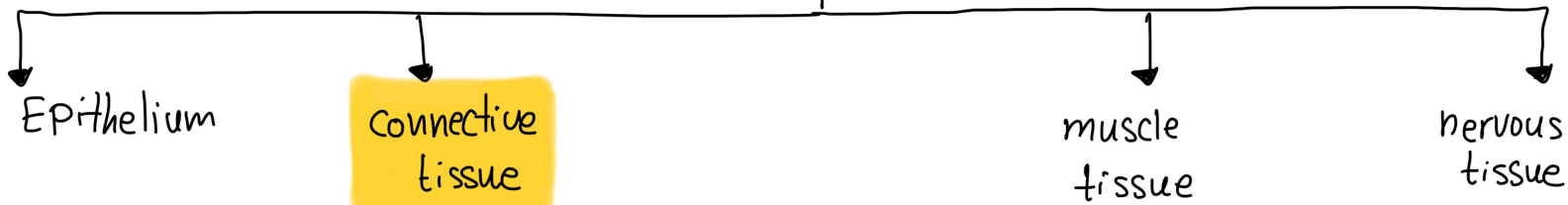
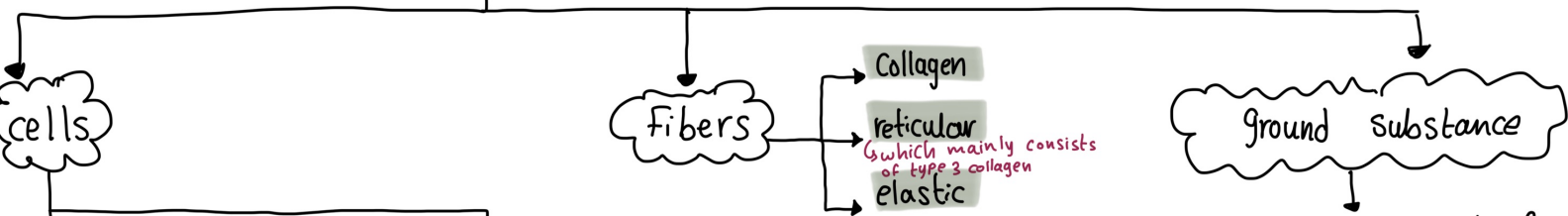


# Main body tissues



when studying connective tissue we care to study its



cells found in connective tissue all around the body

white blood cells that are found in the blood

**Fibroblasts** → Production of ECM components  
 (the old semi-retired form is fibrocytes)  
 → One specialized type of fibroblasts is reticular cells

- Neutrophil**  
Phagocytosis of bacteria
- Eosinophil**  
- modulating allergy  
- defense against Parasites
- Basophil**  
pharmacologically active molecules
- Lymphocytes**  
immune functions
- Monocytes**  
→ monocytes are in the blood, and once they leave the blood and go to other connective tissue sites they become macrophages

which is made of

- proteoglycans
- multiadhesive glycoproteins
- glycosaminoglycans (GAGs)

**mast cells**  
full of secretory granules

**Macrophages**  
has phagocytic ability

**Plasma cells**  
(came from B-lymphatic cells)

**Adipocytes**  
store fats  
white adipocytes  
brown adipocytes

- Kupffer cells in the liver
- Microglial cells in the CNS
- langerhans cells in the epidermis of skin
- osteoclast in bones ⚠ its job isn't immune related
- Dendritic cells in lymphnodes and spleen
- multinuclear giant cells

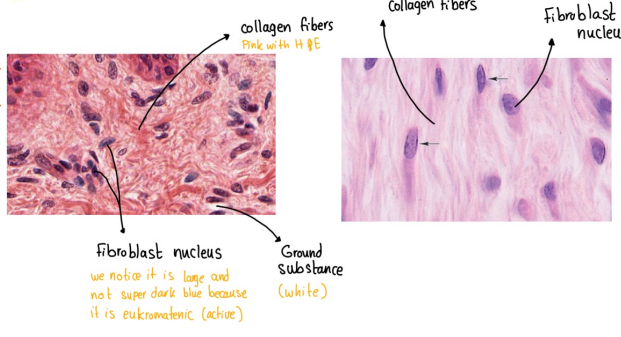
Production of Antibodies

occurs in connective tissue in pathological conditions

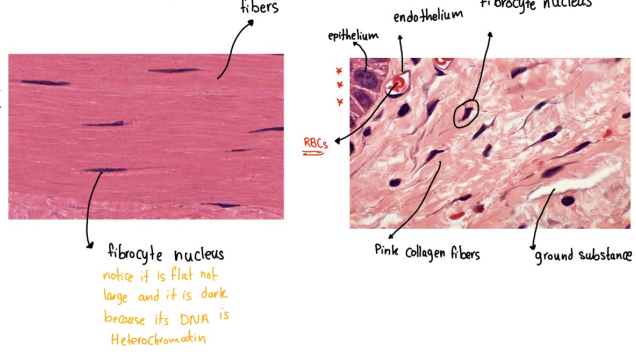
- Hyaluronic acid
- Chondroitin 4-sulfate
- Chondroitin 6-sulfate
- Dermatan sulfate
- Heparan sulfate
- keratan sulfate

# cells

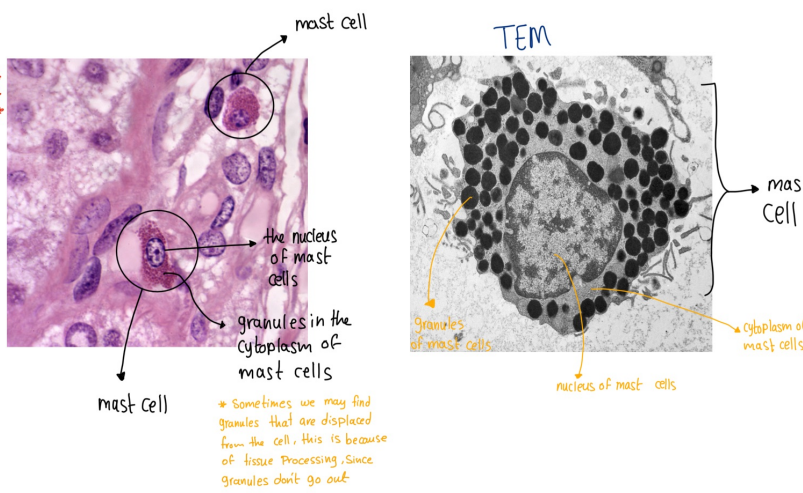
## Fibroblasts



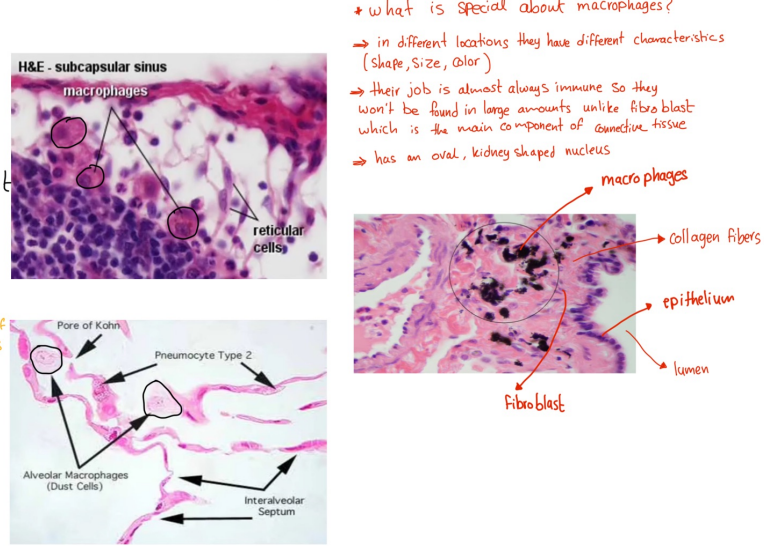
## Fibrocytes



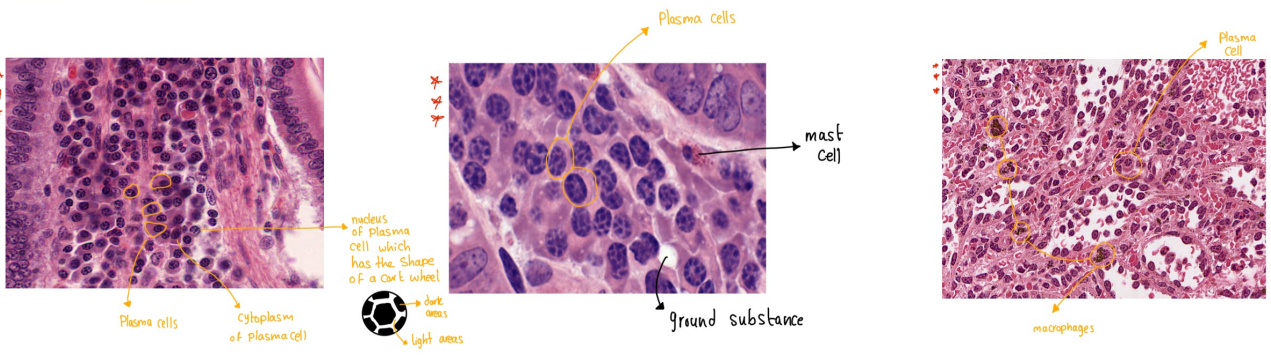
## Mast cells



## Macrophages

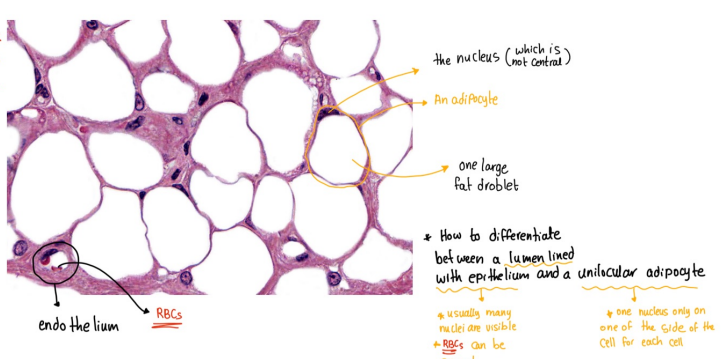


## Plasma cell



## unilocular adipocytes

↳ making white adipose tissue

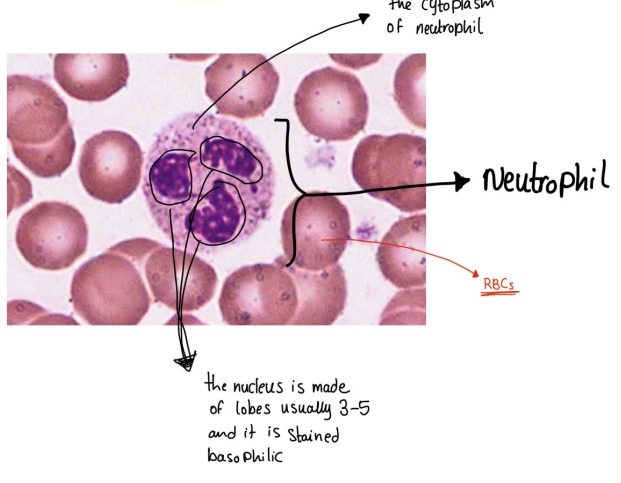


## Multilocular adipocytes

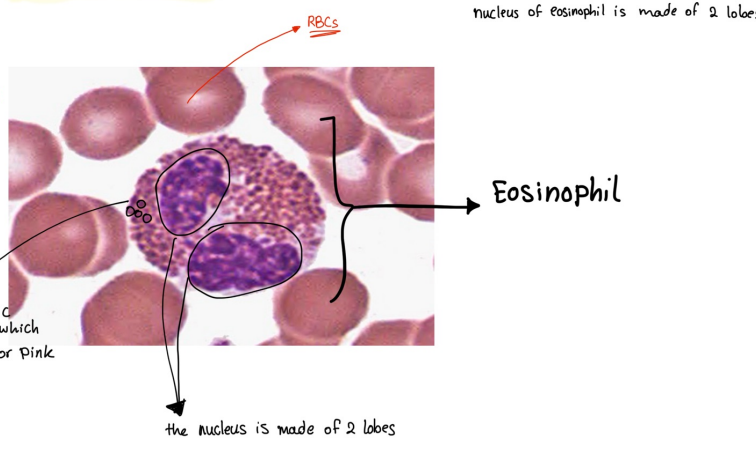
↳ making brown adipose tissue



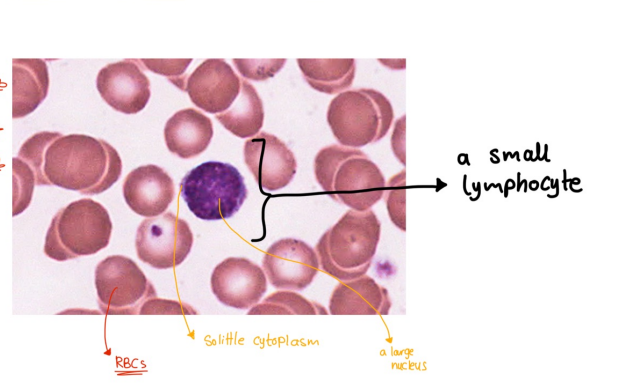
# Neutrophil



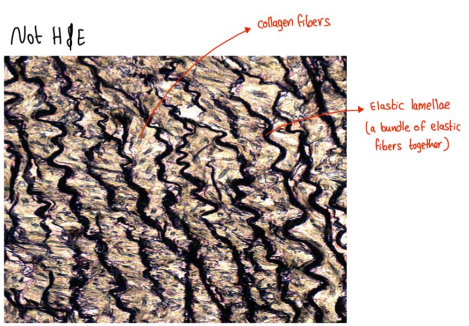
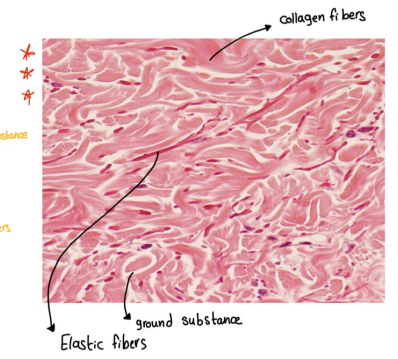
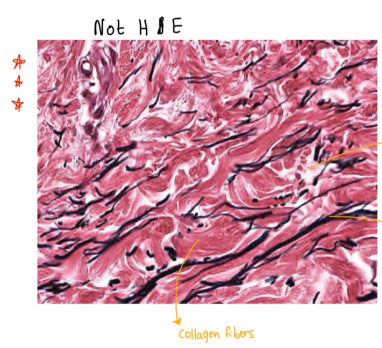
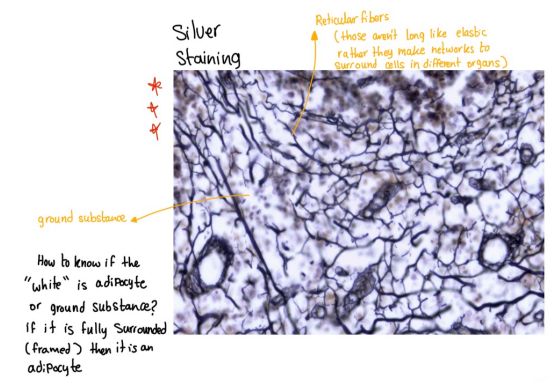
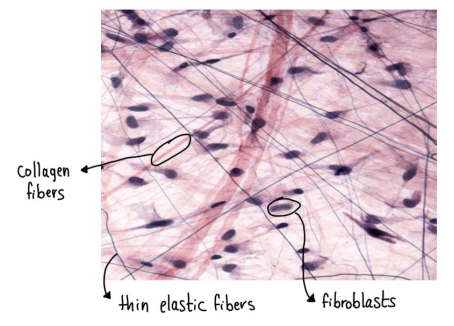
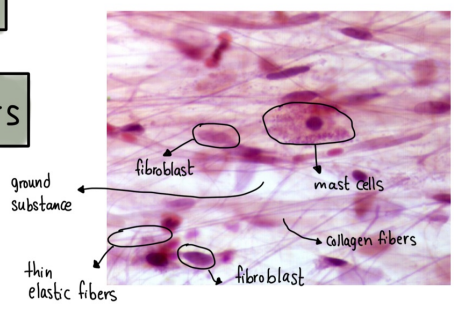
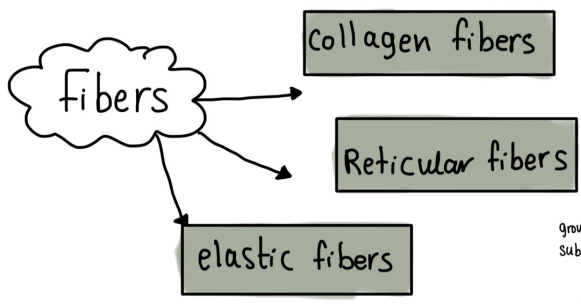
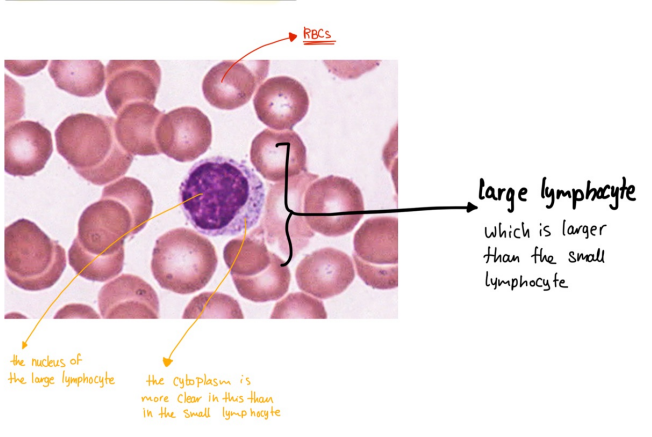
# Eosinophil



# Small lymphocyte



# Large lymphocyte



⇒ Some important notes about the colors with different stains

### collagen fibers

H & E ⇒ Pink

Masson's trichrome ⇒ Blue

Van Gieson ⇒ Pink + muscles stain yellow

### Reticular fibers

Silver stain ⇒ black

PAS ⇒ magenta

### Elastic fibers

→ it is full of zig zags

Verhoff - Van Gieson ⇒ Black

Orcein ⇒ Brownish - Black

fuchsin ⇒ Maroon

### Ground substance

Alcian blue → } light blue

Toluidine blue → }

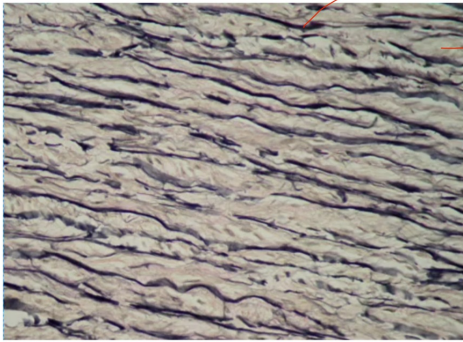
Orcein ⇒ yellow/pale

\* \* \* \* \*

orcein staining

→ Elastic fibers

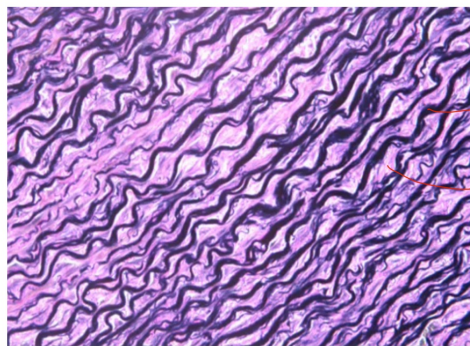
→ ground substance



Verhoff - Van Gieson staining

→ Elastic fibers

→ collagen and other tissue



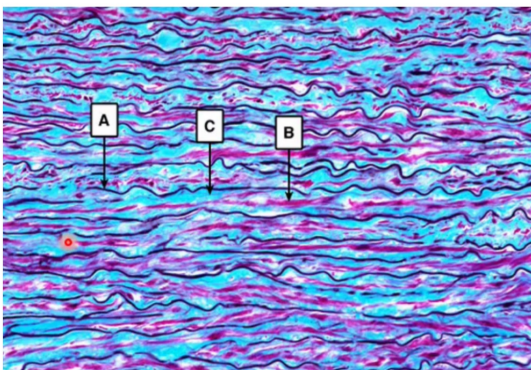
H & E staining

→ Elastic fibers

→ Collagen fibers + muscle cells



a section from a blood vessel



A ⇒ Elastic fibers

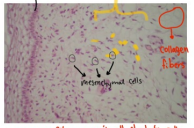
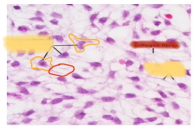
B ⇒ muscle cells

C ⇒ collagen fibers

# connective tissue types

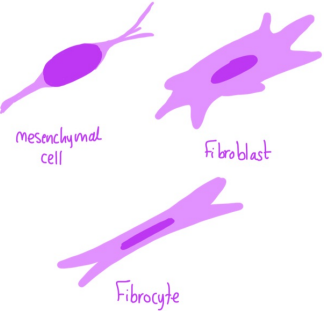
## Embryonic connective tissue

### Mesenchyme connective tissue

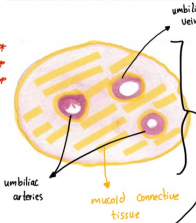


- \* note that mesenchymal undifferentiated cells are:-
- ① larger than fibroblasts
  - ② with long processes
  - ③ their nucleus is oval
  - ④ they are active (achromatic genetic material)

notes to help in differentiating between mesenchymal connective tissue and mucoid connective tissue



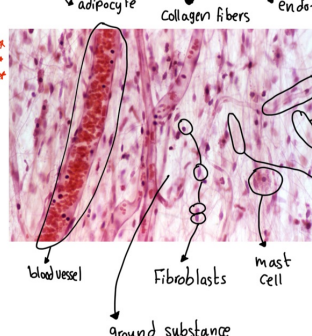
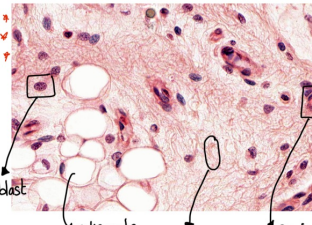
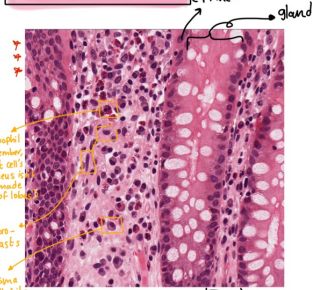
### Mucoid (mucous) connective tissue



the Umbilical Cord

## Connective tissue proper

### loose connective tissue

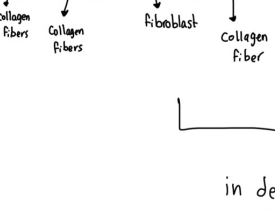
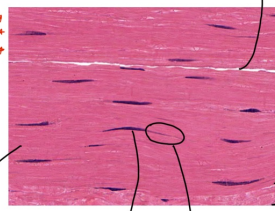


\* in loose connective tissue you can find:-

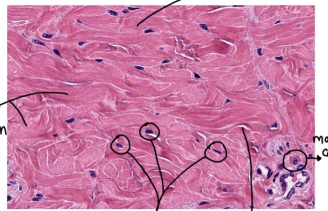
- ① all 3 types of fibers
- ② Several types of cells
- ③ Semi-fluid ground substance

## Dense connective tissue

### Regular dense connective tissue



### Irregular dense connective tissue



in dense connective tissue we have a little ground substance in comparison to loose connective tissue

## Adult connective tissue

### Special type of connective tissue

### Reticular connective tissue

→ found in the:  
liver  
spleen  
lymph nodes

### Adipose connective tissue

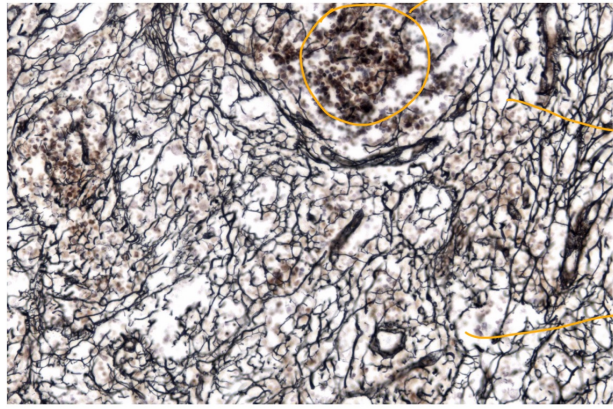
Bone

Cartilage

Blood

# Reticular connective tissue

Silver staining



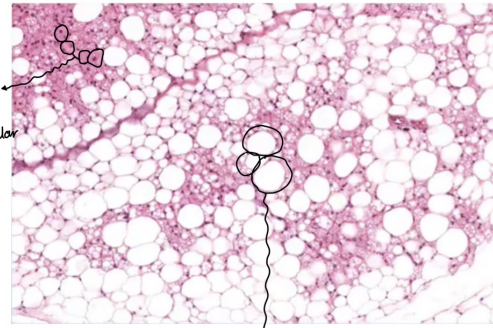
reticular cells

reticular fiber

ground substance

# Adipose connective tissue

it can be   
 → white adipose CT   
 → brown adipose CT   
 → white and brown CT



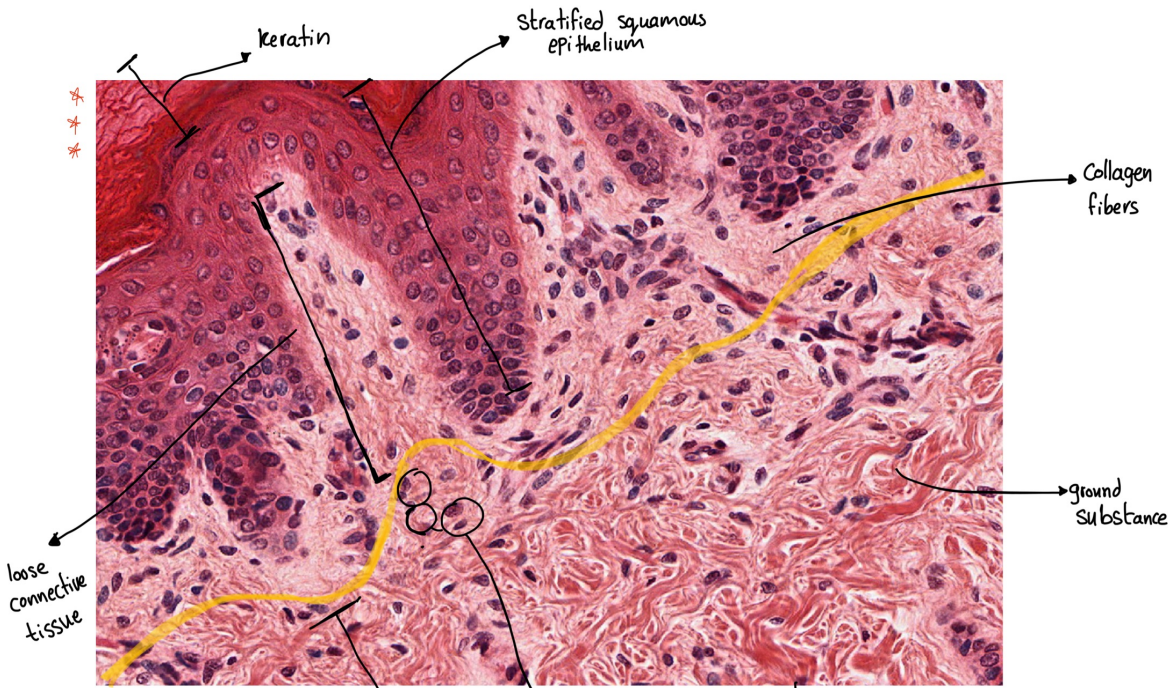
brown adipose cells multilocular cells

white adipose cells unilocular cells

white and brown adipose

\* \* \*

## Different tissue types :-



keratin

stratified squamous epithelium

collagen fibers

ground substance

loose connective tissue

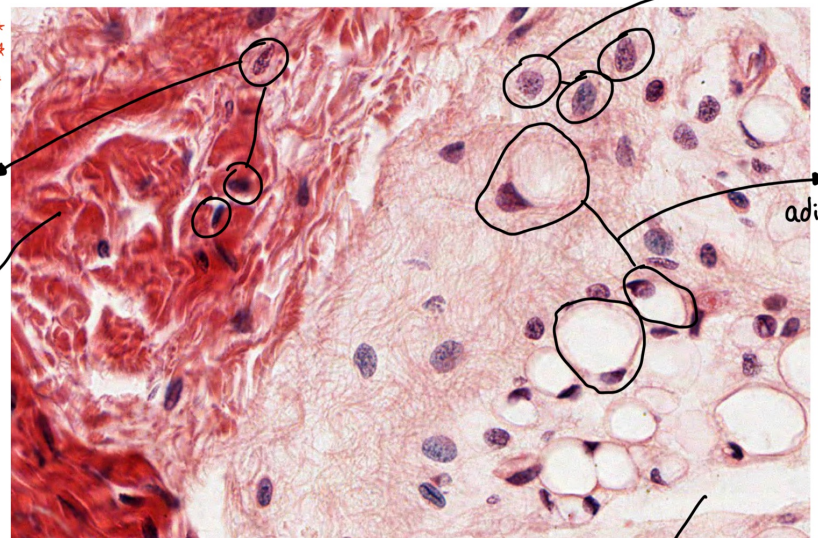
dense irregular connective tissue

fibroblasts

collagen fibers

dense irregular connective tissue

loose connective tissue



fibroblasts

collagen fibers

fibroblasts

adipocytes

ground substance