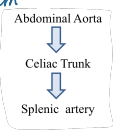


The spleen:

- Oval-shaped intra-peritoneal organ
- Organ of odd numbers
- The largest of the lymphoid organs
- Has a notched anterior border
- Location:
 - * Upper left portion of the abdomen
 - * Just beneath the diaphragm
 - * Behind the stomach, above the left kidney

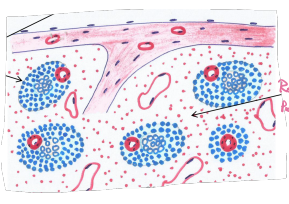
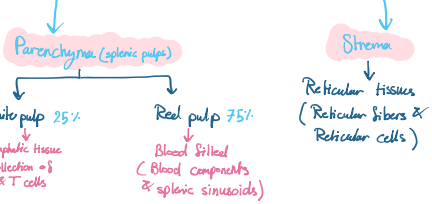
Blood supply:

- **Splenic artery** → then divided into 6 branches enter the spleen at the hilum
 - ↳ supply spleen & large parts of stomach & pancreas
- **Splenic vein** → leaves the hilum → then joins with S.M.V to form → Portal Vein



Structure of the spleen:

* Spleen composed of



White pulp 25% - Lymphatic tissue - collection of B & T cells

Red pulp 75% - Blood filled (Blood components & splenic sinusoids)

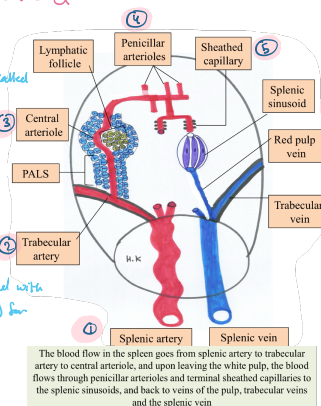
Stromata (Reticular tissues (Reticular fibers & Reticular cells))

* Spleen is covered by Capsule of DCT

↳ give capsular extension → Trabeculae (large Trabeculae originates in the hilum, on the medial surface of the spleen) → Carry branches of Splenic A., V., lymphatics & nerves ↓

The course of splenic Artery:

- 1) Splenic A. → Divides into trabecular A. as it enters the hilum
- 2) Trabecular A. → Follow the course of trabeculae → give branches called central arterioles
- 3) Central Arterioles → Enter the white pulp & surrounded by sheath of lymphocytes
 - * Eventually leave the W.pulp & enter the R.pulp losing the sheath of lymphocytes
 - * Branching as Pericillar Arterioles
- 4) Pericillar Arterioles → Short straight arterioles continues as terminal capillaries
- 5) Terminal capillaria (Sheathed capillaria) → Some of these sheathed with APCs (like macrophages) for immune surveillance



→ When the blood reaches the terminal capillaries can go through either of 2 routes:

Open circulation

The capillaries open into splenic cords (spaces of the R.pulp) & then return to the venous system through splenic sinusoids

Closed circulation

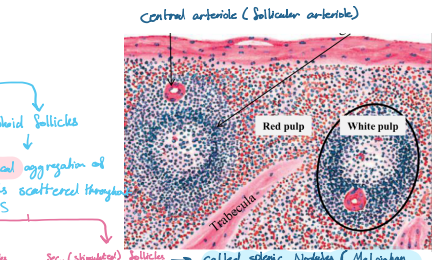
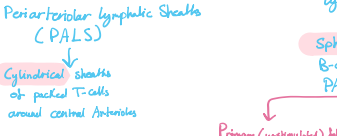
The capillaries open directly into splenic sinusoids (blood enclosed by endothelium)



White Pulp:

→ Constituting 25% of the spleen

The white pulp contains



Primary (unstimulated) follicles → Reacting (naive) B-cells

Sec. (stimulated) follicles → Activated B-cells in central region (germinal center) → differentiated into plasma cells → cells arise toward Red pulp

* The follicles has the same structural organization as in LN

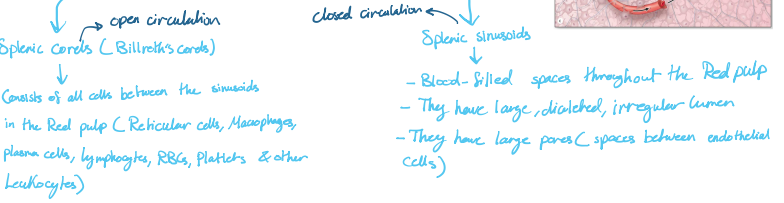
Function:

- ↳ Immunological (lymphatic) function of the spleen
- ↳ lymphocytes & APCs monitor the blood for foreign antigens → Production of Antibodies & Activated lymphocytes which delivered directly to the blood

Red pulp:

→ Constituting 75% of the spleen

The Red Pulp contains



open circulation

Splenic cords (Billroth's cords)

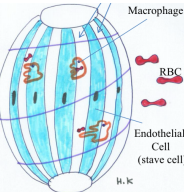
Consists of all cells between the sinusoids in the Red pulp (Reticular cells, Macrophages, Plasma cells, lymphocytes, RBCs, Platelets & other Leukocytes)

closed circulation

Splenic sinusoids

- Blood-filled spaces throughout the Red pulp
- They have large, dilated, irregular lumen
- They have large pores (spaces between endothelial cells)

- The endothelial cells in splenic sinusoids: (stave cells)
- They are elongated, S-shaped cells
- They lie parallel to the long axis of the vessel
- They lie side to side & NOT joined by any type of intracellular junction
- They are supported by discontinuous Basal Lamina (forms bars encircle the sinusoids)



Function:

- ↳ Responsible for hemahological (circulatory) function of the spleen
- ↳ Destruction of worn-out RBCs & platelets.

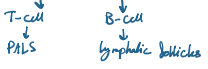
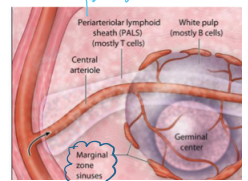
The importance of spaces between endothelial cells:

- ↳ Plasma & all dissolved elements of blood must reenter the vasculature by passing through narrow slits between the stave cells into the sinusoids
- No obstacles to platelets, mobile leukocytes or thin flexible erythrocytes
- Slits or swollen RBCs (at normal lifespan 120 days) → block from passing & undergo selective removal by Resident Macrophages (lie just next to sinusoids)
- Old RBCs lose their flexibility ⇒ Can't penetrate spaces between stave cells ⇒ Phagocytosed by Macrophages
- ↳ Since old erythrocytes lose sialic acid from their membrane → Galactose exposed → induce phagocytosis

After surgical removal of the spleen (splenectomy), the number of abnormal erythrocytes in the circulation increases although most such cells are then removed by macrophages in sinusoids of the bone marrow and liver.

Marginal zone sinusoids: (The junction between White & Red pulp)

- Located between white & Red pulp
- Here where the blood-borne antigens & particulate matter have their first free access to the parenchyma of the spleen
- Events in the marginal zones:
 - 1) APCs sample the material travelling in blood searching for Antigens
 - 2) Macrophages attack microorganisms present in blood
 - 3) Circulating B.T cells leave the bloodstream → entered the preferred location within the white pulp

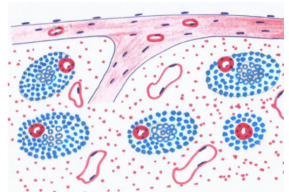
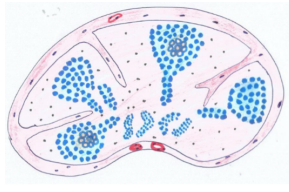


To Sum up the function of the spleen: Circulatory & lymphatic junctions

- 1) Blood cell production (during the fetal life)
- 2) Blood storage (small amount in the sinusoids)
- 3) RBCs destruction (same in liver & bone marrow)
- 4) Defense Mechanism
 - ↳ Macrophage phagocytosis microbes penetrate the blood
 - ↳ Antigen trigger immune response by activate B & T cells
 - ↳ Production of Antibodies & activated lymphocytes
 - ↳ Delivered directly into the blood

* Remember Marginal Zone sinusoids

Lymph Nodes VS Spleen



Lymph node	Spleen
Multiple, small	Single, large
Along the course of lymphatic vessels	Intra-abdominal
Filters lymph	Filters blood
Covered by fascia (Adventitia)	Covered by peritoneum (serosa)
Has afferent vessels	No afferent vessels
Cortex and medulla	White pulp and red pulp
Contains Lymphatic sinuses	Contains Blood sinuses (splenic sinus)

↳ Subcapsular, Trabecular, Medullary sinuses

↳ we have also marginal zone sinus

The End

لا تنسوا اهل غزة مناسك دعائكم