***Connective tissue***

The connective tissue are widely distributed all over the body, consists of cell & abundant extracellular matrix. The extracellular matrix consists of different combination of protein fibers (collagen Reticular and elastic fibers) and ground substance.

***Function of connective tissue***

The functions of the various types of C.T are generally depending on the type of cells fibers and the characters of the ground substance in the matrix. The functions include the binding together support, and physical and immunological protection of other tissue and organs as well as storage.

 ***Extracellular matrix:Ecm***

It consist of ground substance, fibers, cells &tissue fluid,

1\_ground substance is a highly water content (hydrophilic),transparent, viscous complex of mixture macromolecules principally in three classes ,glaycosaminglycans,proteoglycans and multiadhesive glycoproteins .the ground substance fills the space between cells & fibers of connective tissue ground substance is formed mainly of three classes of components :

A \_ Glycosaminoglycans (GAGS) composed of uronic acid and a hexosamine and the largest hyaluronic acid.

B\_proteoglycans are responsible for the physical properties of ground substance.

C\_multiadhesive glycoproteins have binding sites for several components of the extracellular matrix, facilitate the attachment of cell to the extracellular matrix.

THE MAJOR TYPES OF GLYCOPROTEINS:

Fibronectin and laminin

2\_fibers :

1\_collagen fibers, are tough thick fibrous protein and are the most abundant fibers collagen appear as wavy structures ,unbanked and run in bundles and also colors or white within bundles.each fiber consist of parallel aggregation of thiner fibrils,each fibril is composed of small units called tropocollagen molecules each molecule composed of three peptide chains .

***Type of collagen fiber***

***A\_type I collagen*** foundin connective tissue proper,skin,tendon,bone,dentin

***B\_type II collagen*** found in cartilage vitreous body***.***

C\_ type III collagen occurs as a thin fiber arranged in loose networks &found in reticular fiber that surround and sport soft flexible tissue.

D\_type IV ***collagen*** an important network \_forming collagen found in all basement membranes

E\_type V collagen , found in fetal tissue ,skin bone placenta most interstitial tissue .

2) reticular fiber are thin and branched ,do not bundle to form thick fibers and form an extensive network in certain organ.

3) elastic fibers are thin, small,long,wavy,run singly and branching fibers that allow stretch and have less tensile strength than collagen fiber and composed of microfibrils and the protein elastin.

TYPE OF CELLS CONNECTIVE TISSUE:

Resident (fixed) cells

Fibroblasts ,macrophage, adipose cells, mesenchymal stem cell ,pericytes

Transient (migrating) cells:

1\_fibrobast,are the most common cells in the connective tissue synthesize collagen ,elastane and are responsible for the synthesis of extracellular matrix components.

Type of fibroblast according to activity :

A\_ active fibroblast :are satellite or ovoid in shape and has an abundant and irregular branched cytoplasm.

B\_ inactive fibroblast (quiescent) or fibrocyte is smaller than the active fibroblast and usually spindle shape.

2\_macrophage are the most numerous cells type after fibroblast and derived from bone marrow precursor cells that divided.

3\_mast cells are large,oval or rounded c.t derived from bone marrow precursors,

4\_plasma cells: these are free cells and few in number in most c.t

5\_adibose cells: are derived from undifferent mesenchymal cells also may arise from fibroblast.

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Classification of C.T:

A\_EMBRYONIC C.T

B\_ADULT C.T

1\_connective tissue proper: loose (areolar) C.T and dense C.T(regular and irregular)

2\_specialized C.T.

A\_ reticular C.T

B\_ adipose tissue

C\_ blood

D\_ cartilage

E\_ bone

1\_embryonic C.T.

A\_mesechymal C.T.

It give rise all other connective tissue which has star shaped mesenchymal cell, located in embryo

B\_ mucous tissue

The mucous tissue is the principal component of umbilical cord where it is referred to as whartens jelly.