

# **Structure and function of Connective Tissues**

## **Part -1**



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# Introduction



- Connective tissue supports and binds other tissues of the body
- Its cells are mesodermal in nature
- In contrast to epithelia, connective tissue is sparsely populated by cells and contains an extensive extra cellular matrix.

# Structure of Connective Tissue



It has three main types of components

- Ground substance
- Fibers , and
- Cells

The ground substance and fibers make up the Extra Cellular Matrix( ECM)

## **Ground Substance**

- The ground substance is an aqueous gel of glycol proteins and proteoglycans that occupies the space between cellular and fibrillar elements of the connective tissue
- It is characterized by a gel like viscous consistency
- The characteristics of the ground substance determine the permeability of the connective tissue level to solids and proteins.

# Structure of Connective Tissue



## **Fibers**

Connective tissue fibers provide support and are of three types

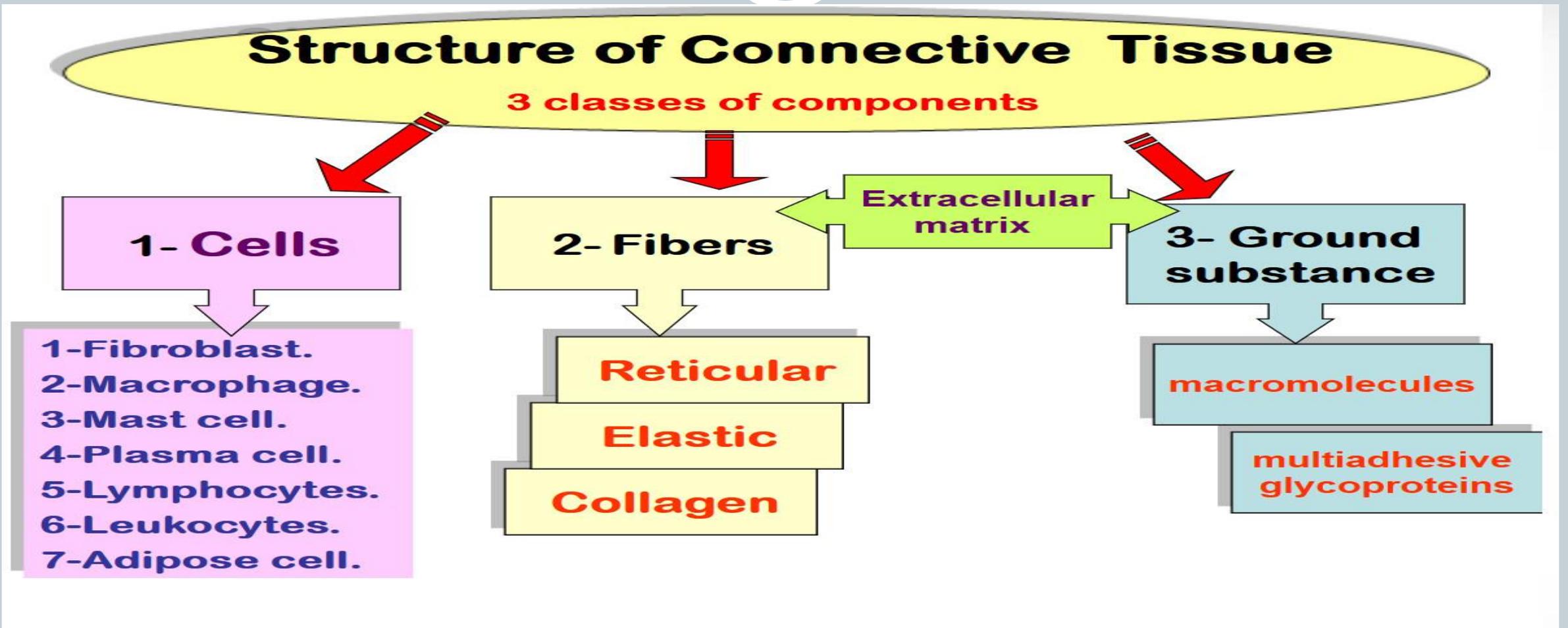
- Collagen Fibers
- Elastic Fibers, and
- Reticular Fibers

## **Cells**

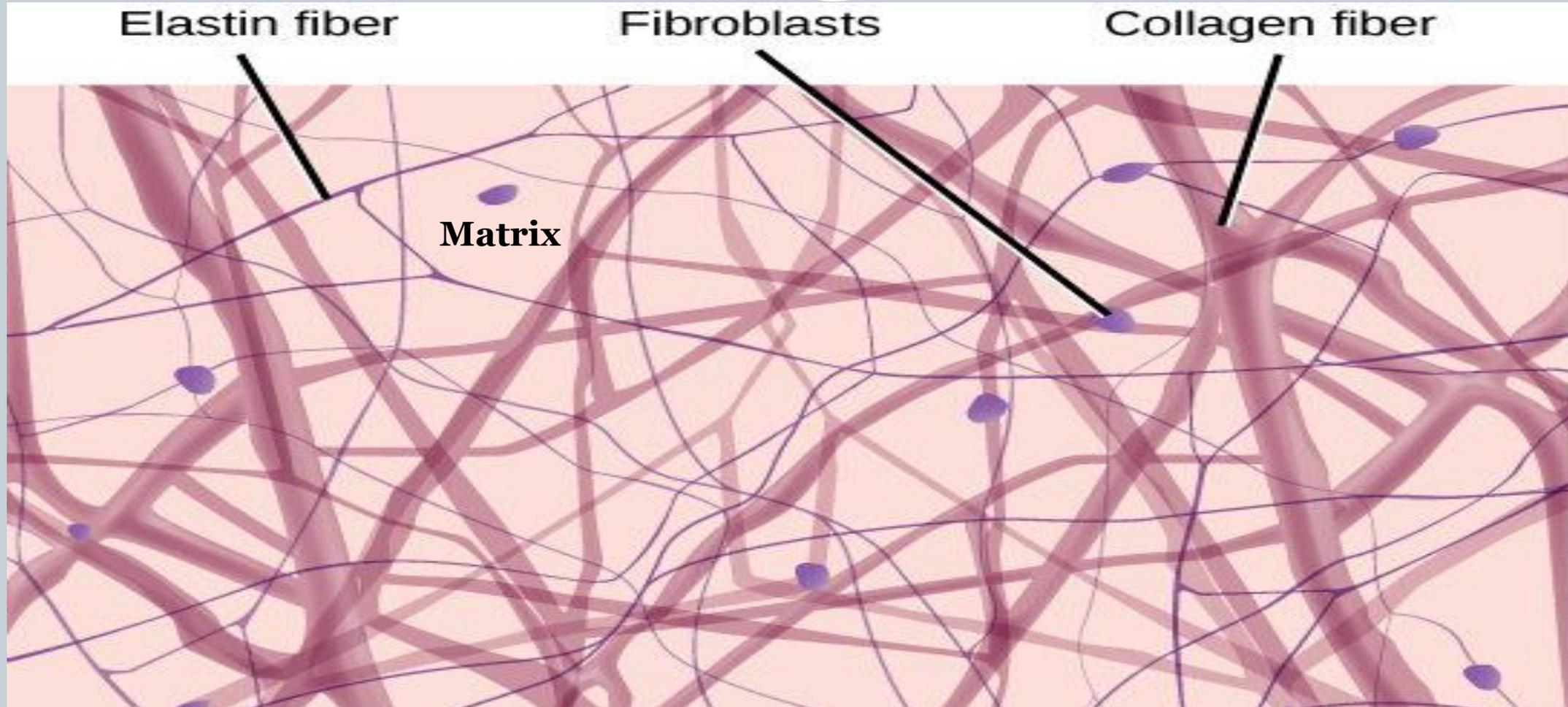
Cells may be of several types , some are of wandering type and others relatively fixed at definite positions

- The primary cell of connective tissue is Fibroblast
- Its function is to produce and maintain the ECM of connective tissue
- Besides fibroblast, several other types of cells are present – these are the cells of the immune system and adipocytes
- Specialized connective tissue contains, specialized cells ,e.g. Cartilage contains chondrocytes and bone contains osteocytes

# Structure of Connective Tissue



# Structure of Connective Tissue



# Types of Connective Tissues



On the basis of nature of matrix, connective tissues are of three types

1. Connective Tissue proper
2. Skeletal connective tissue
3. Vascular connective tissue

# Types of Connective Tissues



## **Connective Tissue proper**

Its matrix is soft and jelly like. It is found throughout the entire body and is of two types

- **Loose connective tissue**
  - Loose Connective tissue is also called the areolar connective tissue
  - It has almost equal amounts of cells, fibers and ground substance
  - Chief cells are the fibroblast
  - However immune system cells are also present
  - Collagen fibers are the principal fibers of the ECM( Extra Cellular Matrix)
  - They are sparsely distributed within the ECM, that's why this tissue type is called loose
  - Besides the collagen fibers, moderate amounts of reticular and elastic fibers are also present
  - This tissue plays an important role in binding other tissue type together e.g. joining tissues into organs, holding organs in place and attaching epithelial tissues to other tissue types.

# Types of Connective Tissues

( Connective Tissue proper .. Contd..)



- **Dense connective tissue**
  - It has fewer cells than loose connective tissue
  - Its ECM is densely packed with collagen fibers
  - Based on the arrangement of the fibers, the dense connective tissues are of two types
    - ✦ Dense Regular connective Tissues, and
    - ✦ Dense Irregular connective Tissues

## Dense Regular Connective Tissue

Dense Regular connective tissue has the collagen fibers aligned parallel to each other. This arrangement provides the tissue with high unidirectional resistance to stress e.g. tendons and ligaments

# Types of Connective Tissues

( Connective Tissue proper .. Contd..)



## Dense Irregular Connective Tissue

This connective tissue has collagen fibers, randomly interwoven, forming a three dimensional network resistant to distension in all directions.

It is located in the capsules and the walls of the organs, the dermis of the skin and glands

*Thank You*

