

Connective tissue

The connective tissues are responsible for providing and maintaining form in the body. Unlike the other tissue types (epithelium, muscle, and nerve). the major constituent of connective tissue is extracellular matrix, composed of protein fibers, ground substance, and tissue fluid. Embedded within the extracellular matrix are the connective tissue cells.

There are several types of connective tissue:

A-Embryonic connective tissue:

1-Mesenchymal c. t.

2-Mucous c. t.:

mucous tissue has an abundance of amorphous ground substance. It is jelly like tissue containing very few fibers. The cells in this tissue are mainly fibroblasts.

B-Adult connective tissue:

1-Proper connective tissue :

there are two classes of connective tissues (loose and dense connective tissues).

A-loose connective tissue (areolar connective tissue):

The loose connective tissue the more abundant. It fills spaces between fibers and muscle sheaths, supports epithelial tissue.

B- Dense connective tissue :

1-Dense regular connective tissue:

a-Dense regular has more collagen than irregular.

b-Dense regular fibers have a pattern, and run in same direction

c-Even more strong than irregular, but only in one direction

d-Found in ligaments, tendons.

2-Dense irregular connective tissue :

a-Has lots of collagen fibers.

b-Fibers have irregular position; no pattern

c-Extremely strong in all directions

d-Found in areas of body where strength is needed (deeper layer of dermis).

2- Connective tissue with special properties:

A- supporting connective tissue:

Cartilages:

The main cell type is chondrocytes. Extracellular matrix is dense collagen; almost solid, very rigid. Avascular (no blood vessels).

There are three types of cartilage:

A-Hyaline cartilage (most joints):

1. dominant component of extracellular

2. matrix is collagen.

3. Bluish-white in life

4. translucent

5. important in formation and growth of long bones

6. In adult, mainly found lining outer wall of

respiratory system and on surfaces of bone joints

where it is called Articular cartilage.

B-Elastic cartilage (ear).

1. high concentration of elastin fibers.
2. in extracellular matrix. (Example - external ears).
3. does not calcify.

C-Fibro cartilage (intervertebral discs).

1. found at connection of tendons to bone.
2. contains very large bundles of collagen fibers.
3. resists compression and shear forces.
4. also found in intervertebral discs.

Bone :

ground substance with less sulfated glycoproteins than cartilage.

cells: **osteoblasts** (secrete osteoid [immature bony matrix before mineralizing]) and **osteocytes** (embedded in bony matrix] within

lacunae and attached to other osteocytes by gap junctions at tips of cytoplasmic extensions within **canaliculli; osteoclasts**

dissolve bony matrix.

There are two types of bones :

1-**Compact bone** (shaft of long bones).

Gross observation of bone in cross section shows dense areas without cavities. The whole complex of concentric lamellae of bone surrounding a canal containing blood vessels and nerve and loose connective tissue called haversian system or osteon.

2- **Spongy bone** (ends of long bones). the areas with numerous interconnecting cavities called spongy bone (cancellous bone).

B-Blood :

Main cell type is **erythrocytes**.

Extracellular matrix is **plasma** (no elastin or collagen unless clots).

C- Elastic tissue:

Elastic tissue is composed of bundles of thick ,parallel elastic fibers. The space between these fibers is occupied by thin collagen fibers and flattened fibroblasts. Elastic tissue which occurs in the yellow ligaments of vertebral column.