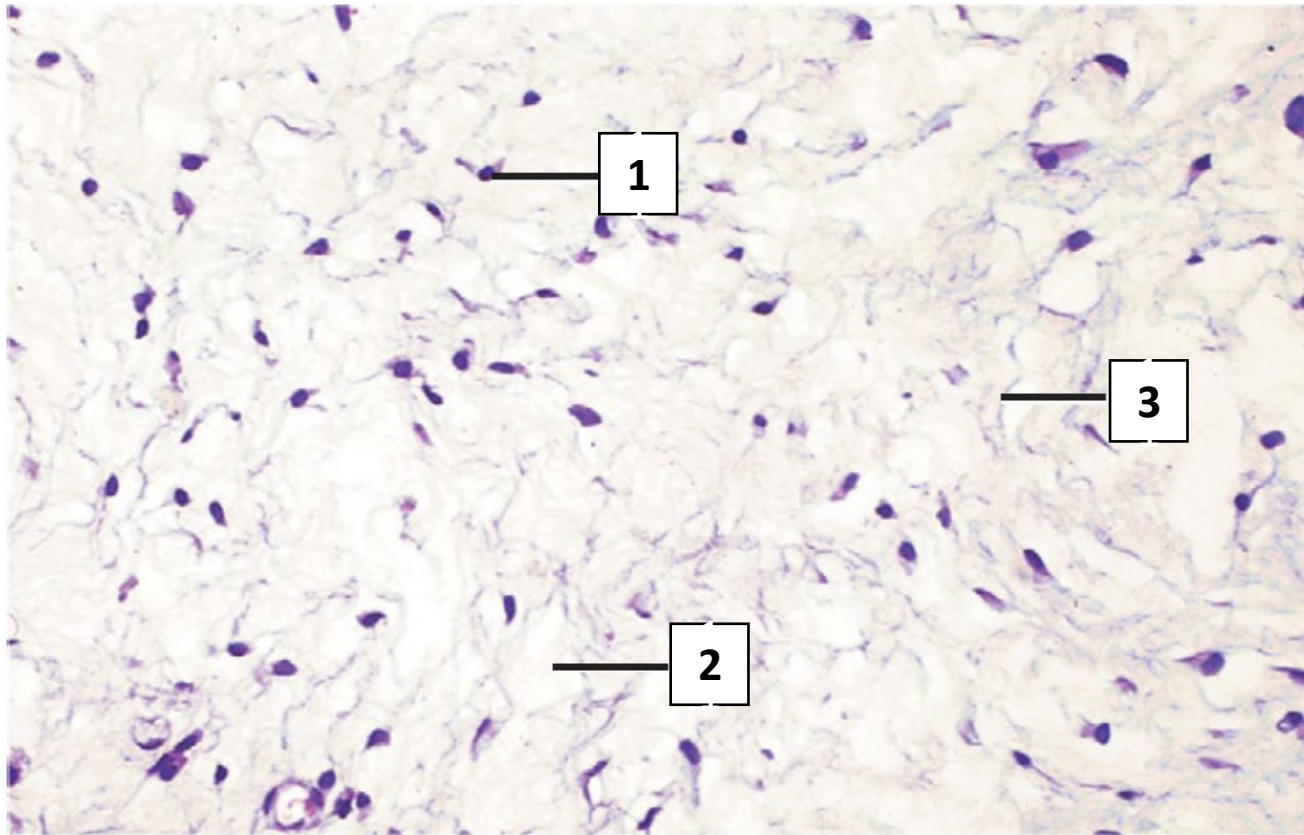
Connective Tissue (CT)

Function of Connective Tissue:

- Support
- Transportation
- Energy source
- Storage
- Inflammation and tissue repair



Composition of connective tissue



Umbilical cord, Cow

Cells (1)

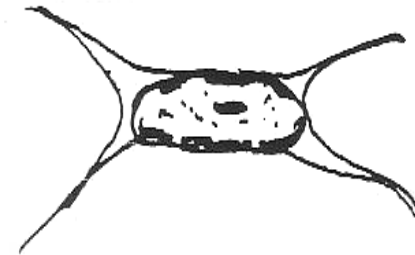
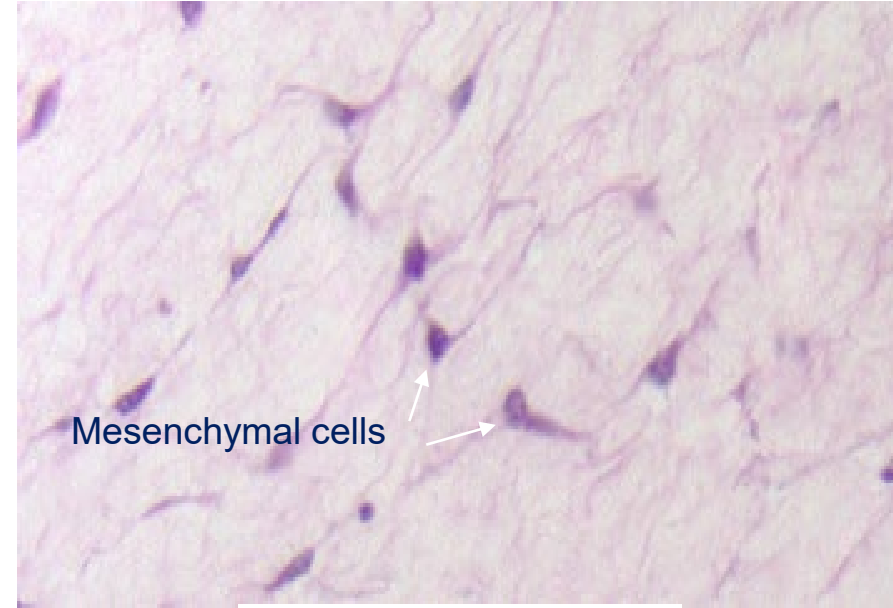
Extracellular material (2,3)

- Amorphous (2)– no shape
- Fibrous (3)

Connective tissue cells

Cells:

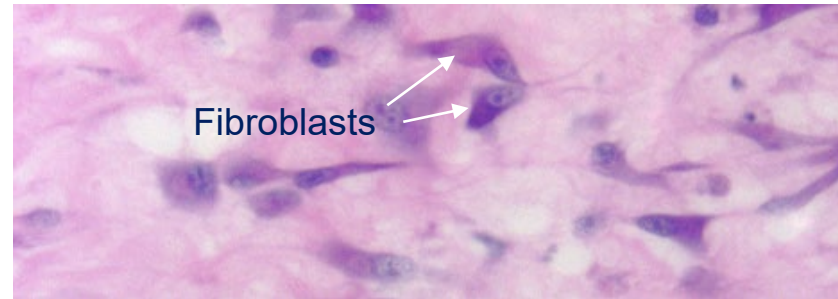
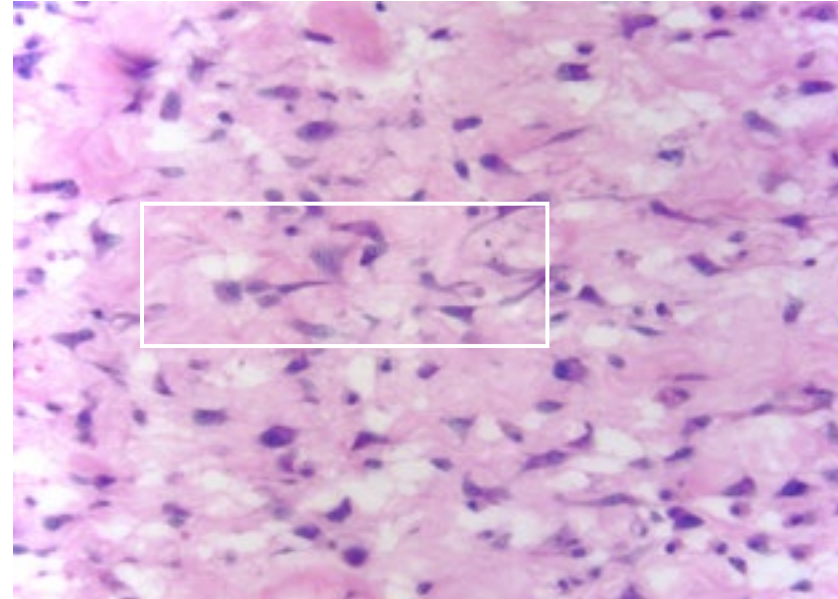
- Mesenchymal cell
- Fibroblast
- Fibrocyte
- Adipocyte
- Macrophage
- Mast cell
- Plasma cell
- Melanocyte



Connective tissue cells

Cells:

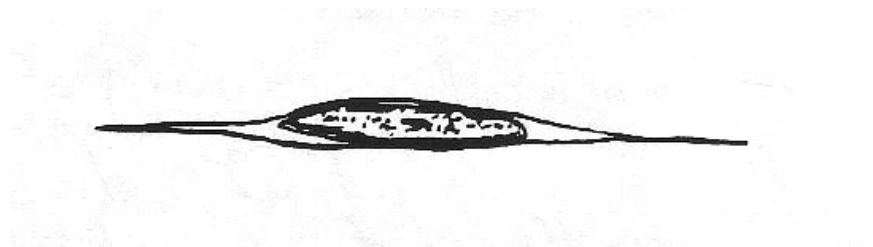
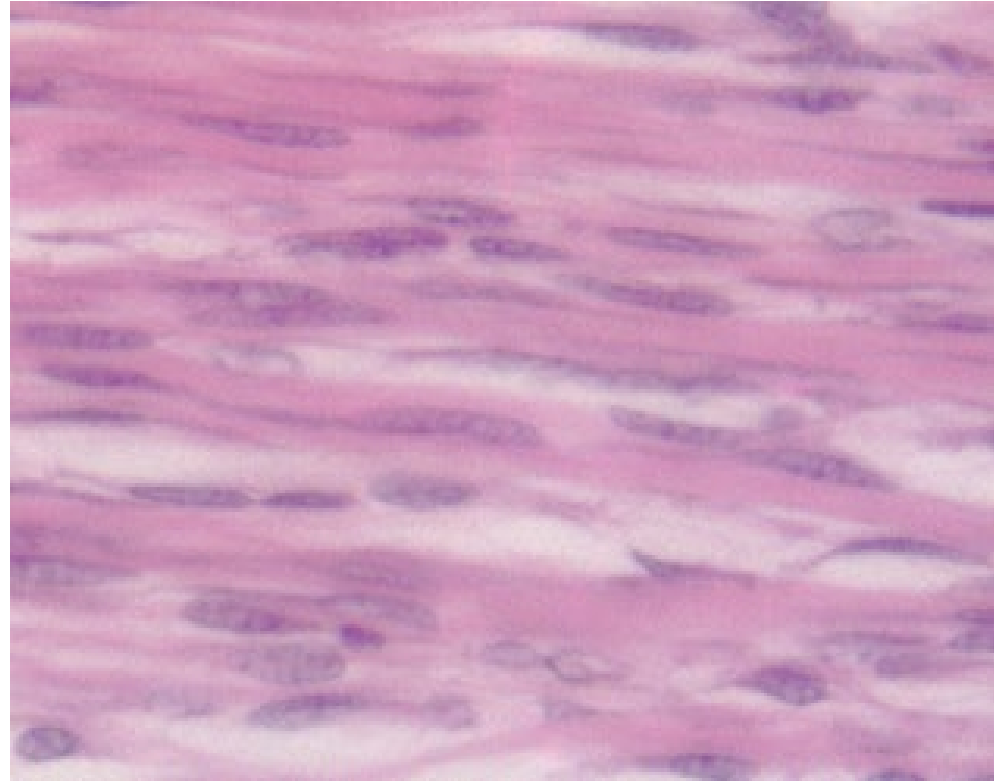
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Connective tissue cells

Cells:

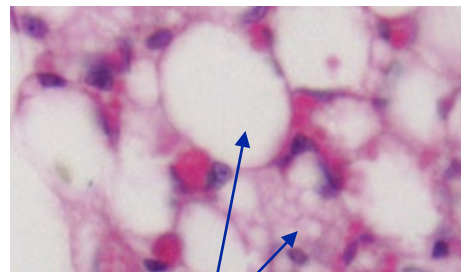
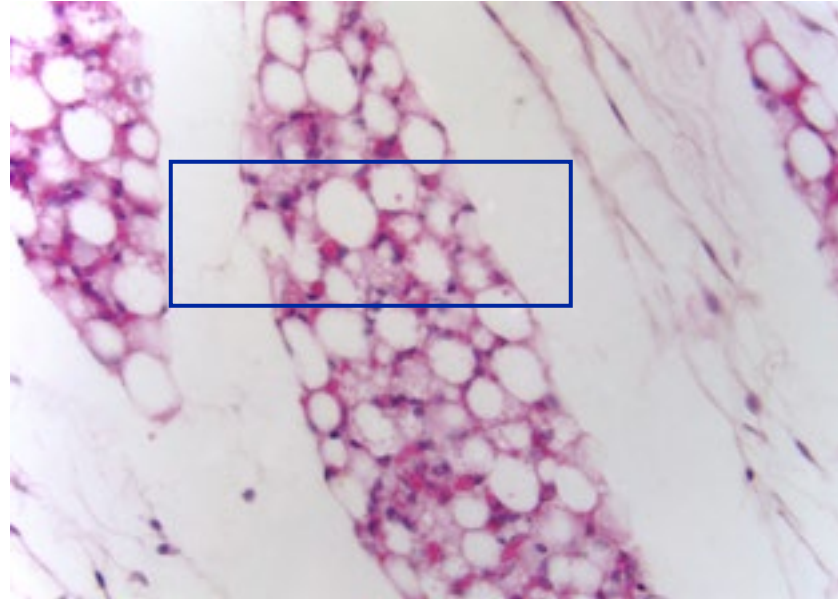
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Connective tissue cells

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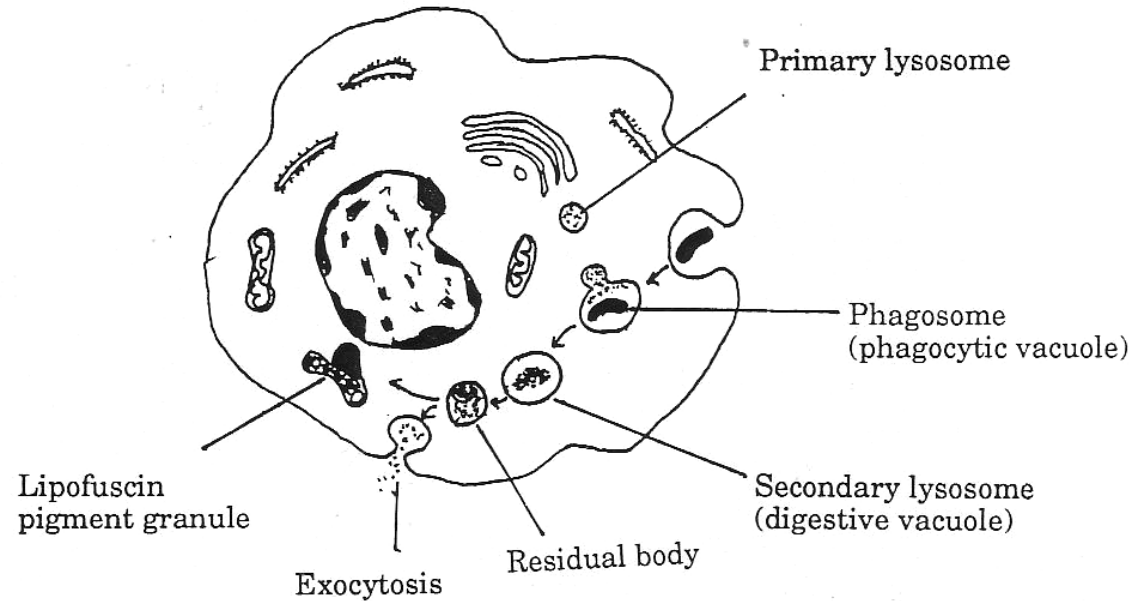
Adipocytes



Connective tissue cells

Cells:

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- Melanocyte

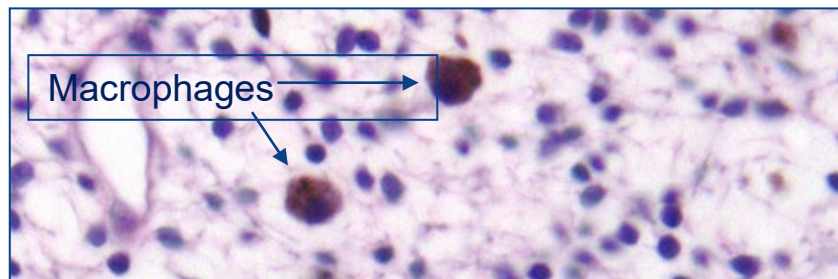
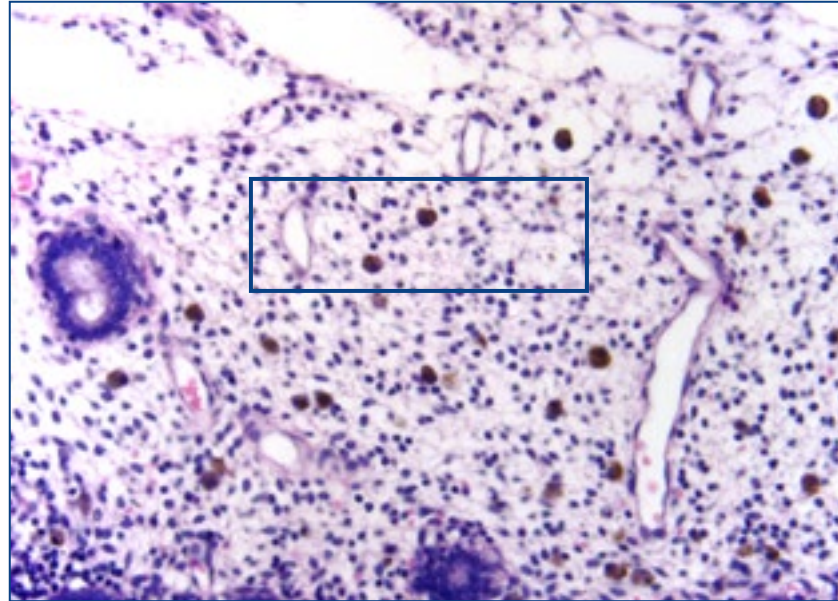


Connective tissue cells

Cells:

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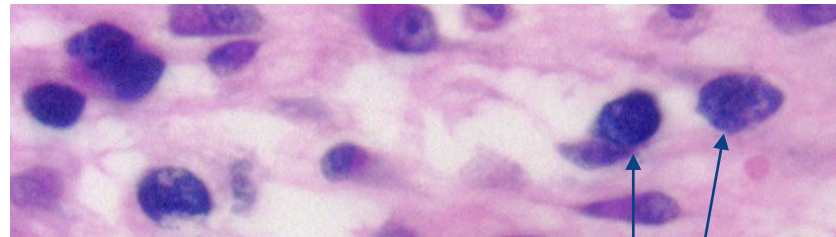
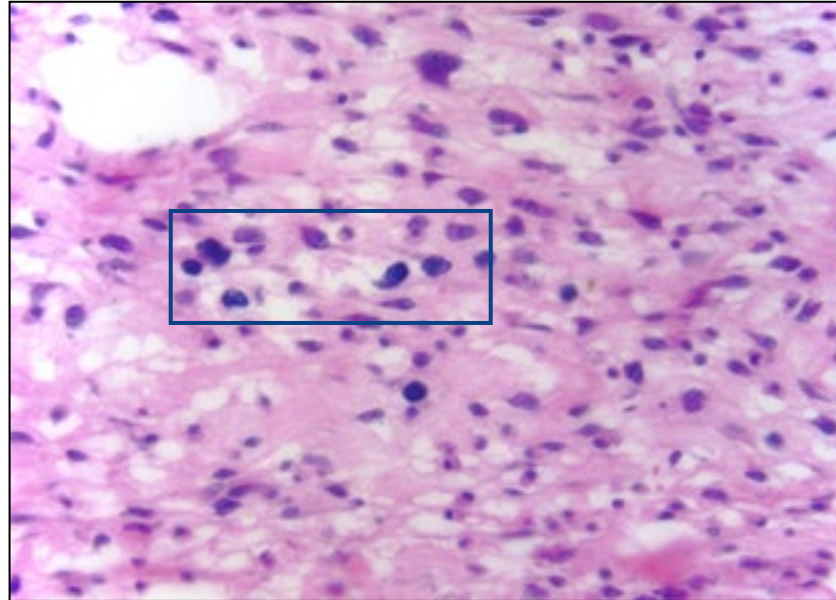
Dog Uterus



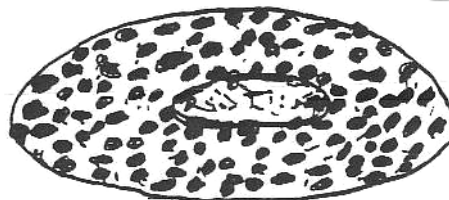
Connective tissue cells

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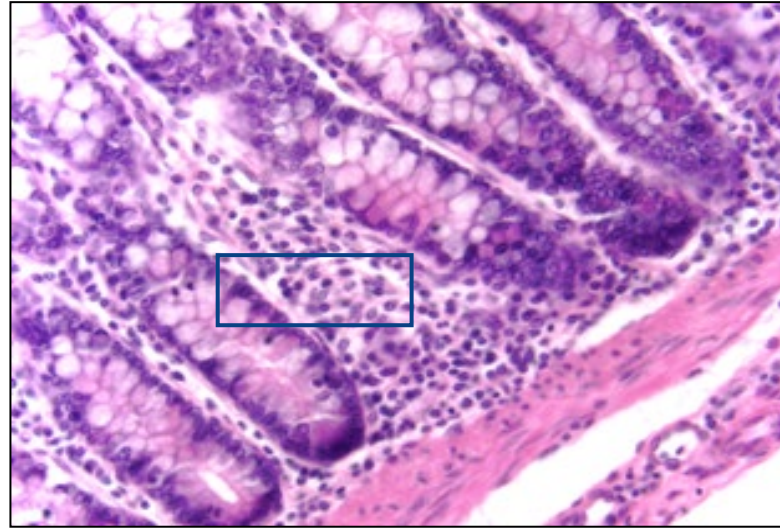
Mast cells



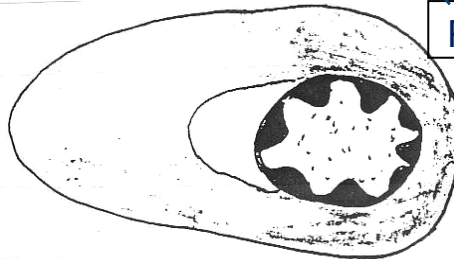
Connective tissue cells

Cells:

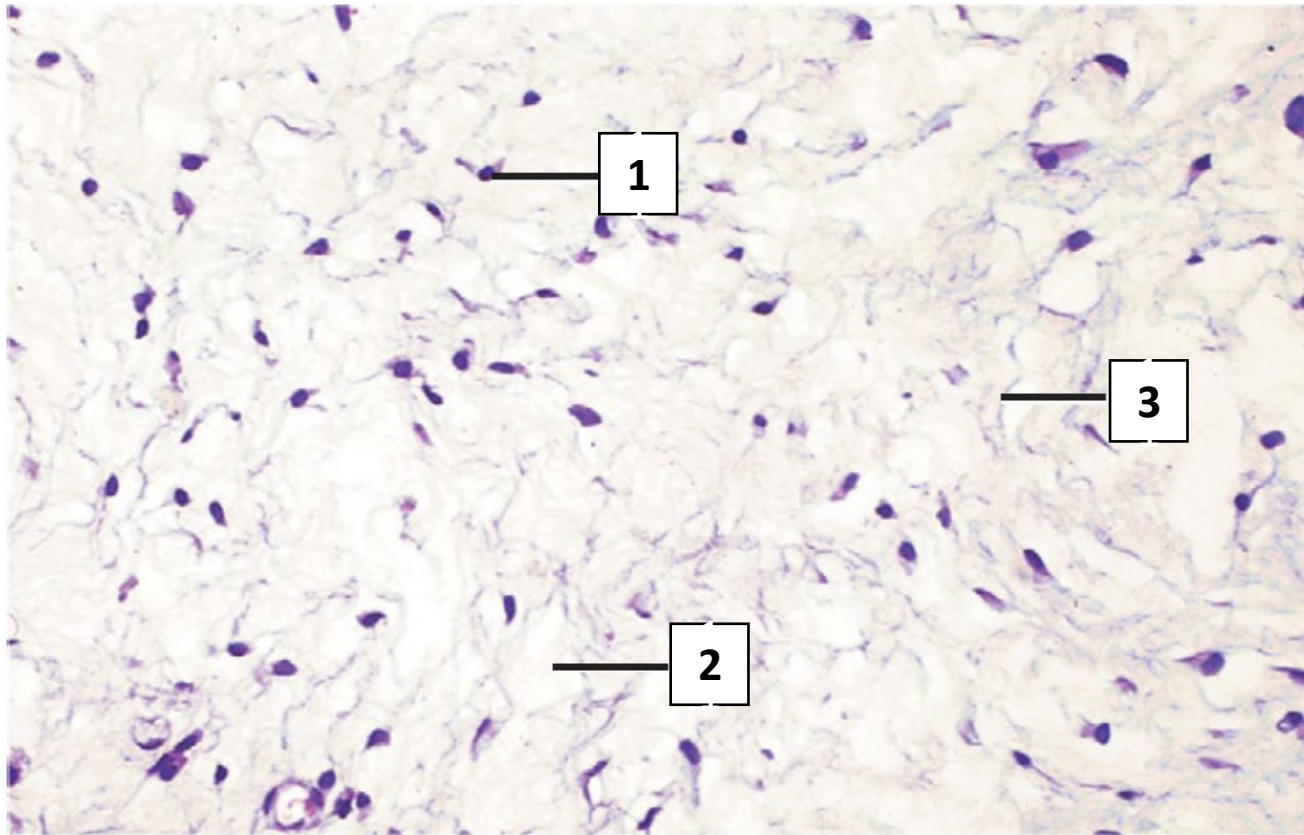
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- Melanocyte



Plasma cells



Composition of connective tissue



Umbilical cord, Cow

Cells (1)

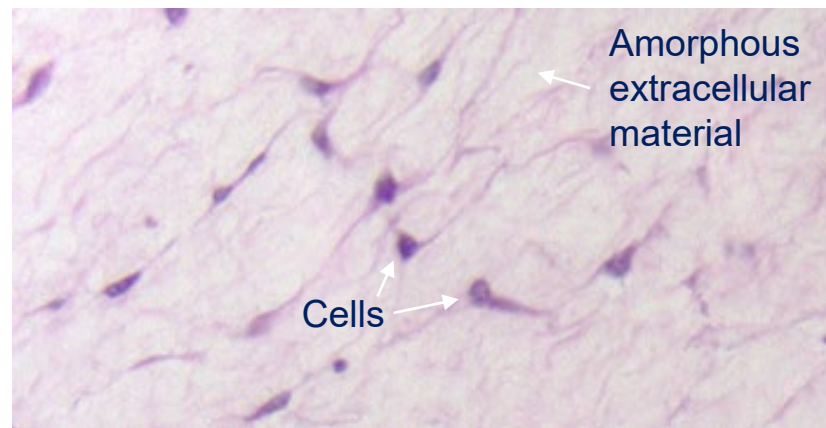
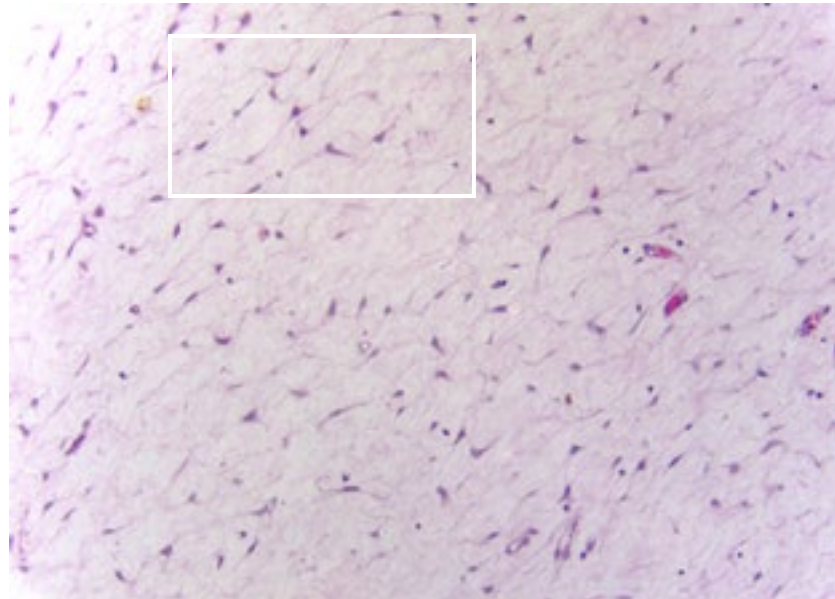
Extracellular material (2,3)

- Amorphous (2)– no shape
 - ✓ Fluid
 - ✓ Jelly
 - ✓ Solid
- Fibrous (3)

Connective tissue – Jelly like ECM

Extracellular material

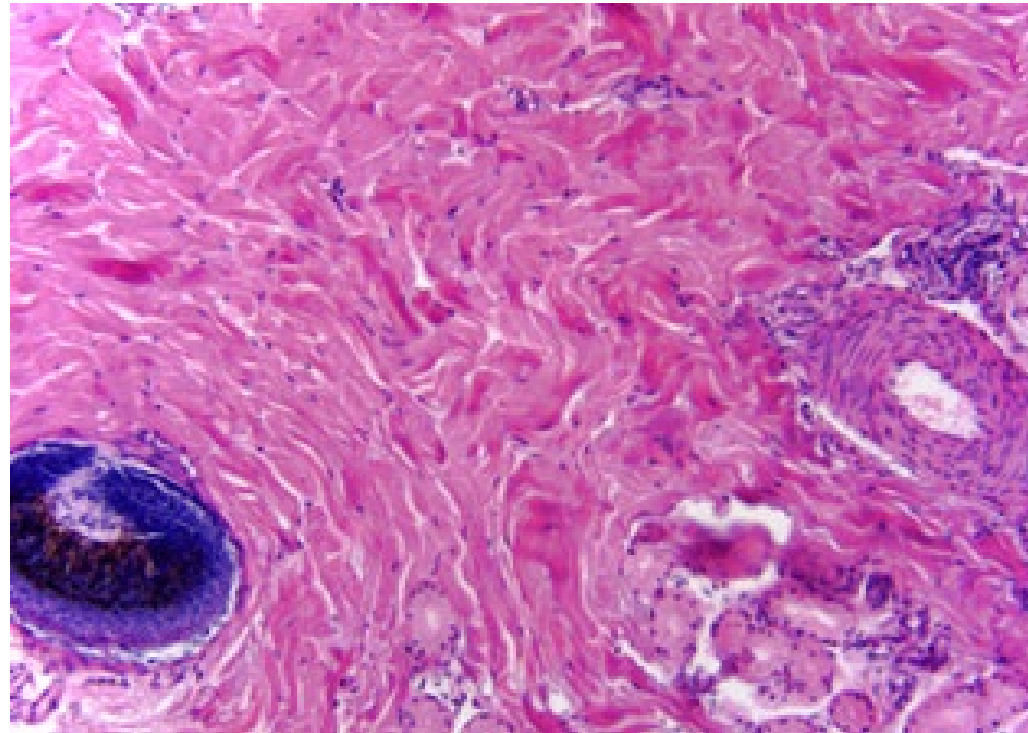
- Amorphous
 - ✓ Fluid
 - ✓ Jelly
 - ✓ Solid
- Fibrous



Connective Tissue - Fibrous ECM

Extracellular material

- Amorphous
- Fibrous
 - ✓ Collagen fibers
 - ✓ Reticular fibers
 - ✓ Elastic fibers

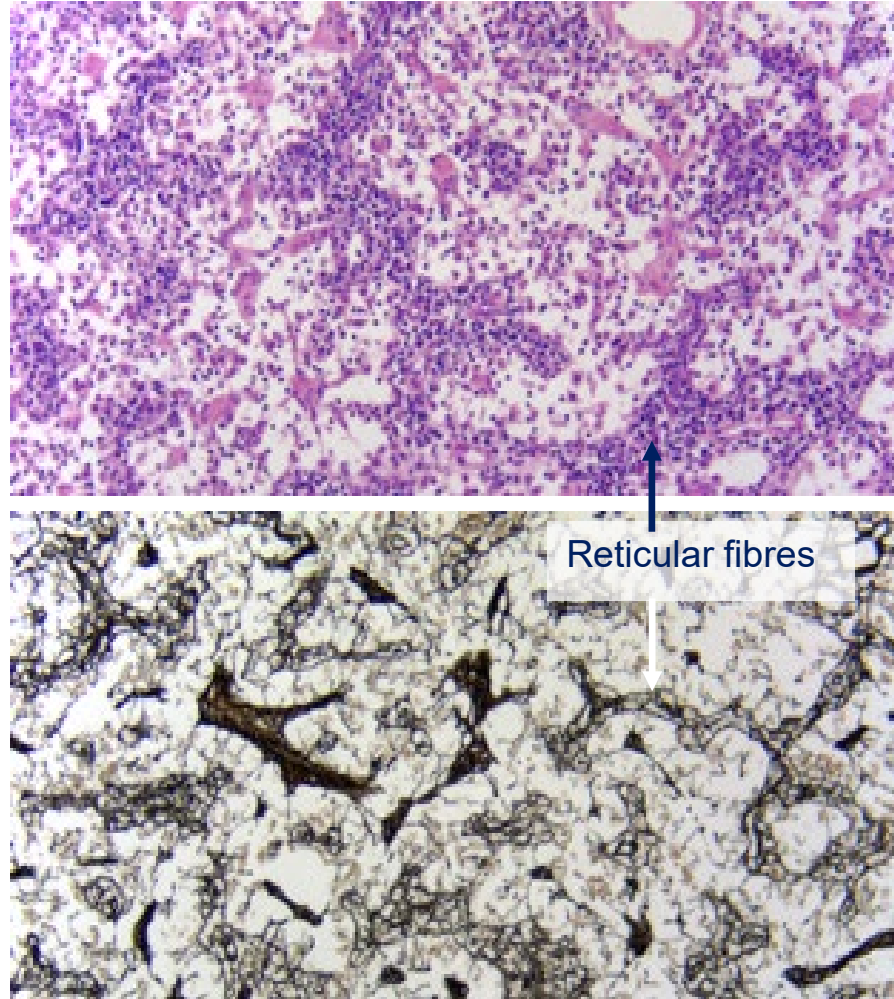


Skin, Horse

Connective Tissue - Fibrous ECM

Extracellular material

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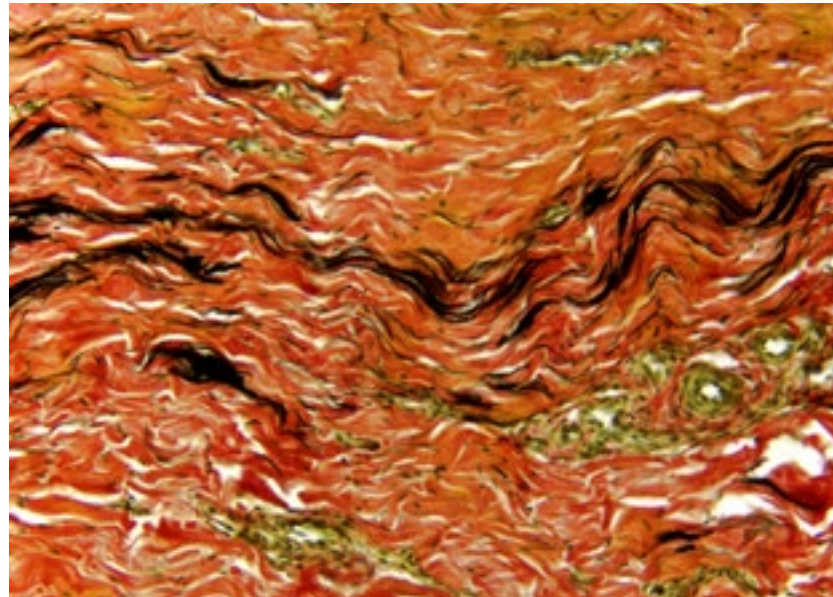


Connective Tissue - Fibrous ECM

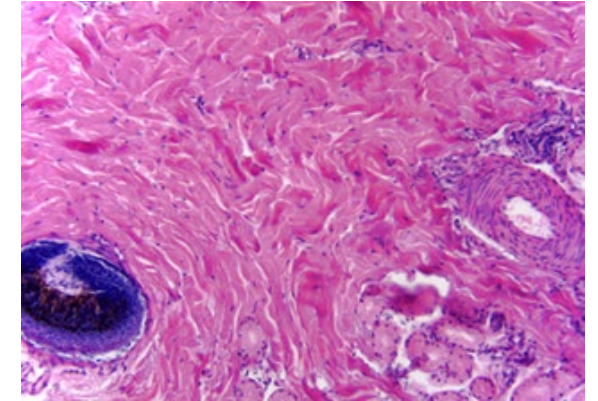
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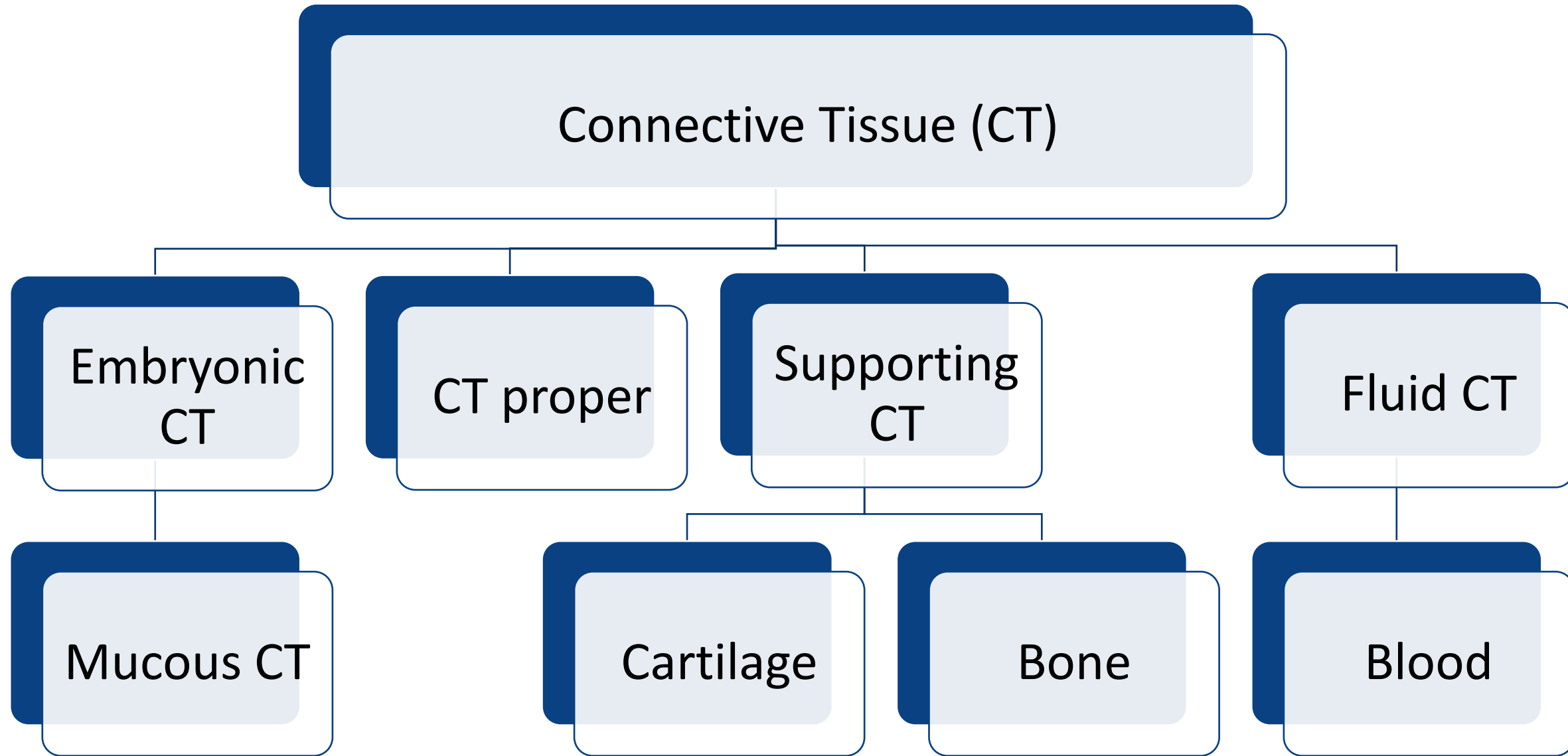
Verhoeff-van Gieson's stain



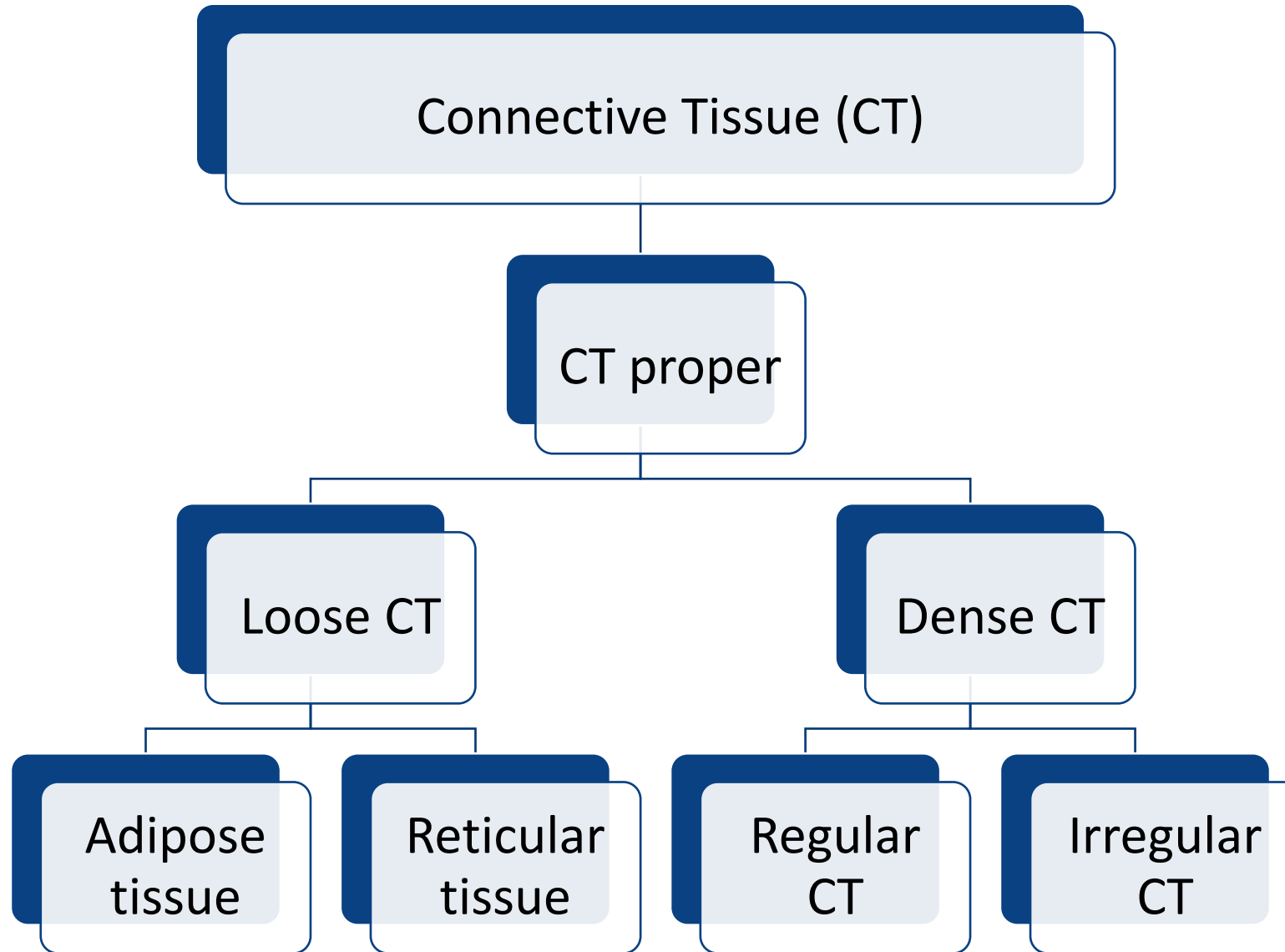
Skin, Horse



Connective Tissue - classification

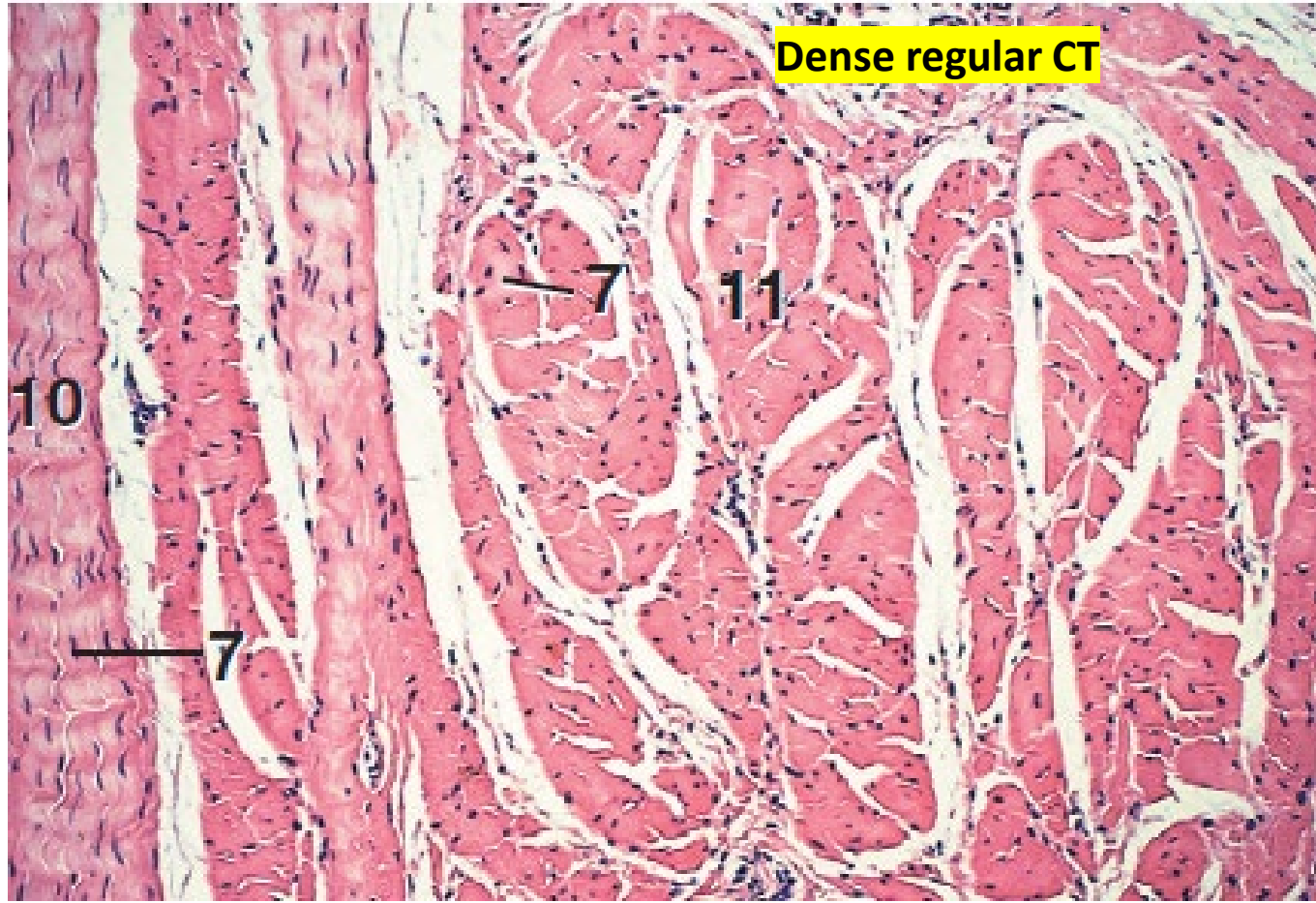


Connective Tissue - classification



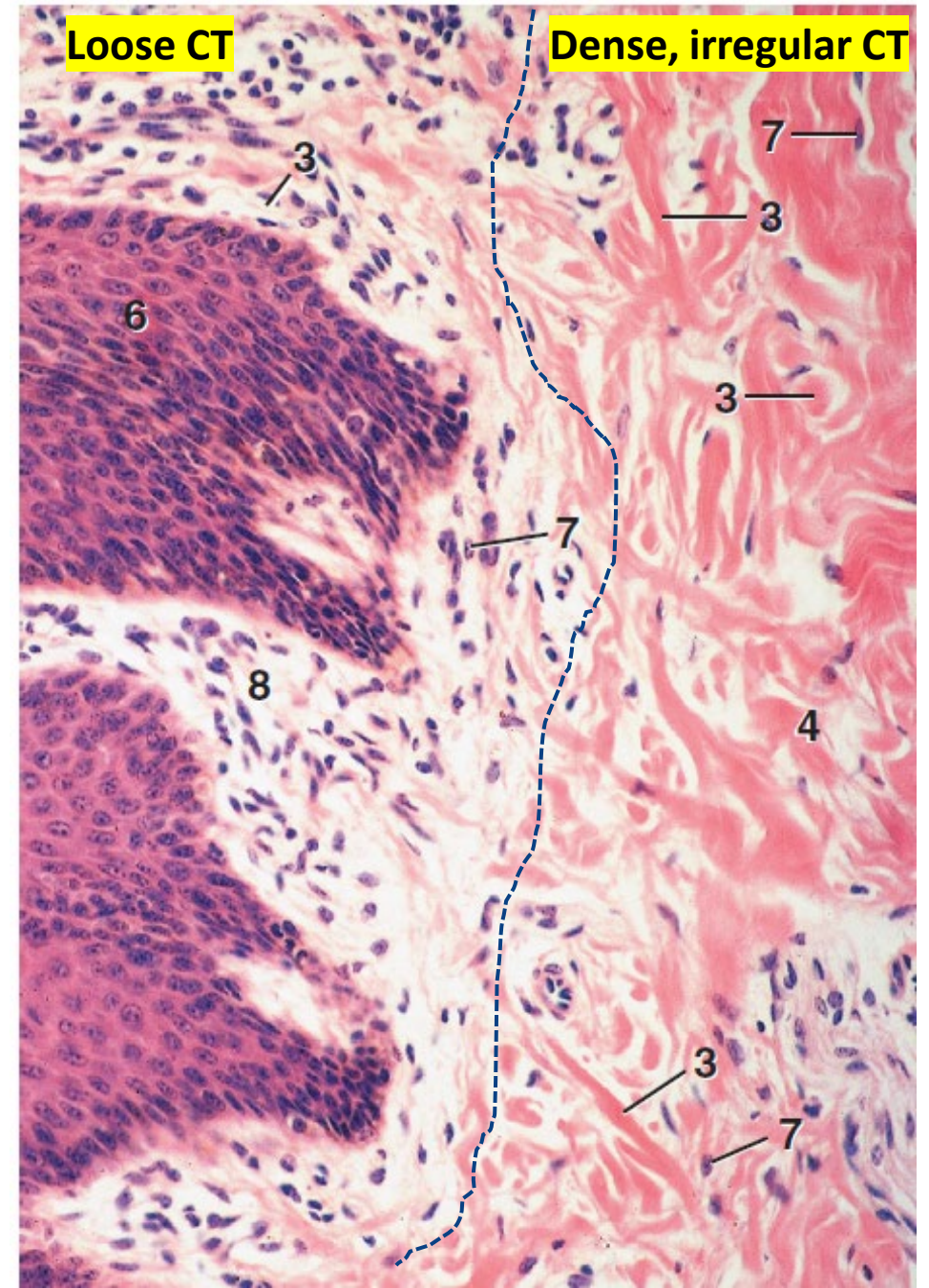
Classification - CT

Tendon



7 - nucleus
3 - collagen fiber

Skin Horse



Thank you!

