

Tissue: The Living Fabric
Connective Tissue
Presented By:
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Connective Tissue

- Found throughout the body; most abundant and widely distributed in primary tissues
 - Connective tissue proper
 - Cartilage
 - Bone
 - Blood

Connective Tissue

Functions of Connective Tissue

- Binding and support
- Protection
- Insulation
- Transportation

Characteristics of Connective Tissue

- Connective tissues have:
 - Mesenchyme as their common tissue of origin
 - Varying degrees of vascularity
 - Nonliving extracellular matrix, consisting of ground substance and fibers

Structural Elements of Connective Tissue

- Ground substance – unstructured material that fills the space between cells
- Fibers – collagen, elastic, or reticular
- Cells – fibroblasts, chondroblasts, osteoblasts, and hematopoietic stem cells

Ground Substance

- Interstitial (tissue) fluid
- Adhesion proteins – fibronectin and laminin
- Proteoglycans – glycosaminoglycans (GAGs)

- Functions as a molecular sieve through which nutrients diffuse between blood capillaries and cells

Fibers

- Collagen – tough; provides high tensile strength
- Elastic – long, thin fibers that allow for stretch
- Reticular – branched collagenous fibers that form delicate networks

Cells

- Fibroblasts – connective tissue proper
- Chondroblasts – cartilage
- Osteoblasts – bone
- Hematopoietic stem cells – blood
- White blood cells, plasma cells, macrophages, and mast cells

Connective Tissue: Embryonic

- Mesenchyme – embryonic connective tissue
 - Gel-like ground substance with fibers and star-shaped mesenchymal cells
 - Gives rise to all other connective tissues
 - Found in the embryo

Connective Tissue Proper: Loose

- Areolar connective tissue
 - Gel-like matrix with all three connective tissue fibers
 - Fibroblasts, macrophages, mast cells, and some white blood cells
 - Wraps and cushions organs
 - Widely distributed throughout the body

Connective Tissue Proper: Loose

Connective Tissue Proper: Loose

- Adipose connective tissue
 - Matrix similar to areolar connective tissue with closely packed adipocytes
 - Reserves food stores, insulates against heat loss, and supports and protects
 - Found under skin, around kidneys, within abdomen, and in breasts
 - Local fat deposits serve nutrient needs of highly active organs

Connective Tissue Proper: Loose

Connective Tissue Proper: Loose

- Reticular connective tissue
 - Loose ground substance with reticular fibers
 - Reticular cells lie in a fiber network

- Forms a soft internal skeleton, or stroma, that supports other cell types
- Found in lymph nodes, bone marrow, and the spleen

Connective Tissue Proper: Loose

Connective Tissue Proper: Dense Regular

- Parallel collagen fibers with a few elastic fibers
- Major cell type is fibroblasts
- Attaches muscles to bone or to other muscles, and bone to bone
- Found in tendons, ligaments, and aponeuroses

Connective Tissue Proper: Dense Regular

Connective Tissue Proper: Dense Irregular

- Irregularly arranged collagen fibers with some elastic fibers
- Major cell type is fibroblasts
- Withstands tension in many directions providing structural strength
- Found in the dermis, submucosa of the digestive tract, and fibrous organ capsules

Connective Tissue Proper: Dense Regular