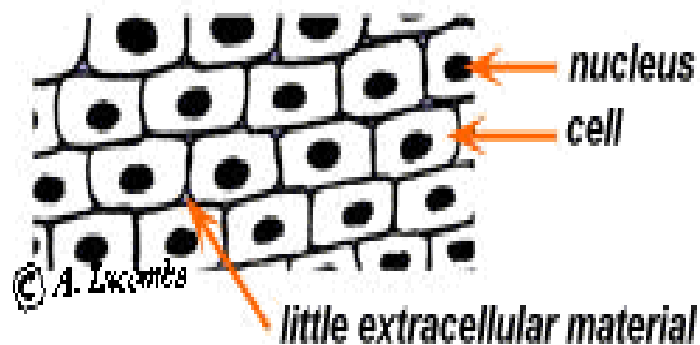


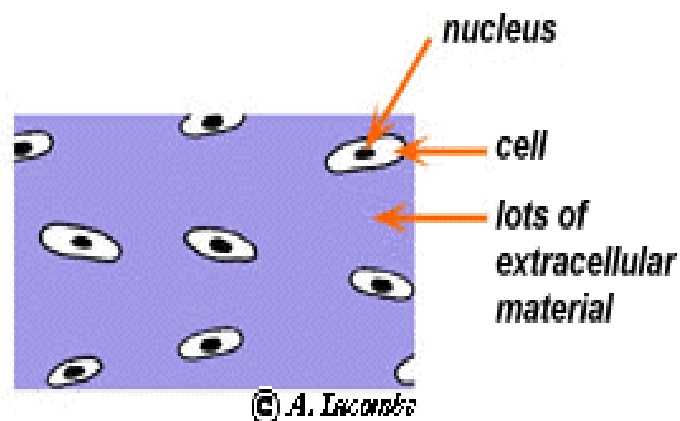
Connective tissues

They are very different from the epithelial, muscle, and nervous tissues.

In these three tissue types, the cells of the tissue are close together:



In contrast, **the cells of the connective tissues are far apart, separated by an abundant amount of extracellular material, also called extracellular matrix:**



The properties of the cells and the composition and arrangement of the extracellular matrix elements vary tremendously, giving rise to an amazing diversity of connective tissues, each uniquely adapted to perform its specific function in the body.

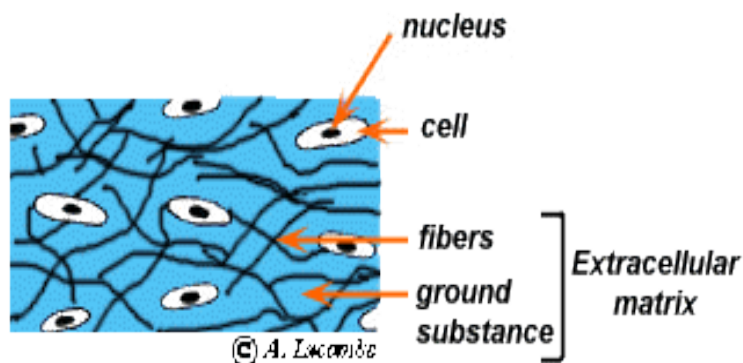
Where do you find Connective tissues?

Everywhere in the body.

What are their functions?

1. **Binding, support, and packaging.**
2. **Protection, defense, and repair.**
3. **Insulation.**
4. **Transportation.**

What are the histological characteristics of connective tissues?



Connective tissues are characterized by abundant amounts of **extracellular matrix** in which a variety of **cell** types are dispersed. The extracellular matrix between the cells usually includes **fibers** of one or more types embedded in an **amorphous ground substance**.

The extracellular matrix is composed of **ground substances** and **fibers**:

The ground substance

Is the amorphous substance that fills the space between the cells and contains the fibers. It is composed of **interstitial fluid, cell adhesion proteins, and proteoglycans**. **Cell adhesion proteins** allow the connective tissue cells to attach themselves to matrix elements.

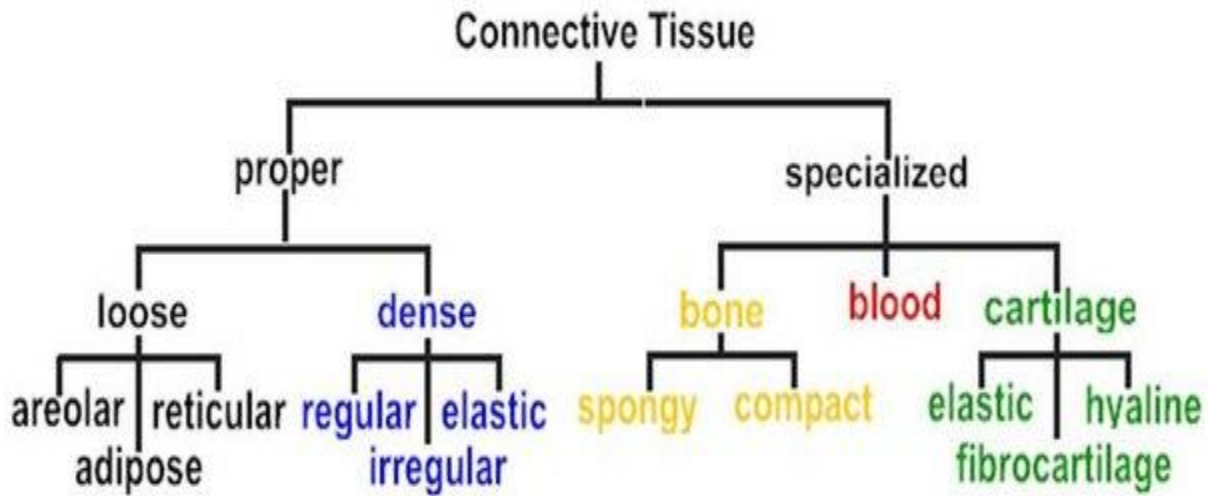
Fibers

*****Collagen fibers** (white fibers): are extremely tough. They are stronger than steel fibers of the same size.

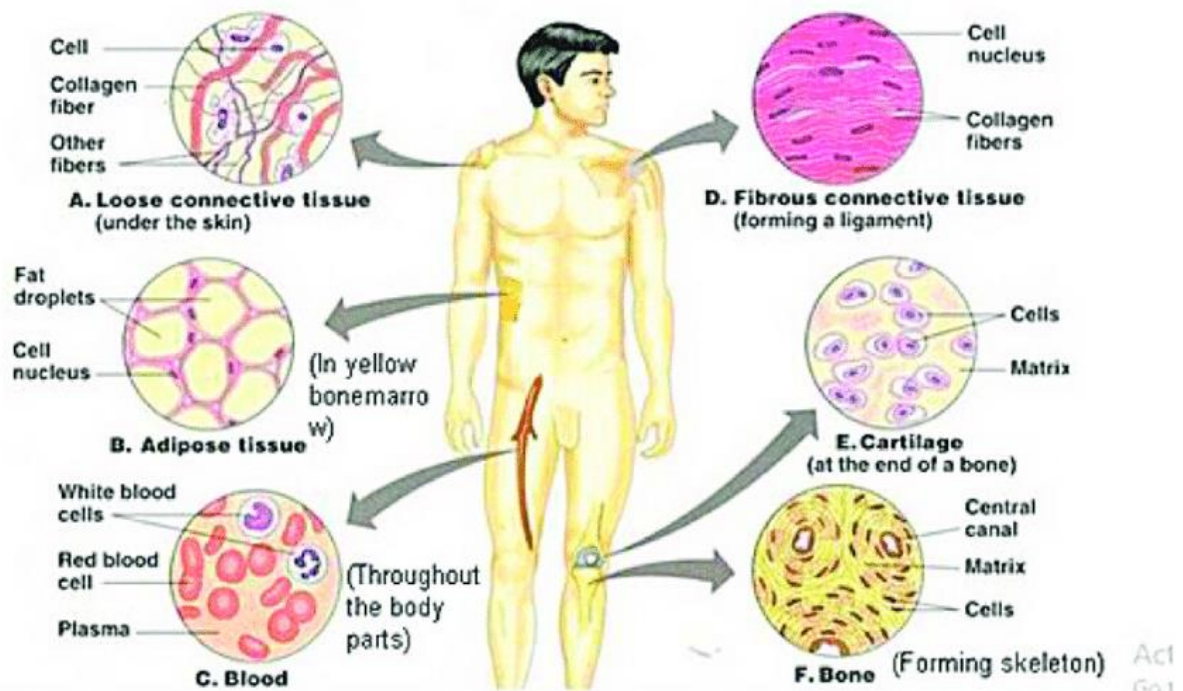
*****Elastic fibers** (yellow fibers): can be stretched to one and one-half times their length, but recoil to their initial length when released. They are found where greater elasticity is needed such as in the lungs

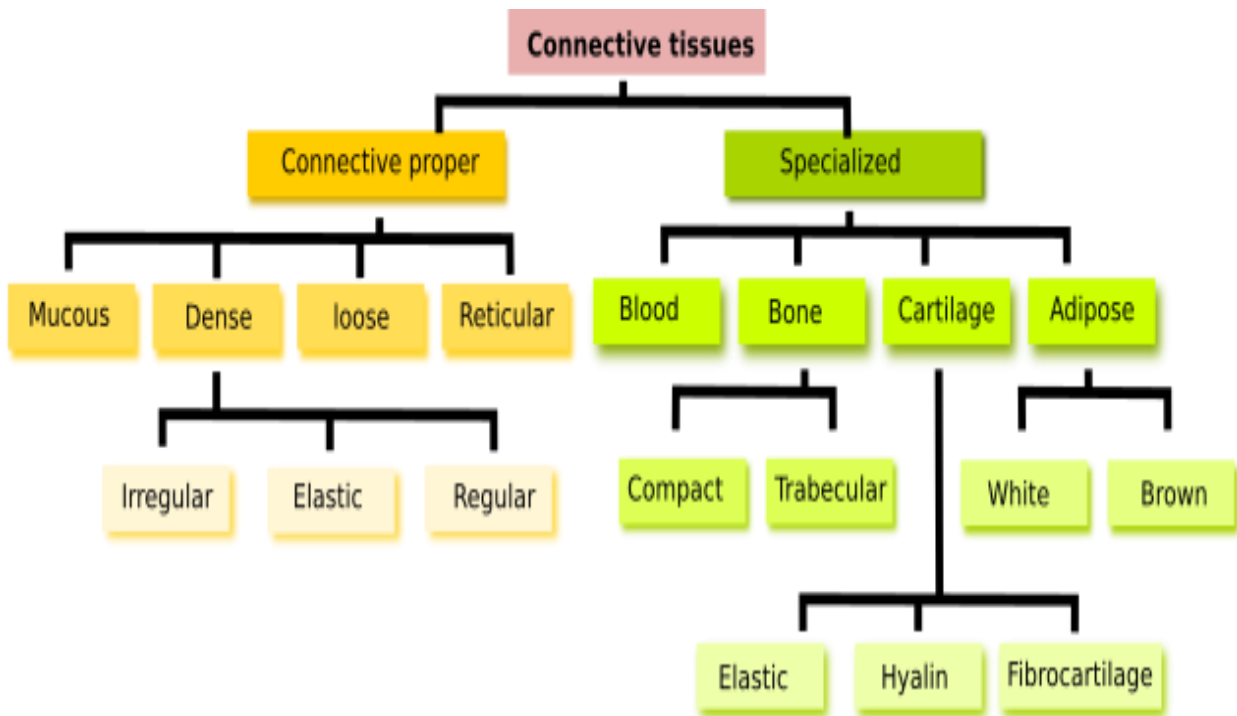
*****Reticular fibers** are fine collagenous fibers. They form a delicate branching network supporting soft organs such as the liver and spleen.

Classification of connective tissues



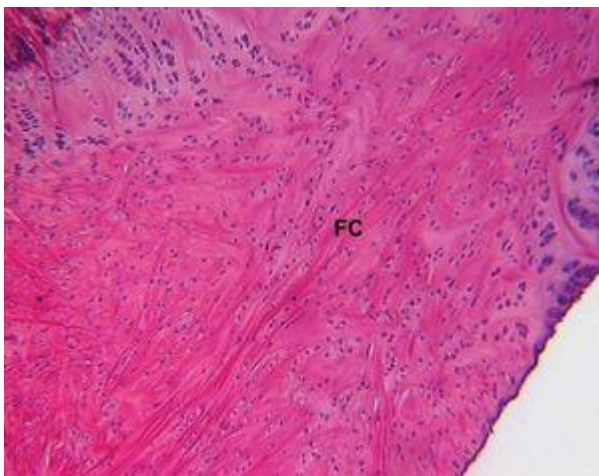
Connective tissue





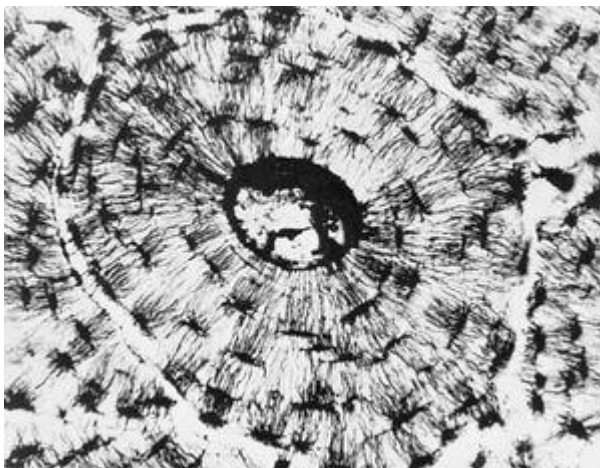
Specialized connective tissue

1- Cartilage



Cartilage is a form of connective tissue in which the ground substance is abundant and of a firmly gelled consistency that endows this tissue with unusual rigidity and resistance to compression. The cells of cartilage, called chondrocytes, are isolated in small lacunae within the matrix. Although cartilage is avascular, gaseous metabolites and nutrients can diffuse through the aqueous phase of the gel-like matrix to reach the cells. Cartilage is enclosed by the perichondrium, a dense fibrous layer lined by cells that can secrete a hyaline matrix.

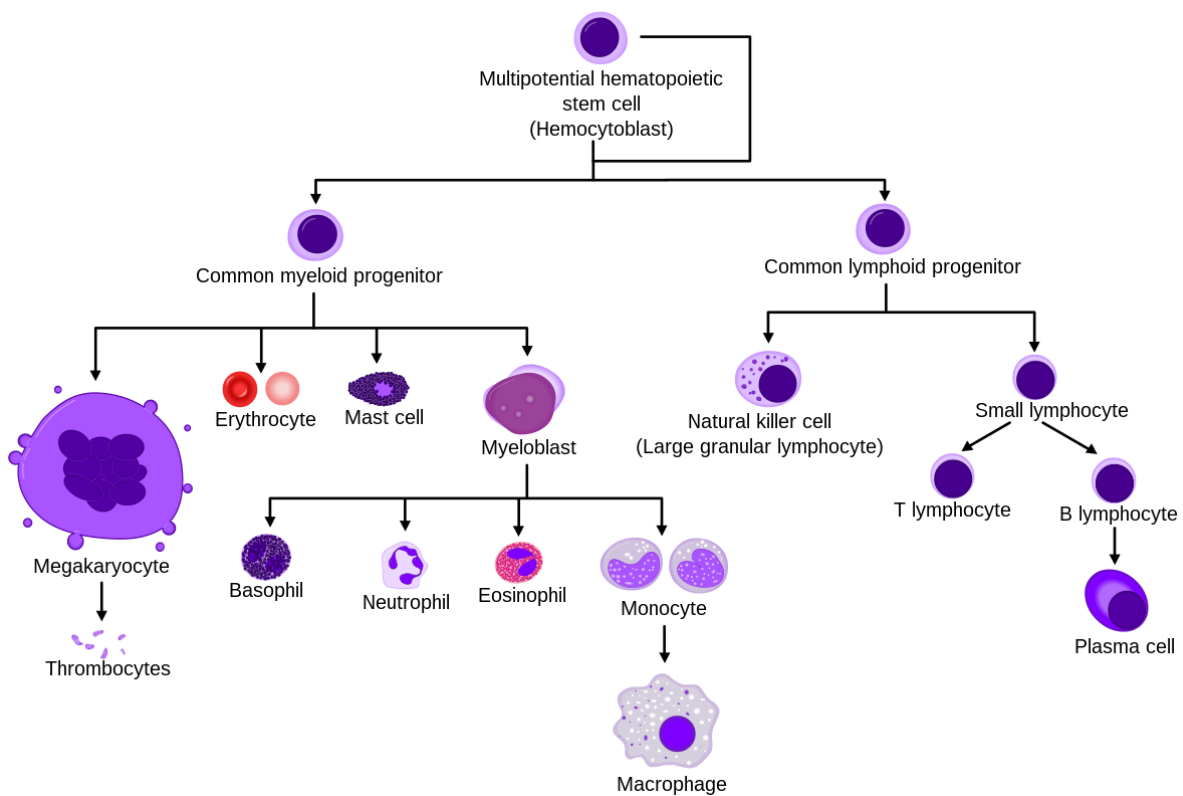
2-Bone



bone consists of cells, fibers, and ground substance, but, in addition, the extracellular components are impregnated with minute crystals of calcium phosphate in the form of the mineral hydroxyapatite. The mineralization of the matrix is responsible for the hardness of bone. It also provides a large reserve of calcium that can be drawn upon to meet unusual needs for this element elsewhere in the body.

3-Blood

contains many types of cells: white blood cells (monocytes, lymphocytes, neutrophils, eosinophils, basophils, and macrophages), red blood cells (erythrocytes), and platelets. Blood circulates through the body in the arteries and veins.



What is the function of the blood cells?

Red blood cells, also known as erythrocytes, deliver oxygen to the tissues in your body. Oxygen turns into energy and your tissues release carbon dioxide.

Blood Cells



Monocyte



Lymphocyte



Neutrophil



Eosinophil



Basophil



Macrophage



Erythrocyte



Platelets