# Connective Tissue

Red: important.
Black: in male|female slides.
Gray: notes.

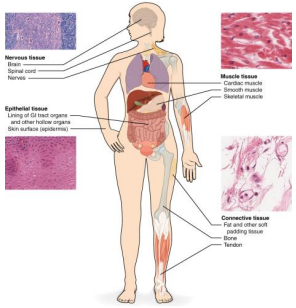
Editing File

غيداء آل مصمع
عبدالرحمن الحيسوني
Revised by

## ➢ OBJECTIVES

- Enumerate the general characteristics of C.T
- Classify C.T into C.T. proper and special types of C.T
- Classify C.T proper (C.T.P)
- Describe the structure (components) and distribution of different types of (C.T.P)

## ➢ CONNECTIVE TISSUE (C.T)




**Definition:**

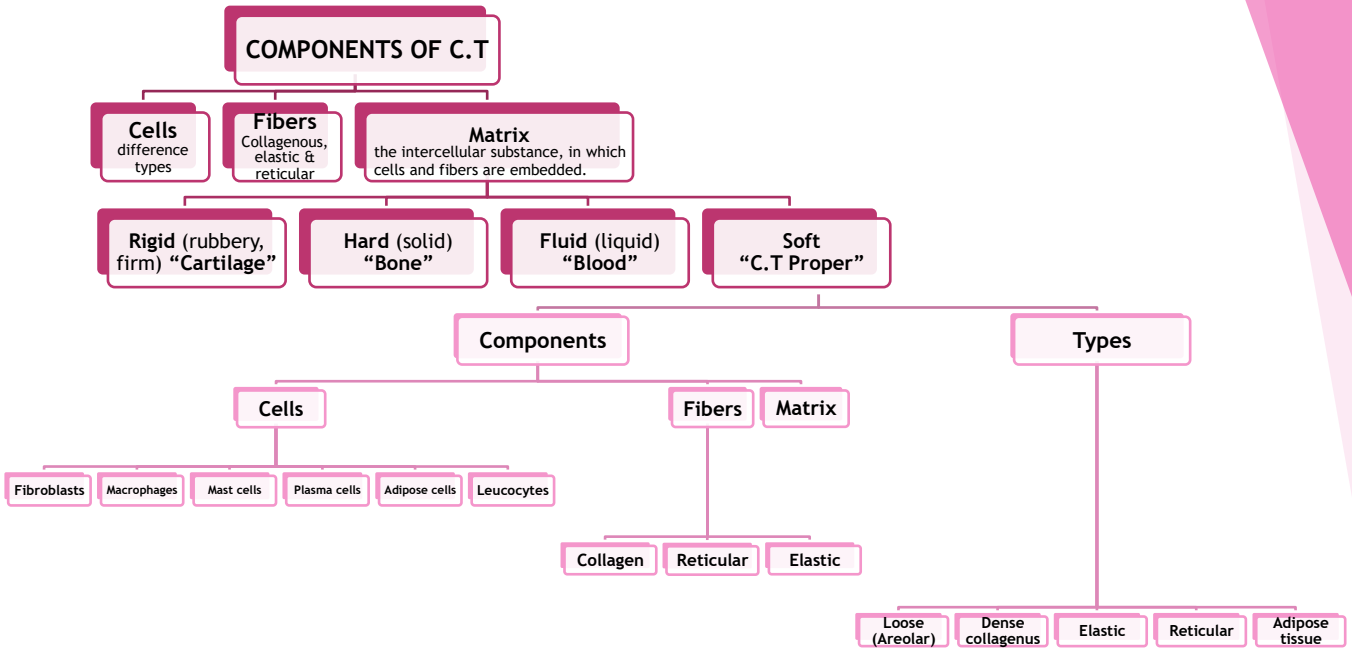
- It is one of the 4 basic tissues "Epithelial, connective, muscular & nervous".
- It is mesodermal in origin.

**General characteristics:**

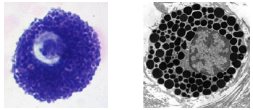
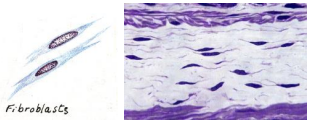
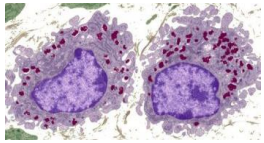
- is formed of widely separated, few cells with abundant extracellular matrix.
- Most are vascular "have blood vessel"
- (Remember: Epithelial tissue & cartilage **A**vascular "lack of blood vessel")

**Functions :**

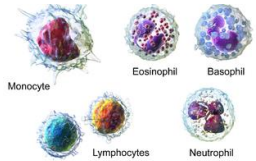
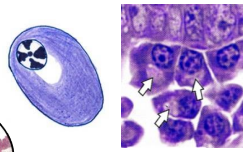
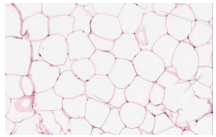
- It supports, binds, and connects other tissues and organs
- providing structural and metabolic support for them.


COMPONENTS OF C.T
Cells
difference types
Fibers
Collagenous, elastic & reticular
Matrix
the intercellular substance, in which cells and fibers are embedded.
Rigid (rubbery, firm) "Cartilage"
Hard (solid) "Bone"
Fluid (liquid) "Blood"
Soft "C.T Proper"
Components
Types
Cells
Fibers
Matrix
Fibroblasts
Macrophages
Mast cells
Plasma cells
Adipose cells
Leucocytes
Collagen
Reticular
Elastic
Loose (Areolar)
Dense collagenus
Elastic
Reticular
Adipose tissue

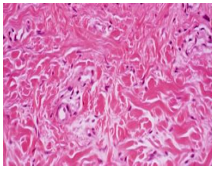
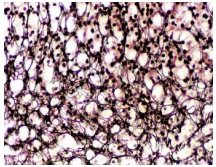
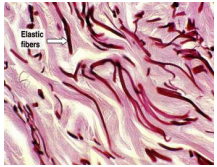
## ➢ COMPONENTS OF C.T PROPER (CELLS):

| 1) Fibroblasts | 2) Macrophages | 3) Mast Cells |
|---|---|---|
| **L/M:**<br>• Most common cell ; found nearly in all types of C.T proper<br>• Flat branched cells (spindle-shaped) with basophilic cytoplasm (rich in ribosomes)<br>• They can divide<br>• Old fibroblasts are called fibrocytes | **L/M:**<br>• Basophilic cytoplasm, rich in lysosomes<br>• Irregular outlines<br>• They can divide<br>• They originate from blood monocytes "inside blood = monocyte , inside connective tissue = macrophage" | **L/M:**<br>Cytoplasm contains numerous basophilic cytoplasmic granules<br>  |
| **Function:**<br>1.Formation of proteins of C.T fibers (Make Extracellular Fluid)<br>2.Formation of C.T. matrix<br>3.Healing of wounds | **Function:**<br>Phagocytosis | **Function:**<br>1. Secrete heparin (anticoagulant) "for maintain fluidity for blood "<br>2. Secrete histamine (allergic reactions) "for control diameter for bronchioles and blood vessel"<br>*When histamine increase the diameter of blood vessel increase and the diameter for bronchioles decrease<br>*Heparin and histamine are hormones that secret by must cell in specific quantities |
|  |  | |

## ➢ COMPONENTS OF C.T PROPER (CELLS):

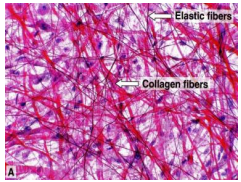
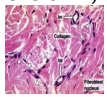
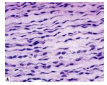
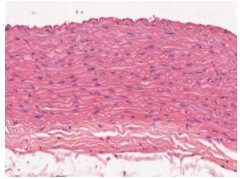
| 4) Plasma Cells | 5) Adipose Cell (Adipocyte, Fat Cells) | 6) Leucocytes (White Blood Cells) |
|---|---|---|
| **L/M:**<br>• Basophilic cytoplasm with a negative Golgi image<br>• Nucleus: spherical, eccentric with a clock-face appearance of chromatin<br>• Derived from B-lymphocytes<br>• **B lymphocyte** it is the plasma cell<br>• Active B lymphocyte known as plasma cell | **L/M:**<br>• Unilocular adipose cells<br>"Uni=one=وحيد , locular=تجويف"<br>• Large spherical, with a single large fat droplet<br>• Thin rim of cytoplasm at the periphery<br>• Nucleus: flattened, peripheral | • Appear normally in C.T. proper<br>• there are 5 types of WBC : Neutrophils, Lymphocytes, Monocytes, Eosinophils & Basophils<br>  <br> |
| **Function:**<br>Secretion of antibodies (5 immunoglobulins)<br>  | **Functions:**<br>• Storage of fat<br>• Source of heat & energy | • **Neutrophils** increase in acute inflammation<br>• **Lymphocytes** and **monocytes** increase in chronic inflammation<br>• **Eosinophils** and **basophils** increase in allergic inflammation |
|  |  | |

## ➢ COMPONENTS OF C.T PROPER (FIBERS):

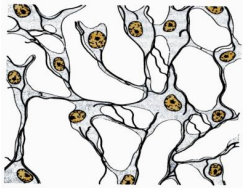
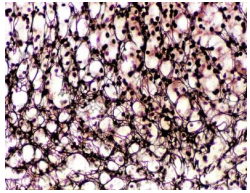
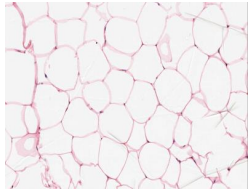
| 1) Collagen Fibers | 2) Reticular Fibers | 3) Elastic Fibers |
|---|---|---|
| • Made of **collagen type I** | • Made of **collagen type III** | • Made of **elastin** |
| • Non-branched fiber & arranged in bundles | • Branch and form a network | • Branched |
| • Acidophilic | • Stained black with silver | • Stained brown with orcein. |
|  |  |  |

**Other important types of collagen include:**
- Type II (In cartilage)
- Type IV (in basement membranes)

## ➢ TYPES OF CONNECTIVE TISSUE PROPER:

| 1) Loose (Areolar) C.T | 2) Dense Collagenous C.T | 3) Elastic Tissue |
|---|---|---|
| • **Most common type.**<br>**L/M:**<br>• Contains all of C.T components in equal amount (cells, fibers & matrix)<br>• No predominant element | **L/M:**<br>• **Predominance** of collagen fibers + fibroblasts<br>• rich in collagen fiber | **L/M:**<br>**Predominance** of elastic fibers (sheets or membranes) + fibroblasts<br>• rich in elastic fiber |
| **Sites:**<br>Subcutaneous tissue "under skin"<br>  | **Sites:**<br>1.Dense irregular: "vascular" dermis of the skin, capsules<br>  <br>2.Dense regular: "Avascular" tendons, ligaments<br>  | **Sites:**<br>Large arteries, e.g. Aorta<br>  |
| | **Function:**<br>tough tissue & resistant to stretch | **Function:**<br>elastic tissue & stretchable |

## ➢ TYPES OF CONNECTIVE TISSUE PROPER:

| 4) Reticular Tissue | 5) Unilocular Adipose Tissue (White Adipose Tissue) |
|---|---|
| **L/M:**<br>**Predominance** of reticular fibers + reticular cells (specialized fibroblasts) | **L/M:**<br>**Predominance** of unilocular fat cells<br>*There is two type of adipose tissue : unilocular and multilocular |
| **Sites:**<br>Stroma of organs (liver, spleen & lymph node)<br>   | **Sites:**<br>• Subcutaneous tissue "under skin" especially in:<br>1. Buttocks<br>2. Abdominal wall<br>3. Female breast<br>4. Hips<br>• Around kidney<br>  |
| **Function:**<br>structural support | **Function:**<br>1. Synthesis, storage & release of fat<br>2. Supports organs, e.g. kidney<br>3. Heat insulation (Especially in newborn children)<br>  |

## ➢ FUNCTIONS OF CONNECTIVE TISSUE PROPER

1) Supports, binds, and Connects other tissues and organs.

2) Nourishes the surrounding structures, through its blood vessels.

3) Its Cells provide healing of injured tissues, produce heparin, histamine & antibodies, store fat & preserve body temperature and protect against microorganisms.

4) Its fibers provide rigidity or elasticity.

## ➢ QUESTIONS:

Q1: What most common type of connective tissue proper?

A) Loose (Areolar) C.T  B) Dense collagenous C.T  C) Elastic tissue  D) Reticular tissue

Q2: What sites of reticular tissue?

A) Around kidney  B) Stroma of organs  C) Neither A & B  D) Both A & B

Q3: What tissue can be found in the Aorta?

A) Loose (Areolar) C.T  B) Dense collagenous C.T  C) Elastic tissue  D) Reticular tissue

Q4: Reticular fibers is made of?

A) Collagen III  B) Collagen II  C) Collagen I  D) Collagen IV

Q5: What is the function of elastic tissue?

A) Resistant to stretch  B) Stretchable  C) Structural support  D) Support organs

5- B
4- A
3- C
2- B
1- A



HISTOLOGY TEAM 437

Q6: What type of fiber is form a network?

A) Collagen fiber B) Elastic fiber C) Adipose fiber D) Reticular fiber

Q7: What type of cell rich in ribosomes?

A) Fibroblasts B) Macrophages C) Plasma cells D) Leukocytes

Q8: What type of cell rich in lysosomes?

A) Fibroblasts B) Macrophages C) Plasma cells D) Leukocytes

Q9: What is the function of Dense collagenous connective tissue?

A) Stretchable B) Resistant to stretch C) Structural support D) Support organs

Q10: What characters nucleus of plasma cell?

A) Flattened & clock-face appurtenance of chromatin B) Flattened & periphery

C) Spherical & clock-face appurtenance of chromatin D) Spherical & peripher

9- D
7- A
8- B
9- B
10- C

Q11: Most of connective tissue are?

A) Vascular B) Avascular C) Branched D) Non-branched

Q12: Which of these cells have basophilic cytoplasm?

A) Fibroblasts B) Macrophages C) Neither A & B D) Both A & B

Q13: What color do elastic fiber stain?

A) Brown with orcein B) Black with silver C) Brown with silver D) Black with orcein

Q14: Describe cytoplasm of adipose cell?

A) Basophilic cytoplasm with negative Golgi image B) Thin rim of cytoplasm at the peripheral

C) Contains A lot of basophilic cytoplasm granules D) Basophilic cytoplasm, rich in lysosomes

Q15: What tissue can be found in subcutaneous?

A) Loose (Areolar) C.T B) Adipose Tissue C) Neither A & B D) Both A & B

11- A
12- D
13- A
14- B
15- D



HISTOLOGY TEAM 437

Q16: Which cell is responsible for structural support?

A) Adipose tissue B) Dense collagenous C.T C) Reticular tissue D) Elastic tissue

Q17: Which cell is responsible for heat insulations?

A) Elastic tissue B) Dense collagenous C.T C) Reticular tissue D) Adipose tissue

Q18: What type of cells that make matrix of cartilage?

A) Soft B) Rigid (firm, rubbery) C) Hard (solid) D) Fluid (liquid)

Q19: What function of mast cells?

A) Maintain temperature B) Connect organs C) Secrete antibodies D) Secrete heparin & histamine

Q20: When monocytes & neutrophils increase?

A) Monocytes increase in allergic inflammations ,Neutrophils increase in chronic inflammations
B) Monocytes increase in chronic inflammations ,Neutrophils increase in allergic inflammations
C) Monocytes increase in chronic inflammations ,Neutrophils increase in acute inflammations
D) Monocytes increase in acute inflammations ,Neutrophils increase in allergic inflammations

16- C
17- D
18- B
19- D
20- C

" لنكن يداً بيد ليرى العالم إنجازاتنا
وتحتلوا شقاء اليوم لأجل حلم الغد "


## Team members :

Hussain Alkharboush
Ebtesam Almutairi
Shahad Alzahrani
Tareq Allhaidan
Marwah Alkhalil
Rinad Alghoraiby

## Team leaders :

Khalid Fayez Alshehri
Rawan Mohammad Alharbi

Twitter.com/Histology437
HistologyTeam437@gmail.com