Connective Tissue

Types of connective tissue proper

There are several types of c.t. that consist of the basic components already described fibres , cells and ground substances. There are two classes of c.t. loose and dense.

A. Loose connective tissue:

1- Mesenchyme.

2- Mucous c.t.

3- Loose (Areolar) c.t.

4- Adipose tissue.

5- Reticular tissue.

B. Dense connective tissue.

A. Loose connective tissue:

1- Mesenchyme.

Is the typical, unspecialized c.t. of the early weeks of embryonic life. Subsequently is disappears as such when component cells undergo differentiation. It is composed of mesenchymal cells, whose branching processes appear to join. They

do not form a true syncytium and of ground substances (do not contain fibers), there is large amount of amorphous.

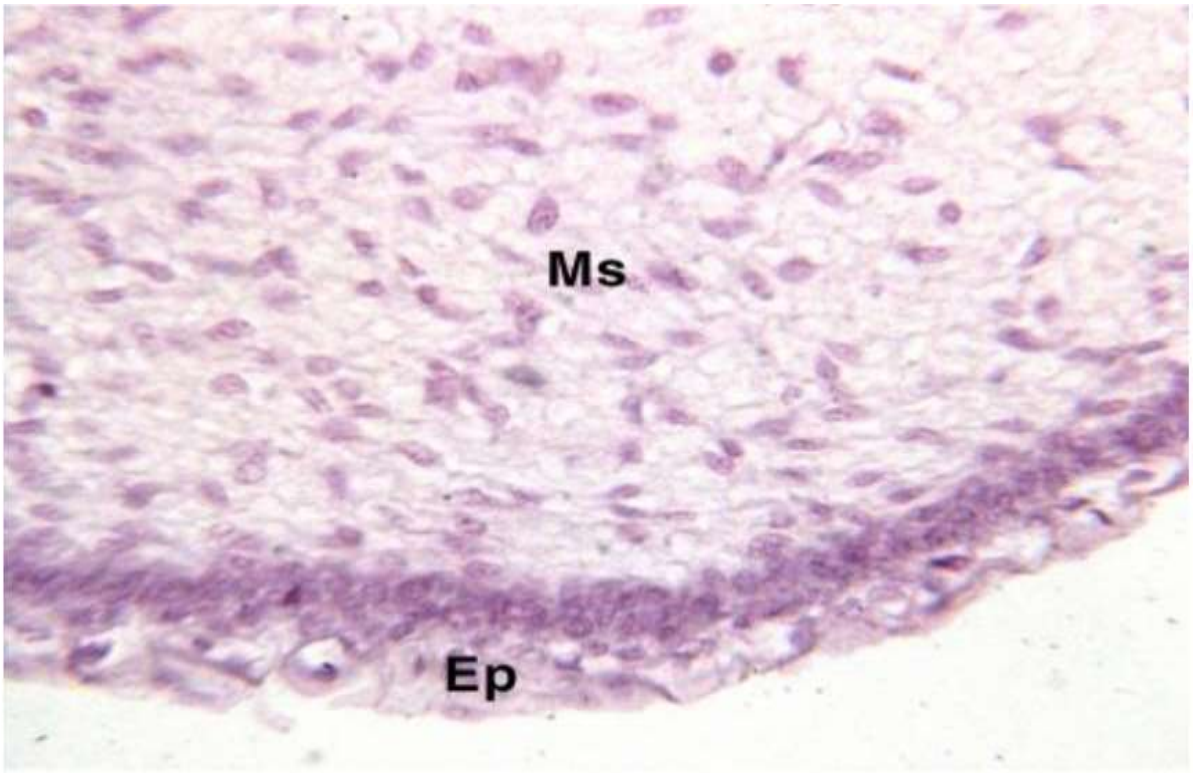

Figure 2-7: Mesenchyme.

2- Mucous c.t.

This is a transient type of tissue which appear in normal development. Occur also as jelly in umbilical cord. Component cells are large, stellate fibroblasts, fuse with neighboring cells. The ground substance is soft and jelly-like. It contains a delicate meshwork of fine collagenous fibers.

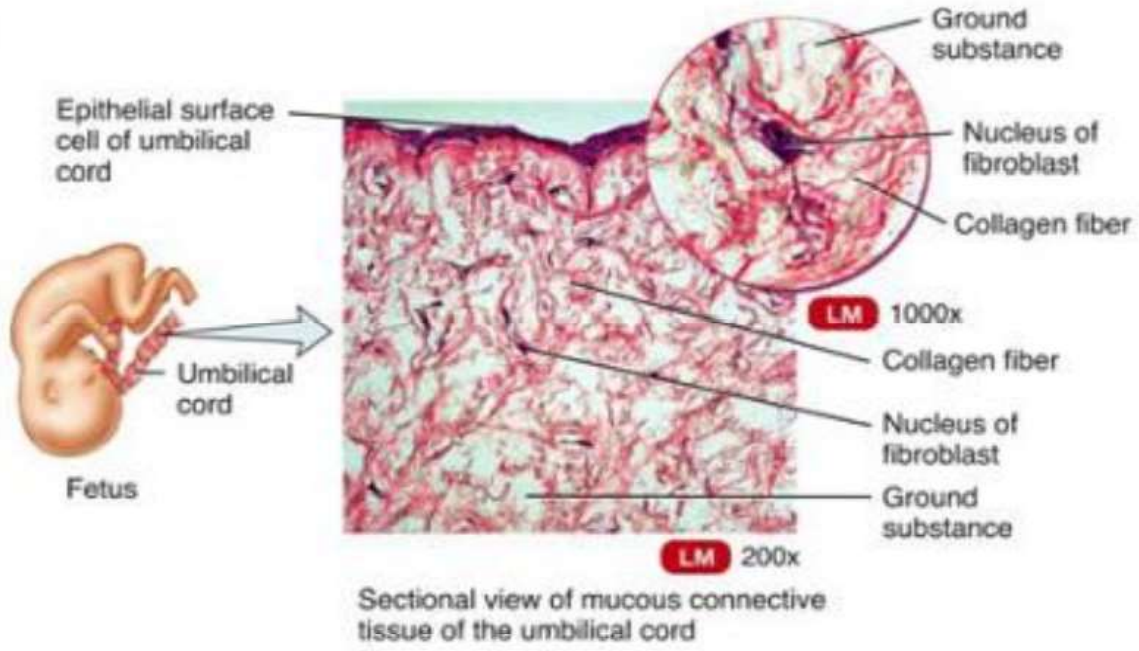

Figure 2-8: Mucous c.t.

3- Loose (Areolar) c.t.

Is formed by the direct differentiation of mesenchyme. It is a loosely arranged, fibro elastic c.t. and is encountered in almost every microscopic section of the body, since it is the packing and anchoring material and the embedding medium of many structures, including blood vessels and nerves. It binds other tissue, organ components, and organs together. All the structural elements, cells, fibers, and ground substance previously described are present within it. The two most common cell types are fibroblasts and macrophages. Collagenous fibers are the most prominent. The ground substance is relatively fluid-like. Loose c.t. is found mainly in the papillary layer of the dermis, in the hypodermis, in the several linings of peritoneal and pleural cavities, and in glands and mucous membranes.

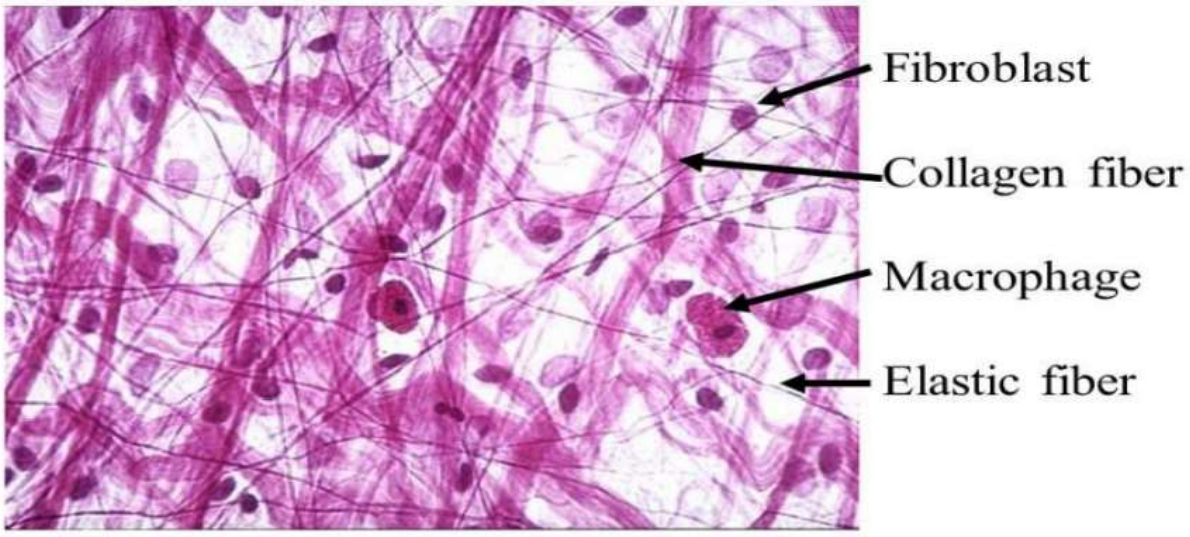

Figure 2-9: Loose (Areolar) c.t.

4- Adipose tissue:

Fat cells are scattered in areolar c.t. when fat cells form large aggregations and are the principal cell type, the tissue is designated adipose tissue. The closely packed fat cells form lobules, separated by fibrous septa. There is a rich network of blood capillaries in and between the lobules. Adipose tissue is not static. There is a vital balance between deposits and withdrawals. Adipose tissue may develop almost anywhere areolar tissue is plentiful, e.g. in the subcutaneous tissues, in the mesenteries and omentum, around the kidneys, and in the bone marrow.

- **Brown Adipose Tissue**: white adipose tissue which composes almost all the adipose tissue in man. Brown adipose tissue is a special type of adipose tissue that is concerned with heat production, particularly important in newborn and young animals exposed to cold. It has a rich blood supply with abundant cytoplasmic lysosomes, giving the tissue its color.

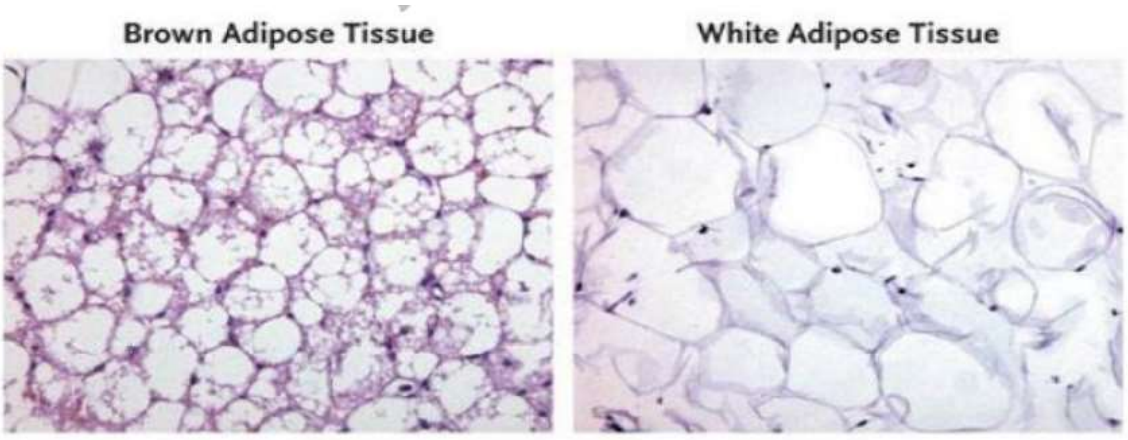

Figure 2-10: Adipose tissue.

5- Reticular tissue: This is a primitive type of c.t., and contains a network of thin reticular fibers associated with primitive reticular cells. These cells are stellate and have long cytoplasmic extensions which appear to join with those of other cells. Reticular tissue forms the framework of lymphoid organs, bone marrow, and liver.

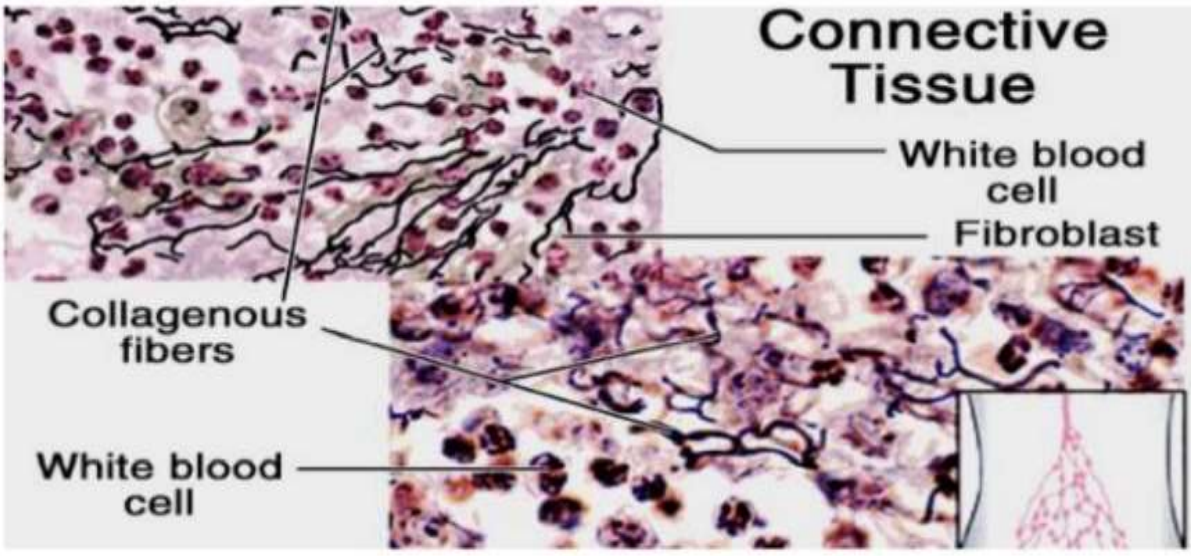

Figure 2-11: Reticular tissue.

B. Dense connective tissue:

This type of tissue is composed of the same components found in loose c.t., but there is a clear predominance of collagen fibers at the expense of the ground substance components. The fibers are packed closely, the cells are few.

Dense c.t. is less flexible and far more resistant to stress. This type of tissue is encountered in the dermis of the skin, in the submucosa of the digestive tract. When the collagen fibers are arranged in bundles without a definite orientation is called dense irregular c.t., and when the collagen fibers are arranged according to a definite pattern is called dense regular c.t. Tendons are the most common example of dense regular c.t., ligament, aponeuroses. In tendons, the collagenous fibers run parallel courses. Each fiber or bundle is composed of a large number of fibrils. Fibroblasts or tendon cells are the only cell type present, and in longitudinal sections of tendon they are aligned in rows between the collagenous fibers Cytoplasm of the cells is often indistinct. In cross-sections, the cells appear stellate in shape with cytoplasmic processes extending between the collagenous bundles. Each primary bundle is covered by a small amount of loose areolar c.t. termed endotendineum. Generally, several primary bundles or fascicles bounded by a coarser type of c.t. ,the peritendineum. The tendon composed of a number of fascicles is sheathed by thick c.t. called epitendineum. Nerve and blood vessels course in the major c.t. septa but do not invade the fascicles. In yellow elastic ligaments, bundles of thick parallel fibers of elastic tissue are bound together by a small amount of delicate c.t. in which typical fibroblasts are present. The elastic fibers branch frequently and fuse with one another. Individual fibers are surrounded by a network of reticular fibers. Yellow elastic ligaments show numerous oval or elongated nuclei of fibroblasts between the parallel elastic fiber.

This is one feature of elastic ligaments which distinguishes them histologically from tendons and collagenous ligaments. (e.g. ligamentum nuchae of quadrupedos and the yellow ligaments of the vertebral column).

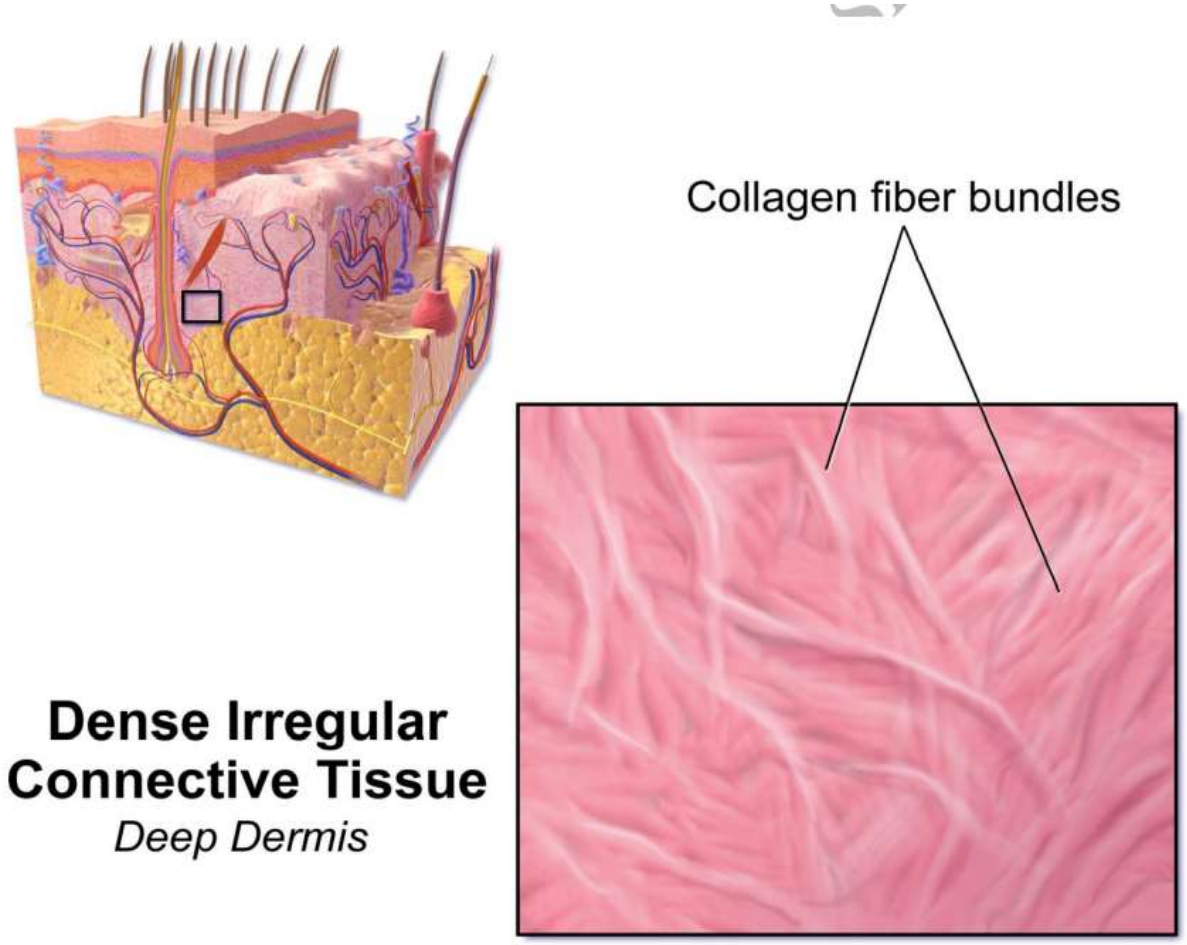

Figure 2-12: Dense c.t