

Anatomy and Physiology

For

The First Class

2nd Semester

LYMPHATIC SYSTEM AND IMMUNITY

Lymphatic Organs

IV. Lymphatic organs

- Lymphatic organs include

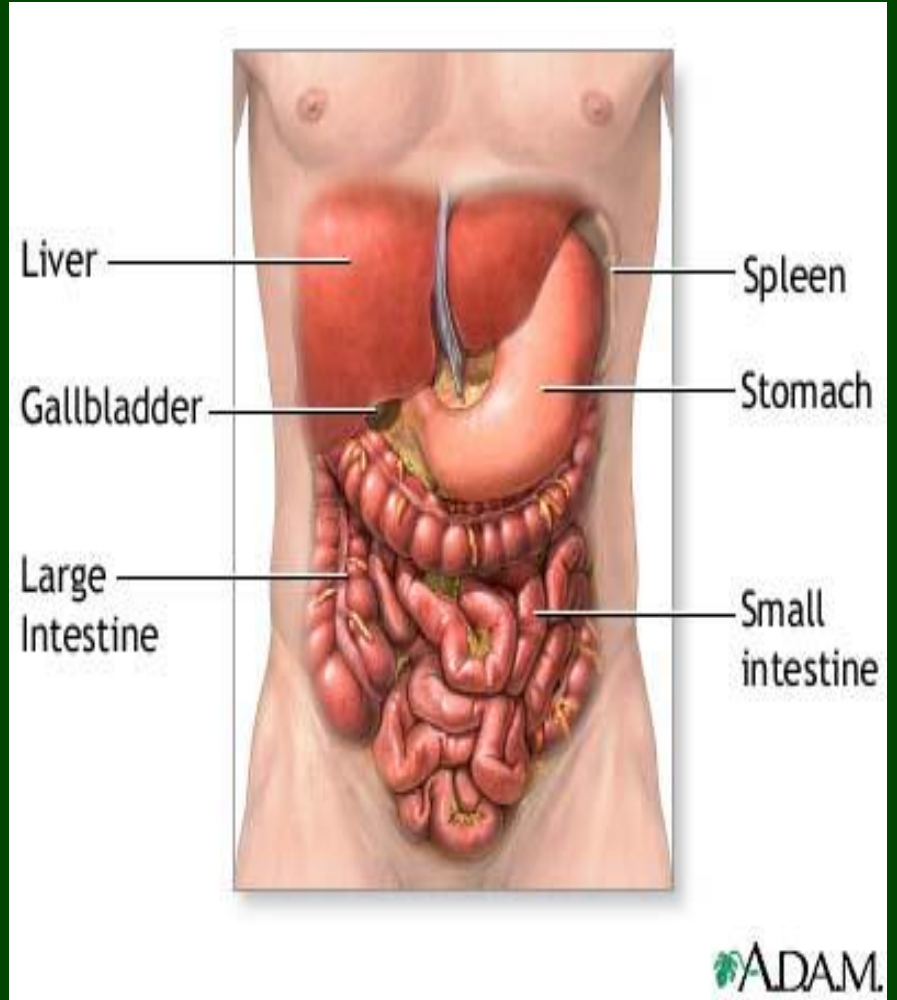
1. Spleen
2. Thymus

1. The Spleen

- The spleen is the largest lymphoid tissue in the body. It is slightly oval in shape with hilum . It is located on the left side of the upper part of the abdomen. And its surface is covered with peritoneum.
- The spleen is contact with diaphragm, stomach and the left kidney.
- Blood reaches to the spleen through **Splenic artery**.



© Getty Images | Image is subject to copyright

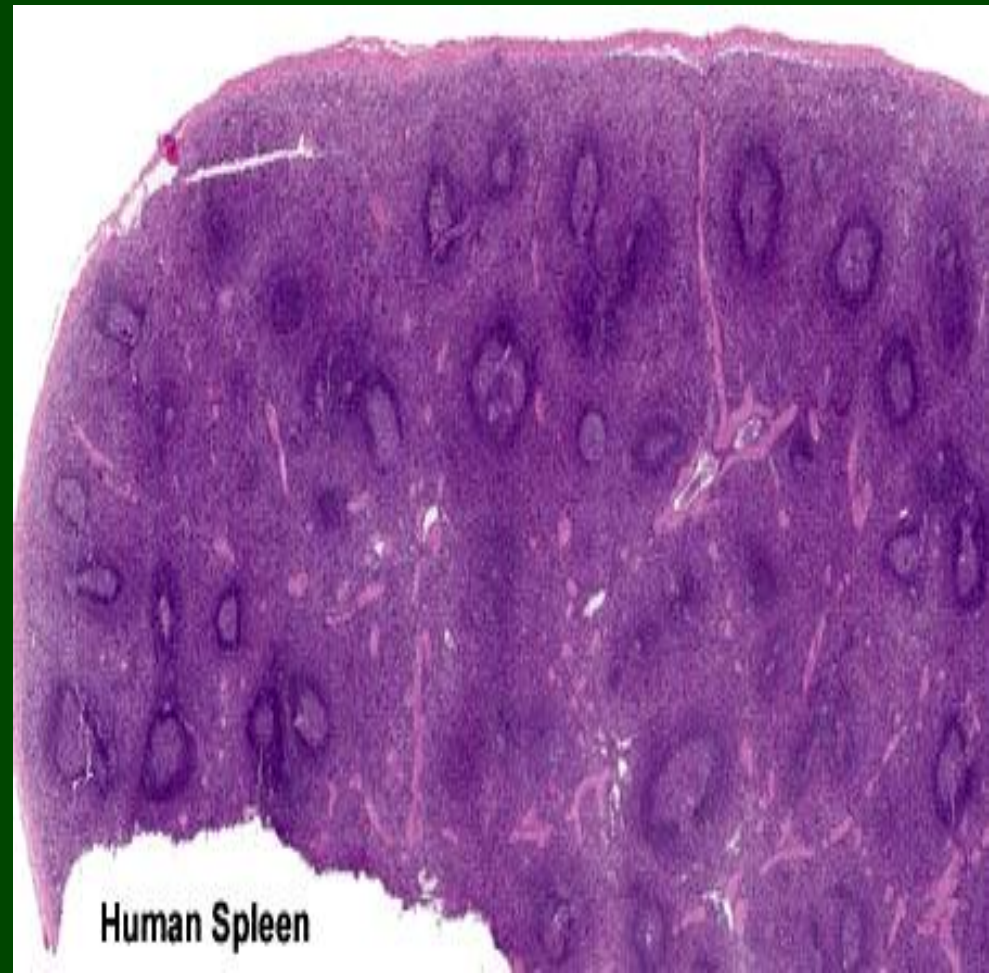
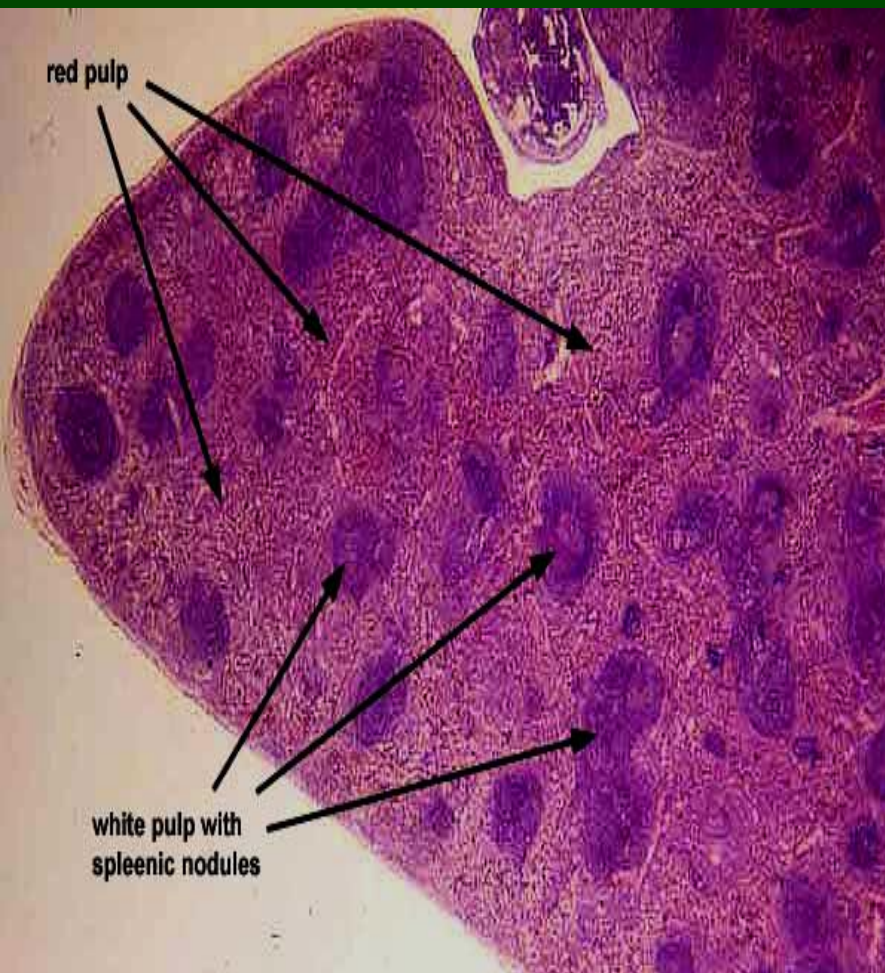


ADAM.

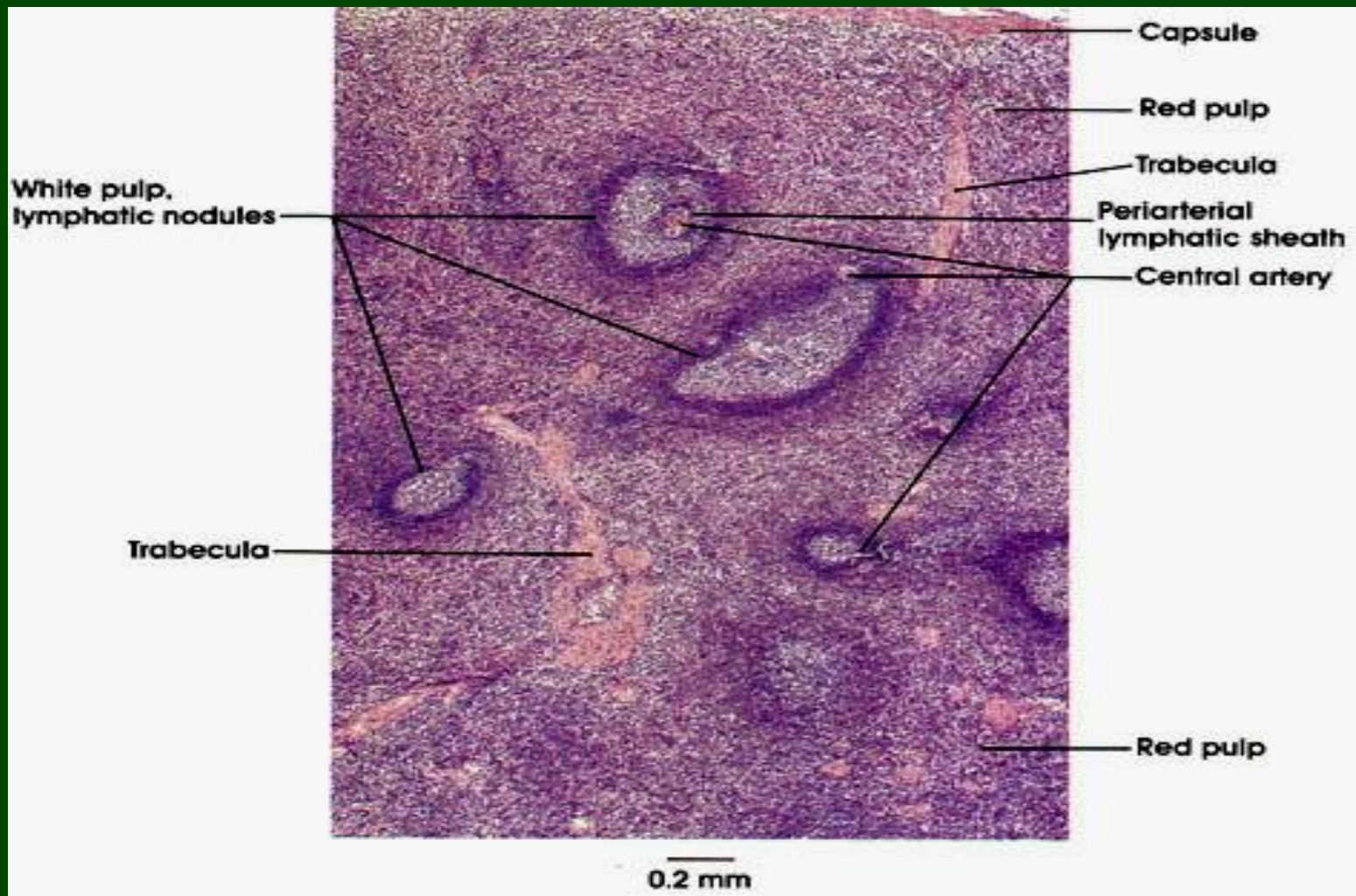
General structure of the spleen

1. **Capsule** it covers spleen and sends trabeculae into the body of spleen. These trabeculae carry arteries and veins.
2. **White pulp:** a white area of lymphoid nodules. It is composed of many central arteries, each central artery surrounded by lymphatic nodule
3. **Red pulp:** a dark red tissue that is rich in blood. It contains **Splenic sinuses, arterioles** and the **Splenic cords** (Billroth).
 - **Splenic Cords** are thin aggregation of lymphatic tissue containing mainly lymphocytes
 - also the red pulp is rich in **macrophages**.
 - The red pulp is the site of **blood filtration**.

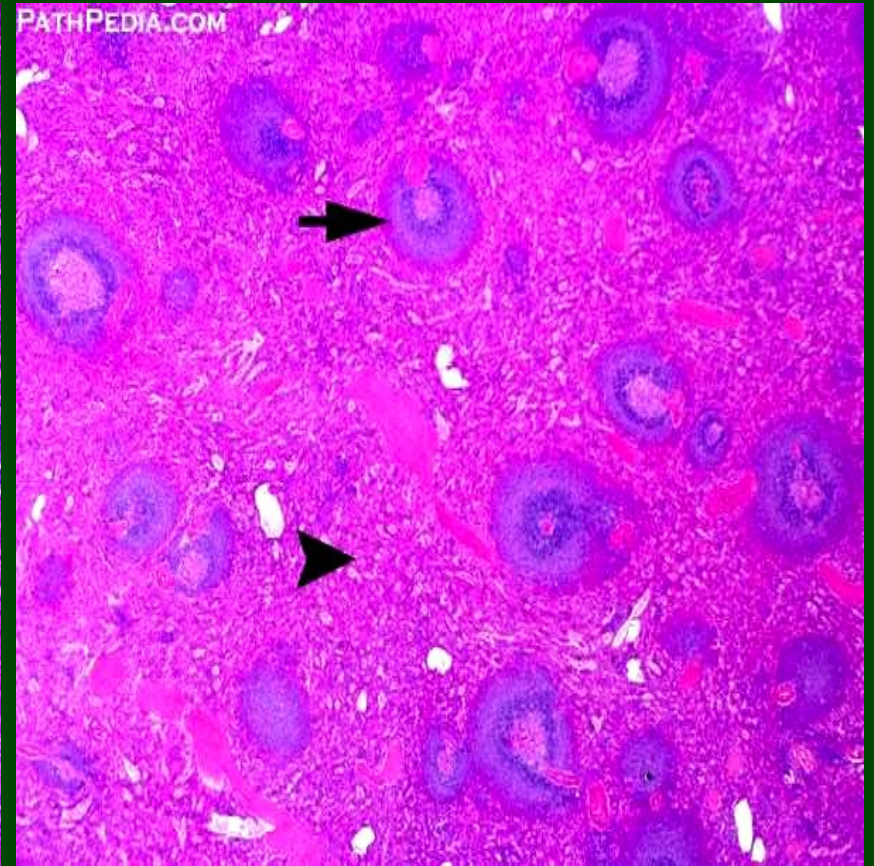
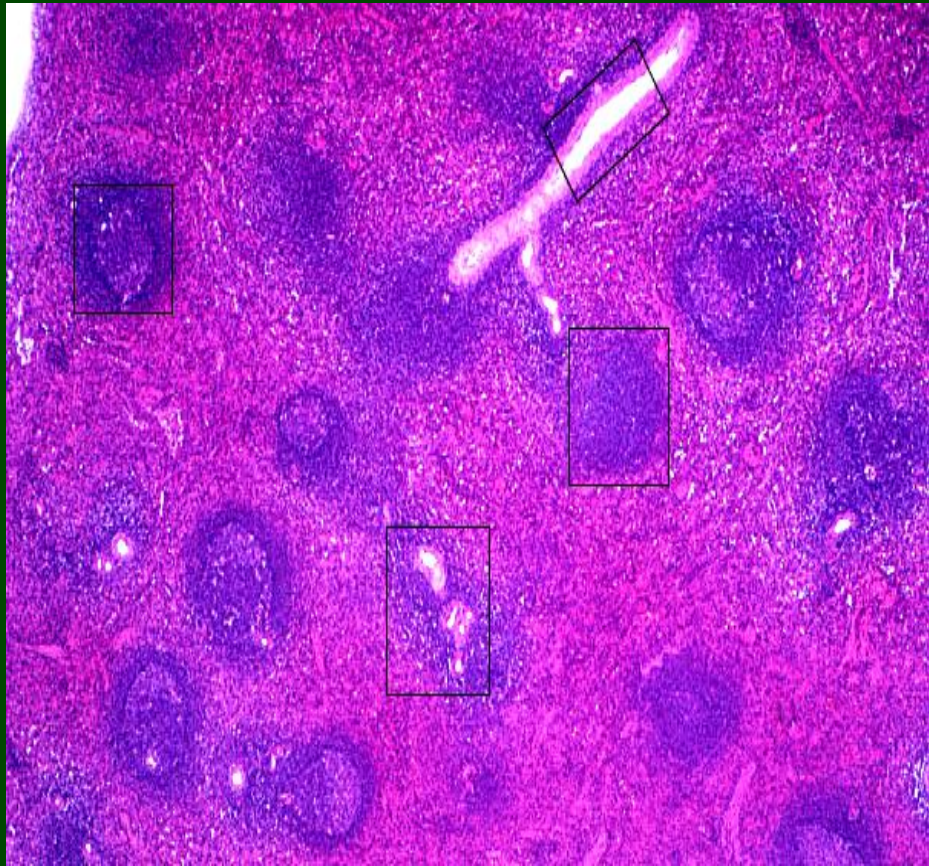
The spleen



The spleen



The spleen



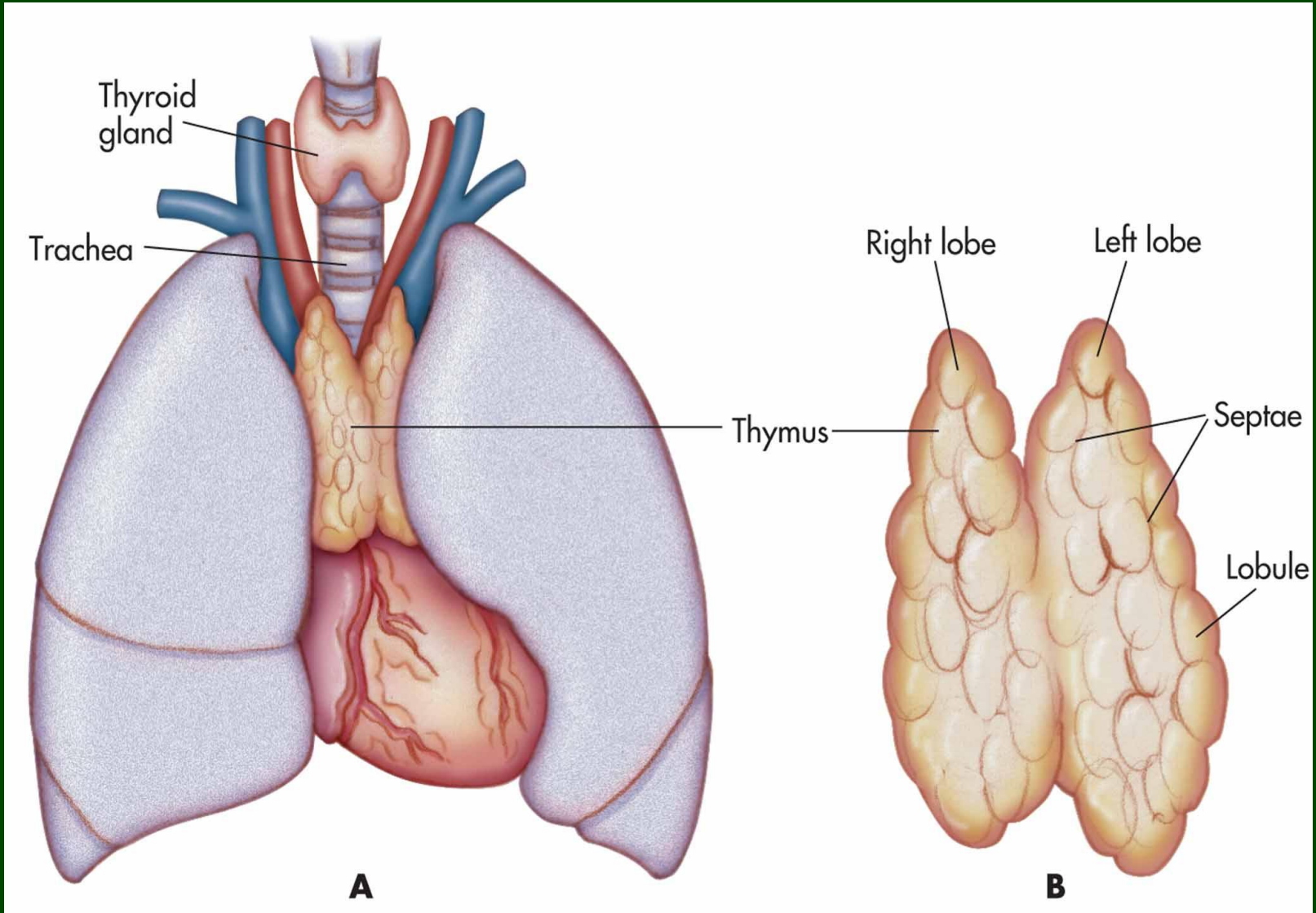
Functions of the spleen

- Production of lymphocytes.
- Destruction of aged erythrocytes.
- Act as defense organ against invaders that enter the bloodstream.
- Immunologically it acts as blood filter and antibodies forming organs.
- The storage of the blood.

2. The thymus gland

- It is a lymphoepithelial tissue, located in the upper part of the mediastinum behind the sternum and extend upwards into the root of the neck. It divides into two lobes.
- It weighs about 10-15g at birth and grows until puberty to reach 30-40g in weight.
- After puberty i.e. by middle age it becomes atrophied.

Thymus gland



Structure of the Thymus

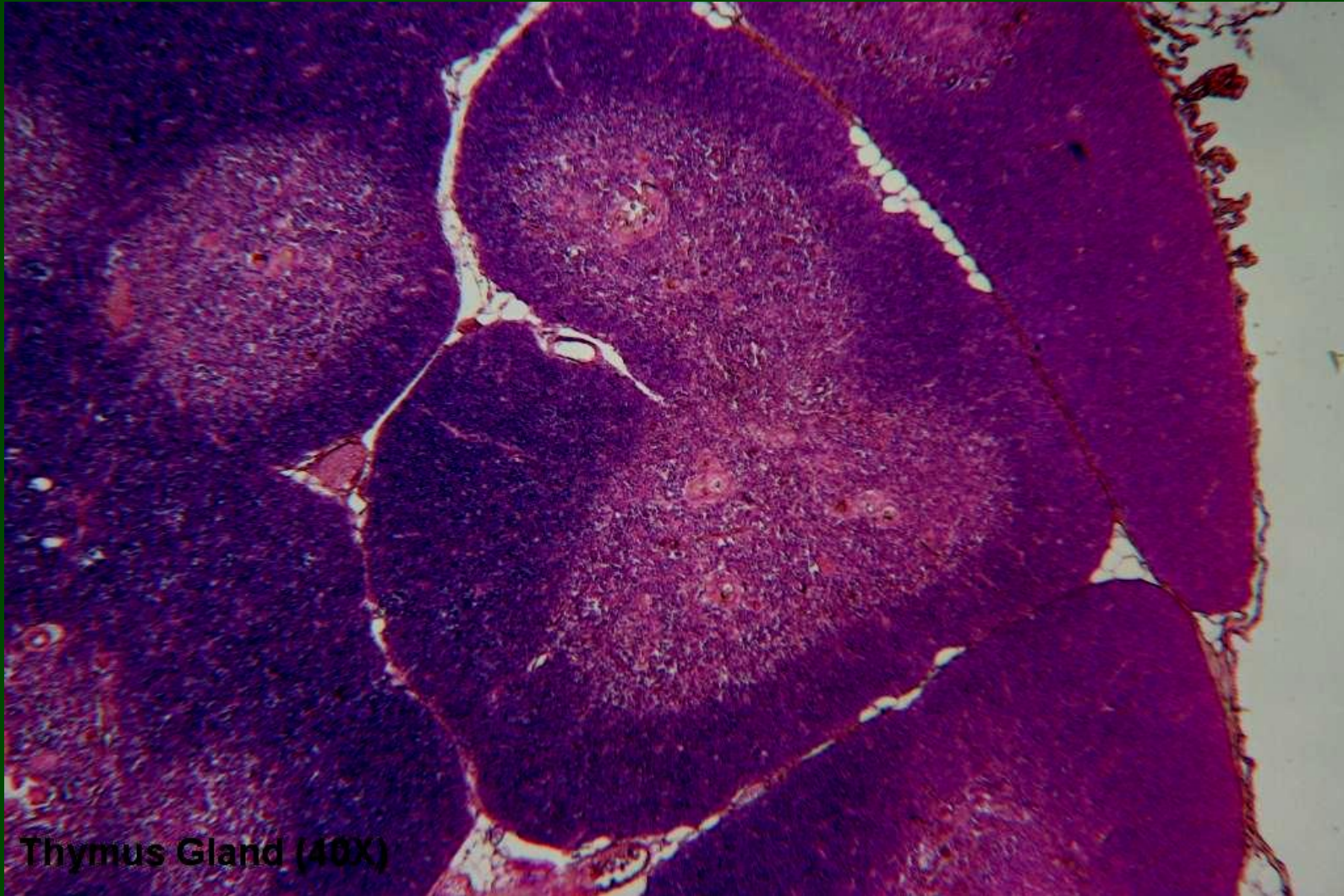
- Thymus has a connective tissue capsule.
- The capsule penetrates the parenchyma of thymus and divides it into lobules.
- Each lobules has a peripheral dark zone known as the **cortex** and a central light zone called the **medulla**.
- **The cortex** is composed of an extensive population of **T lymphocytes**, and also **epithelial reticular cells** with **few macrophages**.
- In the medulla there are small rounded structures called **Hassall's corpuscles**.
- The thymus has only efferent lymphatic vessels.

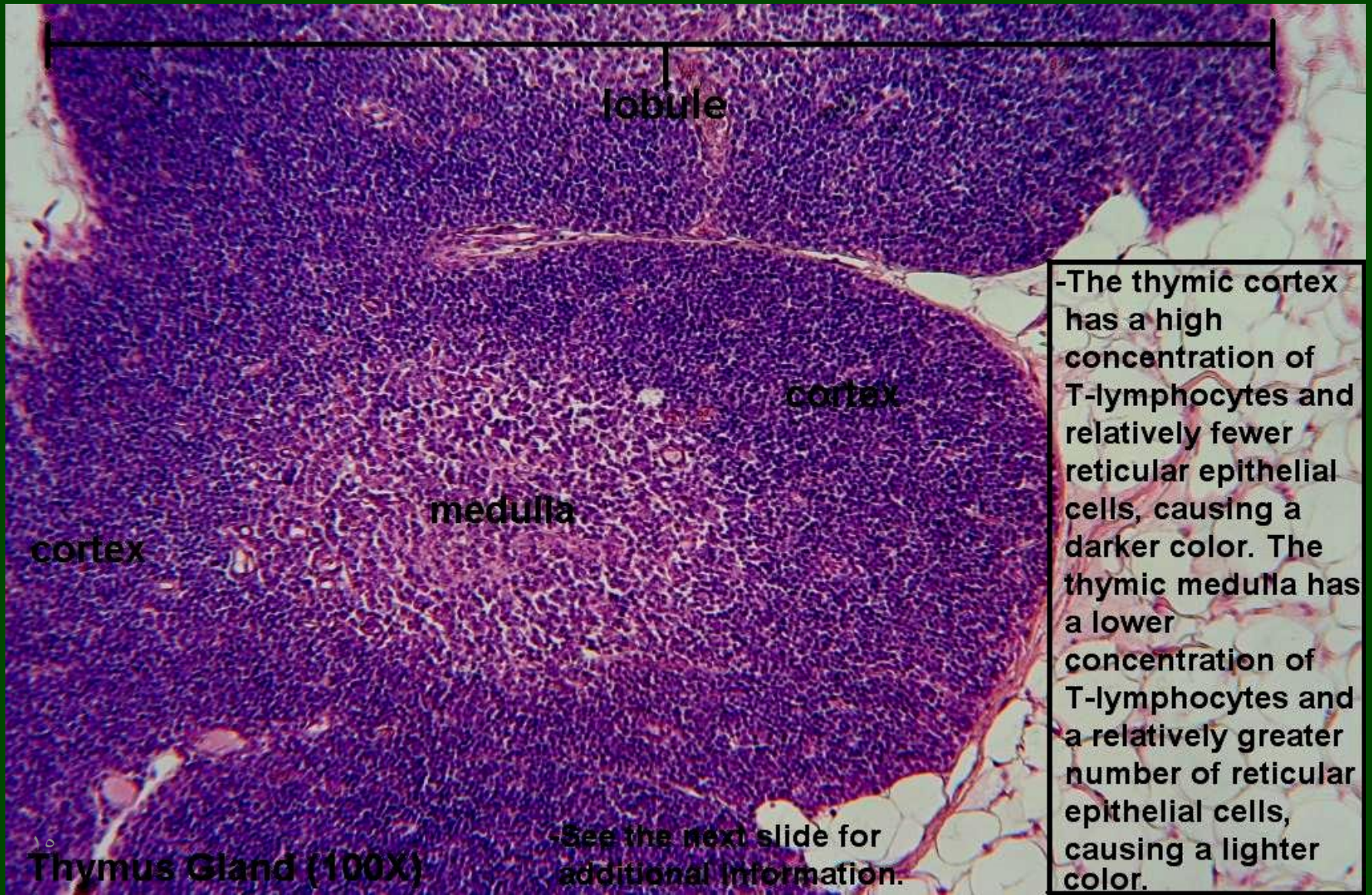
- The thymus produces several **protein growth factors** that **stimulate proliferation and differentiation of T lymphocytes**.

- **These growth factors are: Thymosin- α 1, thymopoietin, thymolin and thymus humeral factor.**

- Shrinkage of the thymus gland begins in adolescence and with increasing age therefore **the effectiveness of T lymphocyte response to foreign body decline.**

The Thymus





lobule

cortex

medulla

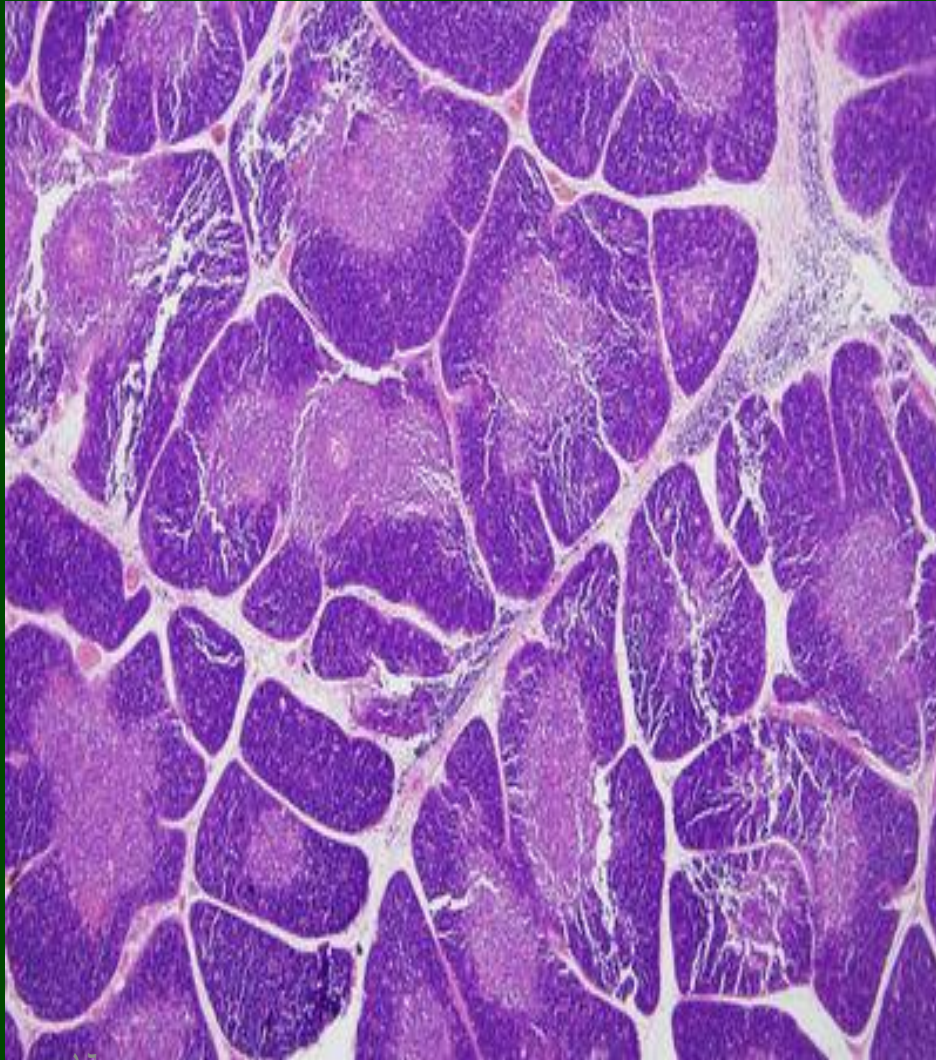
cortex

-The thymic cortex has a high concentration of T-lymphocytes and relatively fewer reticular epithelial cells, causing a darker color. The thymic medulla has a lower concentration of T-lymphocytes and a relatively greater number of reticular epithelial cells, causing a lighter color.

Thymus Gland (100X)

See the next slide for additional information.

The Thymus



Functions of the Thymus

- The main function of the thymus is activation of the T lymphocytes.

V. Diffuse lymphatic Tissue = Mucosa Associated lymphoid tissue (MALT)

- Aggregation of lymphoid tissue in the mucosa of **respiratory system, alimentary system** and **urogenital system** is called **Mucosa associated lymphoid tissue**.
- **This collection**
- In the respiratory system the aggregations are relatively small and are present in the walls of the **trachea** and **large bronchi**.
- In the alimentary system occurs in
 - a). near the junction of the oral cavity with the pharynx there are a number of collections of lymphoid tissue that are referred to as **Tonsils**
 1. **Palatine tonsils**
 2. **Pharyngeal tonsils** (present in the posterior wall of the pharynx). Hypertrophy of this tonsils in children is called adenoids.
 3. **Lingual tonsils**
 - b). Peyer;s Patches (Gut associated lymphoid tissue)