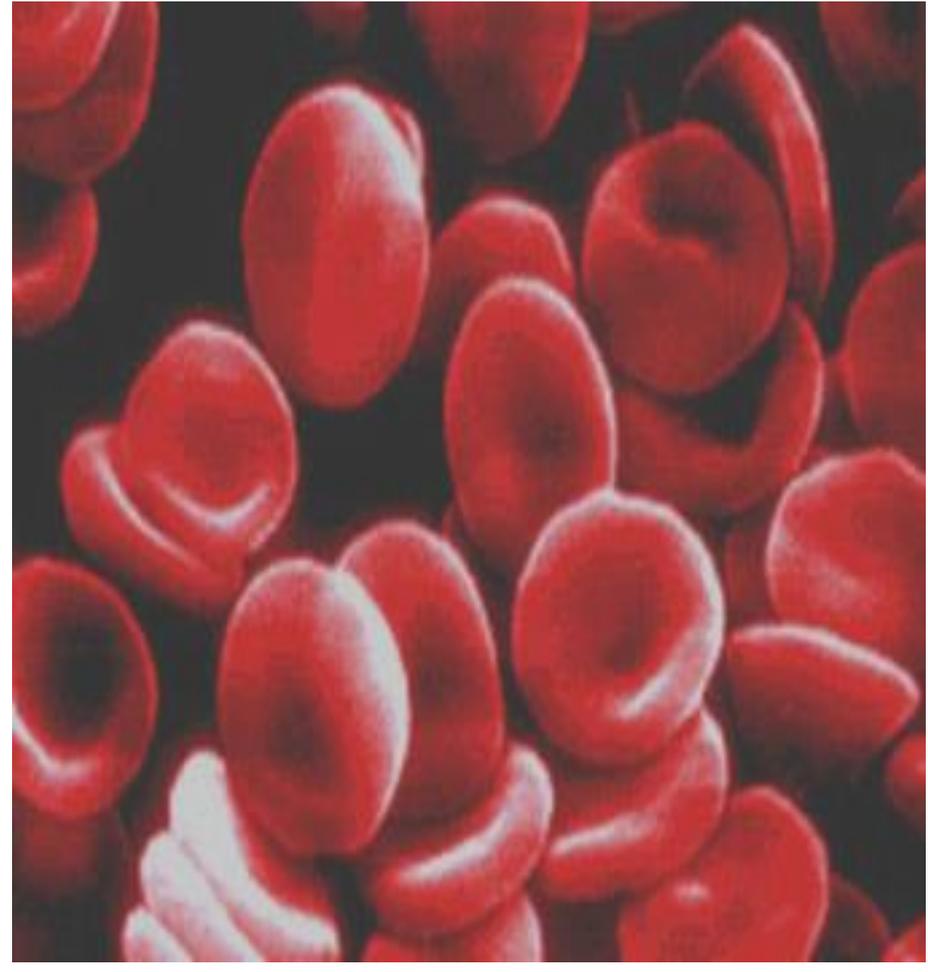
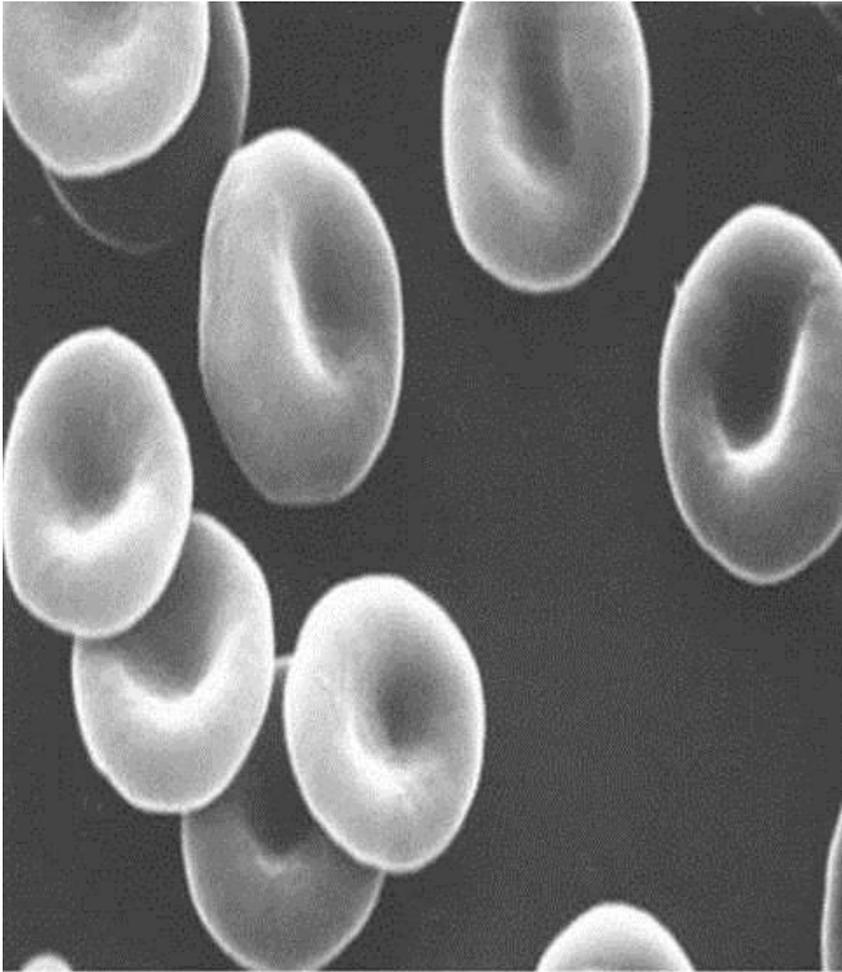


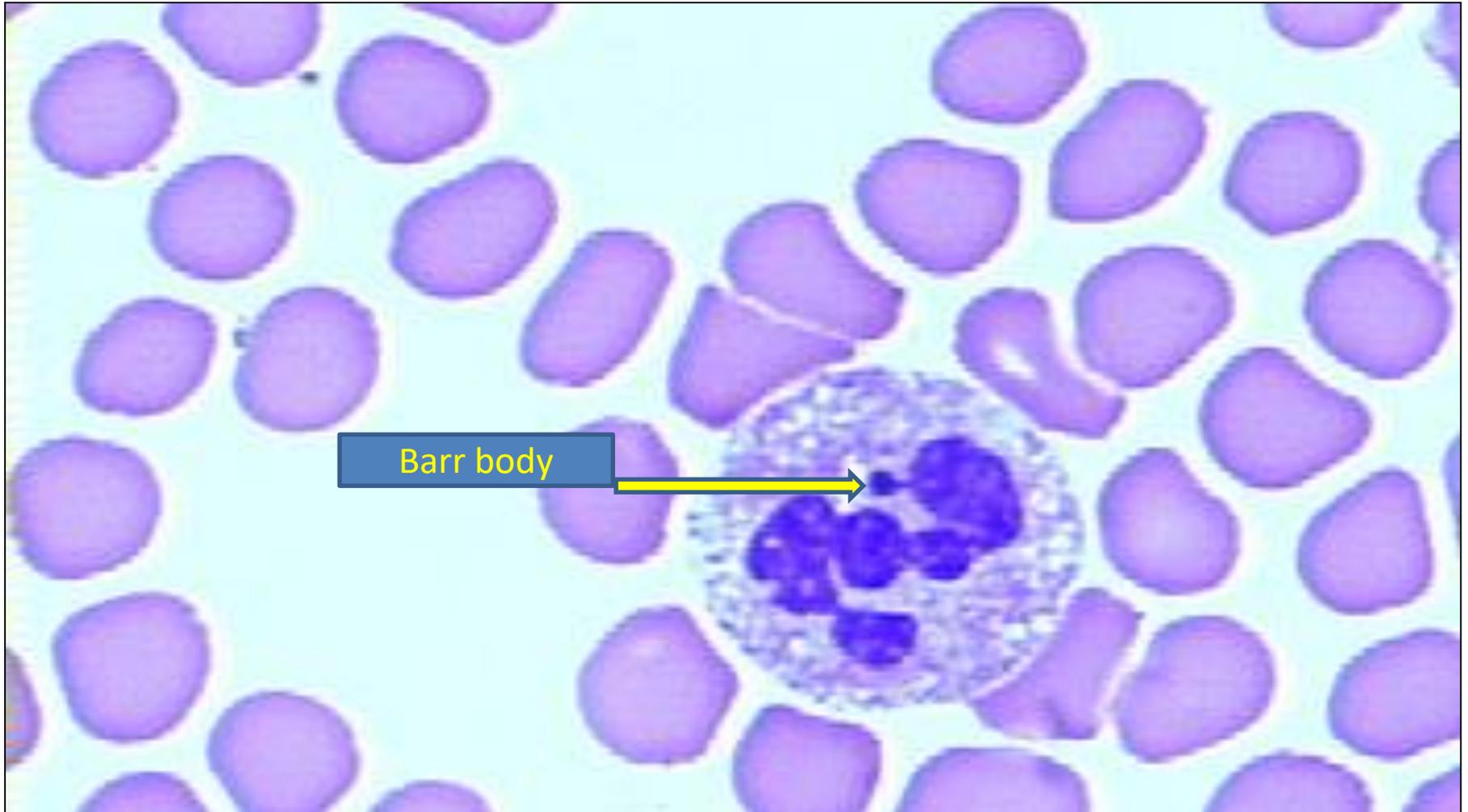
RBCs



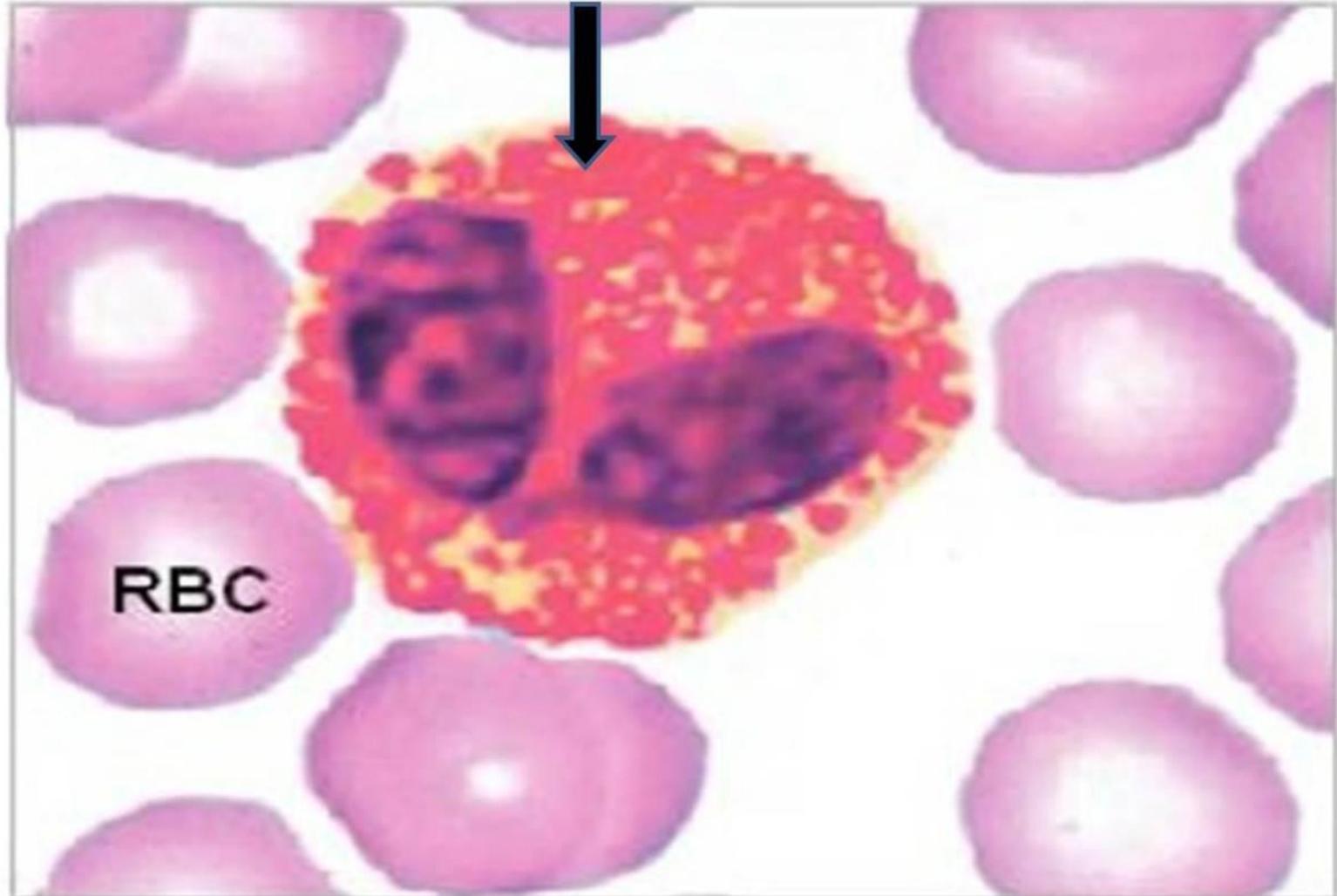
Platelet



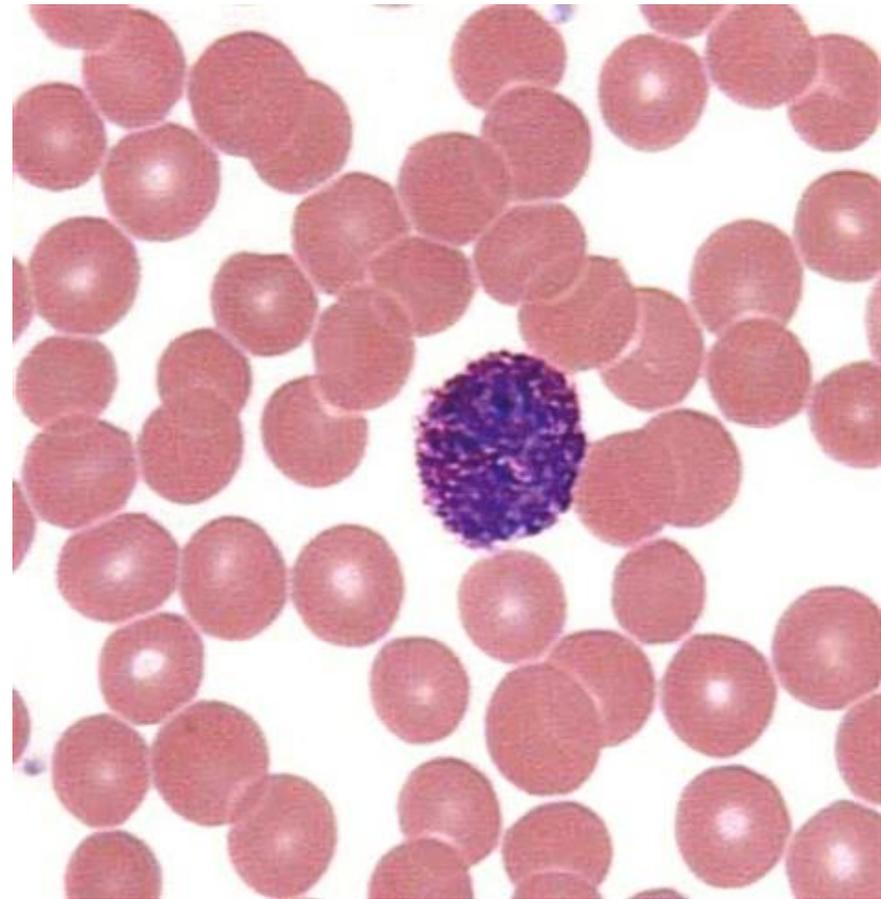
**Neutrophils = polymorphonuclear leucocytes =
Microphage = pus cell**



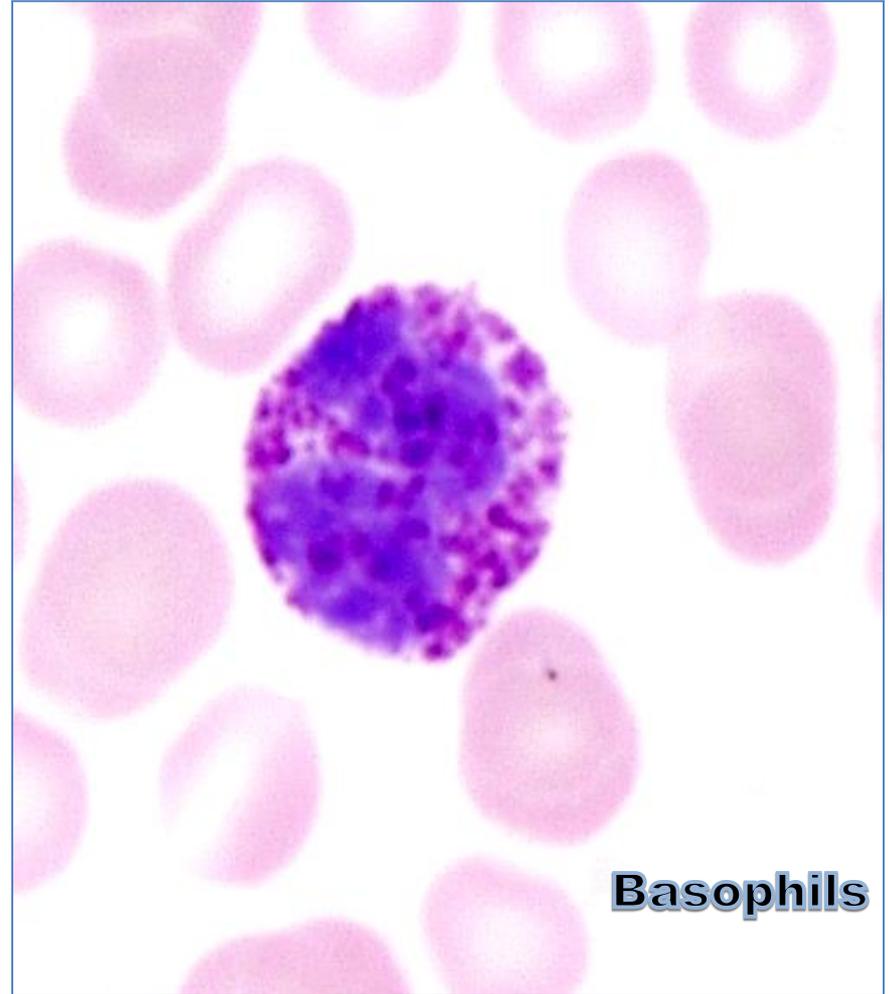
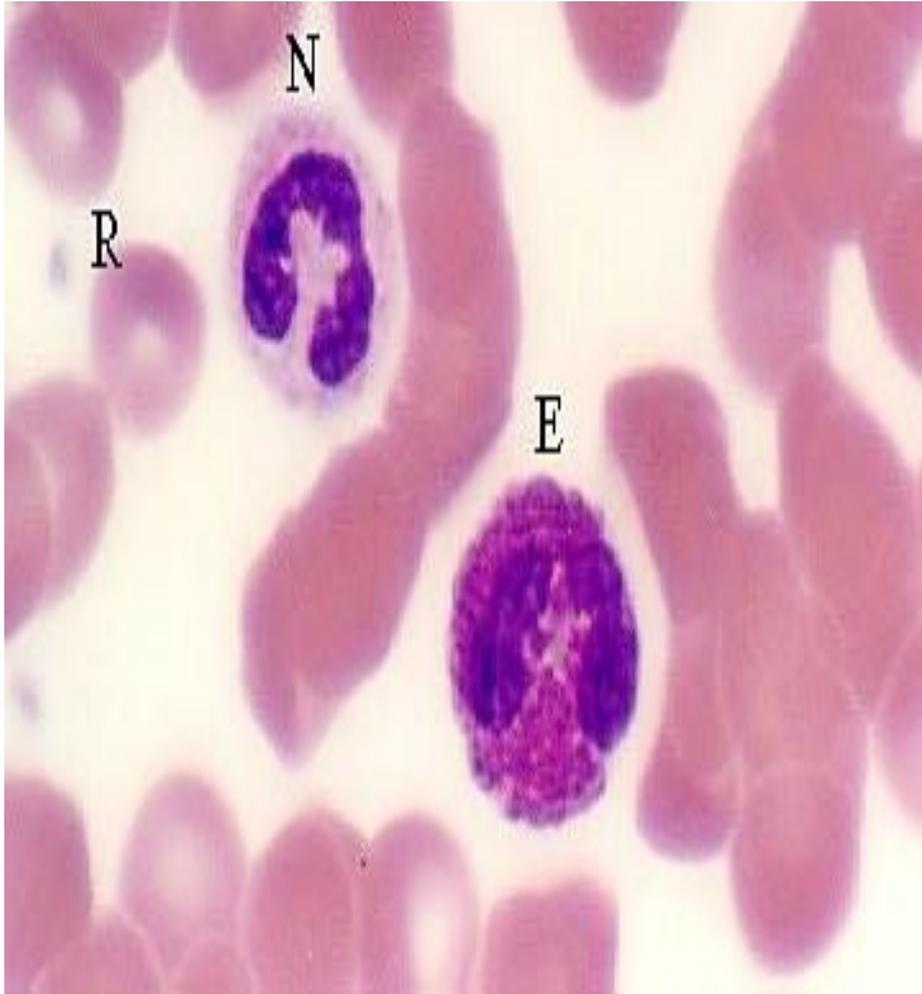
Eosinophils



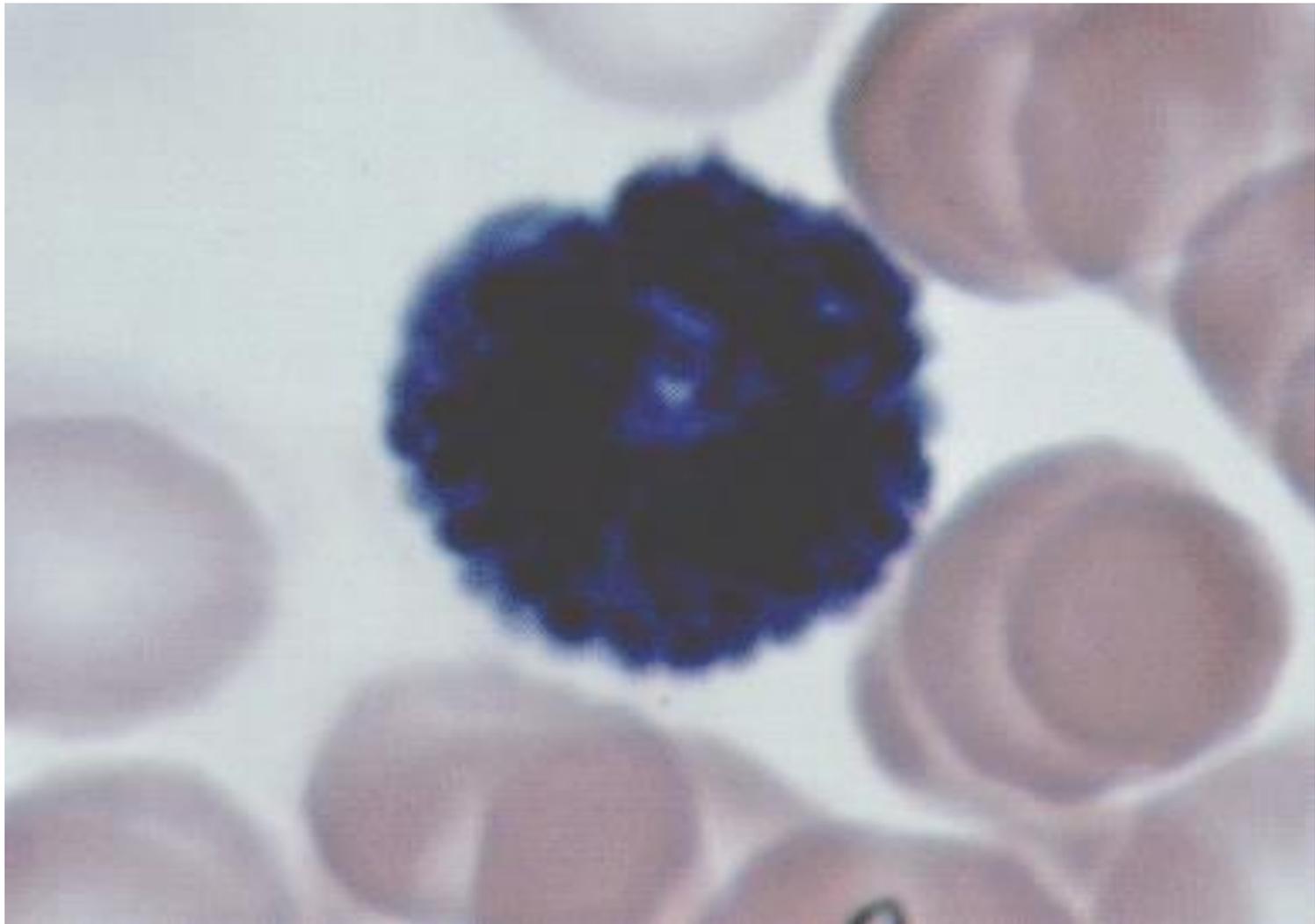
Basophils



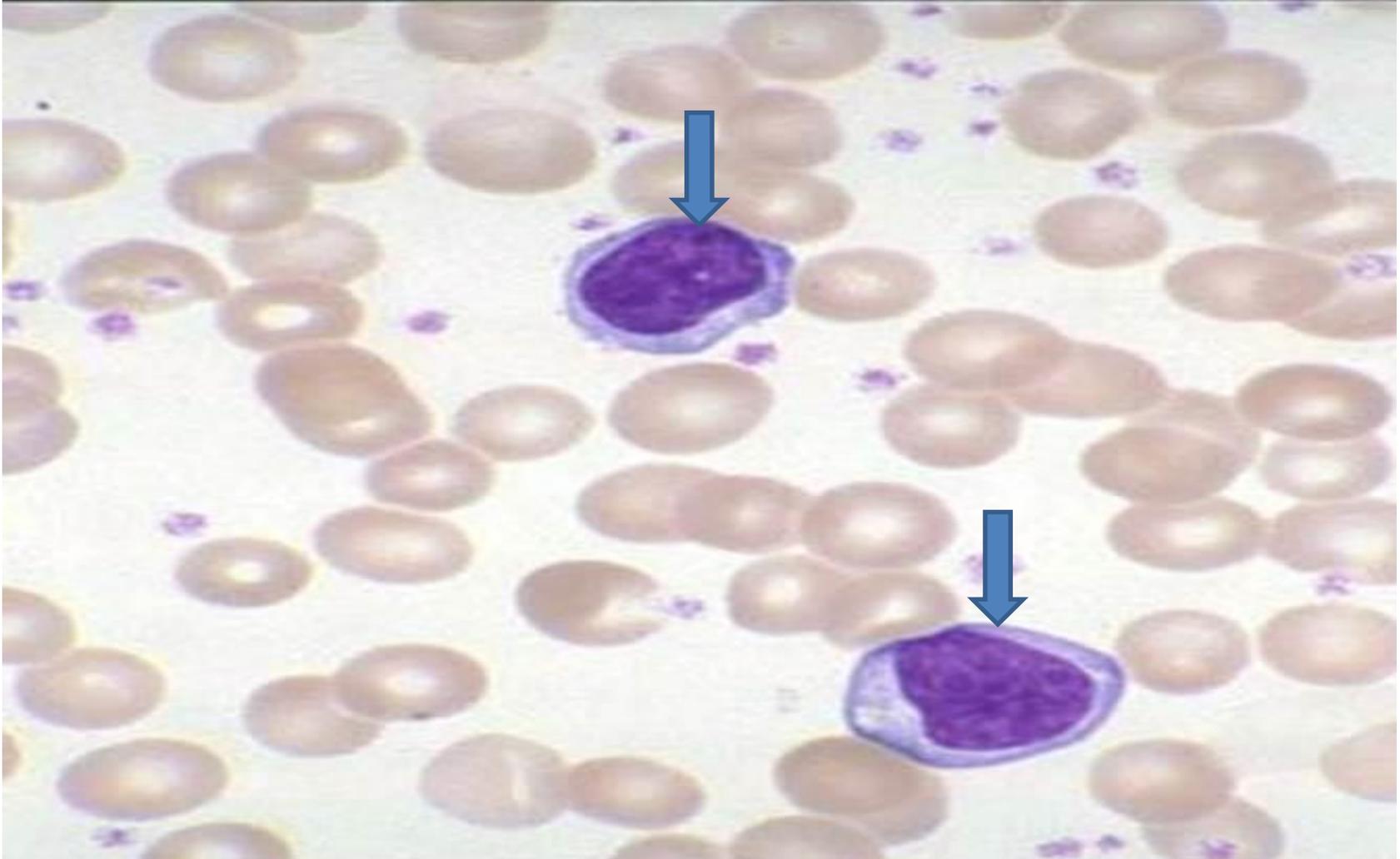
Eosinophils



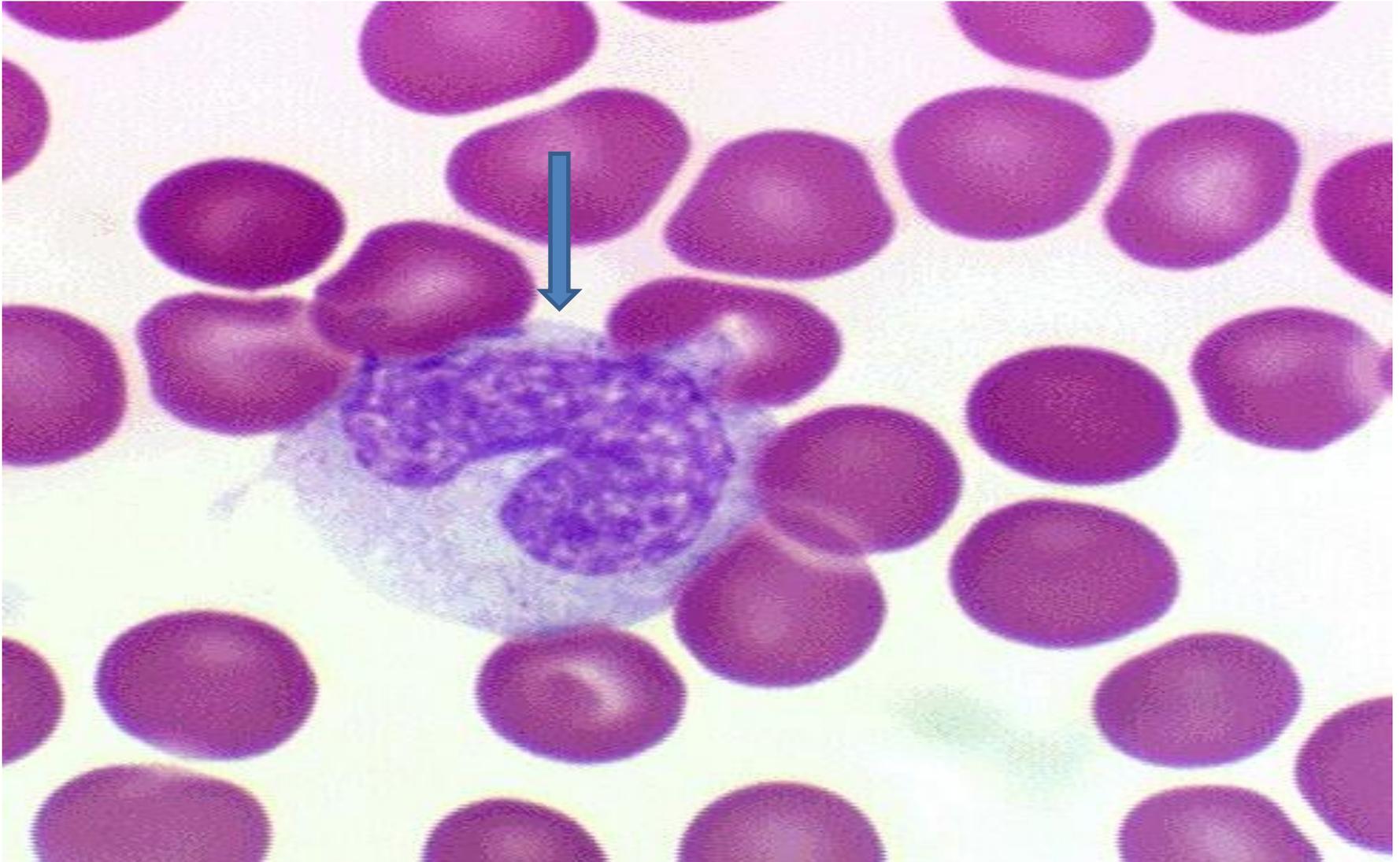
Basophils



lymphocyte



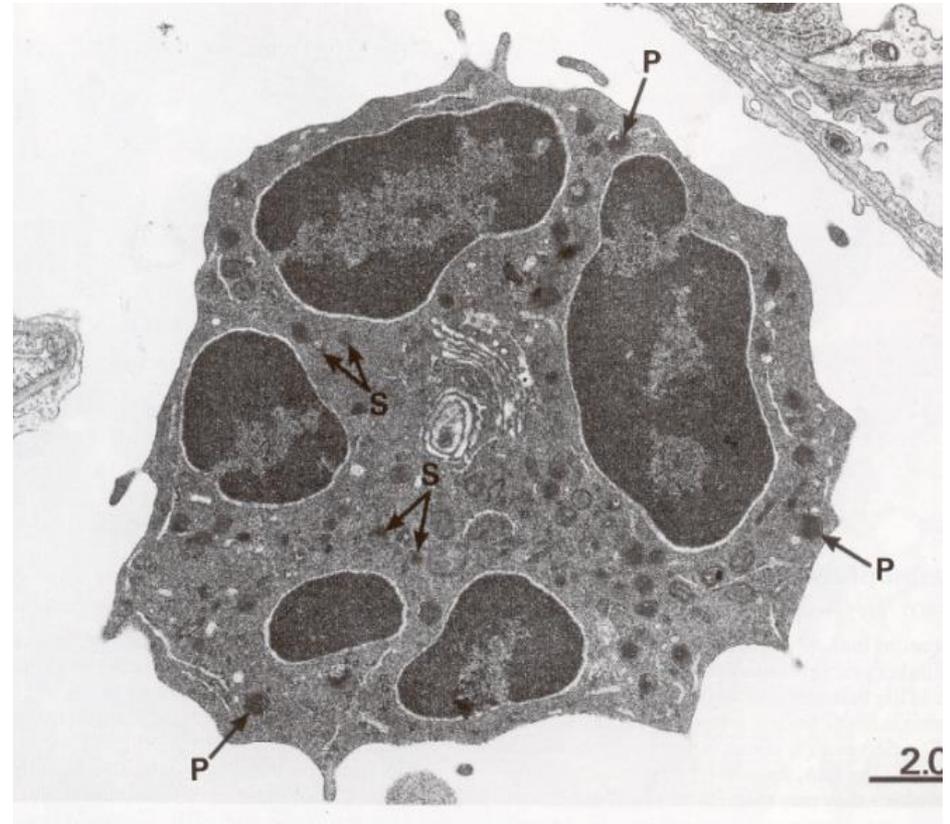
Monocyte



Eosinophils



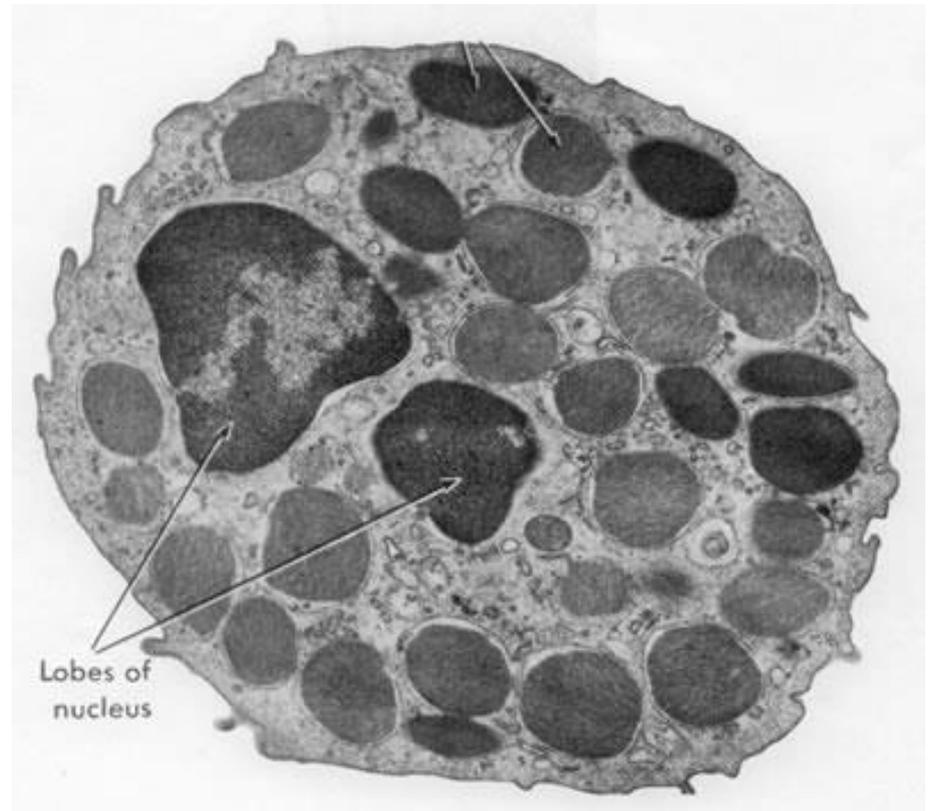
Neutrophils



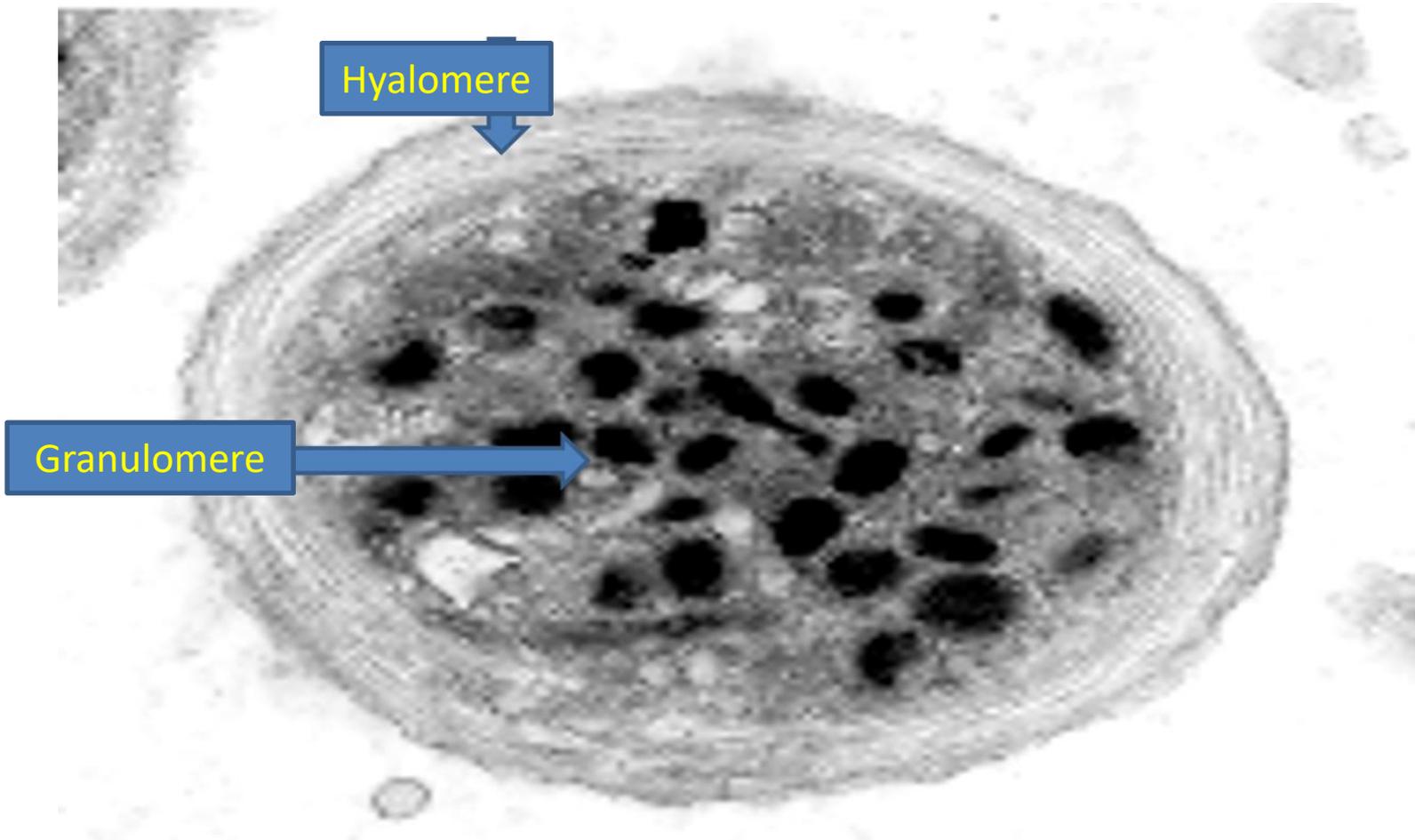
Platelets



Basophils



EM of Platelet

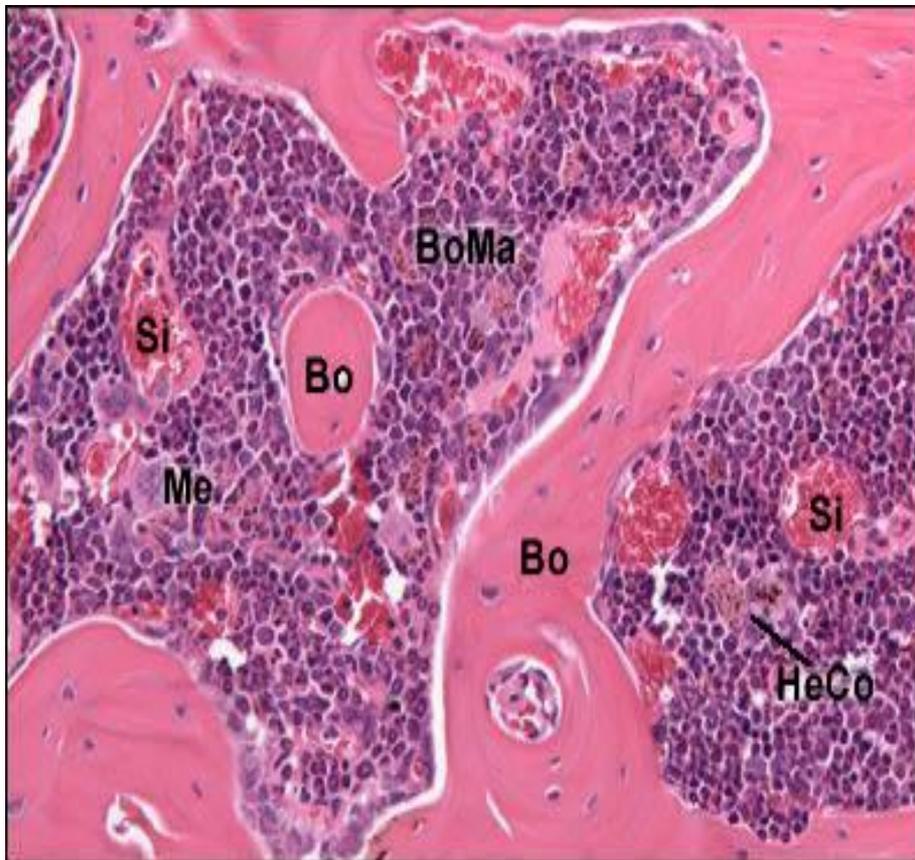


Megakaryocyte

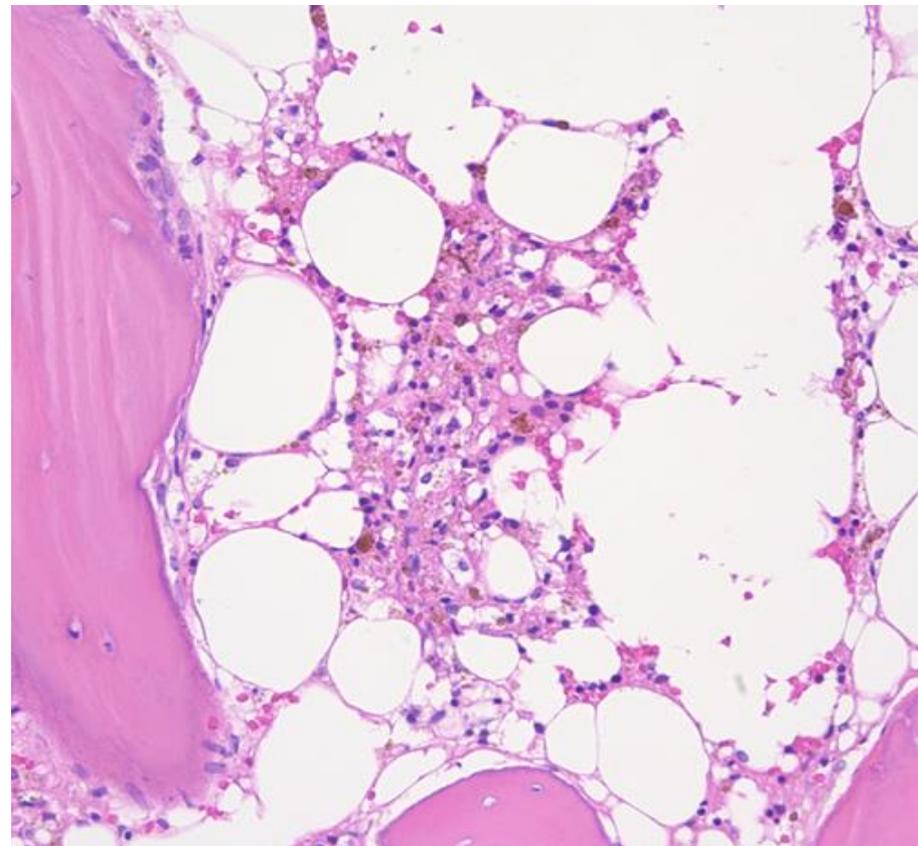


Bone marrow

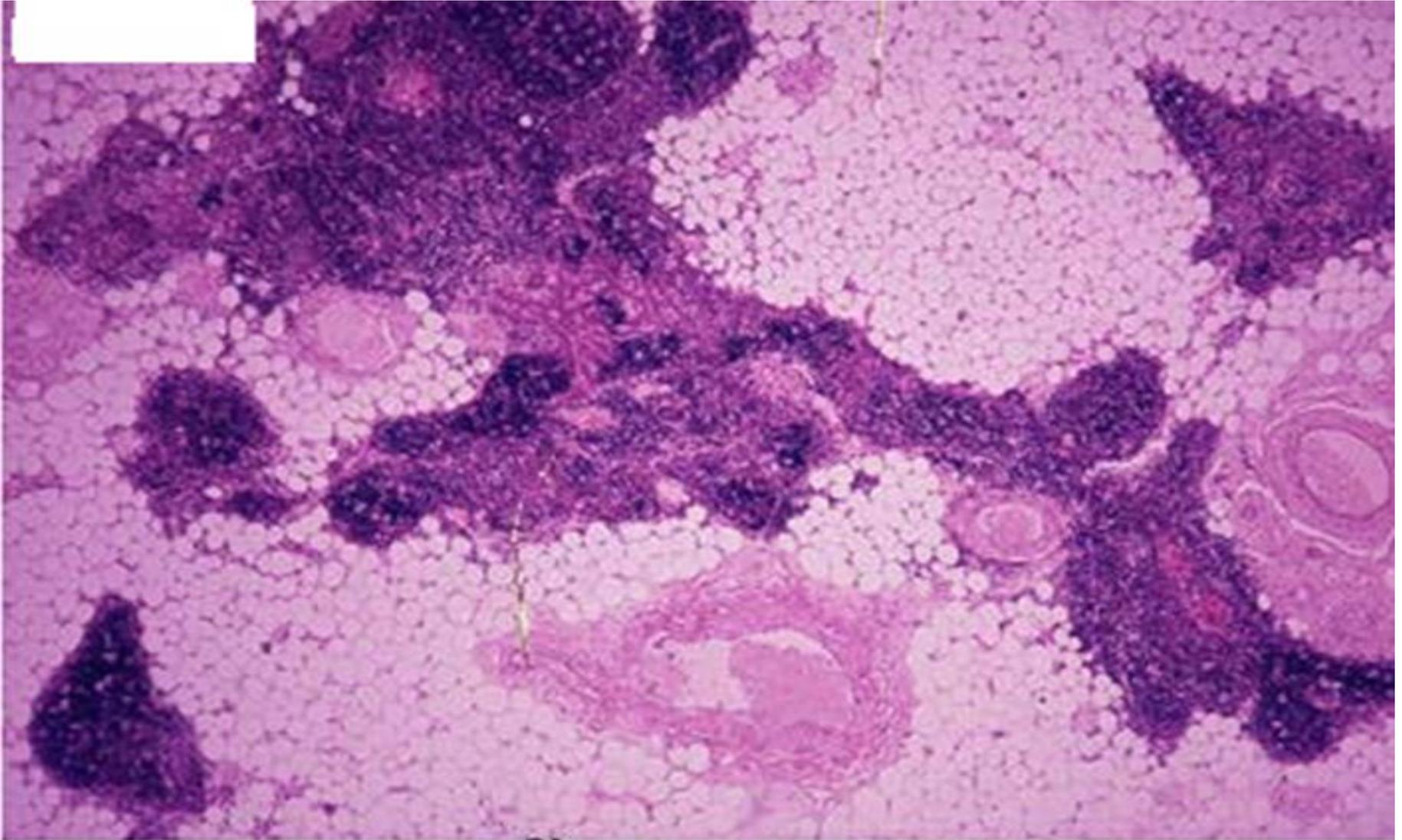
Red bone marrow



Yellow bone marrow



Thymus gland of adult

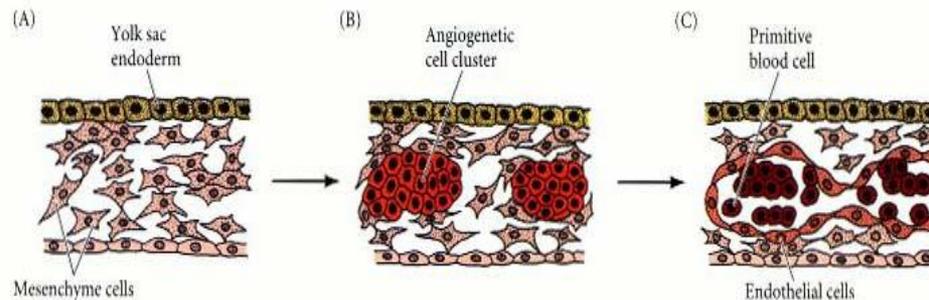


Prenatal hematopoiesis

1- Yolk Sac Hematopoiesis (blood islands) 2-8 weeks:

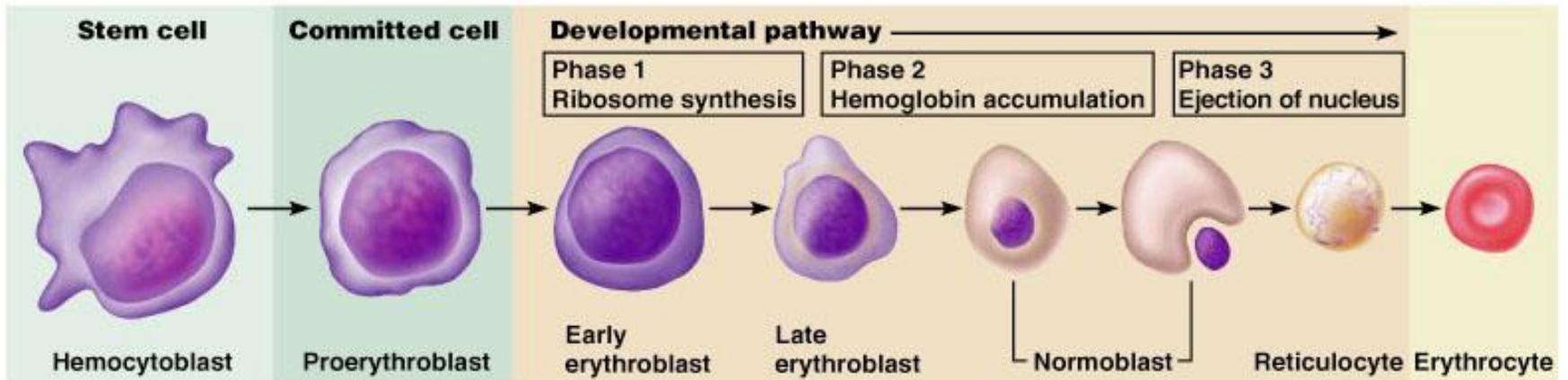
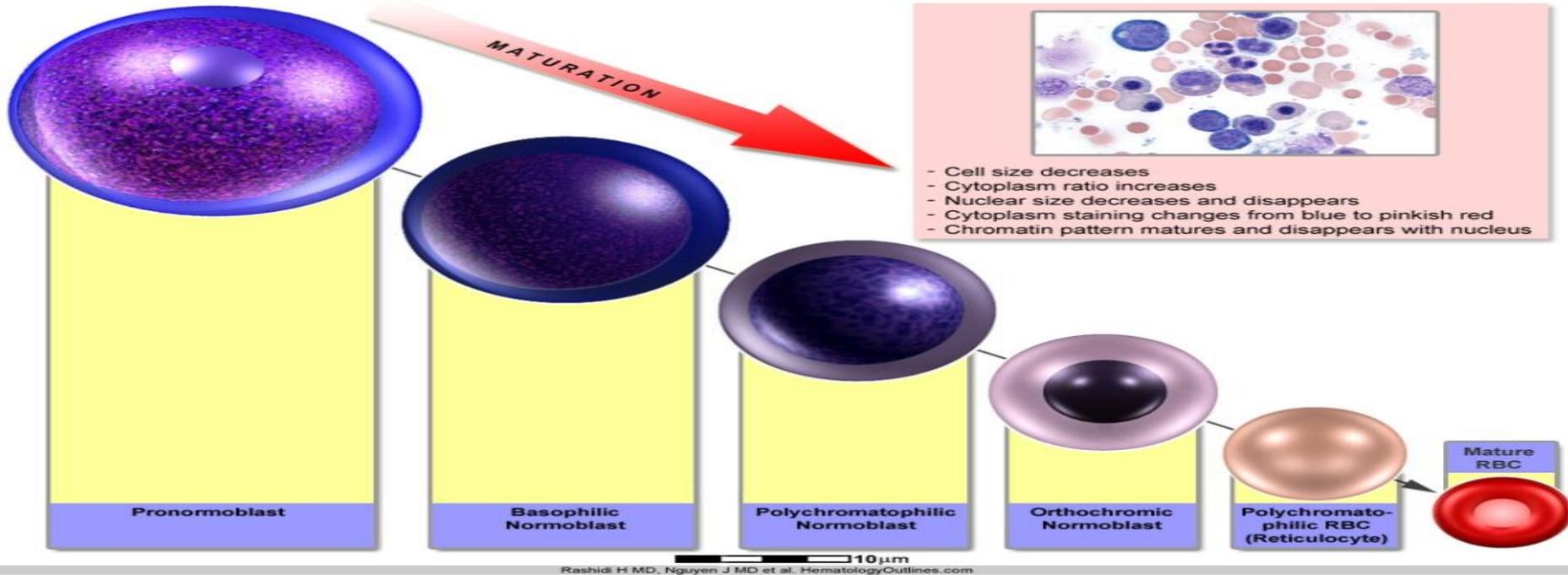
- In the yolk sac, mesenchymal cells differentiate to clusters of hemangioblast cells. **Mesoblastic phase**
- 1-Peripheral hemangioblasts further differentiate into endothelial cells &
- 2-Central hemangioblasts give rise to **nucleated red blood cells**, **no leukocytes** are formed in this phase.
- This is the first “blood vessel” like structure in the embryo.

- **2- Fetal Liver & spleen, L.N Hemopoiesis:** From **8 - 28** wks;
 - *Liver and spleen are colonized by definitive hematopoietic stem cells.
 - * **Erythrocytes still have nuclei**, leukocytes begin to appear. All blood cell types (**except T cells**) can differentiate in the fetal liver & spleen.
 - **extra-medullary hematopoiesis
- **3- Prenatal Myeloid phase:** Bone marrow is colonized late in embryogenesis (after **22 weeks**) by definitive hematopoietic stem cells derived from the fetal liver & spleen.
 - All blood cell types (**except T cells**) can differentiate in the bone marrow.



Erythropoiesis

ERYTHROID (RBC) MATURATION DIAGRAM



Granulopoiesis

1-UMC

2-Pluripotential hemopoietic stem cells (**hemocytoblasts**)

3-Restricted granulocyte progenitor, that are called

(Colony-forming unit granulocytes (**CFU-G**))

4-Myeloblast

5-Promyelocyte :(nonspecific granules)

6-Myelocyte :

(specific granules N,E,B.....?)

7-Metamyelocyte:

(specific granules N, E,B

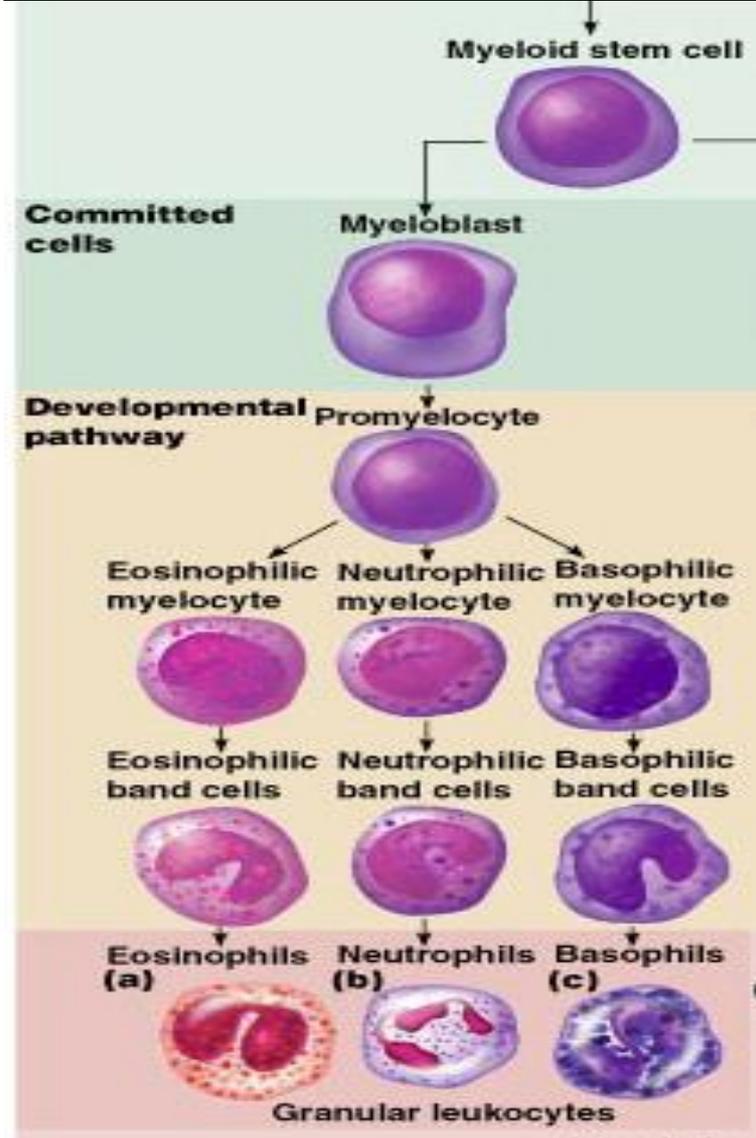
+**indentation of nucleus**)

8-Band cell

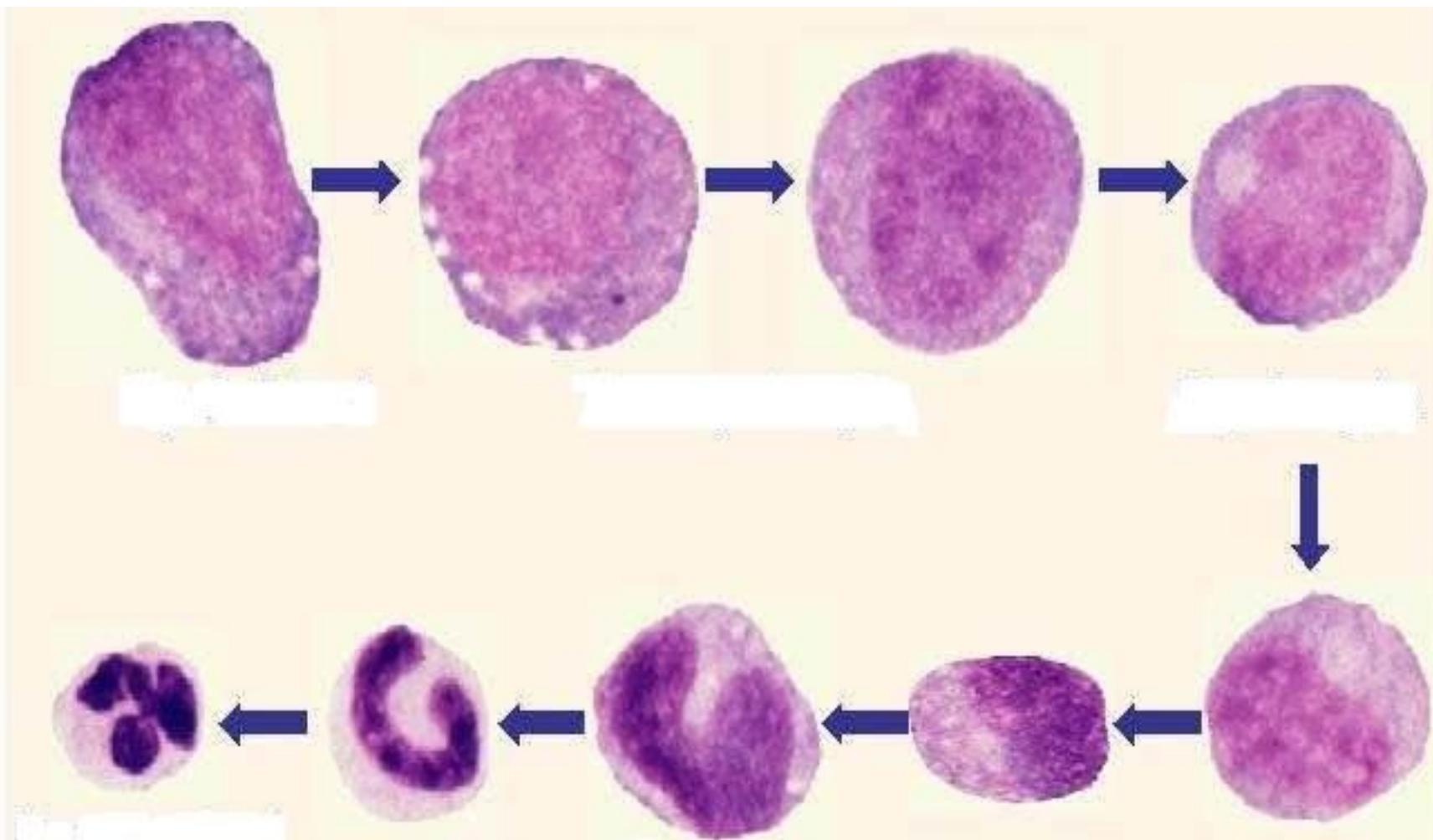
Smaller cells ,curved band nuclei ,**cannot divide**. May be present in peripheral blood.

9-Mature cells: (Neutrophils ,Eosinophils Basophils)

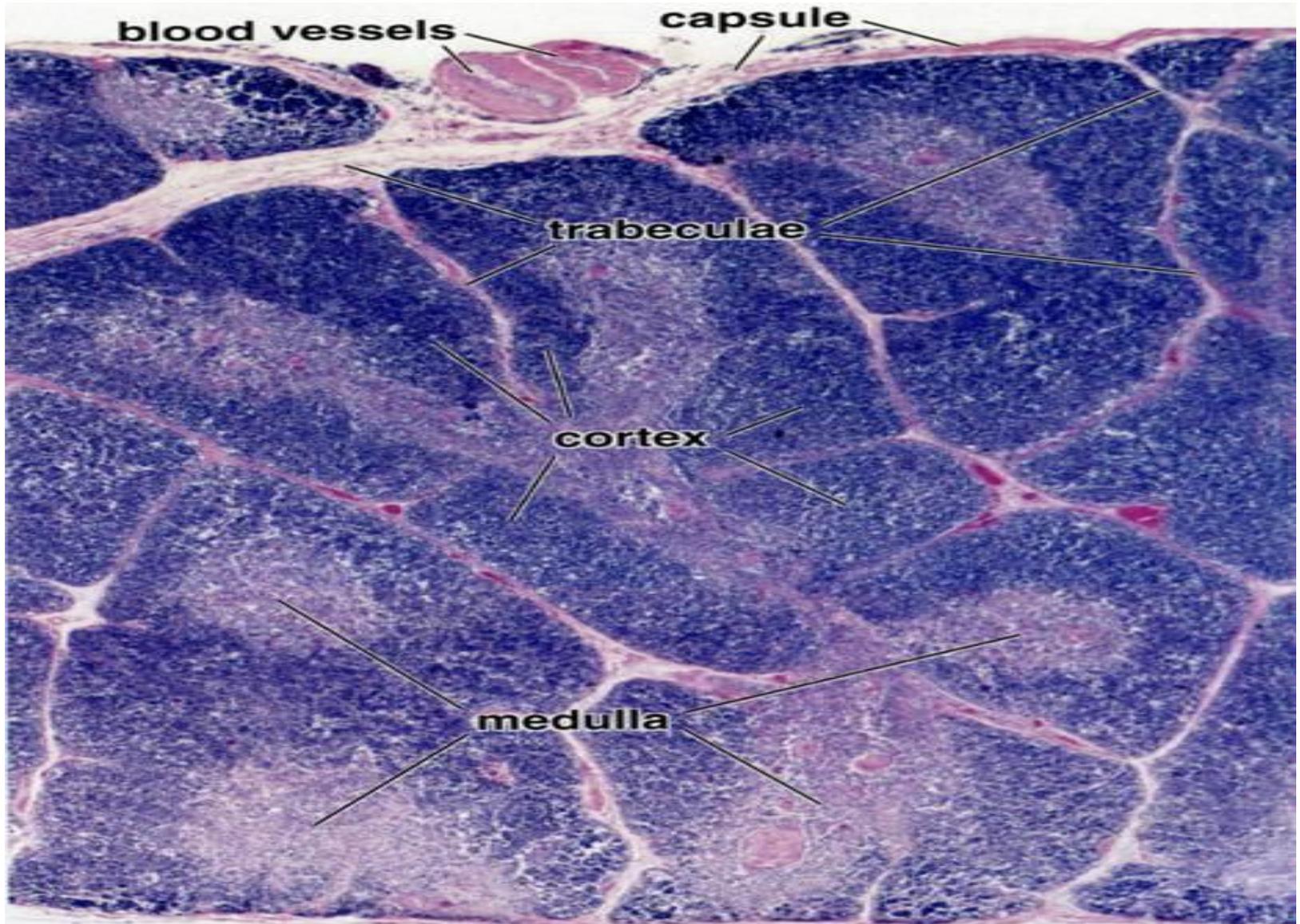
Takes about 10-11 days



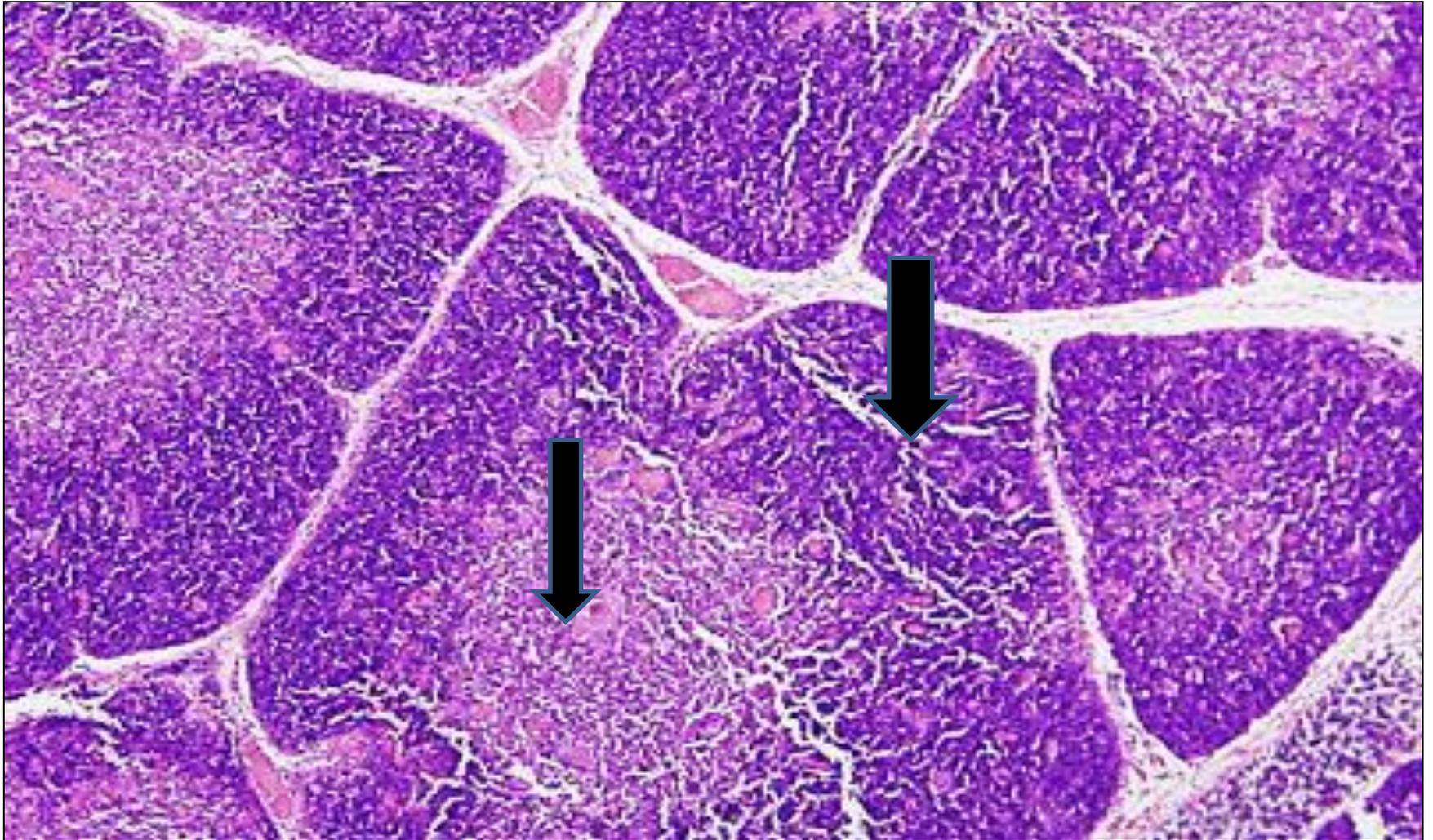
Granulopoeisis



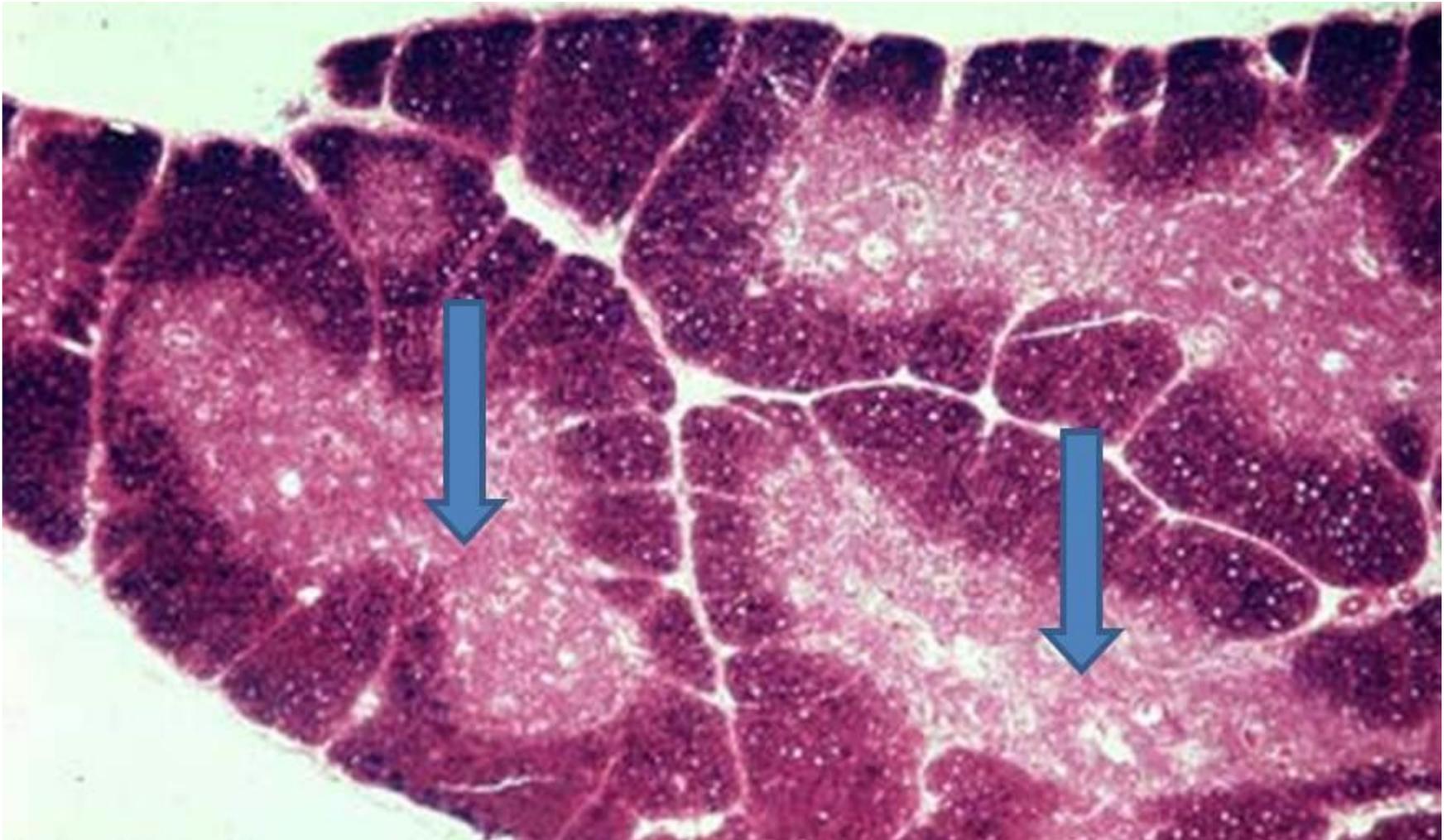
Thymus gland



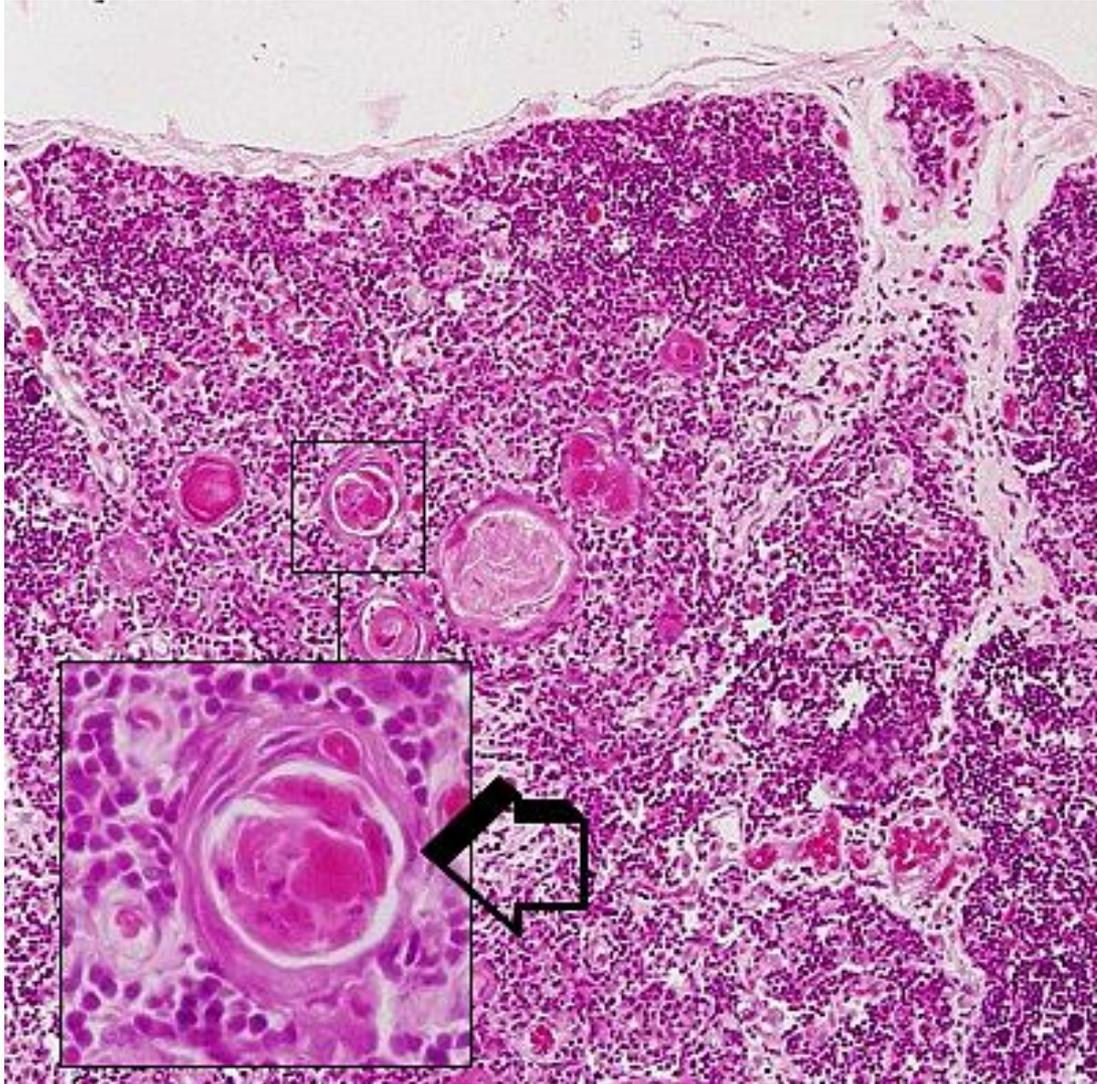
Thymus gland



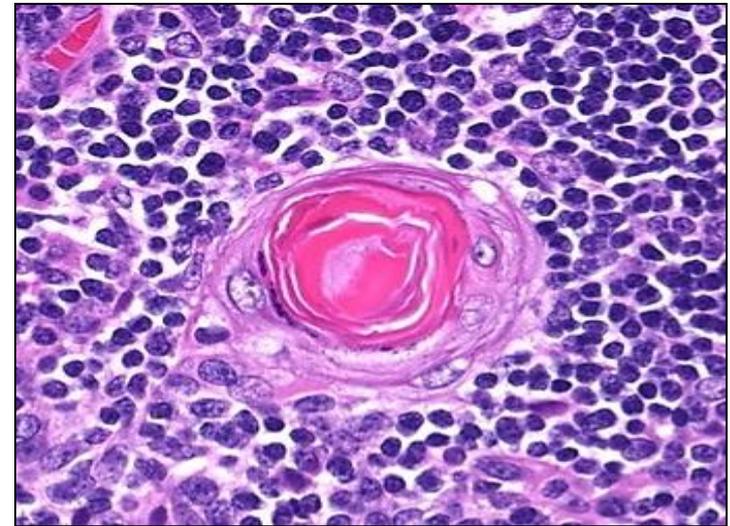
Thymus gland



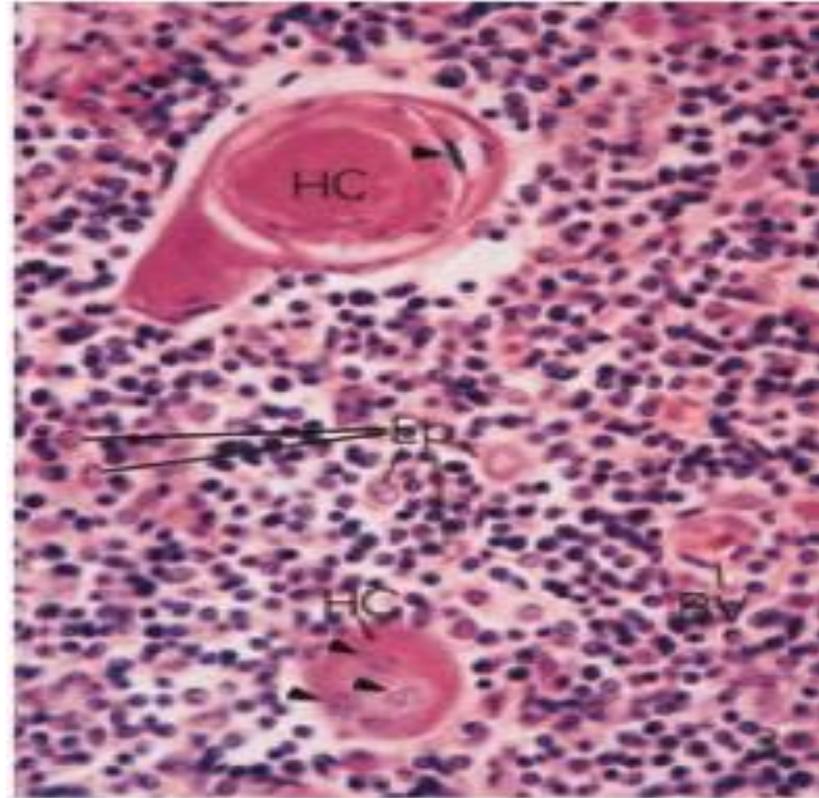
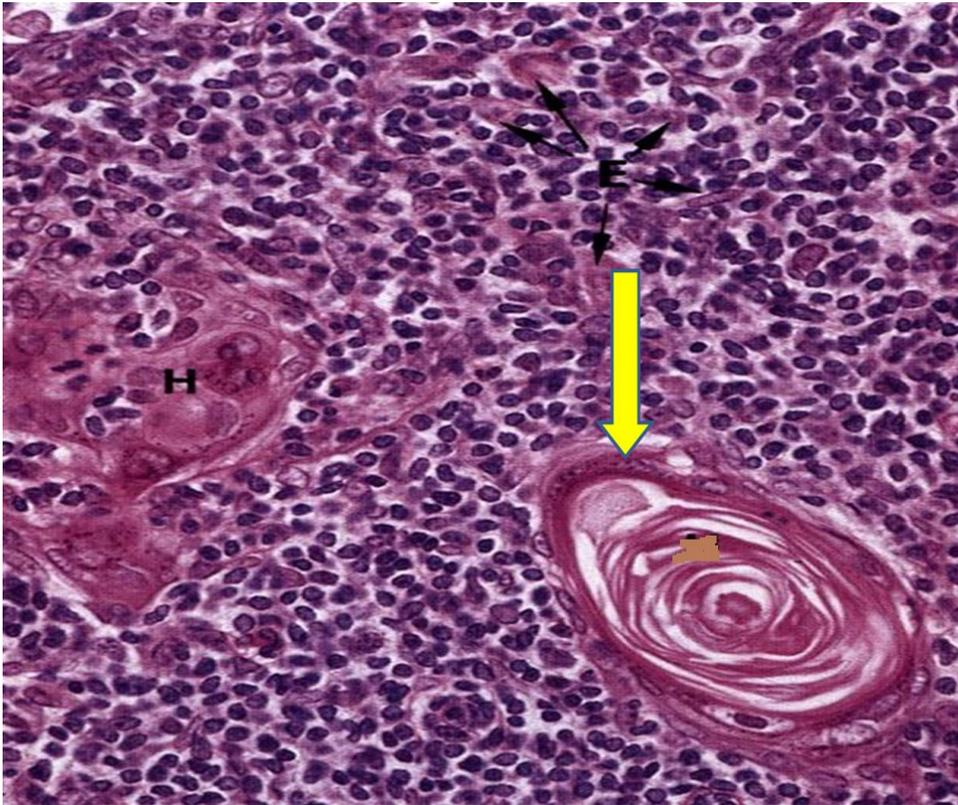
In the medulla, epithelioreticular cells form onionized structures called Hassall's corpuscles –quite prevalent in older thymus
function not very well known, but produce interleukins and so likely influence T-cell differentiation



LM view



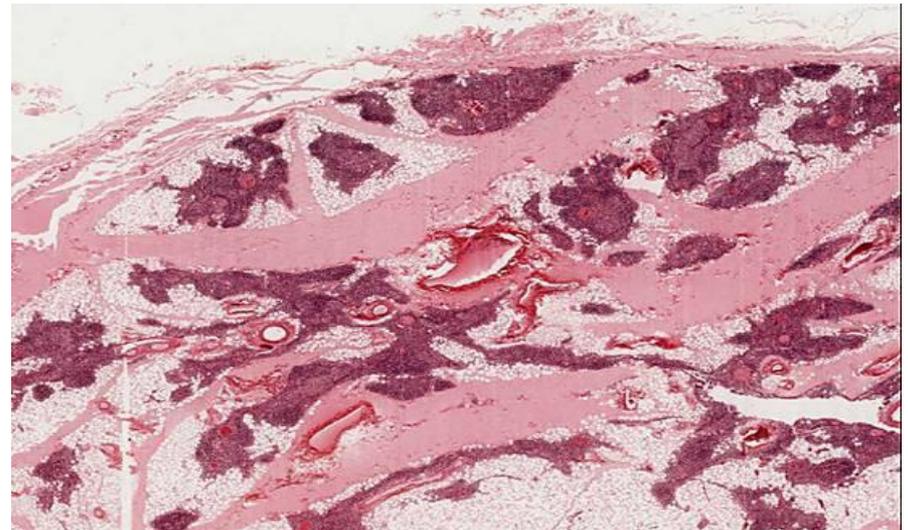
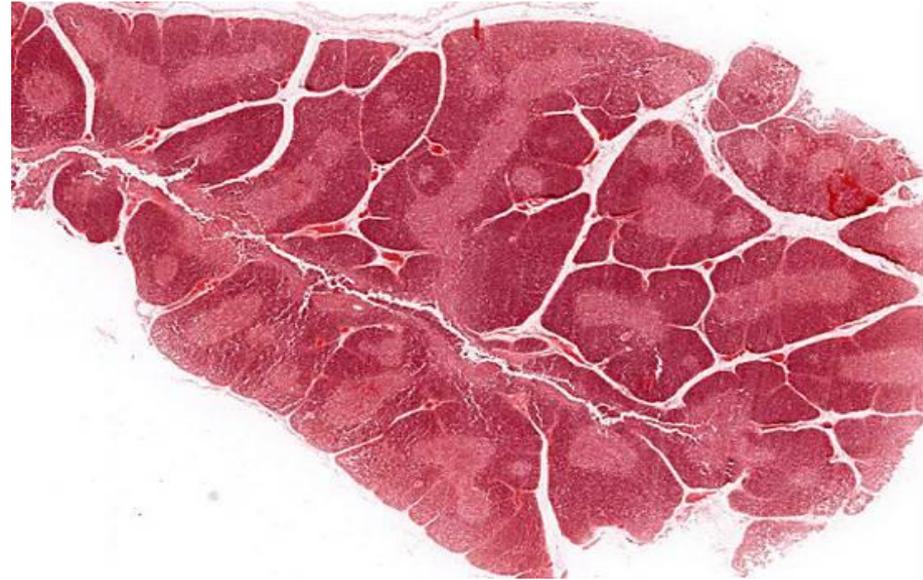
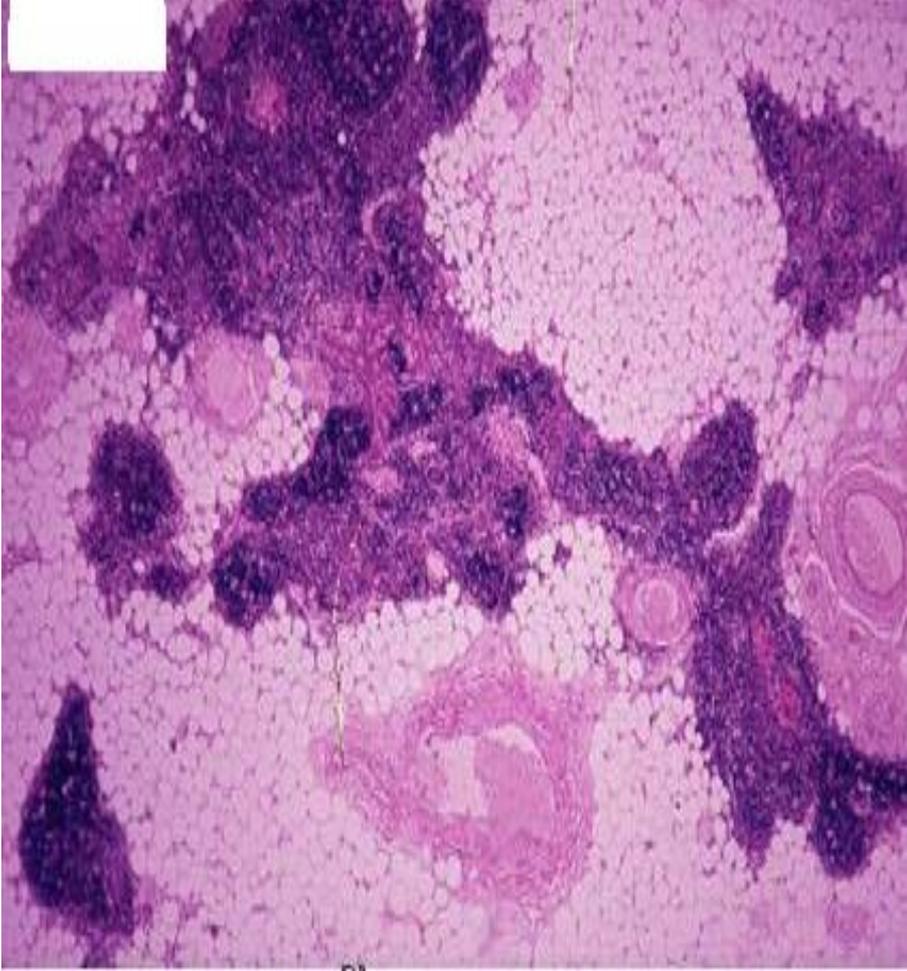
Hassall's corpuscles



Thymus gland of adult



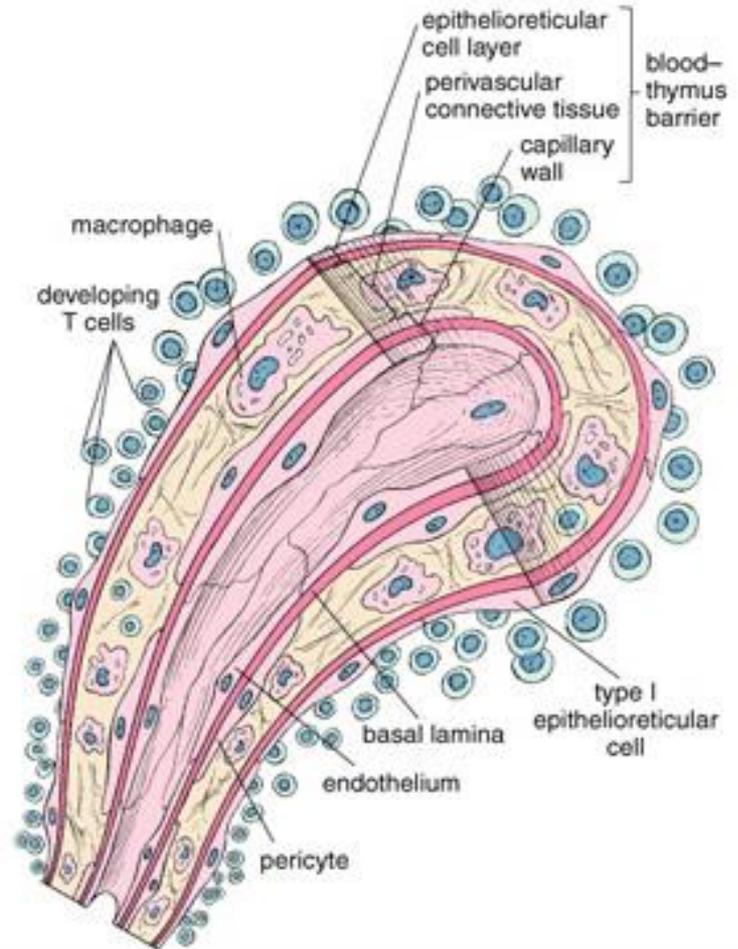
The young thymus



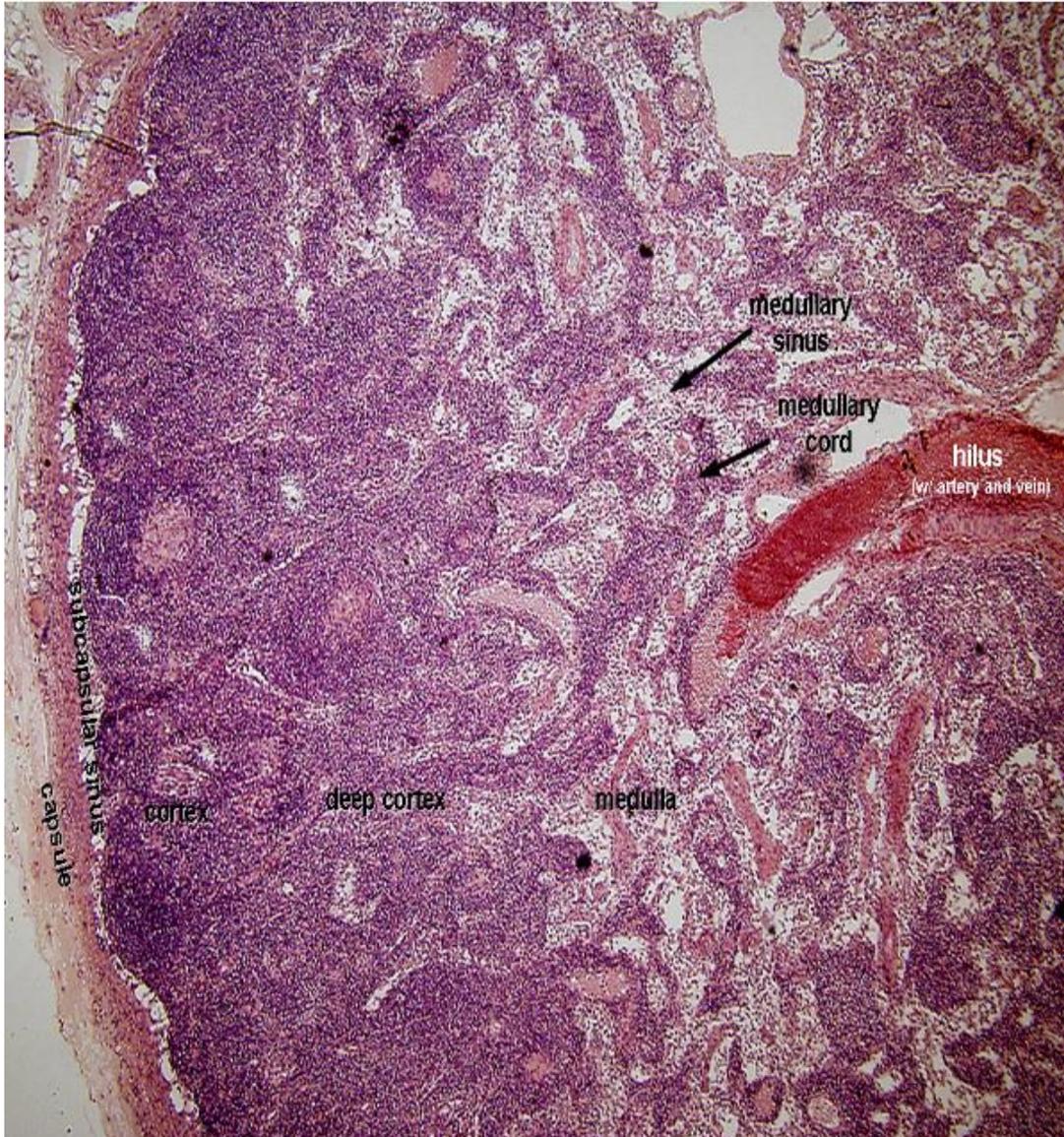
Blood thymic barrier

It is a barrier between T cells and the lumen of the cortical vessels.

1. Continuous endothelium with tight junction
2. Thick basal lamina
3. Pericyte
4. perivascular space with macrophages
5. basal lamina of **Epithelial reticular cell** Epithelial reticular cells with tight junction

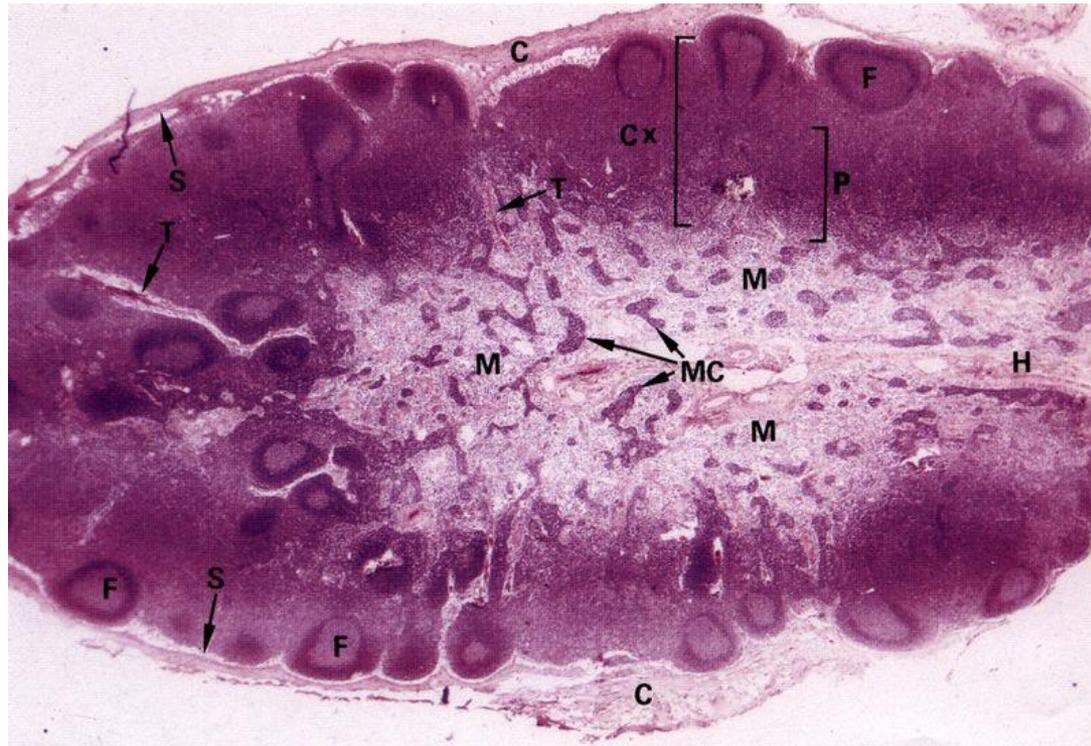


Lymph Node Structure



- **Capsule & subcapsular sinus**
- **Trabeculae & trabecular sinuses**
sinuses contain lymph, macrophages, and reticular cells
- **Cortex:**
 - superficial cortex (B-cells)
 - primary follicles/nodules
 - secondary follicles/nodules (i.e. with germinal centers)
 - “deep” cortex (T-cells, dendritic cells)
- **Medulla:**
 - medullary cords (B-cells, plasma cells)
 - medullary sinuses (lymph, more macrophages, plasma cells, and reticular cells)

Low power view of LN



The outer part of the LN is highly cellular → cortex, superficial (outer) cortex and paracortex (inner cortex)

The inner part of the LN is less cellular → medulla

The cellular component of the LN which are T & B lymphocytes plasma cells and APCs are arranged into dense and loose arrangement.

Dense → cortical nodules and medullary cords

Loose → loosely scattered B lymphocytes, plasma cells, macrophages and lymph sinuses

Cortical nodules

rounded aggregation of **B lymphocytes+ macrophage**

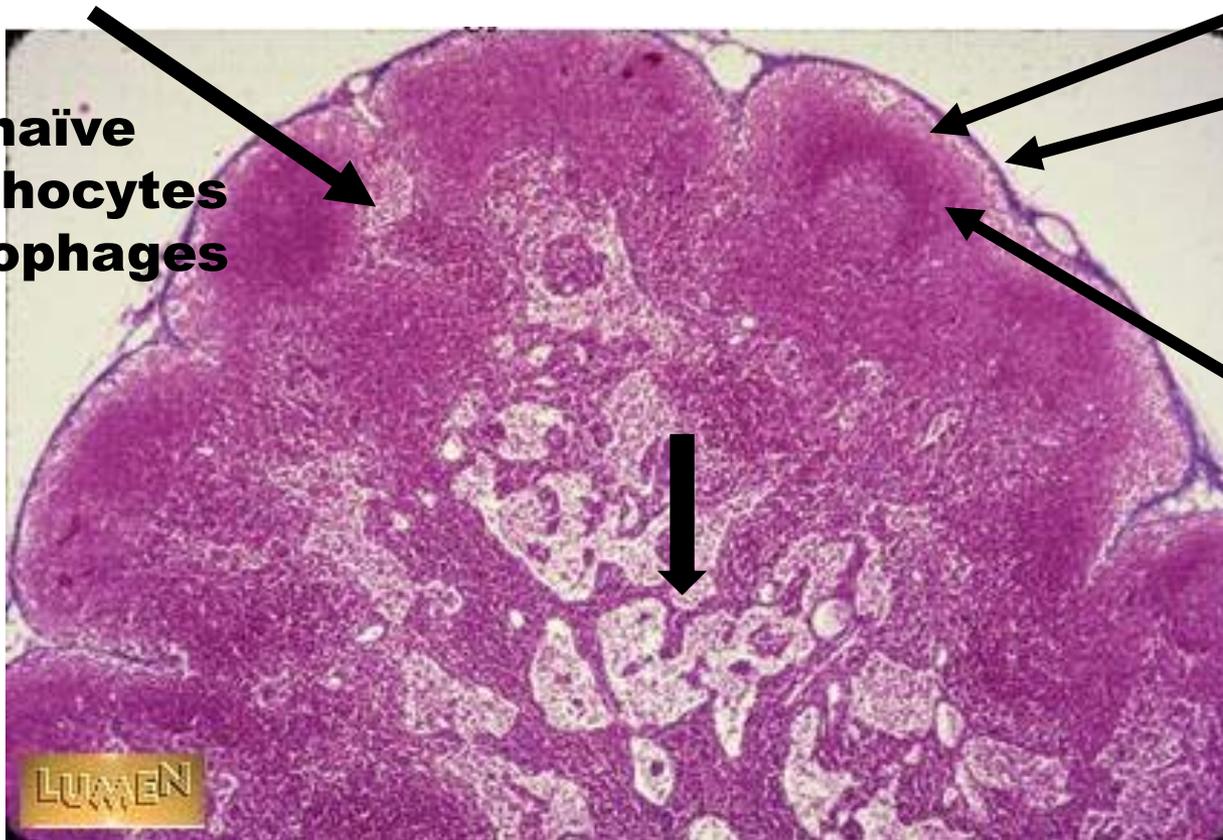
Primary LN

Secondary LN

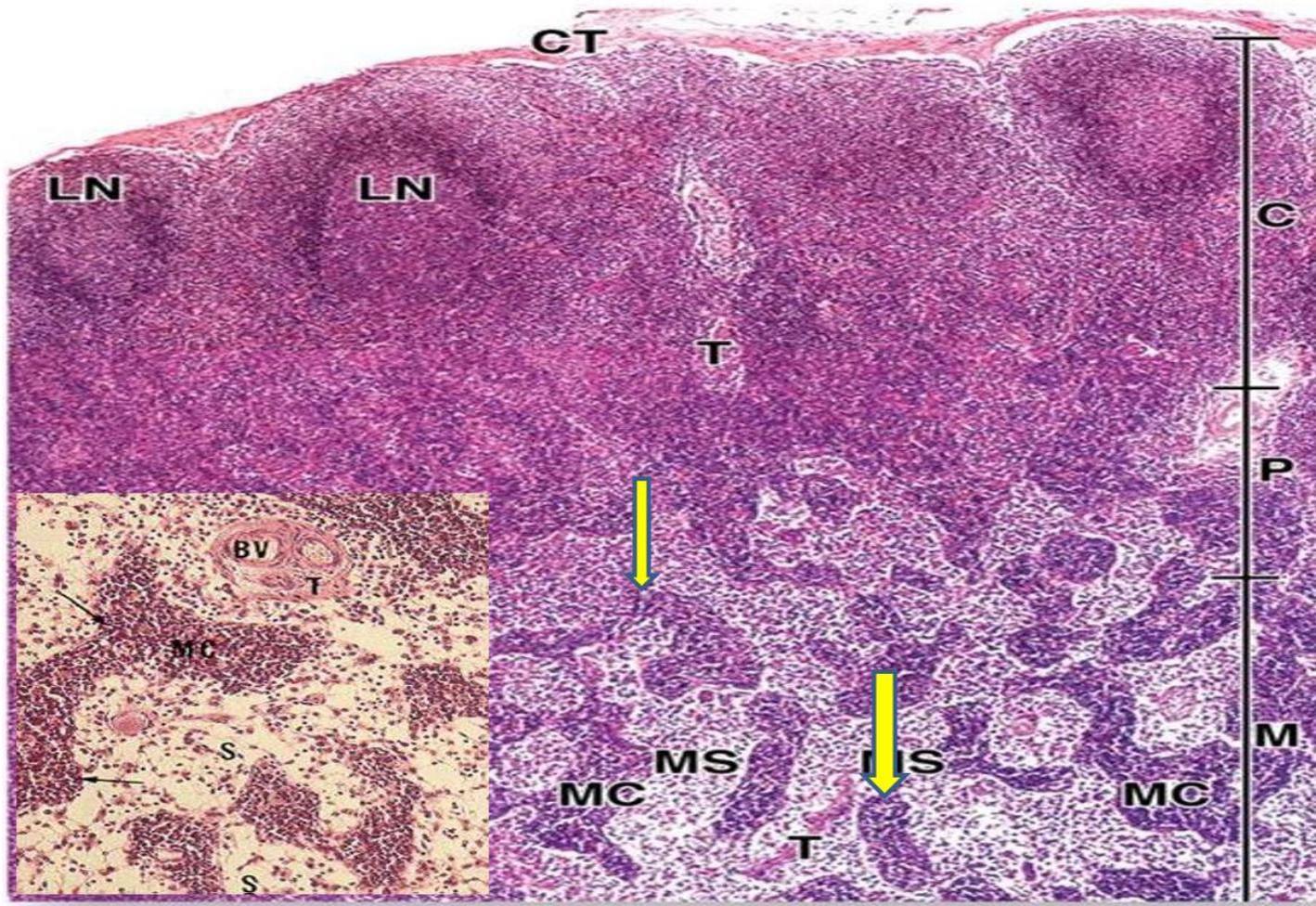
**Small naïve
B lymphocytes
+macrophages**

**Small naïve
B lymphocytes**

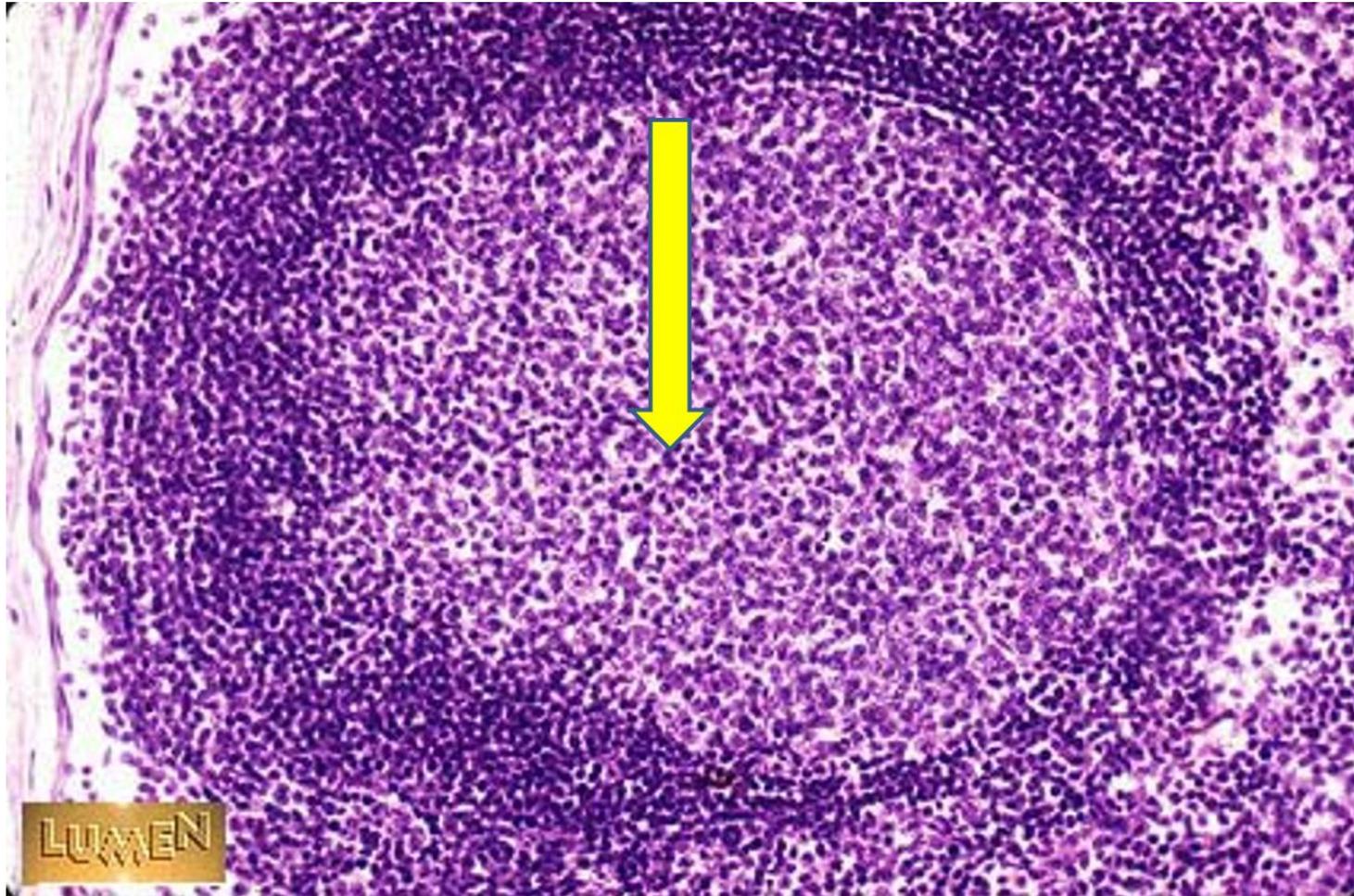
**Lymphoblast
(Germinal
center) +
macrophage
s**



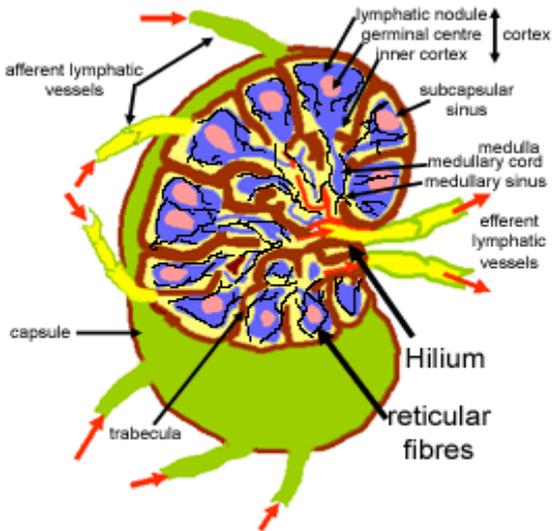
LN



Secondary nodules



Lymphatic circulation

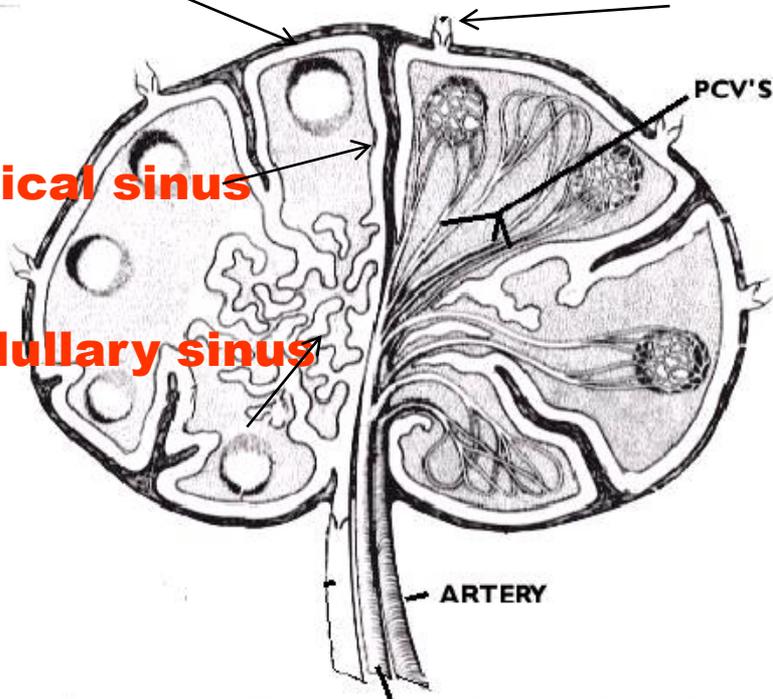


Subcapsula lymphatic

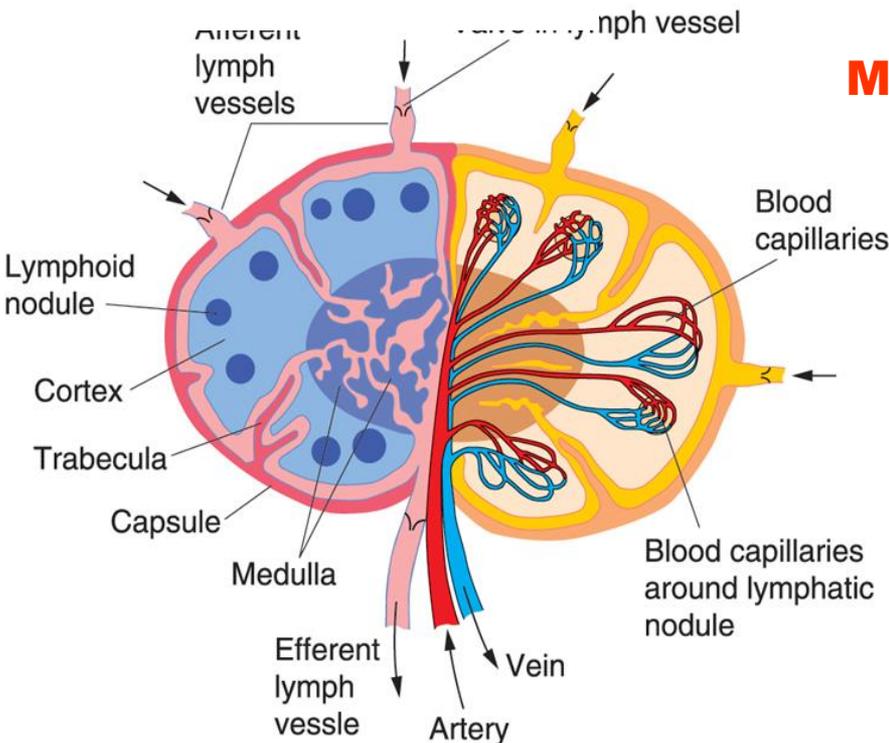
Afferent lymphatic

Cortical sinus

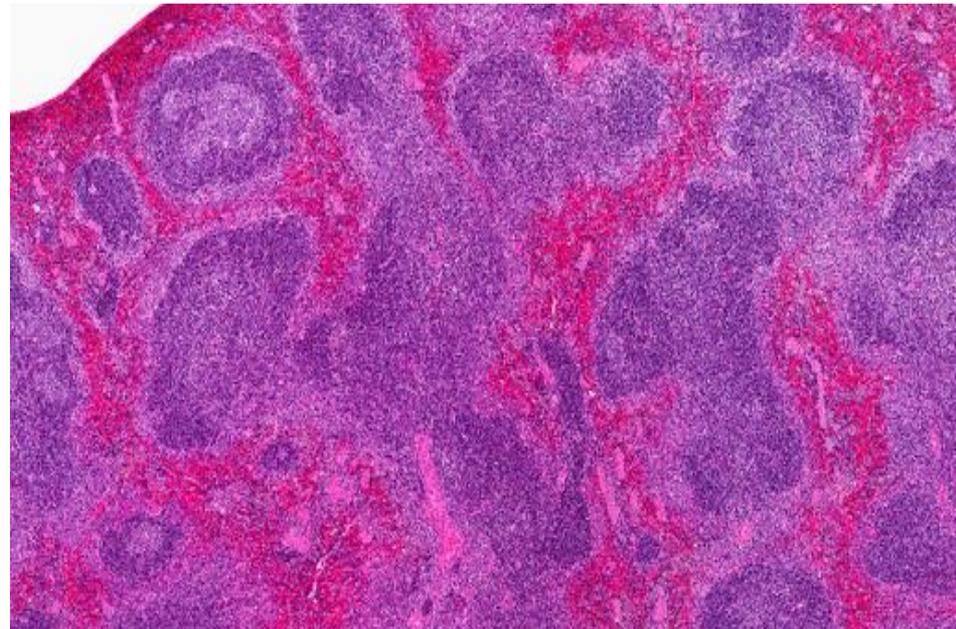
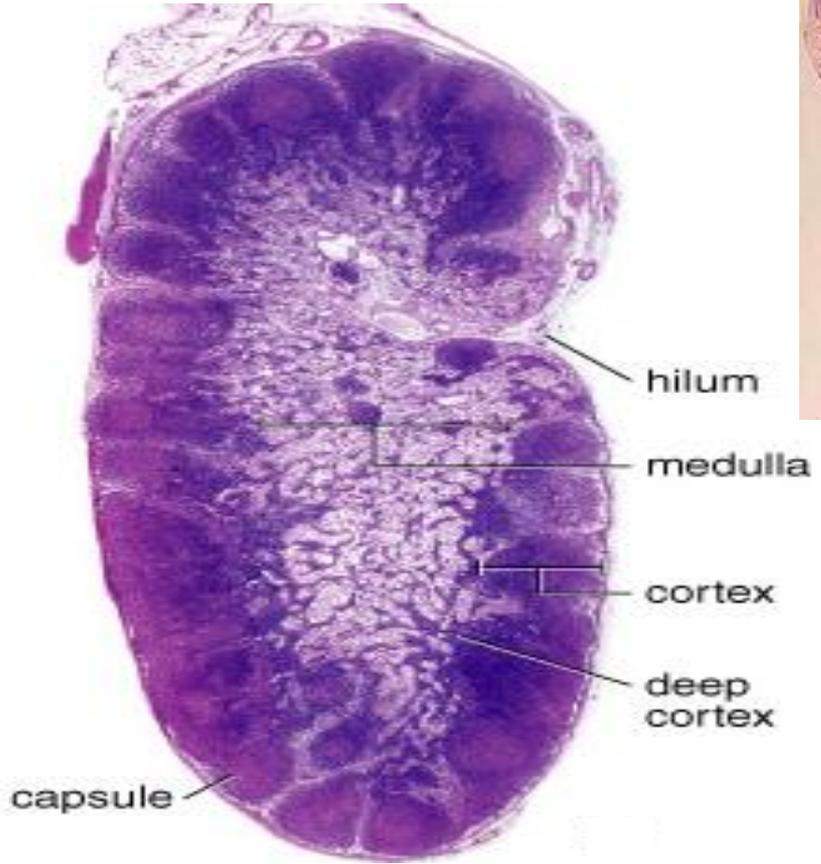
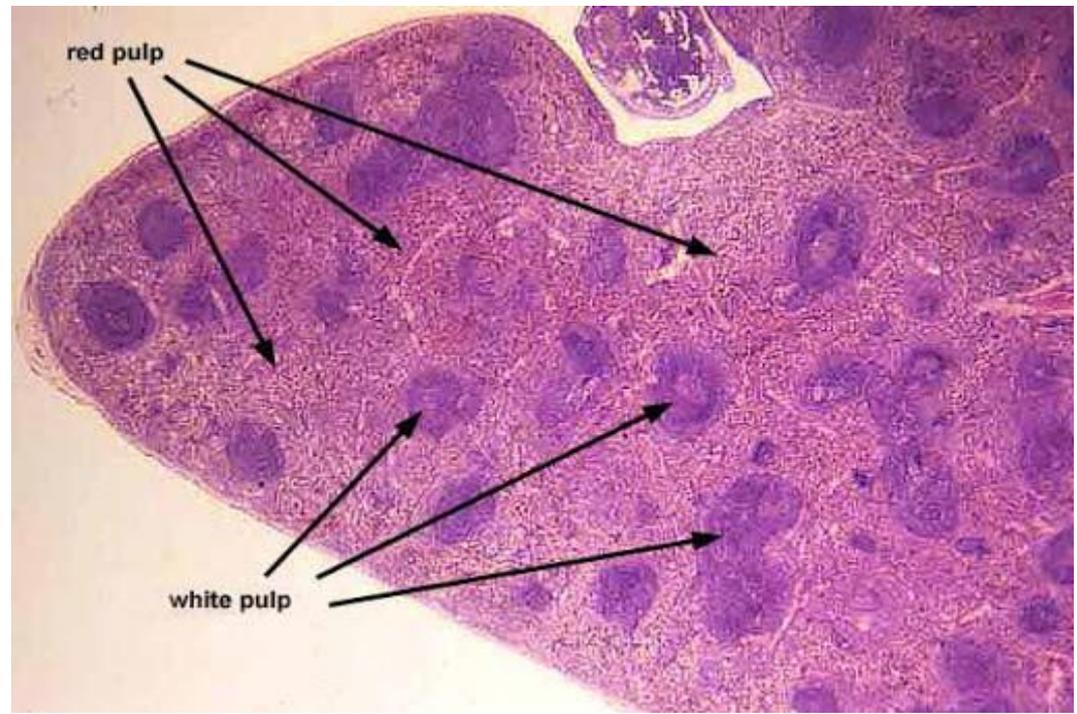
Medullary sinus



Efferent lymphatic

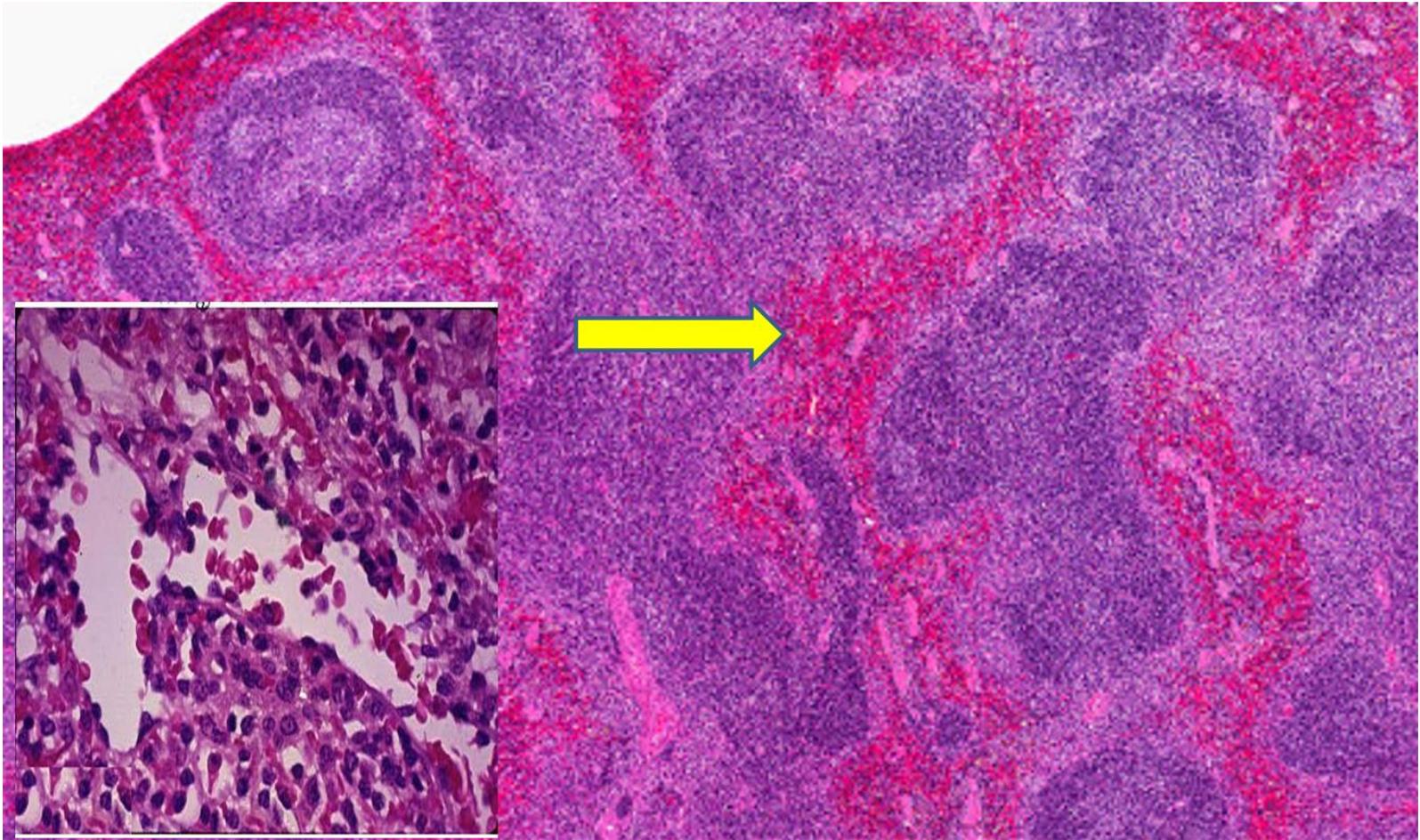


Spleen

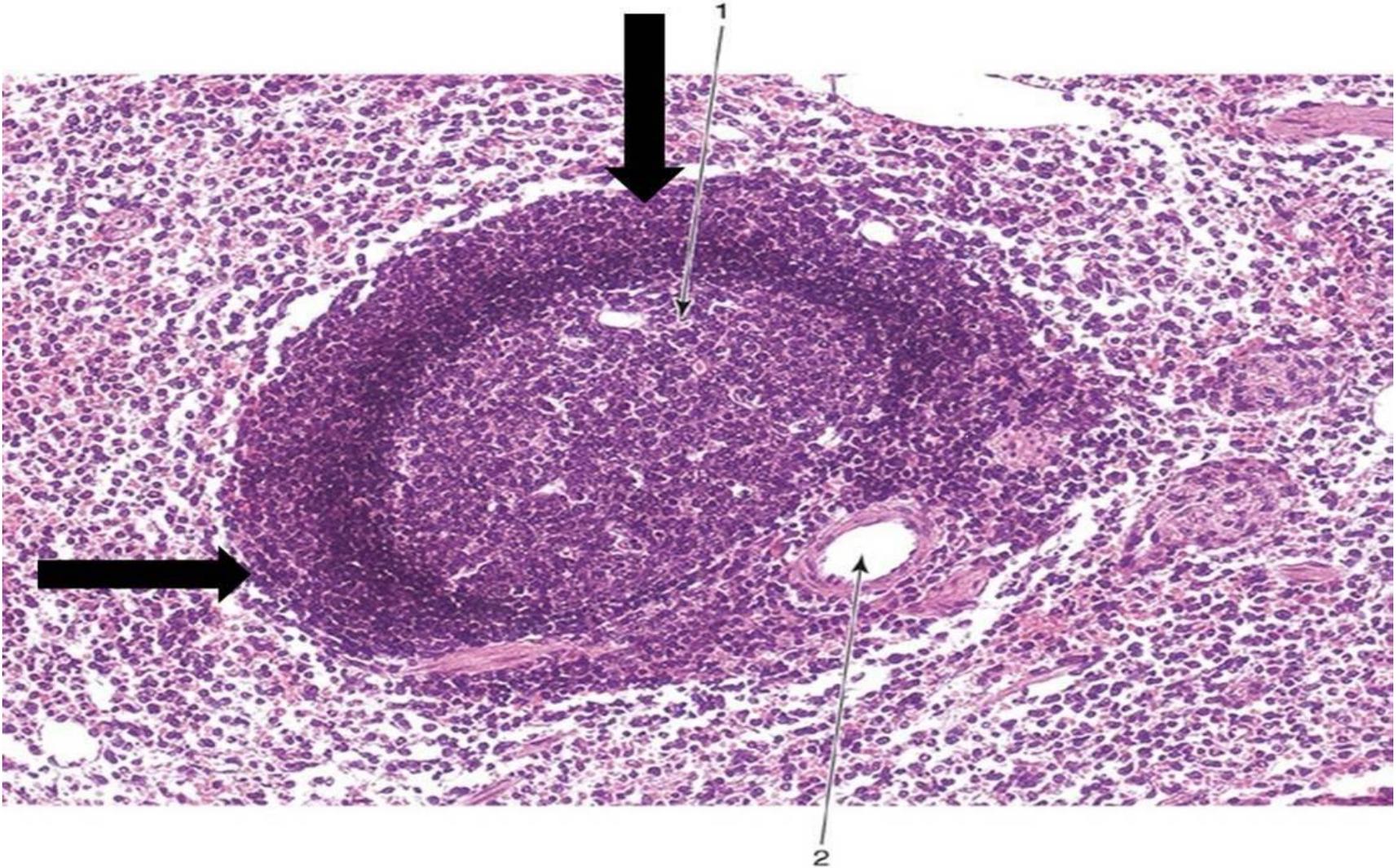


LN

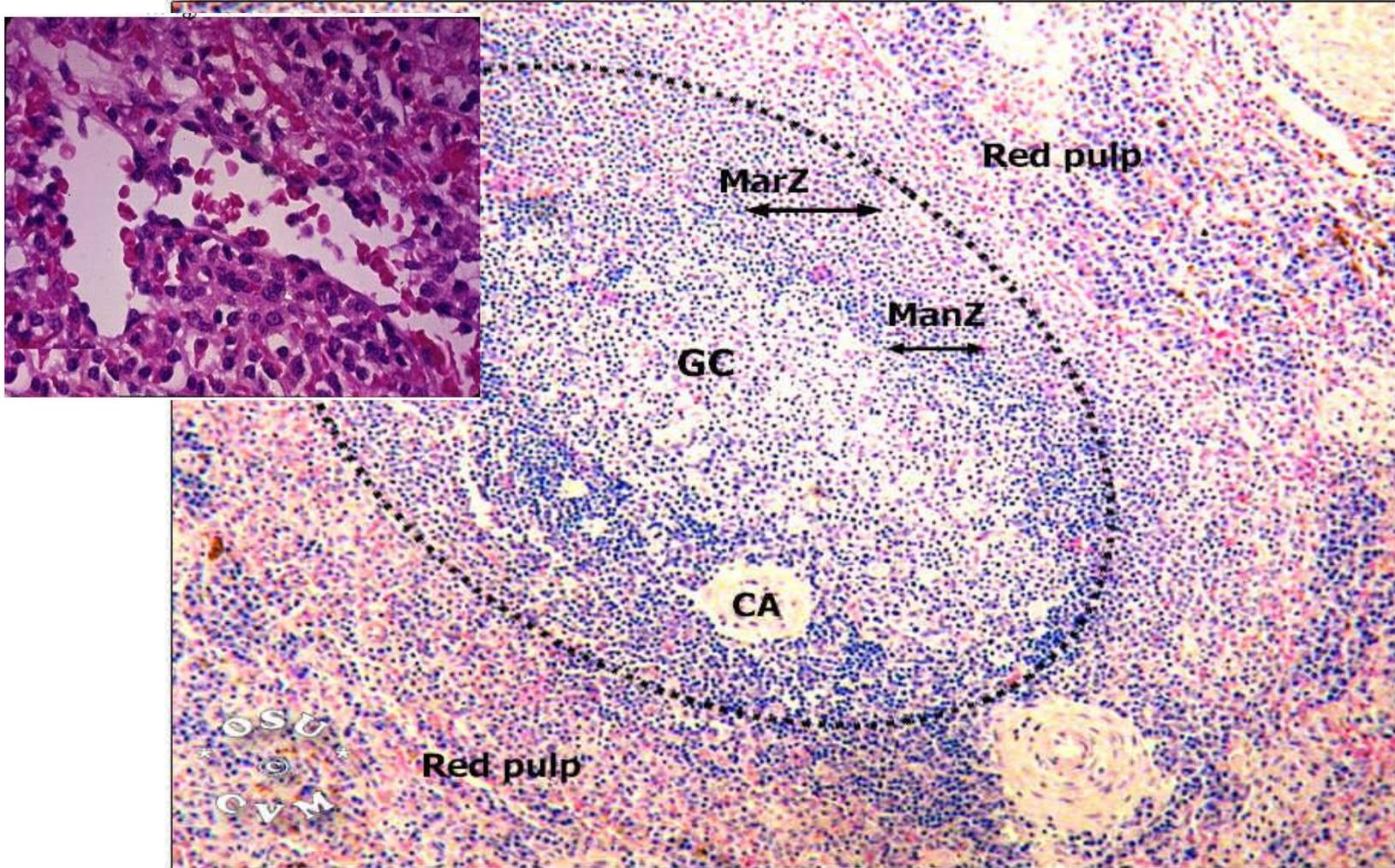
Red pulp



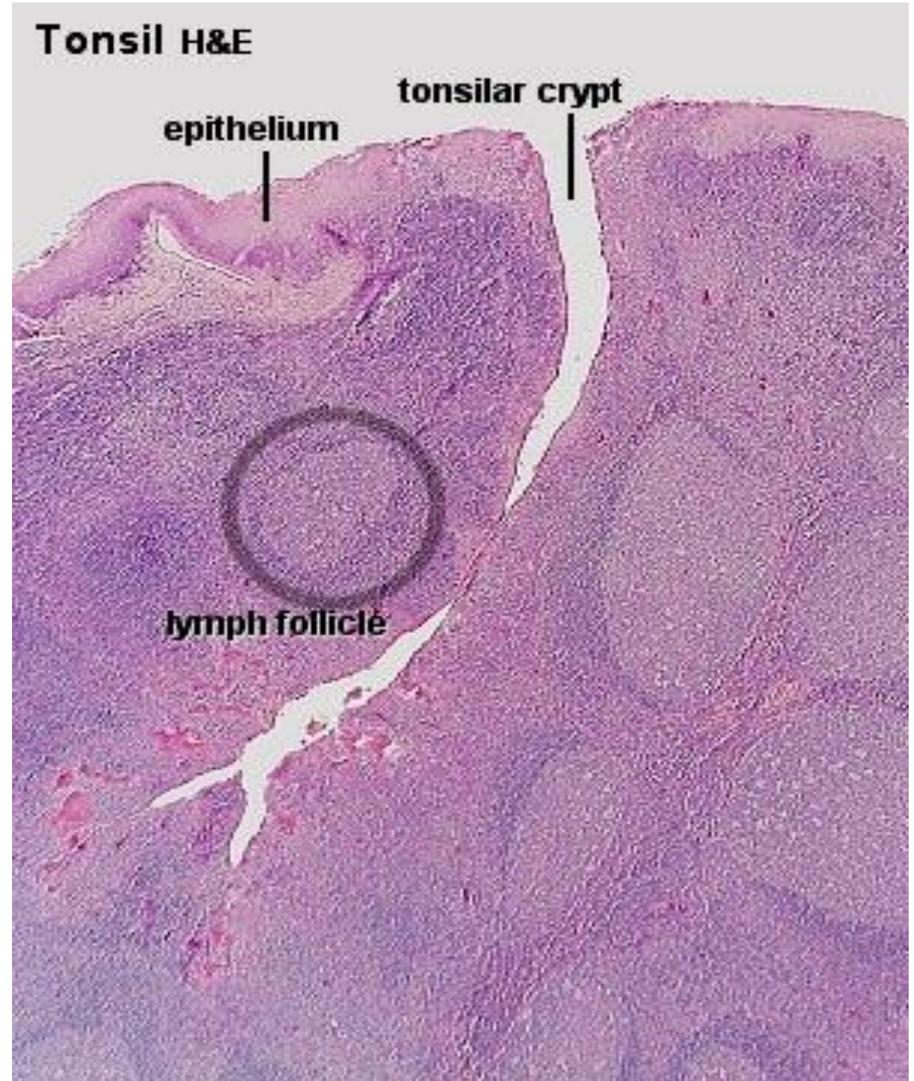
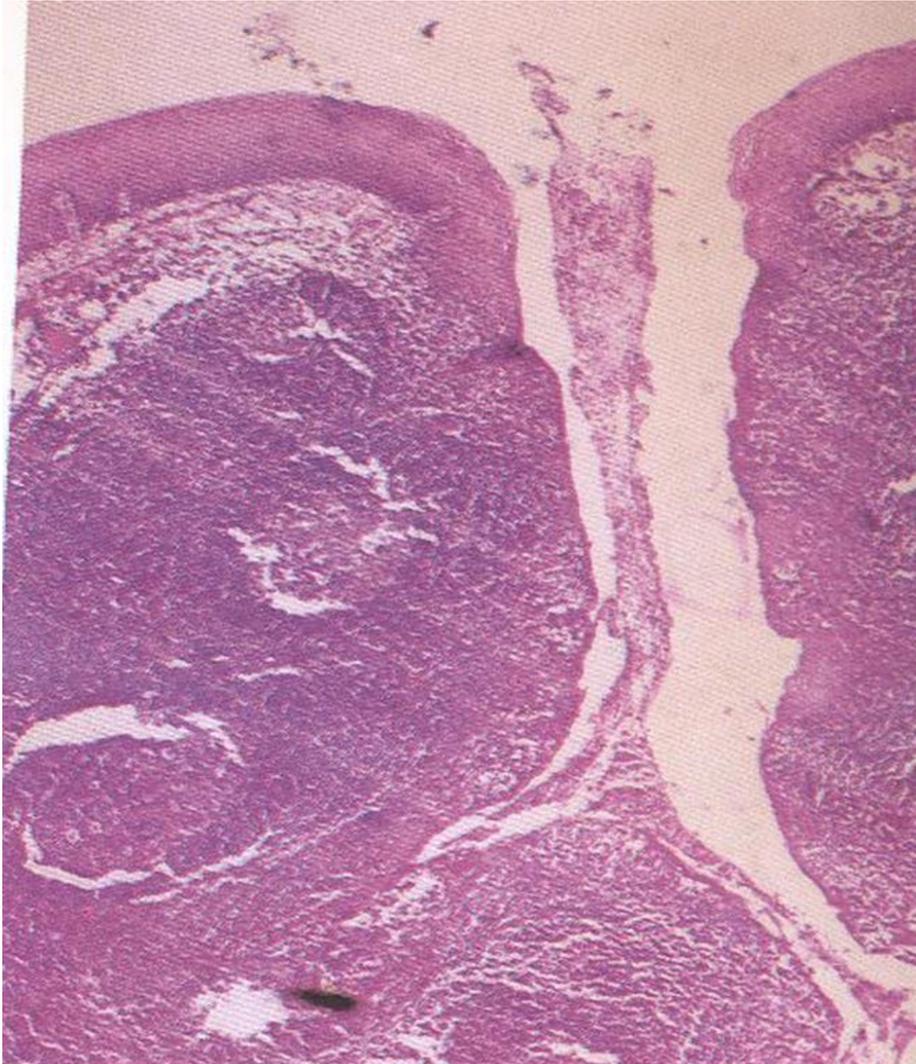
White pulp



White & red pulps of spleen



Palatine Tonsil (H&E)

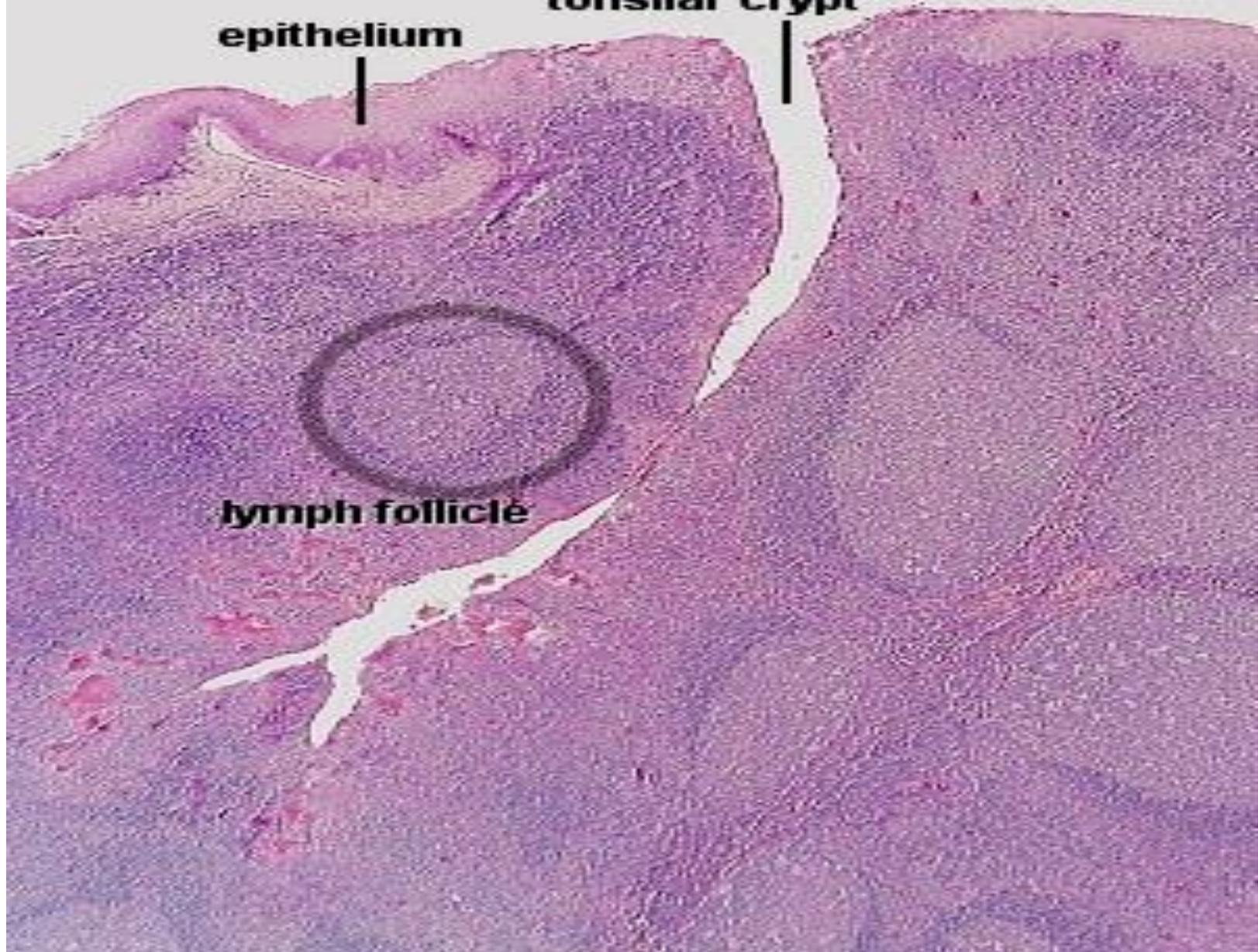


Tonsil H&E

epithelium

tonsillar crypt

lymph follicle



Palatine tonsil

