



**Faculty of Biological Science and Technology**  
**Zoology and Botanical Department**  
**Practical Histology**

# **Lymphoid System**

## **Part 1**

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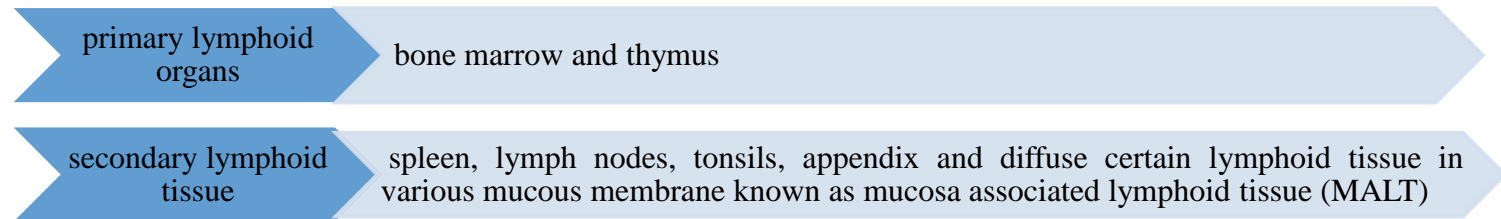
**Ph.D in Animal Development**

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## Lymphoid system

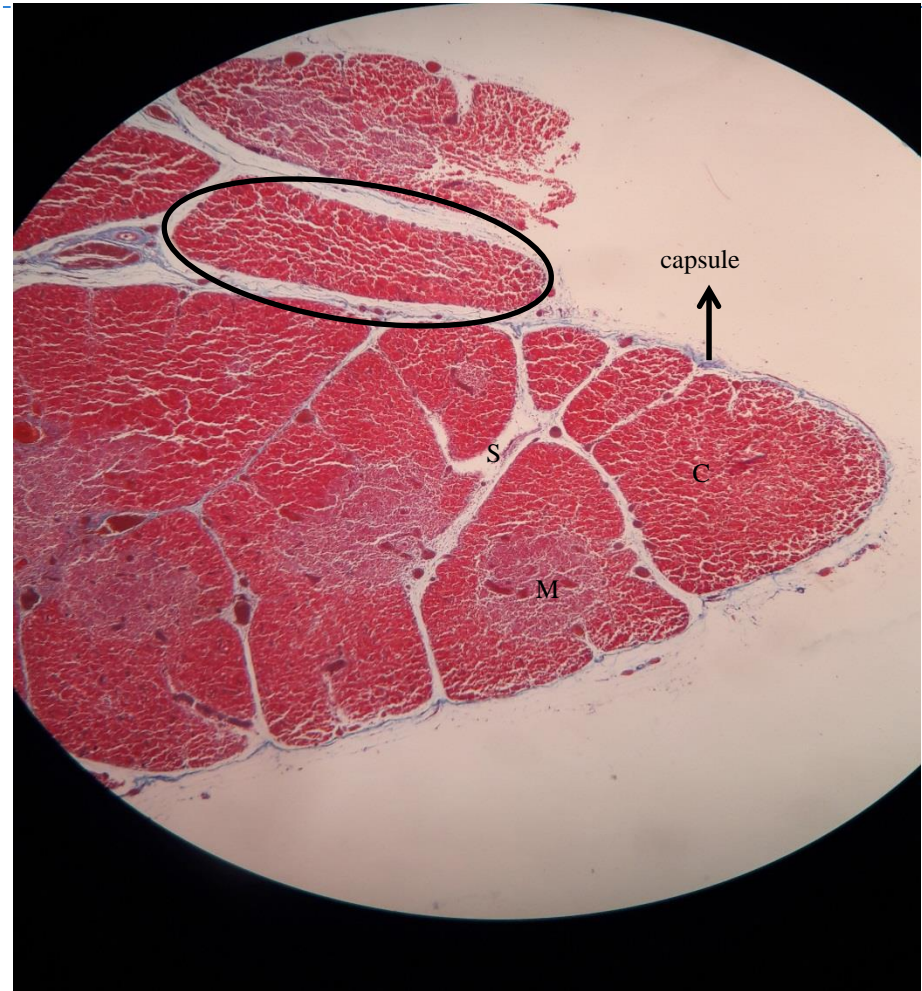
- ▶ Lymphoid system is composed of cells, tissues and organs that protect our body from infections
- ▶ A complex group of immune cells including lymphocytes are located in lymphoid organs
- ▶ There are two groups of lymphoid organs:





## thymus

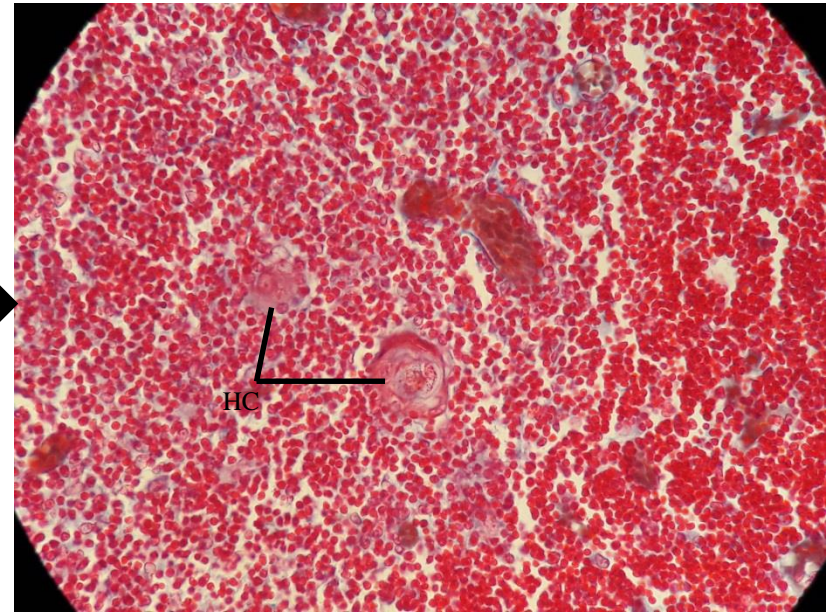
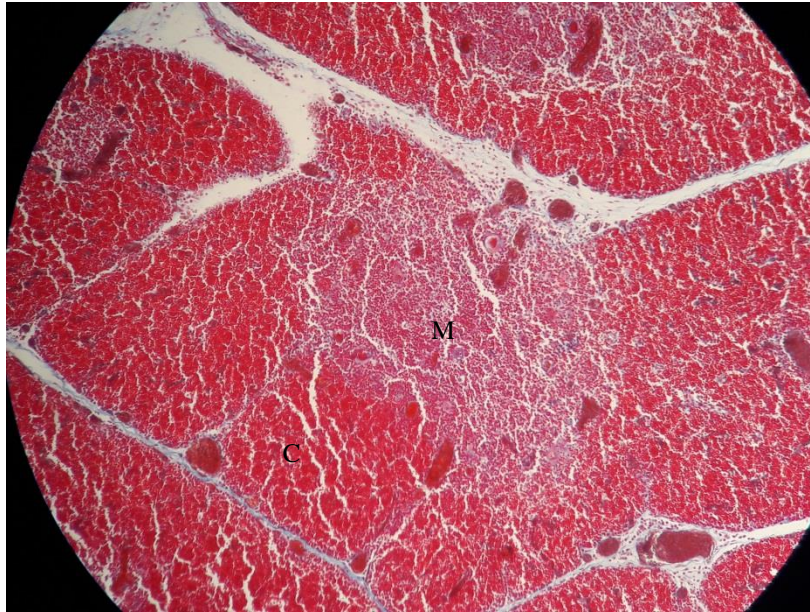
- ▶ Thymus is an encapsulated primary lymphoid organ located in superior mediastinum
- ▶ Thymus is composed of two lobes
- ▶ Septa (or trabecula) from surrounding capsule penetrate into the tissue and divides it into incomplete lobules
- ▶ Capsule and septa are made of connective tissue
- ▶ Each lobule has an outer, dark basophilic region called cortex and inner, lighter region called medulla
- ▶ Cortex contains numerous small lymphocytes (precursors of T lymphocytes called thymocytes). It also contains macrophages and special epithelial reticular cells
- ▶ Medulla contains larger but fewer mature lymphocytes with pale staining nuclei
- ▶ Hassall's corpuscles are structures found in thymus medulla formed from epithelial reticular cells arranged concentrically



Thymus. C:cortex, M: medulla, S: septa. H&E, 5.6X. This picture is taken from histological slide in histology laboratory of Isfahan University



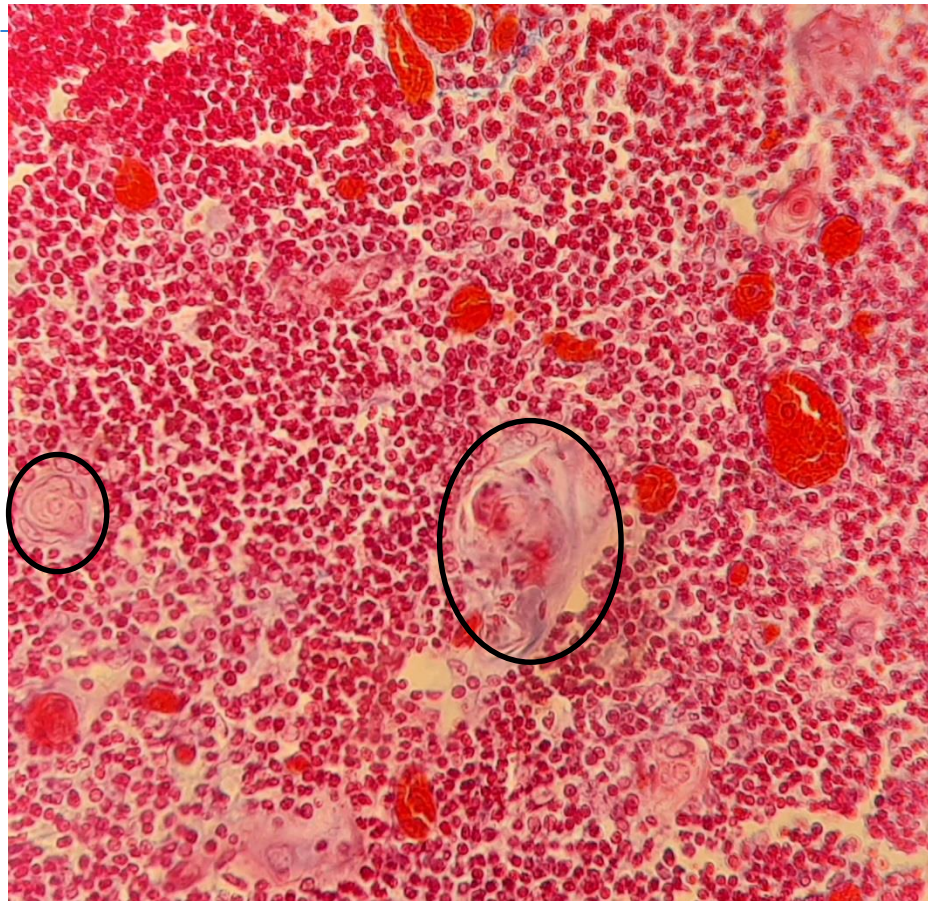
# Thymus



Thymus. C:cortex, M: medulla, HC: Hassall's corpuscles . H&E, left, 10X, right: 40X. These pictures are taken from histological slide in histology laboratory of Isfahan University



## Thymus

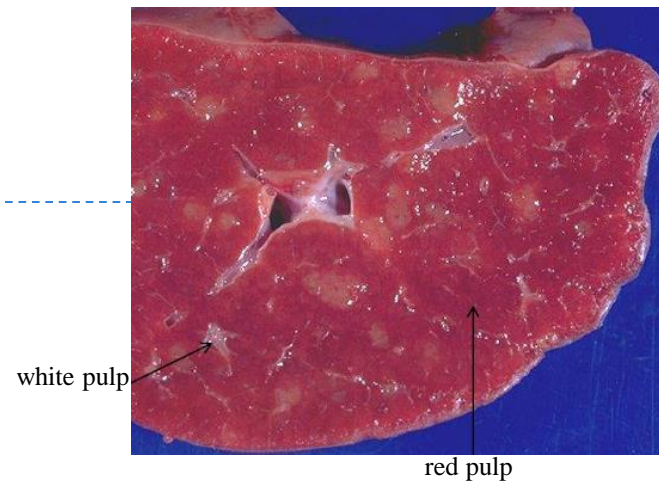


Hassall's corpuscles in the medulla of thymus. Numerous lymphocyte can be seen in this field. H&E, 40X. This picture is taken from histological slide in histology laboratory of Isfahan University

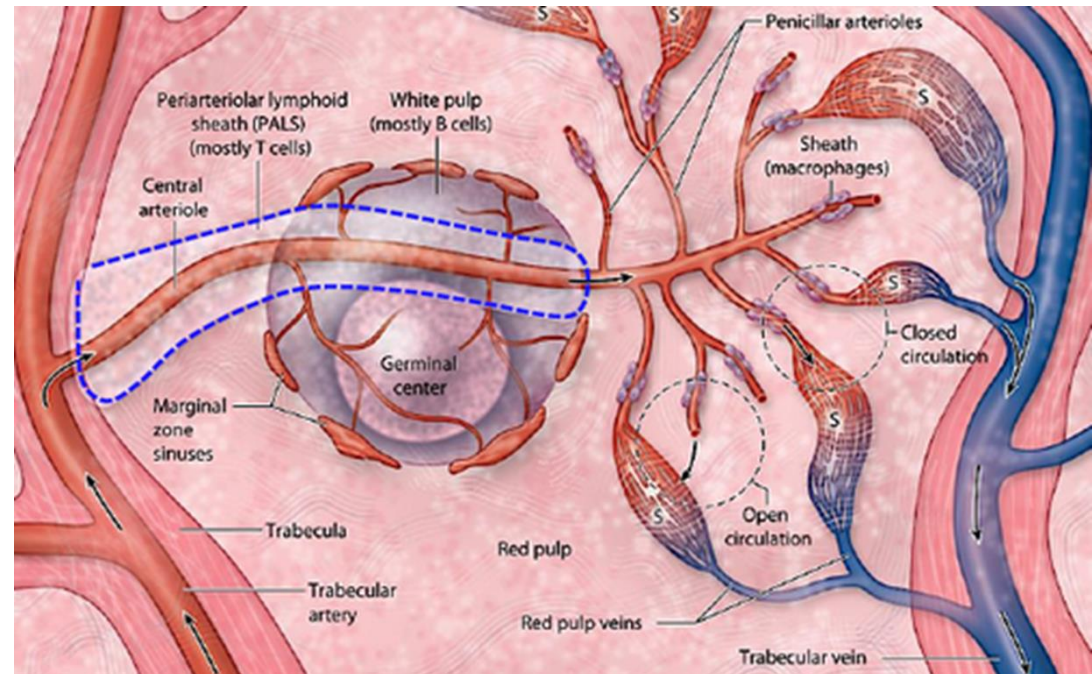


## Spleen

- ▶ Spleen is the largest collection of lymphoid tissue located in the left upper part of body
- ▶ The organ is surrounded by dense connective tissue capsule, emerging from which are trabeculae that support that large vessels and divide the spleen into lobules
- ▶ The spleen parenchyma is divided into two compartments: White pulp and red pulp
- ▶ The white pulp is highly organized lymphatic tissue consists of lymphatic nodules and periarteriolar lymphoid sheaths (PALS). It forms 20% of the spleen volume. PALS contain mainly T cells, macrophages, dendritic cells and plasma cells. Arterioles which is surrounded by PALS is called central arterioles
- ▶ The red pulp makes up the majority of spleen and consists of splenic sinusoids and cords. Splenic cords also known as Billroth cords and contain reticular cells alongside B and T cells, macrophages, other leukocytes and red blood cells

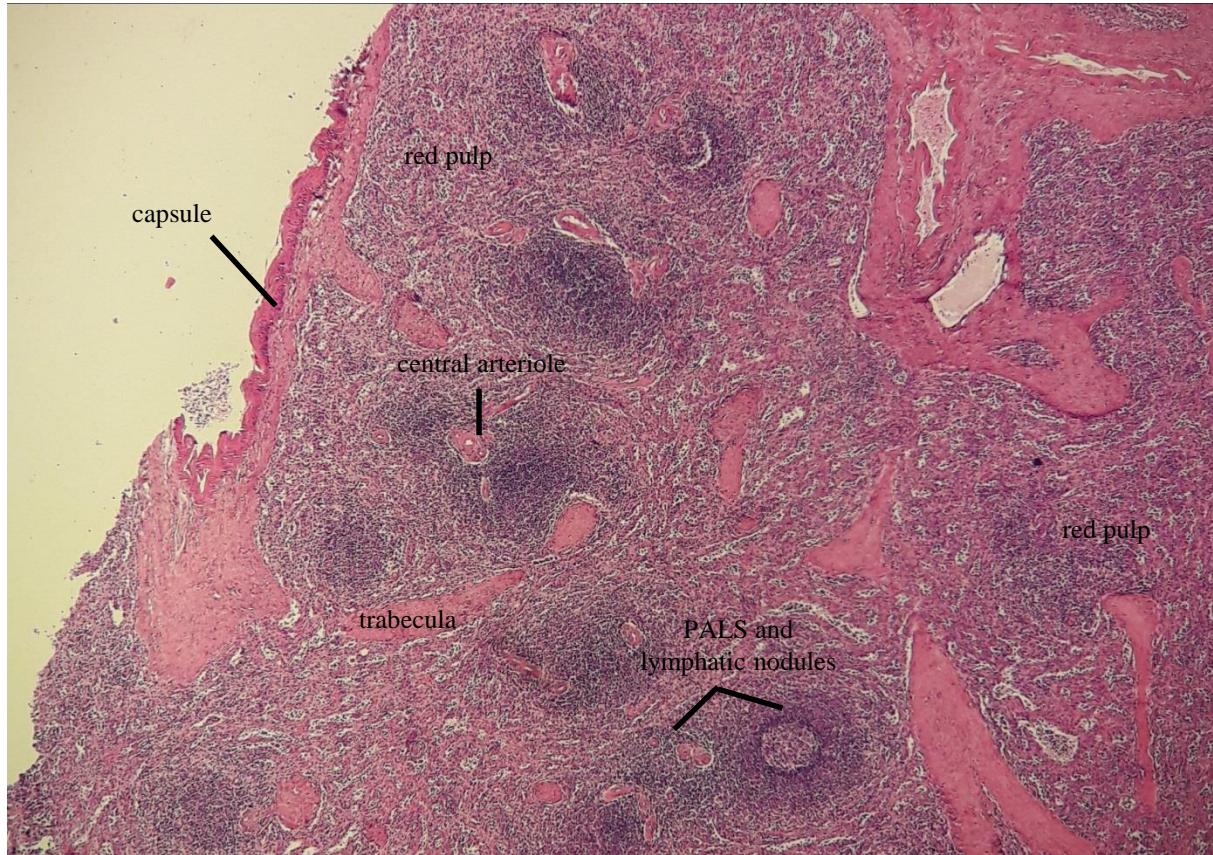


A real illustration of spleen





# Spleen



Spleen. H&E, 4X. This picture is taken from histological slide in histology laboratory of Isfahan University



# Spleen

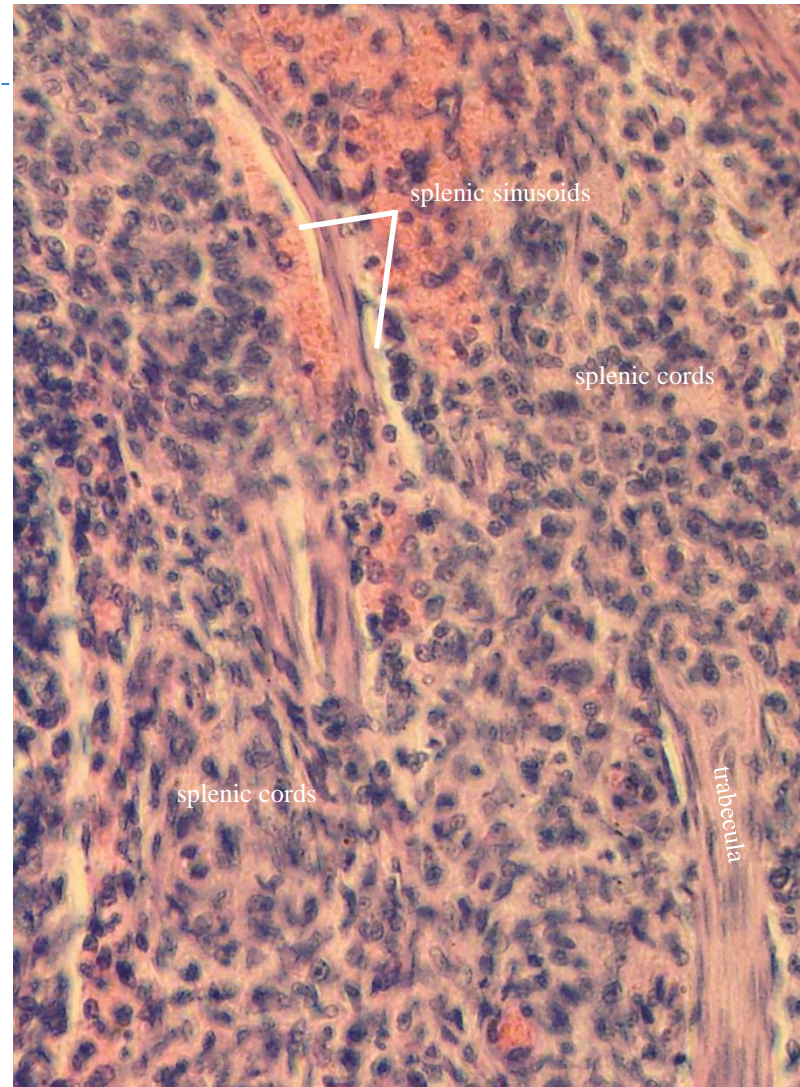


Splenic nodule in spleen. GM: germinal center; H&E, 10X. This picture is taken from histological slide in histology laboratory of Isfahan University





# Spleen



Red pulp of spleen. H&E, 40X. This picture is taken from histological slide in histology laboratory of Isfahan University



# Spleen

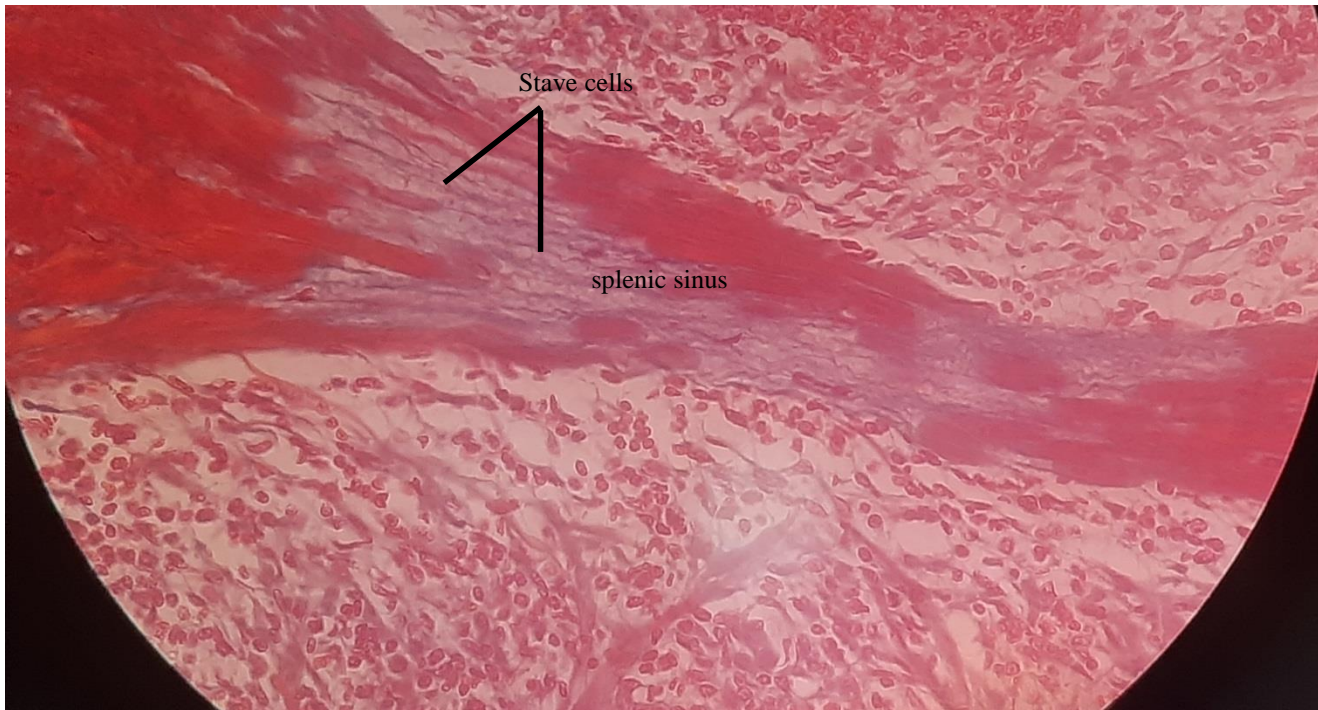


Spleen. H&E, 4X. This picture is taken from histological slide in histology laboratory of Isfahan University



## Spleen

- ▶ Stave cells are unusual endothelial cells that are seen in the splenic sinus
- ▶ They are long and lie parallel to long axis of the vessels



Splenic sinus and stave cells. H&E, 40X. This picture is taken from histological slide in histology laboratory of Isfahan University