



# Immune System Practical - II

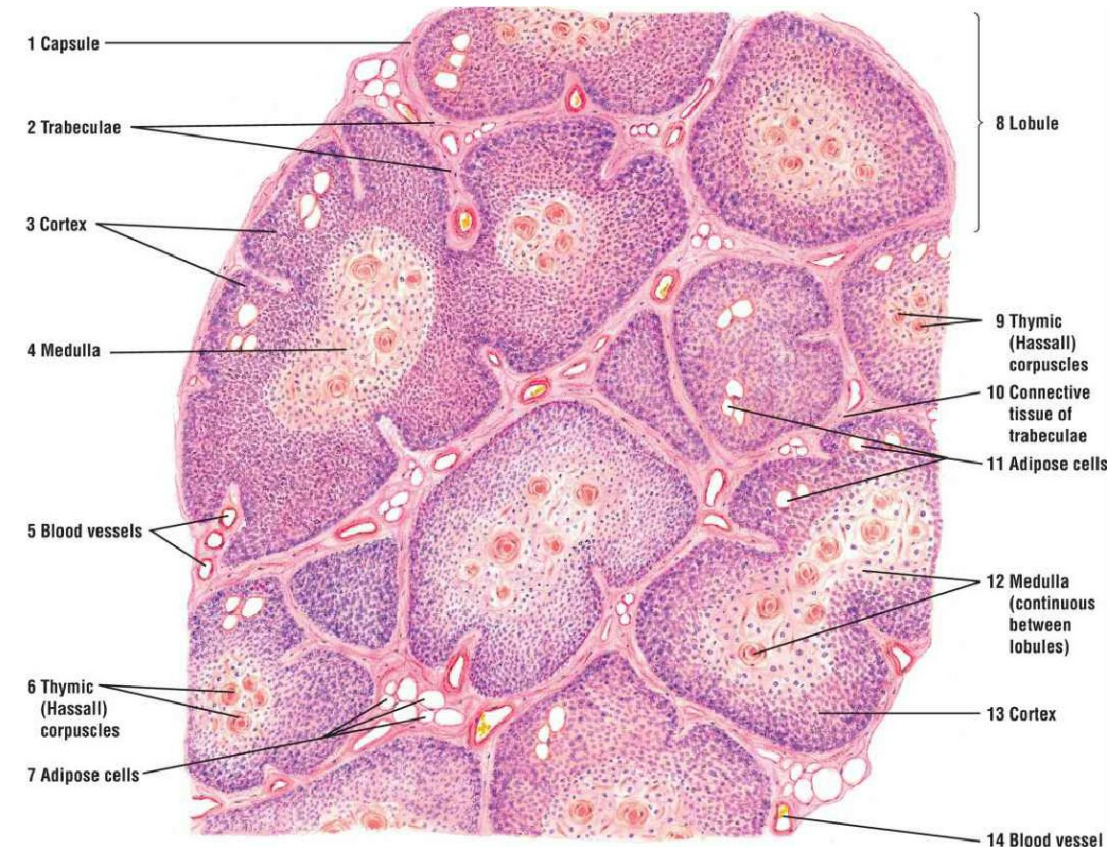
**Dr. Sahar D. YONIS**

.M.Sc. PH.D

Department of Anatomy

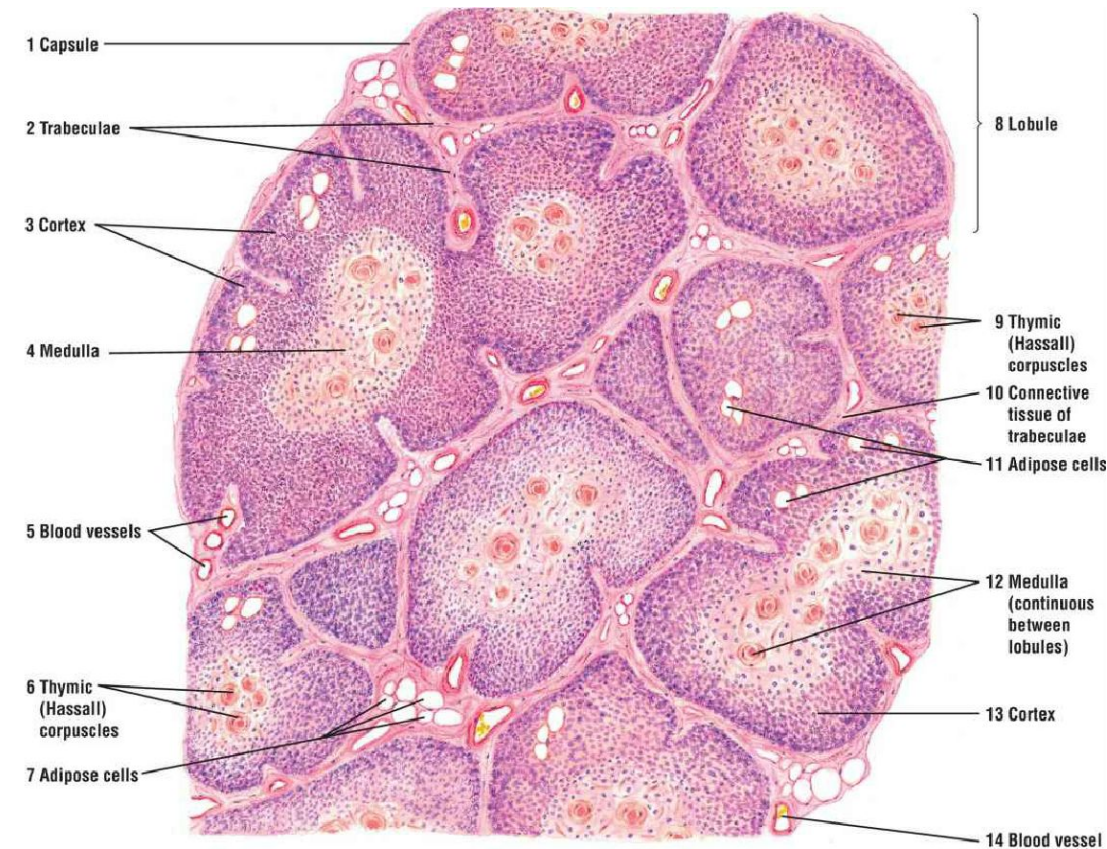
# Thymus Gland (Panoramic View)

- The thymus gland, located in the upper chest region and anterior to the heart.
- is a lobulated lymphoid organ enclosed by a connective tissue **capsule** from which arise connective tissue **trabeculae** that extend into the organ.
- **Blood vessels** pass into the thymus gland via the connective tissue capsule and the trabeculae.
- **trabeculae** subdivide the thymus gland into incomplete **lobules**.



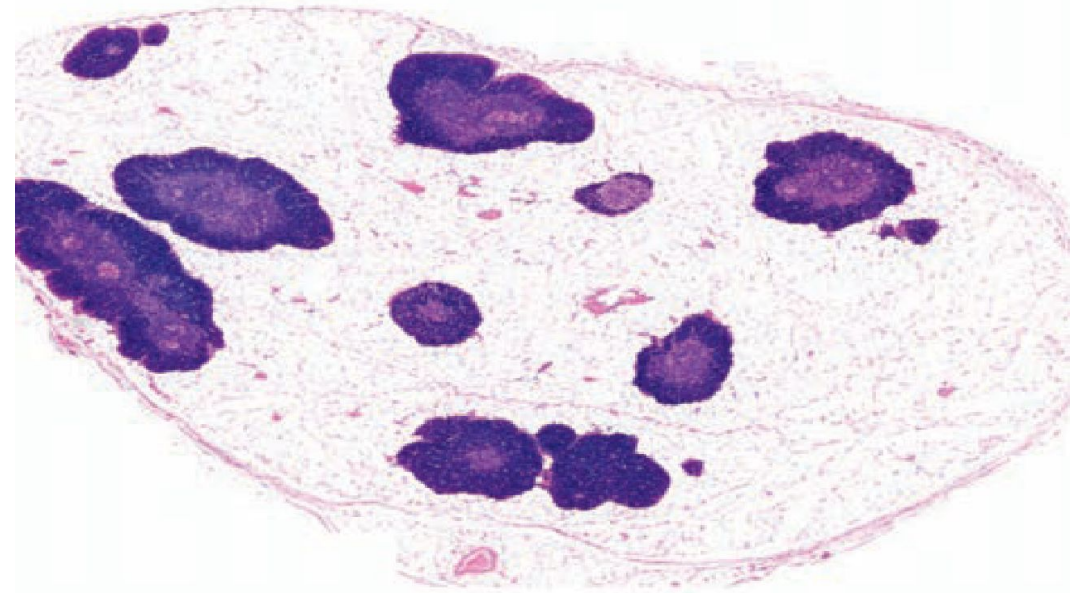
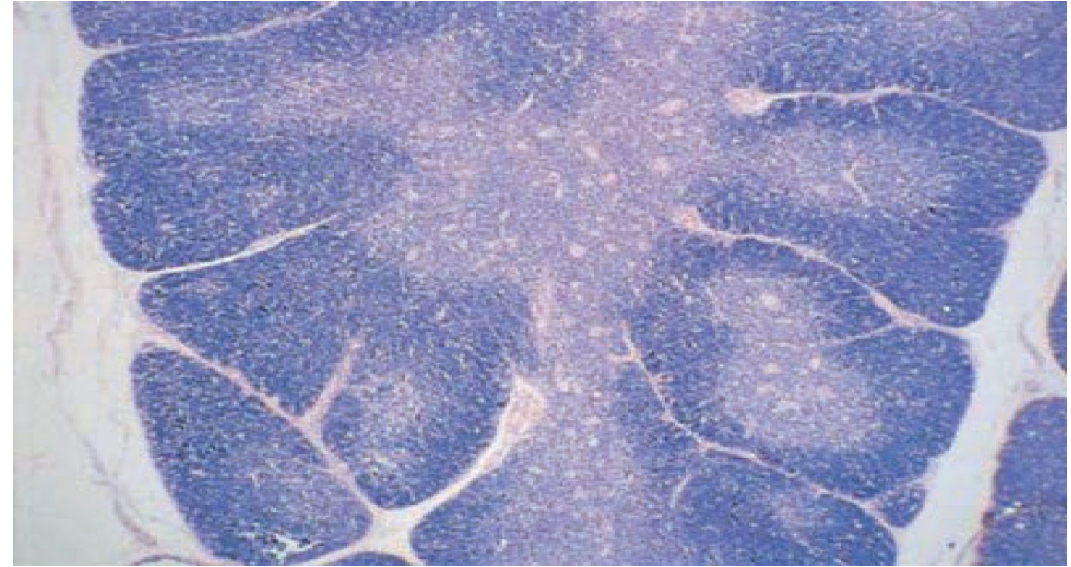
# Thymus Gland (Panoramic View)

- Each lobule consists of a dark-staining outer **cortex** and a light-staining inner **medulla**.
- Because the lobules are incomplete, the medulla shows continuity between the neighboring lobules.
- The cortex of each lobule contains densely packed lymphocytes that do not form lymphatic nodules.
- The medulla contains fewer lymphocytes but more epithelial reticular cells.
- The medulla also contains numerous **thymic (Hassall) corpuscles** that characterize the thymus gland.



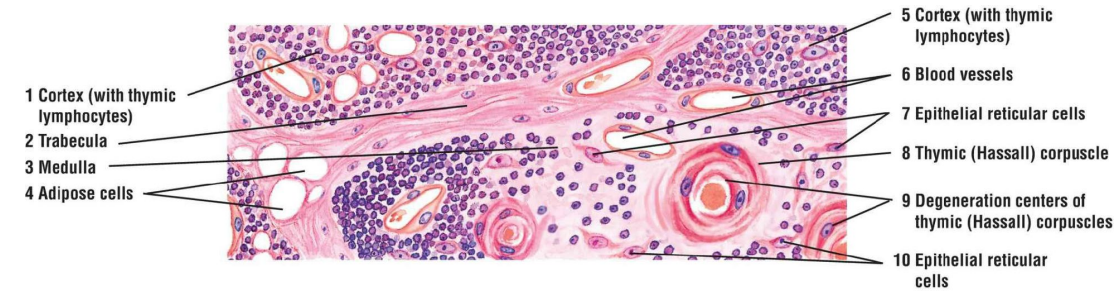


- The histology of the thymus gland varies with age.
- The thymus gland is highly developed shortly after birth.
- By puberty, thymus glands begin to involute with gradual regression and degeneration.
- As a consequence, lymphocyte production declines, and the thymic (Hassall) corpuscles become more prominent. In addition, the parenchyma or cellular portion of the gland is gradually replaced by loose **connective tissue** and **adipose cells**.



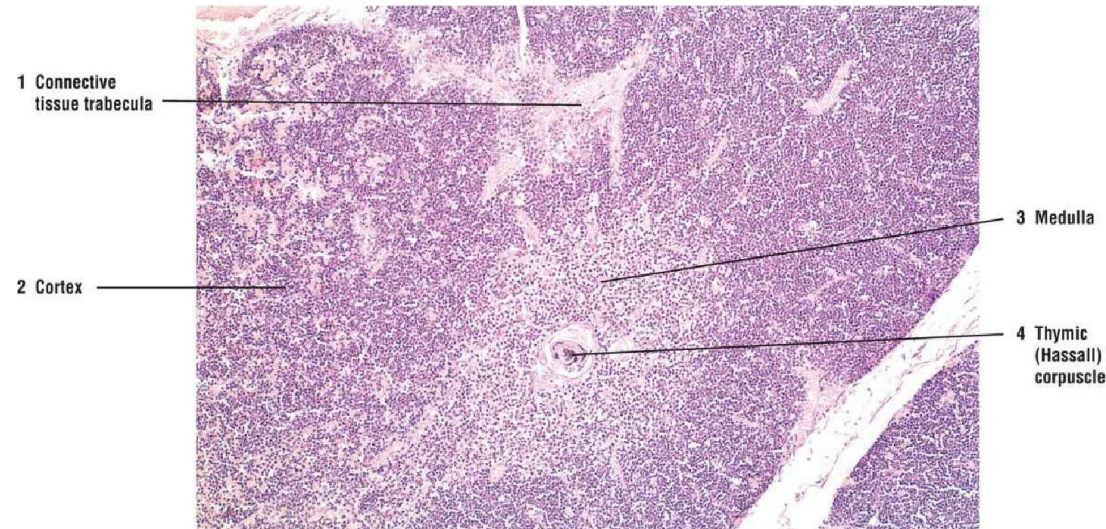
# Thymus gland (sectional view). Stain: hematoxylin and eosin. High magnification.

- The thymic lymphocytes in the **cortex** form dense aggregations.
- The **medulla** contains only a few lymphocytes but more **epithelial reticular cells**.
- The **thymic (Hassall) corpuscles** are oval structures consisting of round or spherical aggregations (whorls) of flattened epithelial cells. The thymic corpuscles also exhibit calcification or **degeneration centers** that stain pink or eosinophilic.
- **Blood vessels** and **adipose cells** are present in both the thymic lobules and in a connective tissue **trabecula**.



# Cortex and medulla of a thymus gland. Stain: hematoxylin and eosin. ×30.

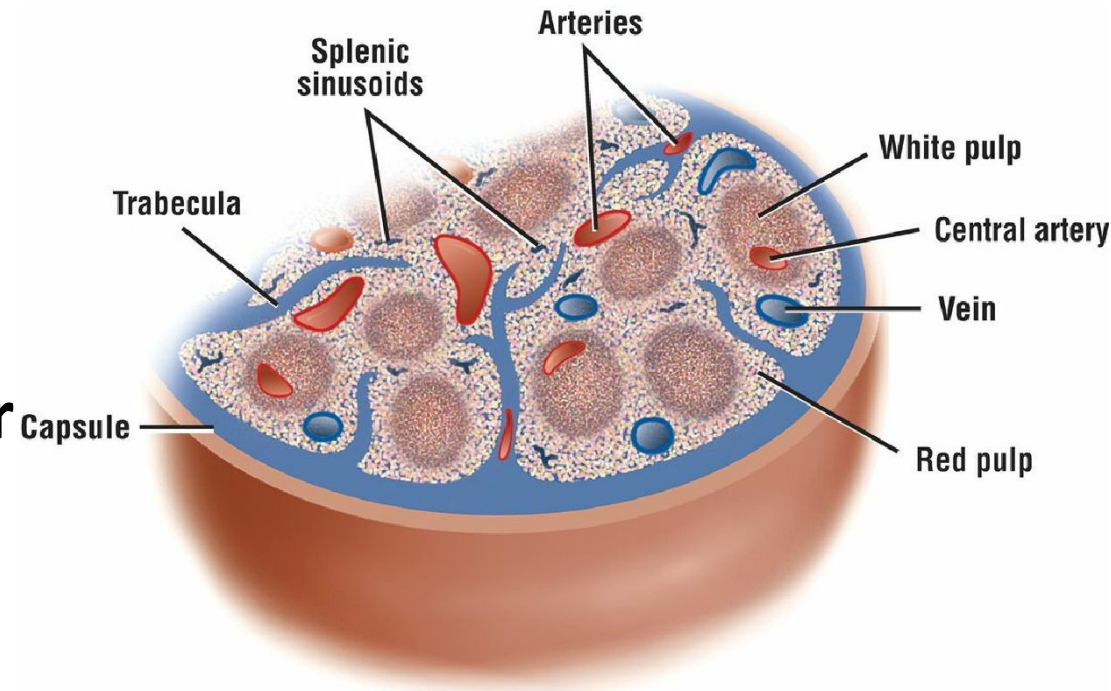
- A **connective tissue trabecula** subdivides the gland into incomplete lobules.
- Each lobule consists of the darker-staining **cortex** and the lighter-staining **medulla**.
- A characteristic **thymic (Hassall) corpuscle** is present in the center of the medulla in one of the lobules.





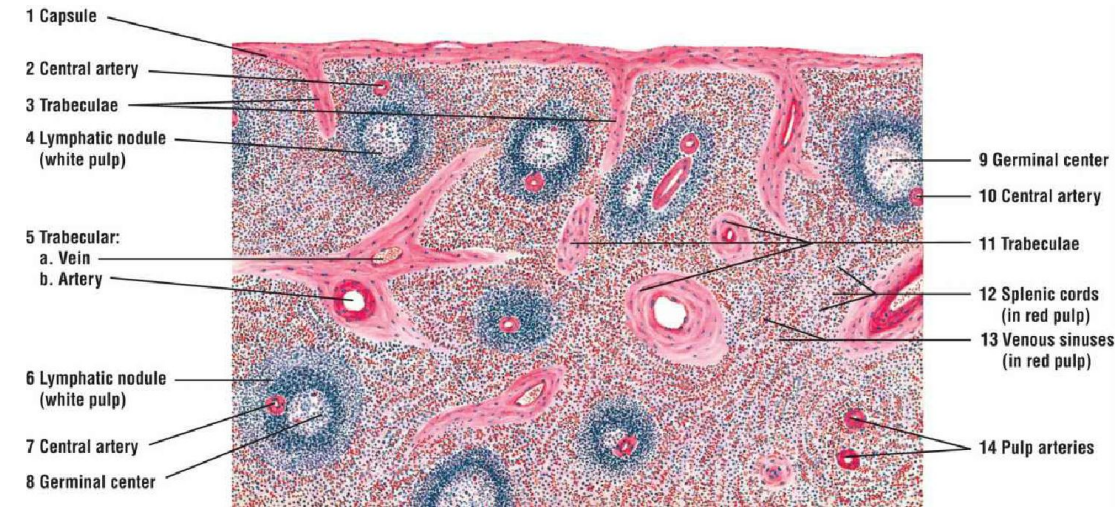
# Spleen (Panoramic View)

- The spleen is surrounded by a dense connective tissue **capsule** from which arise connective tissue **trabeculae** that extend into the spleen's interior.
- The main trabeculae enter the spleen at the hilus and extend throughout the organ.
- Located within the trabeculae are **trabecular arteries** and **trabecular veins**.
- The spleen is subdivided into white pulp and red pulp.



# Spleen (panoramic view). Stain: hematoxylin and eosin. Low magnification.

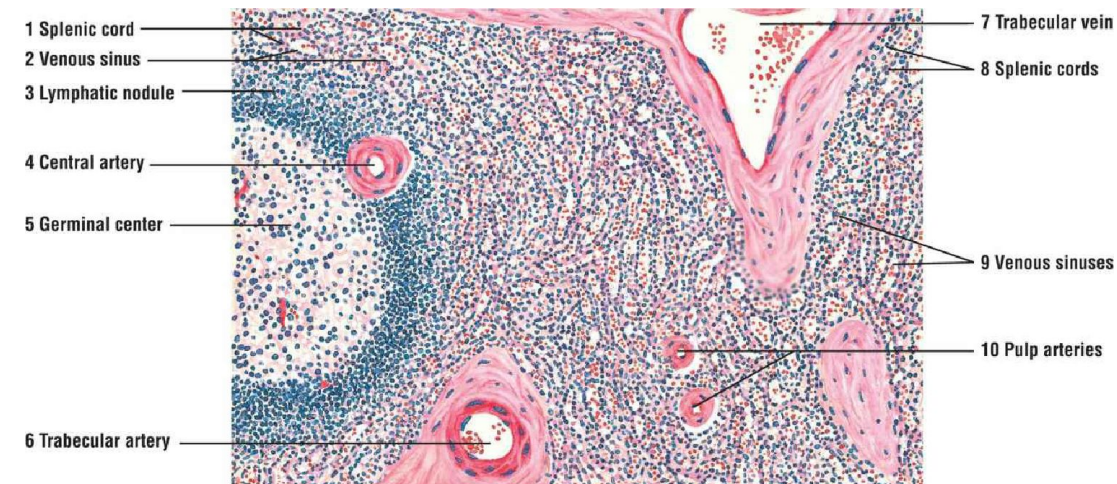
- The spleen is surrounded by a dense connective tissue **capsule** from which arise connective tissue **trabeculae**.
- The spleen is characterized by numerous **lymphatic nodules** that constitute the **white pulp**.
- Included in the white pulp are the **germinal centers** and blood vessels called **central arteries**.
- Central arteries are branches of trabecular arteries that become ensheathed with lymphatic tissue as they leave the connective tissue trabeculae.
- Surrounding the lymphatic nodules and the connective tissue trabeculae is a diffuse cellular meshwork that makes up the bulk of the organ and constitutes the **red** or **splenic pulp**.
- Present in the red pulp are **pulp arteries**, **venous sinuses**, and **splenic cords** (of Billroth).





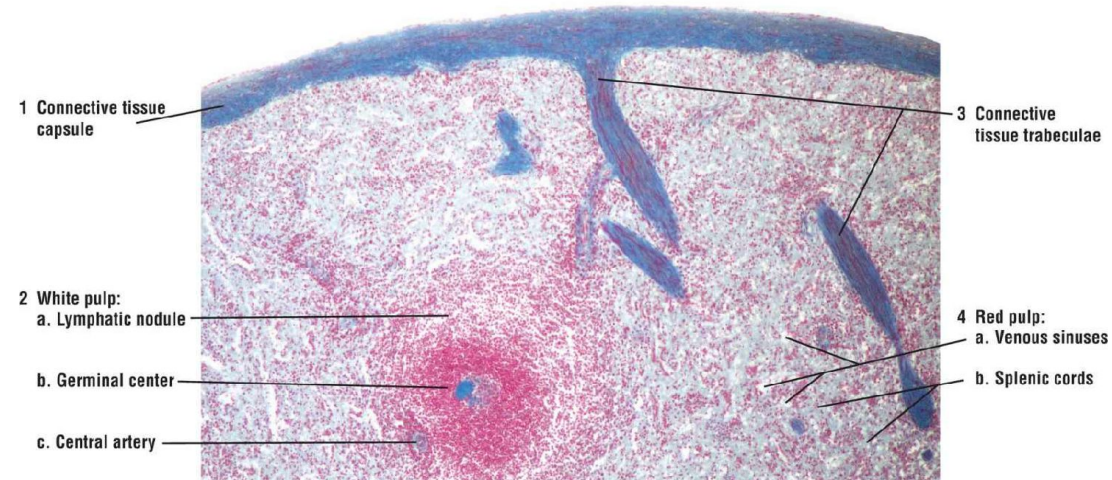
# Spleen: red and white pulp. Stain: hematoxylin and eosin. Medium magnification.

- The large **lymphatic nodule** represents the white pulp of the spleen.
- The **central artery** in the lymphatic nodule has a peripheral, or an eccentric, position.
- The red pulp contains the **splenic cords** (of Billroth) and **venous sinuses** that course between the cords and **pulp arteries**.
- The splenic cords are thin aggregations of lymphatic tissue containing small lymphocytes, associated cells, and various blood cells.
- Venous sinuses are dilated vessels lined with the modified endothelium of elongated cells that appear cuboidal in transverse sections.
- **pulp arteries**, branches of the central artery after it leaves the lymphatic nodule.
- Connective tissue trabeculae with a **trabecular artery** and **trabecular vein** are evident.



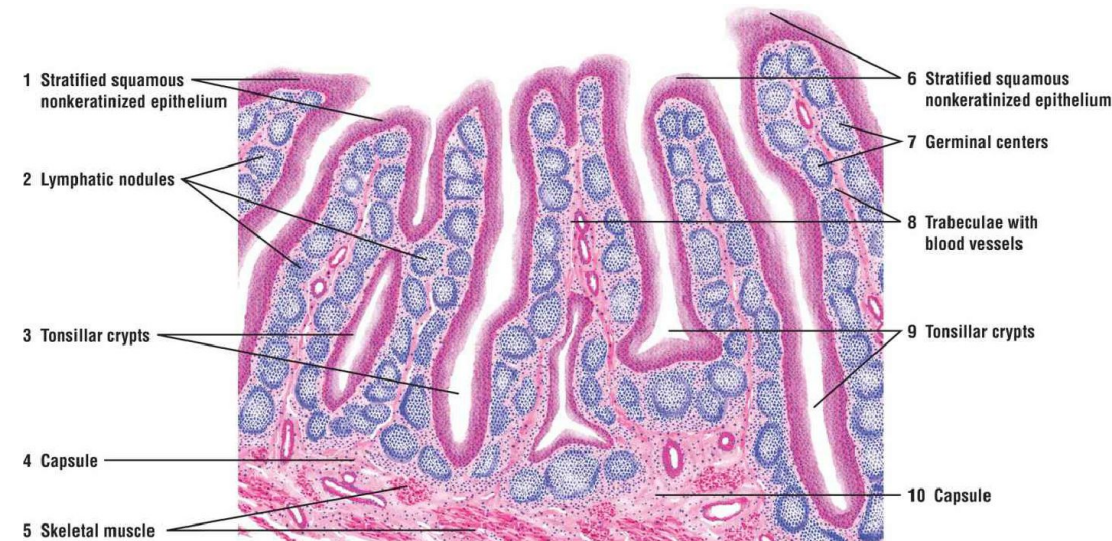
# Red and white pulp of the spleen. Stain: Mallory-Azan. ×21.

- A dense irregular **connective tissue capsule** covers the organ.
- From the capsule, **connective tissue trabeculae** with blood vessels extend into the interior of the organ.
- **White pulp** consists of lymphocytes and **lymphatic nodules** with a **germinal center**, and a **central artery** is located off-center.
- Surrounding the white pulp lymphatic nodules is the **red pulp**, primarily composed of **venous sinuses** and **splenic cords**.



# Palatine tonsil. Stain: hematoxylin and eosin. Low magnification.

- The palatine tonsil is covered by a **stratified squamous nonkeratinized epithelium**.
- Each tonsil is invaginated by deep grooves called **tonsillar crypts** that are also lined by stratified squamous nonkeratinized epithelium.
- Below the epithelium in the connective tissue are **lymphatic nodules** distributed along the lengths of the tonsillar crypts.
- The lymphatic nodules frequently merge with each other and usually exhibit lighter-staining **germinal centers**.
- A dense connective tissue underlies the palatine tonsil and forms its **capsule**.
- The connective tissue **trabeculae**, some with **blood vessels**, arise from the capsule and pass toward the surface of the tonsil between the lymphatic nodules.
- Below the connective tissue capsule are sections of **skeletal muscle** fibers.





THANK YOU