

## Lecture 1

- **Microtechnique:** any method for preparing material for microscopic observation.

- Most common type is in which the material is made into thin sections
- Last stage of microtechnique is staining

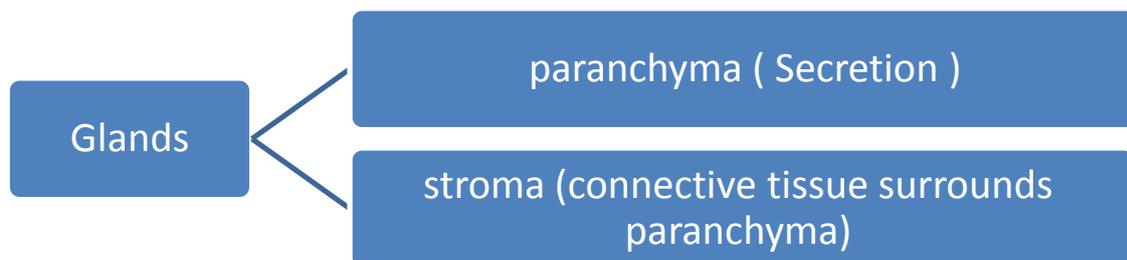
### Stains:

- Classical stains refers to "H and E" stain
- The term "basophilic" and "acidophilic" describes the **tissue** not the stain
- Rough endoplasmic is basophilic due to ribosomes which are made of the acidic RNA
- In general, the basic stains (e.g. hematoxylin) react with negatively charged materials, and acidic stains (e.g. eosin) react with positively charge materials
- Most glycoproteins are PAS positive (exceptions include acidic glycoproteins)
- PAS is used for basement membrane staining because of its high content of reticular fibers and glycoproteins

### -Connective Tissue (CT)

- In general, fibroblasts produce the fibers and the ground substance
- Pericytes are a type of stem cells in adults found around capillaries
- By transient macrophages, we mean the "wandering macrophages" in blood which are a type of monocyte
- Examples of hollow organs that contains a lot of elastic fibers for expand and recoil: stomach, lungs, and large blood vessels ( as ascending aorta and pulmonary trunk)
- Examples of Parenchymal organs: tear glands, salivary glands, liver (produces bile)
- Fibers are found in deep fascia and superficial fascia also

- There is no fibroblasts in blood vessels
- Epithelium cells are closely attached to each other, which means they have less matrix in between, unlike connective tissue cells that are spaced having high amount of matrix in between.
- Glycosoaminoglycans are neuropolysaccharides and prateoglycans are derived from GAGs.
- Pericytes are like stem cells, they differentiate into many types of cells.
- White blood cells are the common transient cells.
- Monocytes are circulated in the blood and when they receive the proper stimulus, they migrate into C.T. to be fixed macrophages.
- Dermis is the deep part of the skin.
- Hyaluronic acid is nonsulphated GAGs.
- Epithelium cells are based into a basal membrane that is positively stained with PAS (+ve).



**-Fibers:**

- Collagen is the most abundant fiber in the body
- Collagen is a major component of bones
- Odontoblast (origin from neural crest) makes collagen type 1 which produces dentine in teeth
- Hepatocyte is a major liver cell and can produce reticular fibers
- Reticular fibers aren't stained by "H and E" stain but are PAS positive (due to their large sugar content) and Argylophilic
- fibers of each bundle are parallel to each other to resist tension in one specific direction.
- Cross banding is a characteristic of skeletal muscles.

## Lecture 2

Wound healing and scar formation.

- at the first 3 weeks, collagen type III accumulates to form the scar at this time the tensile strength of the dermis is only 10%, at week 4 the scar is nothing but collagen type I which is a thick collagen to raise the tensile strength up to 80% (almost as strong as the skin).

- reticular fibers are nothing but collagen type III.

- myeloid is the bone marrow.

- Elastic fibers sheets in the large blood vessels (aorta and pulmonary trunk) expand during systole and recoil during diastole to keep the contentious blood flow.

- Fibroblasts are protein-producing cells.

- Plasma cells live from 2 to 3 weeks.

- in acute inflammation, neutrophils attack Bacteria.

## Lecture 3

-Symptoms of inflammation: redness, swelling, hotness and pain.

-kupffer cells: phagocytosis of old RBCs.

-alveolar cells: phagocytosis of carbon.

-macrophages in spleen (filters blood) and lymph nodes (filter lymph) play a role in the immune system.

-the release of chemical mediators indicates inflammation or allergic reaction (anaphylactic reaction).

-two ways to modulate an inflammation:

1- phagocytosis of antibody-antigen complex.

2-inactivity of histamine.

-Osonization occurs so that the cell membrane of macrophage identifies the bacteria, the cancer cell ....etc.



## Lecture 4

**Note: on the top right corner of each handout page there is a page numbering that we are going to use.**

### **Page 43:- {Notes added about Diapedesis}**

1. Diapedesis occurs all the time, but it increases during inflammation and allergic reactions.
2. On the 9<sup>th</sup> line we can add the following examples, neutrophils die with the bacteria it engulfs and forms pus, and thus it doesn't return back to the blood. Eosinophil also dies, and doesn't return back to blood.

### **Page 43:- {Notes added to the types of C.T section}**

1. The difference between loose C.T and dense C.T is that loose C.T contains less fibers than dense C.T, thus it's weaker.

### **Page 44:- {Notes added to Mucoïd tissue}**

1. Hyaluronic acid is non-sulfated glycosaminoglycan.
2. Most cells in the Mucoïd tissue have differentiated into fibroblast but some remained as stem cells (undifferentiated cells) which we can extract and use for therapeutic purposes such as re-growing skin.
3. Umbilical cord originally contained 2 arteries and 2 veins, but then the right vein is lost and the left vein remains.

### **Page 44:- {Notes added to loose areolar C.T}**

1. Loose means lots of cells and ground substance in the C.T but few fibers.
2. Areolar means open spaces between fibers.
3. Loose areolar C.T contains collagen and elastic fibers and few reticular fibers.
4. We can prepare a slide of loose areolar tissue from the mesentery.

### **Page 45:- {Notes added to Dense C.T}**

1. Dense regular C.T is present in tendons and ligaments.
2. Dense irregular tissue C.T is present in the Dermis and Joint Capsule.

## **Page 45:- {Notes added to Reticular tissue}**

1. It's a special type of C.T rich in reticular fibers.

## **Page 46:- {Notes added to Adipose tissue}**

1. Unilocular adipose tissue is the commonest type of adipose tissue.
2. Unilocular adipose tissue forms fat depo. (Fat storage).
3. Multilocular adipose tissue is present also in hibernating animals (e.g.: snakes and frogs) providing them with energy during their hibernation period.
4. The neurotransmitter released from postsynaptic ganglia of sympathetic nervous system is NE, which through a mechanism activates lipase enzyme breaking down lipids-whether in unilocular or multilocular adipose tissue- providing energy in a process called lipolysis.