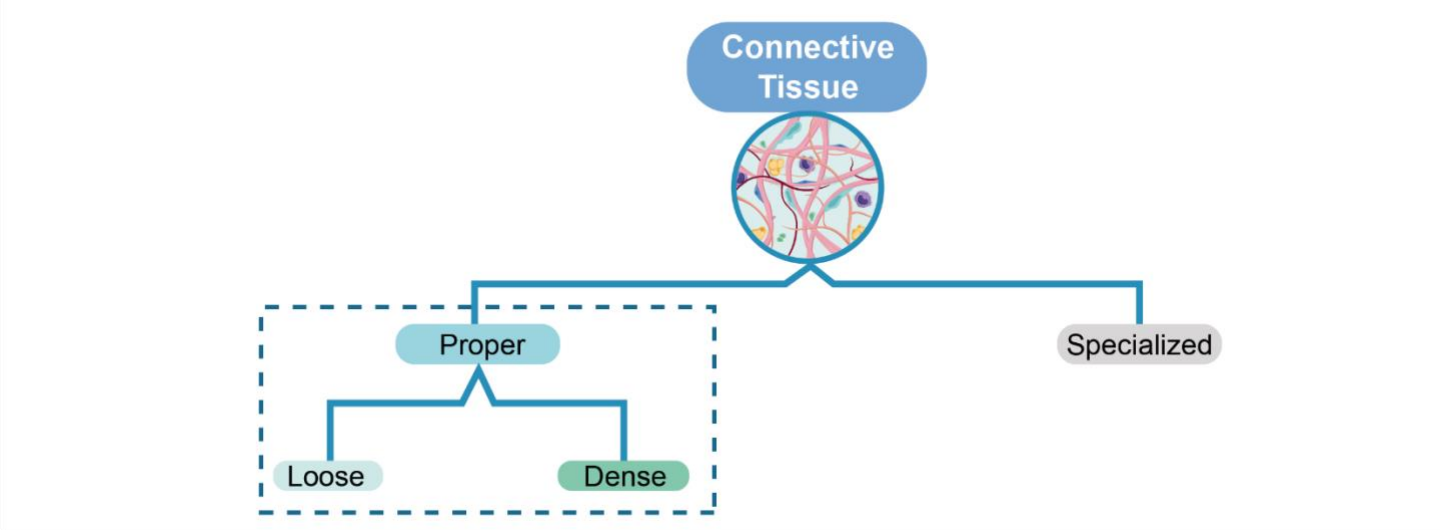
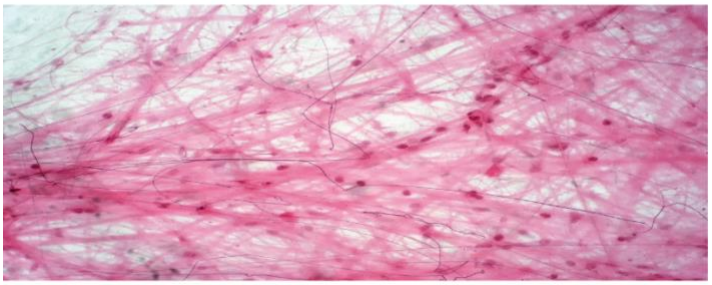
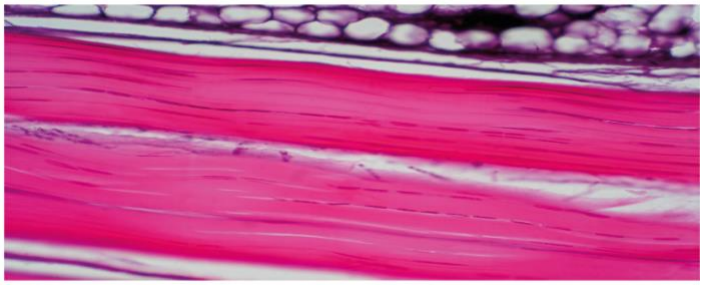
TOPIC: INTRODUCTION TO CONNECTIVE TISSUE PROPER

- **Connective Tissue Proper**: collective term to refer to both *loose* and *dense* connective tissues.
  - Found _____ throughout body in various locations — rich in fibers — _____ functions.
  - Loose & Dense Connective Tissues are made from same cells & fibers but differ in *amounts* & *arrangement*.



Loose	Dense
_____ spaced fibers separated by ground substance.	_____ packed fibers with less ground substance.
	
E.g. Layer under the epithelia.	E.g. Tendons and ligaments

PRACTICE: True or False: Connective Tissue Proper is categorized into two types based on their cell types.

a) True—the presence of -blast and -cyte cells determines if it is loose or dense connective tissue proper.

b) False—the arrangement of fibers determines if it is loose or dense connective tissue proper.

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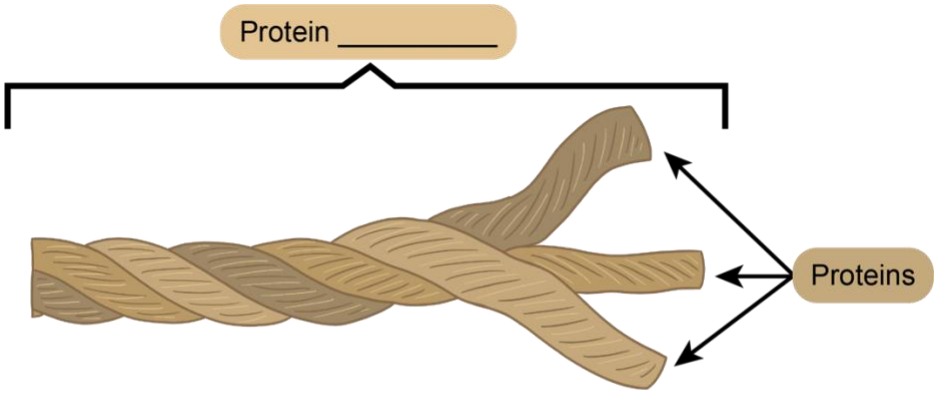
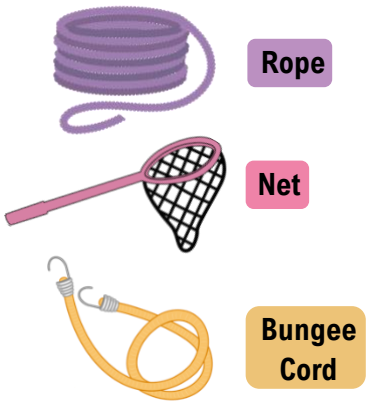
Protein Fibers

- **Protein Fibers**: large, thread/rope-like structures in the ECM made up of _____ proteins.
  - 2 main smaller proteins make up the protein fibers:
    - _____: non-elastic.
    - _____: elastic.

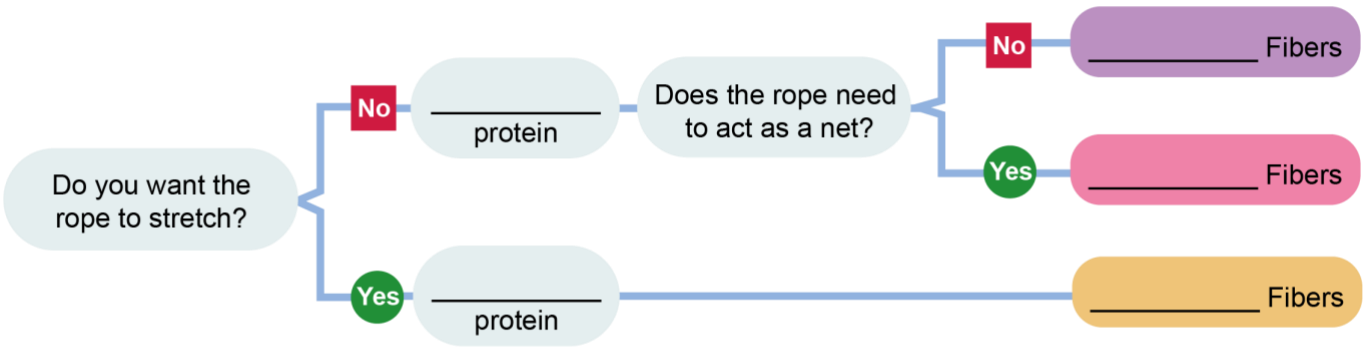


3 Types of Protein Fibers

- _____ types of protein fibers can be found in the ground substance:
  1. **Collagen Fibers**: made of collagen proteins.
     - Long, thick, _____-branched, straight: _____ but flexible.
  2. **Reticular Fibers**: also made of collagen proteins (Reticular = "Netlike").
     - Thin & _____: resists force in _____ directions.
  3. **Elastic Fibers**: made of elastin proteins:
     - Branched and wavy: _____.



EXAMPLE: Fill out the interactive blanks in the flow chart.



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PRACTICE: A student knows a particular structure is made of connective tissue and they want to know what type of fiber exists in its ground substance. The structure must withstand force from muscles pulling in different directions. What type of fiber is likely used in this connective tissue?

a) Collagen b) Reticular Fibers c) Elastic

PRACTICE: Both collagen fibers & reticular fibers are made of the same protein collagen. How are the two different?

a) Collagen fibers are wavy while reticular fibers are straight.

b) Collagen fibers are branched while reticular fibers are long and straight.

c) Collagen fibers are thin while reticular fibers are thick.

d) Collagen fibers are long and straight while reticular fibers are branched.

PRACTICE: Ehlers-Danlos syndromes are a group of genetic conditions that affect the production of collagen. One symptom of Ehlers-Danlos syndrome can be hyper-elasticity of the skin (skin that stretches much more than normal). This symptom is due to changes in the connective tissue supporting the skin. Relate this symptom to the roles of different fibers in connective tissue:

a) Collagen is not elastic; the condition likely results in less collagen, allowing skin to stretch more than usual.

b) Both elastic and reticular fibers are elastic; the condition likely results in higher concentrations of these.

c) Collagen has highly elastic properties; the condition must result in an overproduction of collagen.

d) Both A and B are correct.

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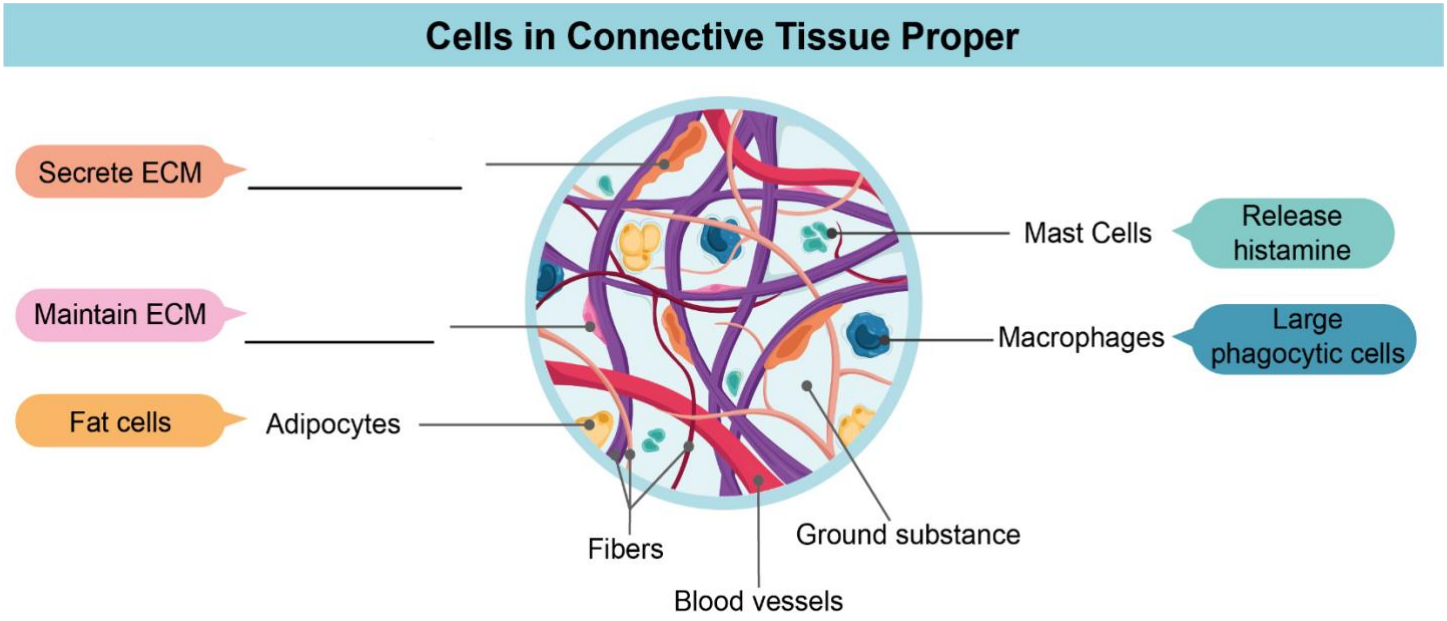
Cells in Connective Tissue Proper

- Cells in Connective Tissue Proper can be broken into two groups:
- Fixed/Resident Cells: permanently _____ in the tissue in a fixed/stable fashion.
  - _____: cells that build/secrete ECM.
  - _____: cells that maintain ECM.
  - **Adipocytes**: _____ cells found in some types of connective tissue proper.
- Migratory Cells: immune cells that _____ in & out of the tissue to protect against infection.
  - Macrophages: large phagocytotic cells.
  - Mast Cells: release histamines.



EXAMPLE: How does the structure of connective tissue proper benefit the function of macrophages & mast cells?

a) Gelatinous matrix allows movement of migratory cells.

b) Gelatinous matrix restricts movement of fixed cells.

c) Protein fibers allow movement of migratory cells.

d) Protein fibers restrict movement of fixed cells.

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PRACTICE: What is the difference in function between fixed and migratory cells in connective tissue proper?

a) Migratory cells maintain the matrix while fixed cells defend against infection.

b) Migratory cells defend against infection while fixed cells maintain the matrix.

PRACTICE: Fibrocytes are mature fibroblasts. But in some cases, fibrocytes can revert to fibroblasts. Based on their function, when would you expect a fibrocyte may revert to a fibroblast?

a) A fibrocyte may revert to a fibroblast as a normal aging process as the cells become less active over time.

b) A fibrocyte may revert to a fibroblast in the case of significant tissue injury/damage to produce new ECM.

c) A fibrocyte may revert to a fibroblast in order to store energy in the form of lipids.

d) A fibrocyte may revert to a fibroblast during an acute infection as fibroblasts provide direct immune protection against pathogens.