

# Histology

## \* RBCs \*

### \* Adaptation to Function of RBCs :-

① ↑ surface of Area    ② ↑ Hb    ③ ↑ Hb at periphery    ④ ↑ flexibility

- Anisocytosis → Variable size

- Poikilocytosis → Variable shape.

- Echinocytes → Hypertonic solution (crenation)

- Ghosts → Hypotonic solution

\* Any ↑ in reticulocyte (More than 1%) → anemial Hemorrhage.

## \* Platelets \*

→ Granulomere

- α granule → (co-agulation factor)
- δ granule → (ATP, serotonin)
- γ granule → (Hydrolytic enzyme)

→ Hyalomere

- ① microtubule (discoid shape)
- ② Actin, Myosin (clot retraction)
- ③ Canalicular system (secretion)

## \* WBCs \*

① Neutrophils  
(Microphage / pus cell)  
or (polymorphnuclear)

- Multilobulated Nucleus

- Has Barr body (Female)

- 60-70% / specific granule: Rice grain (Collagenase)

## ② Eosinophil

- Bilobulated C-Shape
- 1-4% / - Specific Granule: Crystalloidal dense / Histaminase.
- Increase: ① Allergic reaction / ② parasitic infection.

## ③ Basophil (Mast cell of blood)

- Bilobed (S-shape) nucleus → obscured by abundant deep blue granule / → 1/2 - 1%
- Specific granule → (Heparin / Histamin)
- Granules stain red with toluidine blue = Metachromasia

## ④ Monocyte

- 3-8% / - Round large eccentric kidney shape nuclei
- 1-2 day circulation in blood → CT become (Macrophage) (APC)

## ⑤ Lymphocyte

- 20-30% / - its cell coat has No. of cell receptor:
- ① MHC "II" → on APC / ② MHC "I" → on All Nucleated cell

For BM aspiration → In adult → Sternum

In Infant → Tibia

## \* Hematopoiesis

### ① Prenatal H.

- A. Yolk sac (2-8 Ws) → Hemangioblast
  - ① peripheral → Endothelial
  - ② central → Nucleated RBCs
- B. Fetal liver and spleen (8-28 Ws)
  - Erythrocyte with nuclei
  - Leukocyte (except T-cell)
- C. Prenatal Myeloid phase (22 Ws) → All blood cell except (T-cell)

### ② Postnatal H.

- prep to puberty → Skull / Ribs / Sternum / Shaft of long Bone
- After puberty → as same as ↑ / But No shaft of long Bone
- Extra medullary H. → liver + spleen produce Blood cell After birth.

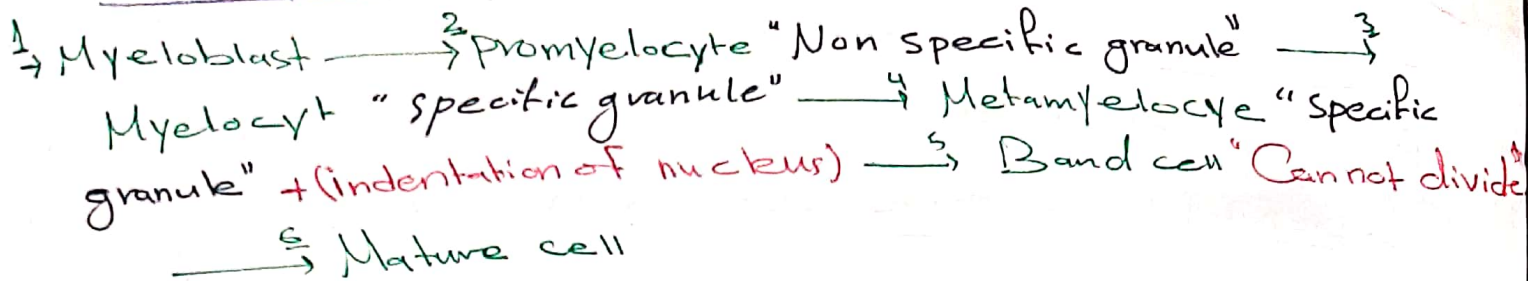
## \* Erythropoiesis (7 days)

- ① Undifferentiated mesenchymal cell
- ② pluripotential Hemopoietic (Hemocytoblast)
- ③ Restricted Erythrocyte progenitor (CFU-E)
- ④ pro-Erythroblast
- ⑤ Basophilic erythroblast "Maximal formation of Hgb"
- ⑥ polychromatophilic Erythroblast
  - ↳ Last stage in repeated cell division
- ⑦ orthochromatophilic E. (Normoblast)
  - ↳ "Complete synthesis of Hgb"
- ⑧ Reticulocytes
- ⑨ Mature RBCs.

## \* Thrombopoiesis (10 days)

- ① UMC
- ② Pluripotential
- ③ CFU-meg
- ④ Megakaryoblast → DNA (poly ploidy)
- ⑤ promegakaryocyte "lobulated nuclei"
- ⑥ Megakaryocyte → Demarcation membrane.
- ⑦ Platelet (1200 Platelet / Megakaryocyte)

## \* Granulopoiesis



## \* Monopoiesis

Monoblast → pro monocyte → Mature monocyte.

## \* Lymphopoiesis

(Repeated mitosis by stimulation)

### Factor Affecting H<sub>o</sub>P

#### Stimulation

- ① EPO
- ② GH
- ③ Testosterone
- ④ Thyroxin

#### Inhibition

- ① Estrogen
- ② Nutritional deficiency

No afferent L

- No B-cell
- No plasma cell
- No Reticular F.
- No Lymphatic Nodule

# Thymus Gland

Dark capsule  
pale medulla  
No-B cell  
No Plasma

## Stroma

- loose CT-capsule
- Lobe
- Incomplete Lobule
- No Reticular Fiber

## parenchyma

- T-cell | macrophage | epithelial reticular cell

## Cortex

## Medulla

Contain "Hassall's corpuscles"

\* Epithelial Reticular cell :- (ERC)

- cytoreticulum
- APCs
- Blood Thymus Barrier
- secretion Growth Factor (thymulin/thymosin)

\* Blood Thymus barrier

- continuous endothelium with tight junction
- Thick basal Lamina
- pericyte
- macrophage

(5) Basal Lamina of ERC

# \* Lymph Node \*

## Stroma

- CT capsule (complete fibroblast)
- trabeculae with Incomplete compartment

## parenchyma

## Medulla

Has Medullary Cord

## Cortex

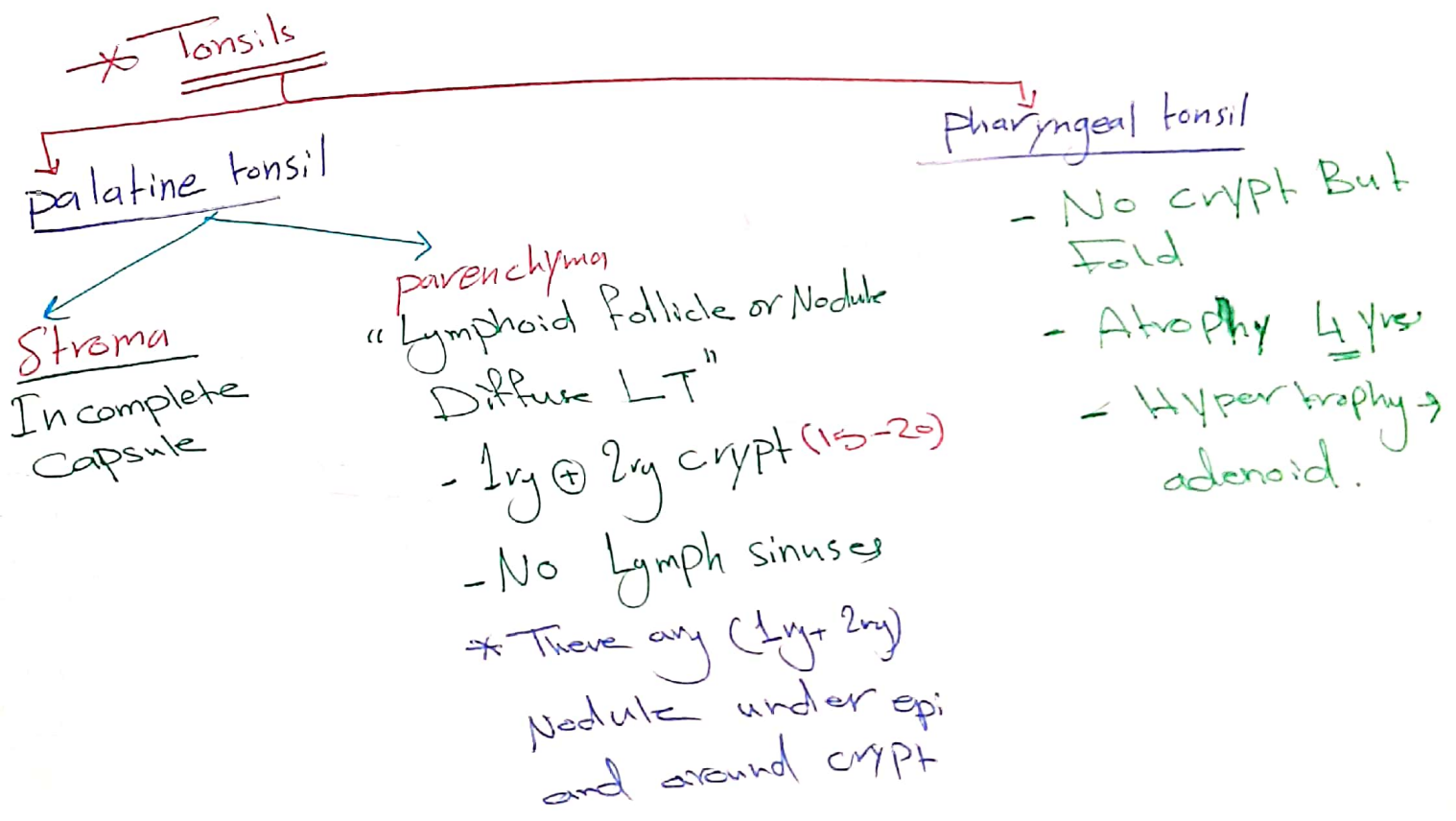
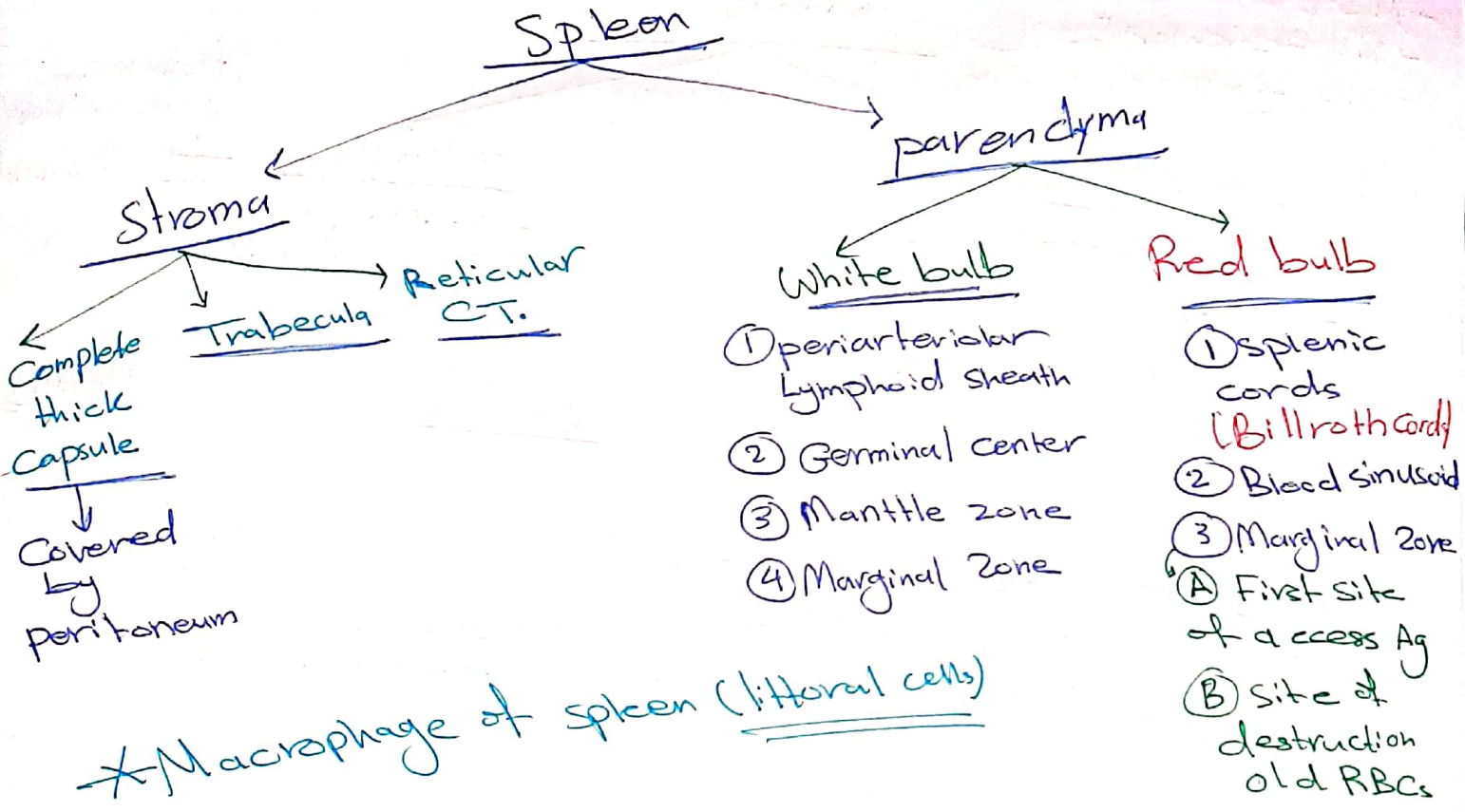
### outer

1<sup>ry</sup> + 2<sup>ry</sup> Follicle or Nodule

### inner

Thymus dependant area or paracortical area.

There are High endothelial venules



## Histology

1) Which of the following statements concerning lymph nodes is TRUE?

- a. They have Hassall's corpuscle in their medulla.
- b. Their white pulp contains central arteriole.
- c. T cells predominate in the deep cortex.
- d. They have single crypt.
- e. They don't contain secondary nodules.

Ans : c

2) The blood picture of a patient shows a total leucocytic count 16,000/mm<sup>3</sup> and Monocytes 25% this probably goes with the diagnosis of? Physio or histo

- a. Parasitic infection.
- b. Acute bacterial infection.
- c. Bronchial asthma.
- d. Hemodialysis.
- e. Malaria.

Ans : e

3) Site of formation of RBCs in 20 years old healthy male is?

- a. Flat bone.
- b. Center of Long bone.
- c. Liver.
- d. Yolk sac.
- e. Yellow bone marrow

ans : a

4) in which of the following sites will be abnormal RBCs be removed from the circulation?

- a. Thymic cortex.
- b. Periarterial lymphoid sheath.
- c. Medullary sinuses of lymph nodes.
- d. Thymic medulla.

e. Marginal zone

Ans : E

5) The peak of synthesis of the hemoglobin proteins occurs during the stage of the along the erythropoietic process?

- a. CFU-erythrocytes.
- b. Proerythroblast.
- c. Basophil erythroblast.
- d. Polychromatophil erythroblast.
- e. Normoblast.

Ans : c

6) During granulopoiesis, the appearance of the specific granules in the cytoplasm starts at the stage of?

- a. Myeloblast.
- b. Promyelocytes.
- c. Metamyelocytes.
- d. Myelocytes.
- e. Mature granulocytes

Ans : d

7) Which of the followings is INCORRECT about the thymus?

- a. Divided into lobes and incomplete lobules.
- b. Has afferent and efferent lymphatic's vessels.
- c. The cortex of the lobule has epithelial reticular cells.
- d. The medulla of the lobule has Hassall's corpuscles.
- e. Involuting after puberty.

Ans : b

8) Micropages are leucocytes referring to?

- a. Monocytes.
- b. T-lymphocytes.
- c. Neutrophils.
- d. Natural killer cells.
- e. Mast cell of the blood.

Ans : c

9) The discoid shape of the blood platelets is preserved by?

- a. Actin and myosin in the granulomere.
- b. Spectrin and ankyrin.
- c. Bundles of microtubules in the granulomere.
- d. Open canalicular system.

e. Bundles of microtubules in hyalomere.

Ans : e

10) The antigen for cluster of differentiation present in?

- a. Granular leucocytes.
- b. Different types of lymphocytes.
- c. Glycocalyx of platelets.
- d. Glycocalyx of R805.
- e. Monocytes and macrophages.

Ans : b

11) When looking at a lymph node, which term does not refer to the same region as all the others listed?

- a. Deep cortex.
- b. Thymus dependent area.
- c. Outer cortex.
- d. Juxtamedullary cortex.
- e. Paracortical zone.

Ans : c

12) Class II MHC antigens are expressed on the following cell?

- a. Epithelial cells.
- b. Bone cells.
- c. Red blood cells.
- d. T- lymphocytes.
- e. Macrophages.

Ans : e

13) The chief site of mesoblastic period in prenatal hematopoiesis?

- a. Liver and spleen.
- b. Yolk sac.
- c. Bone marrow.
- d. Lymphoid tissue.
- e. Bone lamellae.

Ans : b

14) In the process of hematopoiesis, myeloblasts give rise to \_\_\_\_\_?

- a. Erythrocytes.
- b. Basophils.
- c. Lymphocytes.
- d. Monocytes.
- e. Platelets.



Ans : b

15) What is the dense lymphatic tissue in the spleen called?

- a. Lymph follicles.
- b. White pulp.
- c. Peyer's patches.
- d. Lymph node.
- e. Diffuse lymphatic tissue.

Ans : b

16) The leucocytes which can proliferate by mitosis in response to stimulation are?

- a. Basophils.
- b. Neutrophils.
- c. Lymphocytes.
- d. Eosinophils.
- e. Monocytes.

Ans : c



**17) Basophil granulocytes?**

- a. Are the most numerous leucocytes.
- b. Have a life span of about 120 days.
- c. Are formed mainly in lymph nodes.
- d. Secrete heparin.
- e. Are strong phagocytic cells.

Ans : d

**18) The peak of synthesis of the hemoglobin proteins occurs during the stage of the along the erythropoietic process?**

- a. CFU-erythrocytes.
- b. Proerythroblast.
- c. Basophil erythroblast.
- d. Polychromatophil erythroblast.
- e. Normoblast.

Ans : c

**19) Erythropoiesis involves the following stages of maturation EXCEPT?**

- a. Colony forming erythrocytes.
- b. Promyelocytes.
- c. Basophilic Erythroblast.
- d. Normoblasts.
- e. Reticulocytes.

Ans : b

**1) Peyer's patches are?**

- a. Located at the antimesenteric intestinal border. XXX
- b. Located at the mesenteric intestinal border.
- c. Located midway between the two intestinal borders.
- d. Absent in the duodenum.
- e. T lymphocytes dominate in their germinal centre.

**4) Metachromasia ----? histo**

- a. Staining of a tissue by the color of the original stain.
- b. Staining of a tissue by a color differs from the original stain XXX
- c. Staining of granules of plasma cells by a red color after toluidine blue.
- d. Staining of phagocytic cells by trypan blue.
- e. Staining of granules of eosinophils by a red color after toluidine blue.

**5) The specialized cell type involved in the entry of lymphocytes into lymph nodes are called?**

- a. M-cells.
- b. Mesangial cells.
- c. PALS.
- d. HEV endothelial cells. XXX
- e. Selectins.

**6) Microphages are Leucocytes referring to?**

- a. Monocytes.
- b. T-lymphocytes.
- c. Neutrophils. XXX
- d. Natural killer cells.
- e. Mast cell of the blood.

**7) in a lymph node, thymus-dependent antigen leads to? Select one:**

- a. B- Lymphocyte proliferation in the paracortex.
- b. T- Lymphocyte proliferation in the paracortex. XXX
- c. PALS development
- d. Proliferation in cortical lymphoid follicles.
- e. The absence of germinal centers.

**2) Erythrocytes Ghost occur in—————?**

- a. in hypertonic solution.
- b. in slow circulation.

- c. Defect in hemoglobin.
- d. Hypotonic solution. XXX
- e. increase in size of RBC.

**3) The thymus secretes \_\_\_\_\_?**

- a. Antibodies.
- b. Hormones that mature the red blood cells.
- c. Hormones that stimulate macrophages.
- d. lymph and is the main "lymph factory".
- e. Thymosin, a hormone thought to aid in maturation of T- lymphocytes. XXX