salivary glands

"CONNECTIVE TISSUE"

1. support cells of body/organ
2. medium of exchange
3. Nutrients exchange
4. fats deposition
5. helps the organ in proper differentiation & proliferation.

Connective Tissue Components
- ground substance
- cells
- fibres

1. Ground subs. : i semi-fluid gel-like with high water
   ii, has GAGS, proteoglycans, glycoproteins (gps)

Connective Tissue Fibres
- collagen fibres
- Reticular fibres
- Elastic fibres

CONNECTIVE TISSUE

Functions :

- structural support
- medium for exchange
- Defense & body protectim
  - physical barrier
  - phagocytosis of bacteria
  - production of Antibodies
- fat storage

Cells :

- Resident cells
  - fixed cells
  - develop & remain within connective tissue
    - fibroblasts
    - myofibroblasts
    - mesenchymal stem cells
    - adipocytes
- migrant cells
  - enter the connective tissue from blood stream
    - macrophages
    - mast cells
    - plasma cells
    - various WBC types

↓
adipocytes stem cells

① FIBROBLASTS :

- most abundant
- types : active, inactive

Active		Inactive (fibrocytes)
large, spindle shaped	cells	small ovoid cells (small, dense rod-shaped nucleus)
(large, ovoid, prominent nucleus)	nucleus	
deeply basophilic	cytoplasm	slightly acidophilic little/no stain in peripheral cell region
(↑) amount of RER + free ribosomes		too thin cell memb.
reside in close proximity to collagen fibres.		

Function of fibroblast:

- secrete proteins: collagen, elastin } polymerizes to various connective tissue
- secrete various comp. of ground subs.: proteoglycans, gps.

(2) MYOFIBROBLASTS

- not easily distinguished from fibroblasts in ordinary H&E sections under LM.
- contractile apparatus:
  - in cytoplasm
  - similar to smooth muscles cells (actin filaments bundles & dense bodies)
- Abundance: areas of wound healing
- chief function: wound contraction

(3) MESENCHYMAL STEM CELLS

- loose connective tissue → niches of adult stem cells called "mesenchymal stem cells"
- pericytes:
  - special cells found around capillaries
  - have capability to serve as mesenchymal stem cell.
- differentiation ability into:
  - smooth muscle cell
  - fibroblasts
  - adipocytes
  - chondrocytes

such differentiation is stimulated by injury.

④ ADIPOCYTES :

- characterized by presence of fat in cytoplasm → (fat cells)
- adipocytes accumulate in large number → (adipose tissue) - connective tissue

white adipocytes (fat cells)	brown adipocytes
- occur singly / in groups	
- unilocular (single large fat droplet)	- multilocular (has multiple small fat droplets)
- more abundant	- less abundant
- stores energy (fat)	- produces heat (thermogenisis)
- single ring appearance	
- peripherally displaced flattened nucleus	- ecentric nucleus

MIGRANT CELLS

1. macrophages

- in blood (monocytes)
- in tissue (macrophages)
- ingest bacteria
- Antigen representing cells (MHC-I)
- types

1. skin epidermic (Langerhan's cells)
2. Brain (microglia)
3. Liver (Kupffer cells)
4. Alveoli (dust cells)
5. Bone (osteocytes)
6. Blood (monocyte)

2. Lymphocytes

- most numerous in loose CT of resp. and GI tract.
- produce antibodies and kill virus infected cells.

3. Plasma cells

- derived from lymphocytes
- Antibody production.

4. Neutrophils

- Active phagocytes.

5. Mast - Cells

- closely associated with blood vessels
- found in skin, resp. & GI tract CT.
- spherical cells with fine, regular basophilic granules.
- Release histamine & vasoactive chemicals when exposed to allergens (causing allergic rxn).

6. Eosinophils

- inc^{d} after parasitic infect
- phagocytose antigen-anti complexes during allergic rxns.

1. Collagen fibres

Type-I
- most common & very strong.
- ligaments, tendons, bone and skin

Type-II
- elastic & hyaline cartilage
- vitreous body of eye
- provide resistance to pressure

Type-III
- forms meshwork in liver, lymph node, spleen & hemopoietic organs

Type-IV
- found in basal lamina of basement memb.
  - associated with hemidesmosomes

2. Reticular fibres
- comp. of type-III collagen.
- forms delicate net-like framework in diff. organs.

3. Elastic fibres
- thin, branching fibres that allow stretch
- comp. (microfibrils and elastin protein)
- found in:
  - skin
  - lungs
  - gall bladder
  - walls of large blood vessels
- In large blood vessel walls, smooth muscles synthesize elastic fibres.