





# LYMPHATIC SYSTEM

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## Agenda

- Types of lymphoid tissue**
- Structure of Non capsulated lymphatic nodule**
- Structure of Lymph node**
- Structure of Tonsils**
- Structure of Spleen**
- Structure of Thymus gland**



## ILOs

- Differentiate between types of lymphoid tissue**
- Identify structure of Non capsulated lymphatic nodule**
- Identify structure of Lymph node and Tonsils.**
- demonstrate the structure of Spleen and Thymus gland**



# Lymphatic system

❖ **Lymphatic system includes:**

**A. The lymph vessels.**

**B. The lymphatic organs.**

**I. Primary lymphatic organs:**

-Bone marrow.

-Thymus

**II. Secondary lymphatic organs:**

-Lymph node

-Spleen

-Tonsils

## 3- TONSILS

**The tonsils are masses of lymphatic tissue present in the lamina propria of a mucous membrane.**

**These are:**

### **1- The palatine tonsils:**

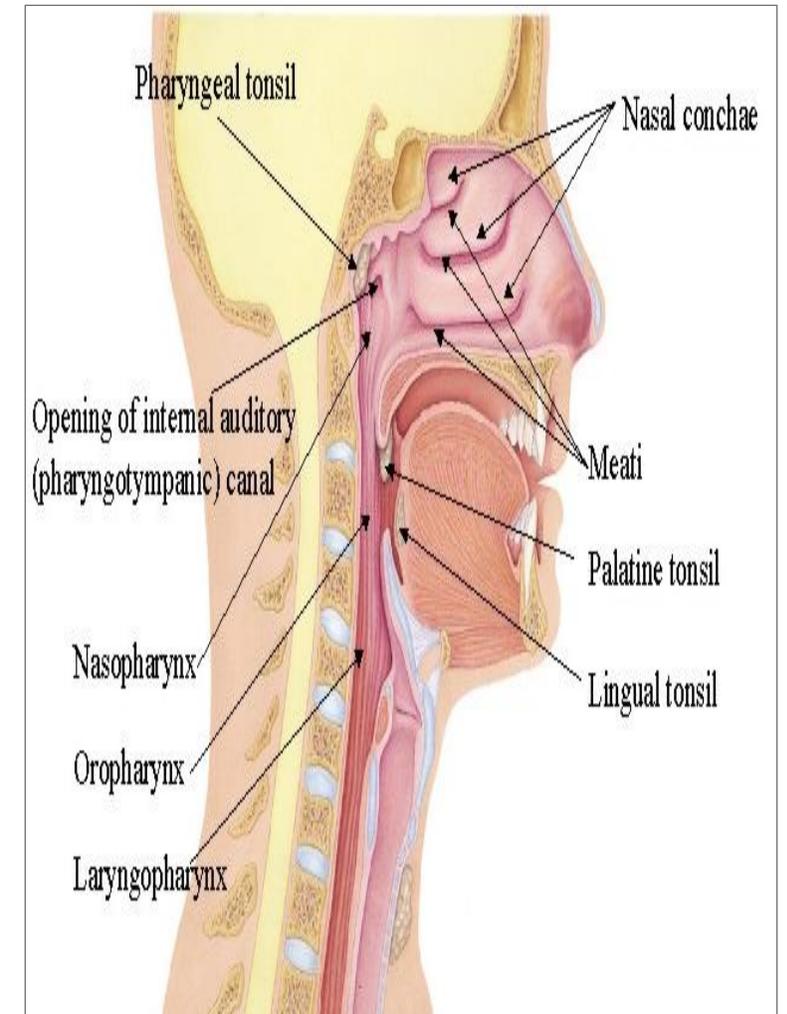
**They are two masses of lymphatic tissue embedded in the C. T. under the mucous membrane of **oro-pharynx**.**

### **2- The pharyngeal tonsils (adenoid):**

**• Single mass of lymphatic tissue present in **nasopharynx**.**

### **3- Lingual tonsils:**

**They are small collections of lymphatic tissue in the C. T. at the root of **tongue**.**



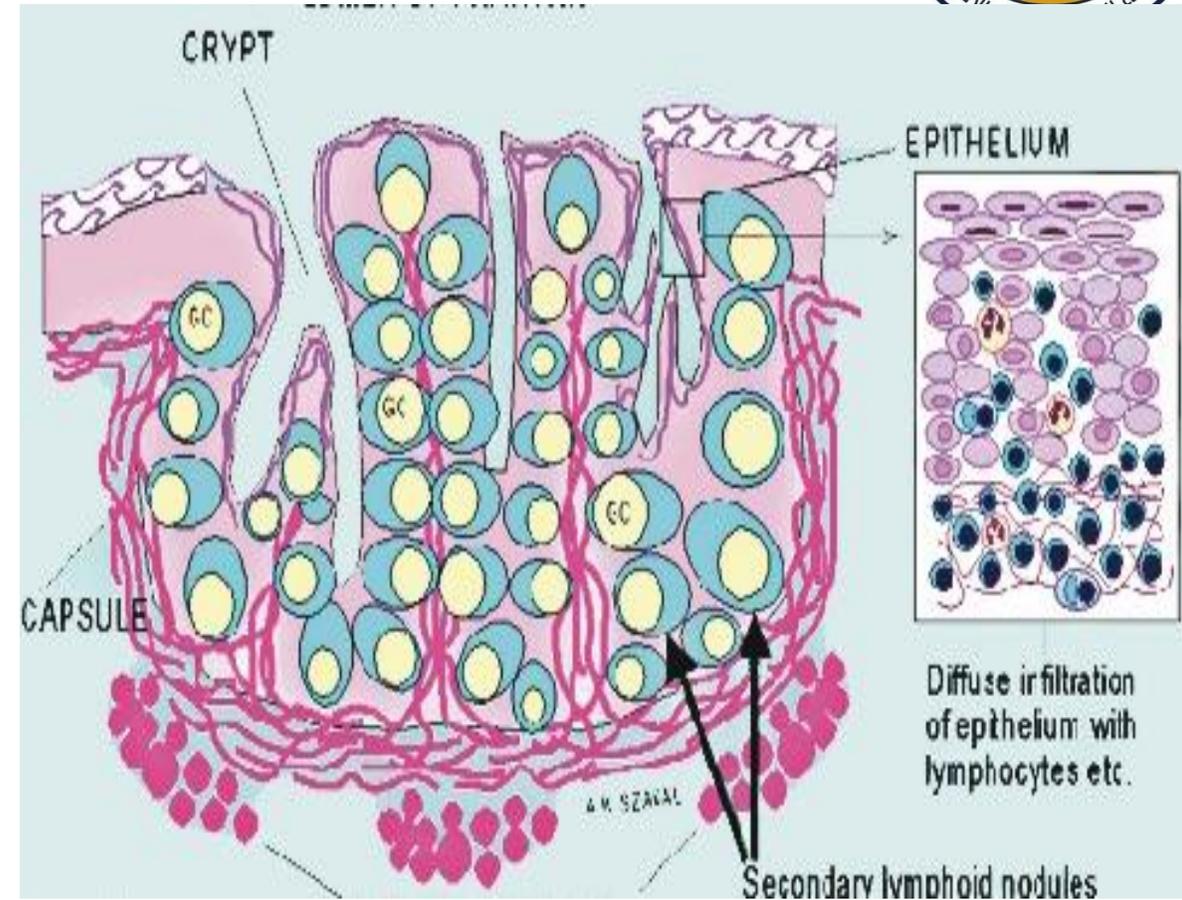
## **1- The palatine tonsils:**

**They are two masses of lymphatic tissue embedded in the C. T. under the mucous membrane of **oro-pharynx**.**

**- The histological structure:**

**a- Stratified squamous ( non keratinized):**

**-Each tonsil is covered with stratified squamous epithelium which dips into the underlying lymphatic tissue to form primary and secondary tonsillar crypts.**



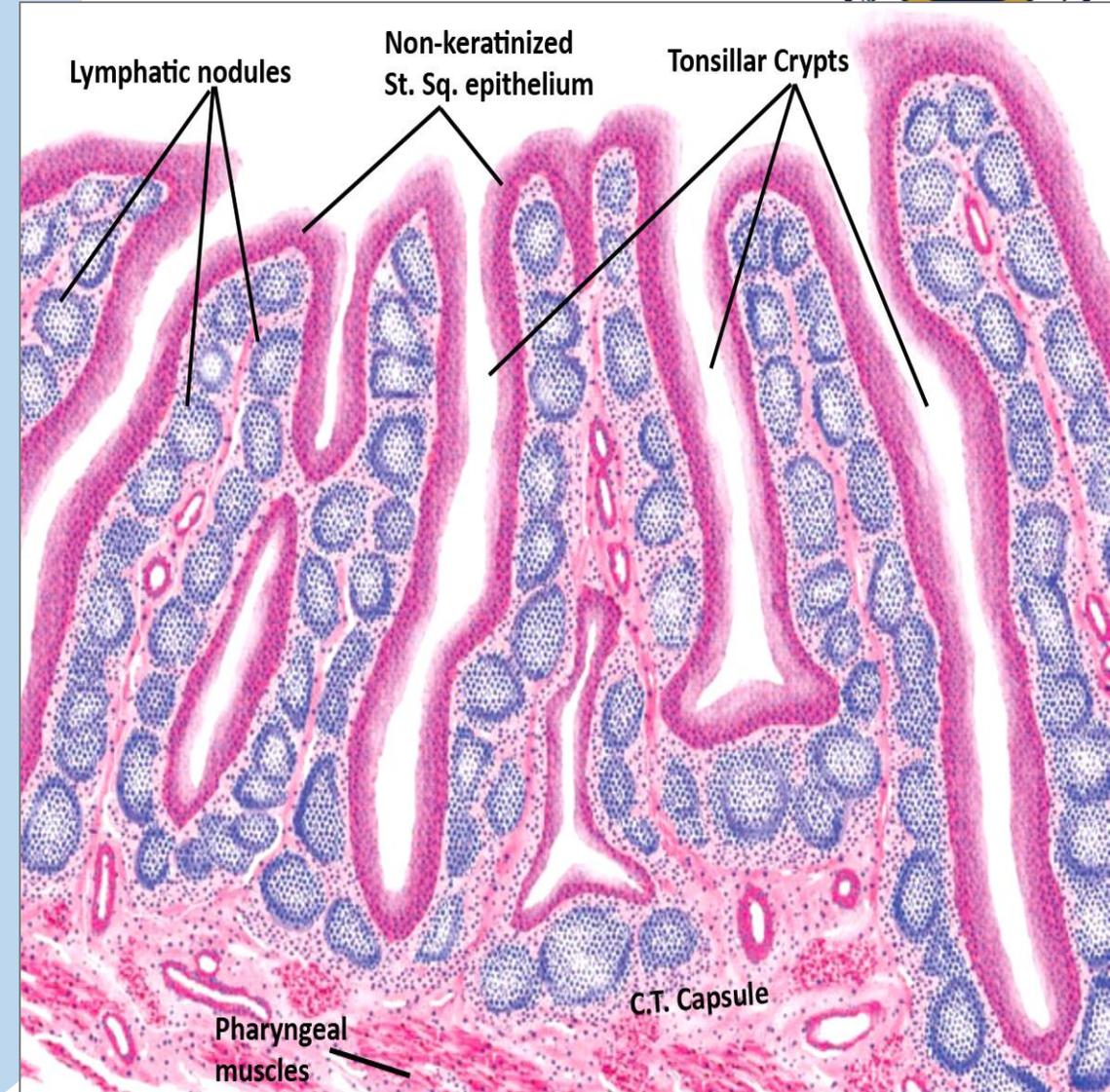
## **b- Lymphatic tissue of two kinds:**

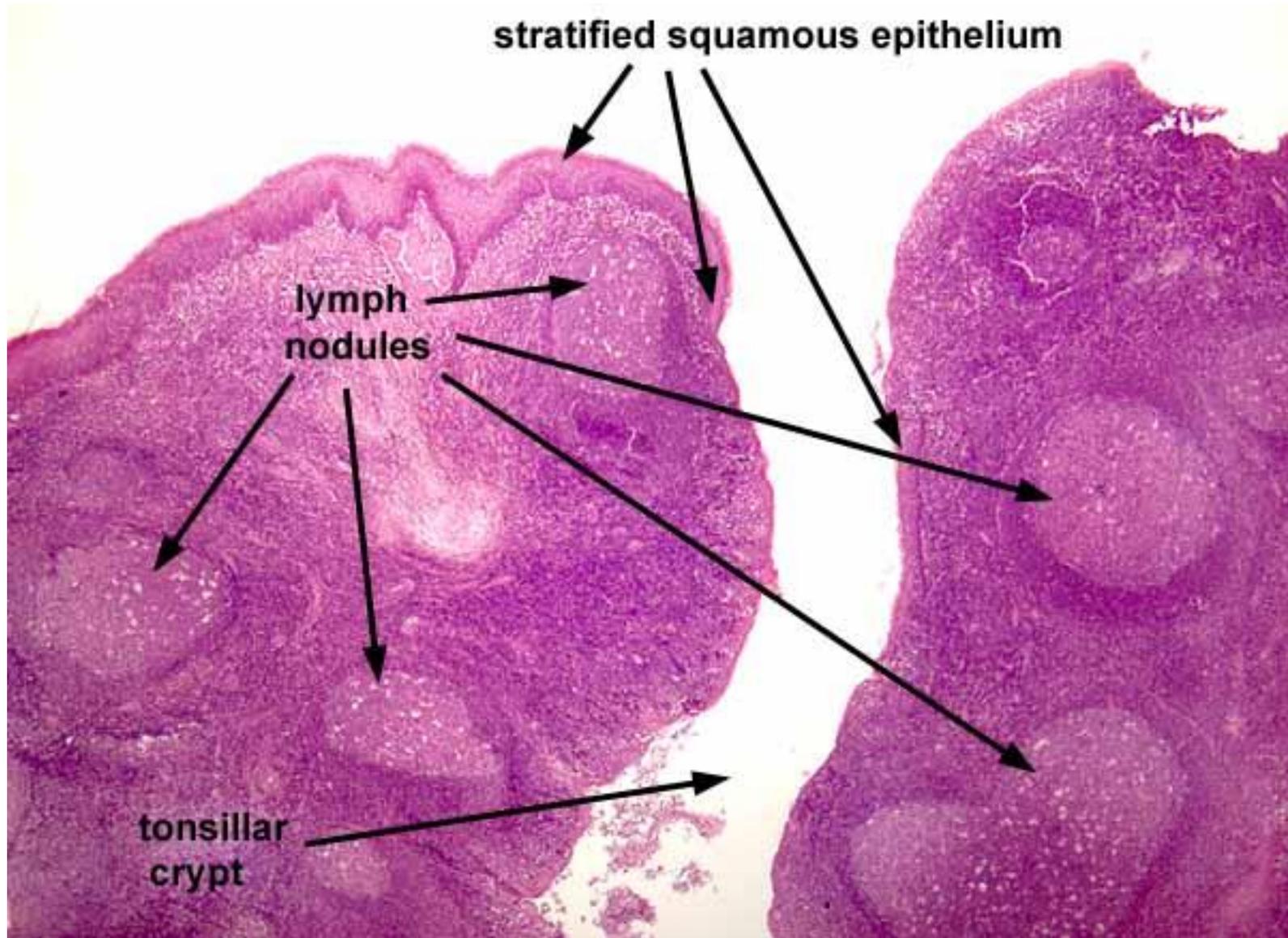
**-Lymphatic nodules (Primary or secondary) are located under the epithelium and around the crypts.**

**-Diffuse lymphatic tissue (lymphocytes and plasma cells) occupies the areas between the lymphatic nodules.**

## **c- Capsule:**

**-Dense connective tissue, which separates the tonsils from the muscular wall of the pharynx.**







## **2- The pharyngeal tonsils (adenoid):**

- **Covered by pseudo-stratified columnar ciliated epithelium which forms folds.**
- **The lymphatic tissue is more diffuse.**

## **3- Lingual tonsils:**

**Similar in structure to palatine tonsil but without capsule.**

## **Function of tonsils:**

- **Quick defense mechanism.**
- **They form antibodies against infective agents (antigens) which may be taken with food or air.**



## 4- THYMUS GLAND

- It is a flattened bilobed organ lying behind the sternum.
- It is very large in infants. At puberty it starts to involute and decrease in size.

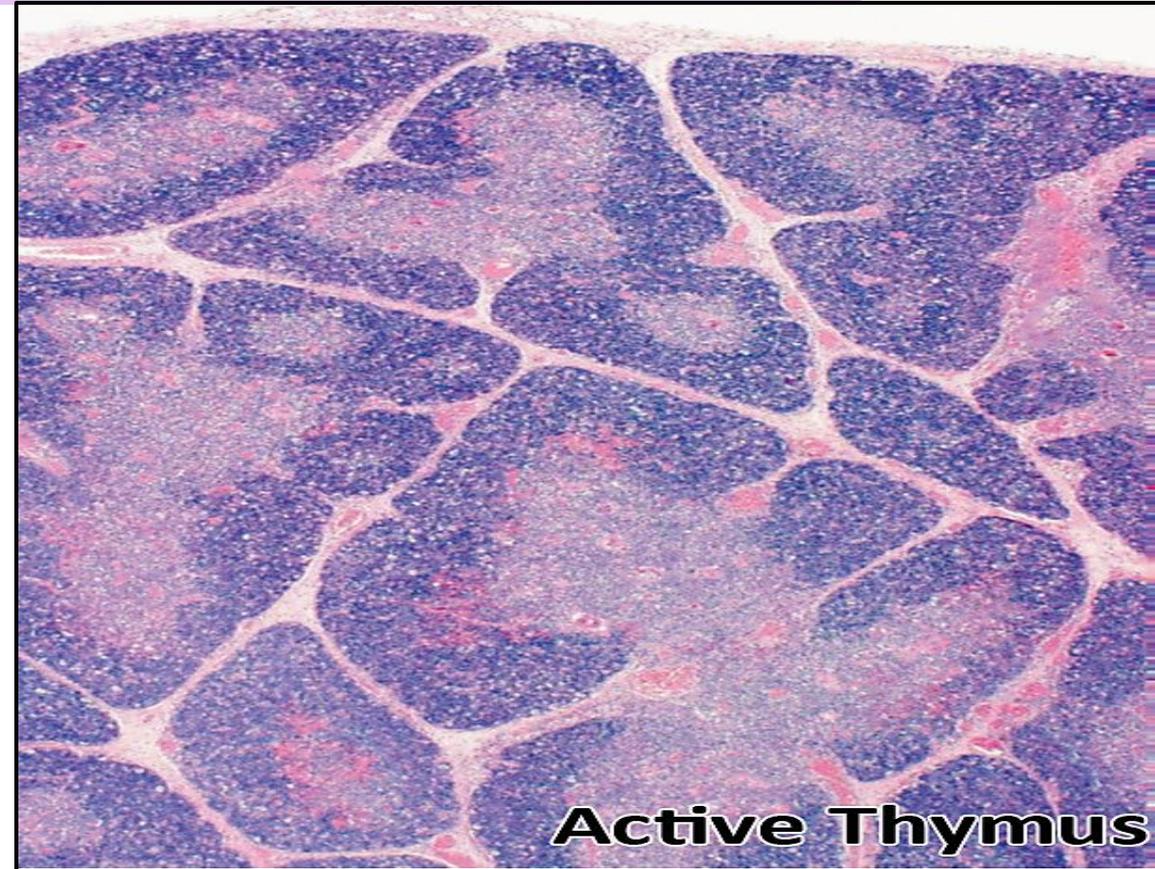
### Histological structure

The thymus gland consists of:

1- Stroma 2-Parenchyma

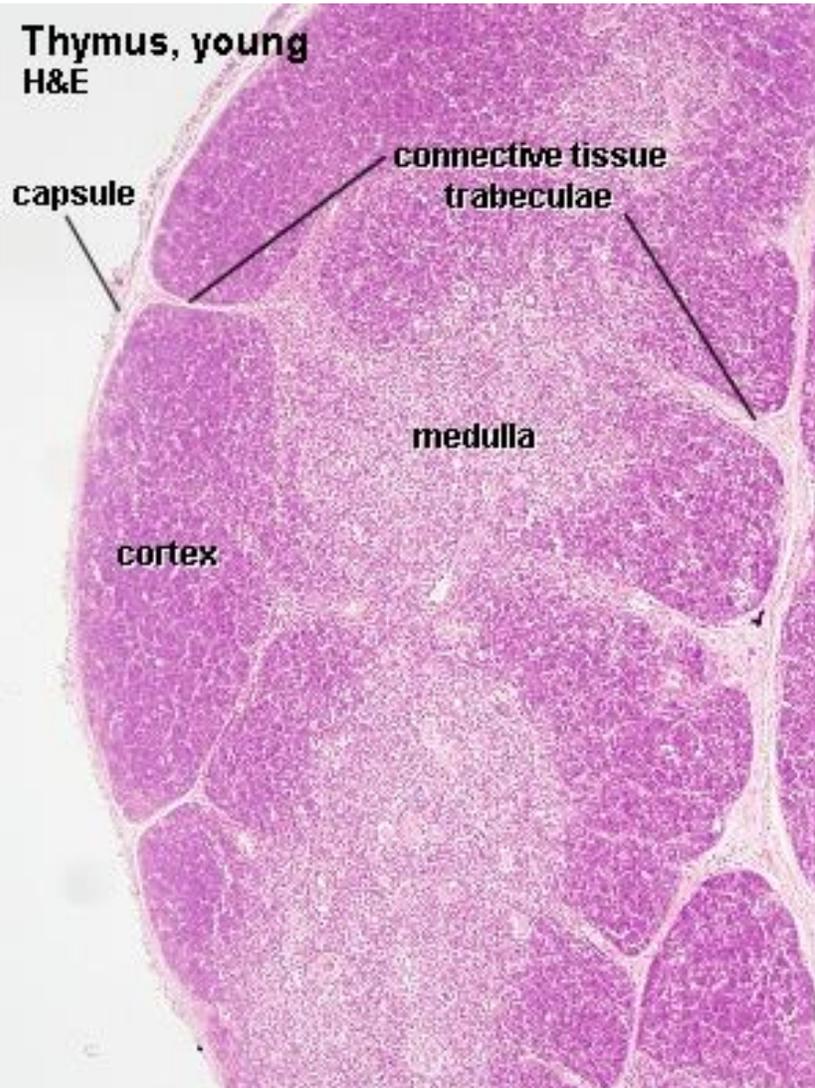
#### I- Stroma:

- **Capsule:** thin loose C. T.
- **Trabeculae:** Are thin and arise from the capsule dividing each lobe into incomplete lobules of variable size and shapes.



## II-Parenchyma:

Each thymus lobule is composed of Outer cortex and Central medulla.



### The cortex:

- the outer dark part of the lobule ( high content of lymphocytes).

Contains the following cells:

1- Lymphoblasts:

2- T- lymphocytes:

- They migrate to the medulla and pass to the blood via the post-capillary venule to reach **Thymus Dependant Zone** in lymph node and spleen.

3- Reticular epithelial cells:

- Branched cells with a pale nucleus, their processes together form a reticulum.

- Functions: 1- Secretory function: thymic hormones.  
2-Supportive function.

4- Few macrophages.

## - The medulla:

- It is the central paler part of the thymus lobule ( low content of lymphocytes).

- The medulla consists of the following:

- 1-T- lymphocytes.

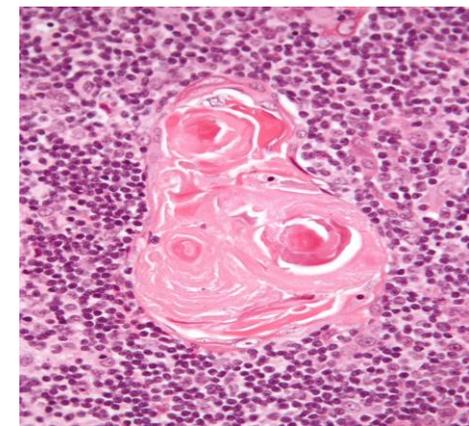
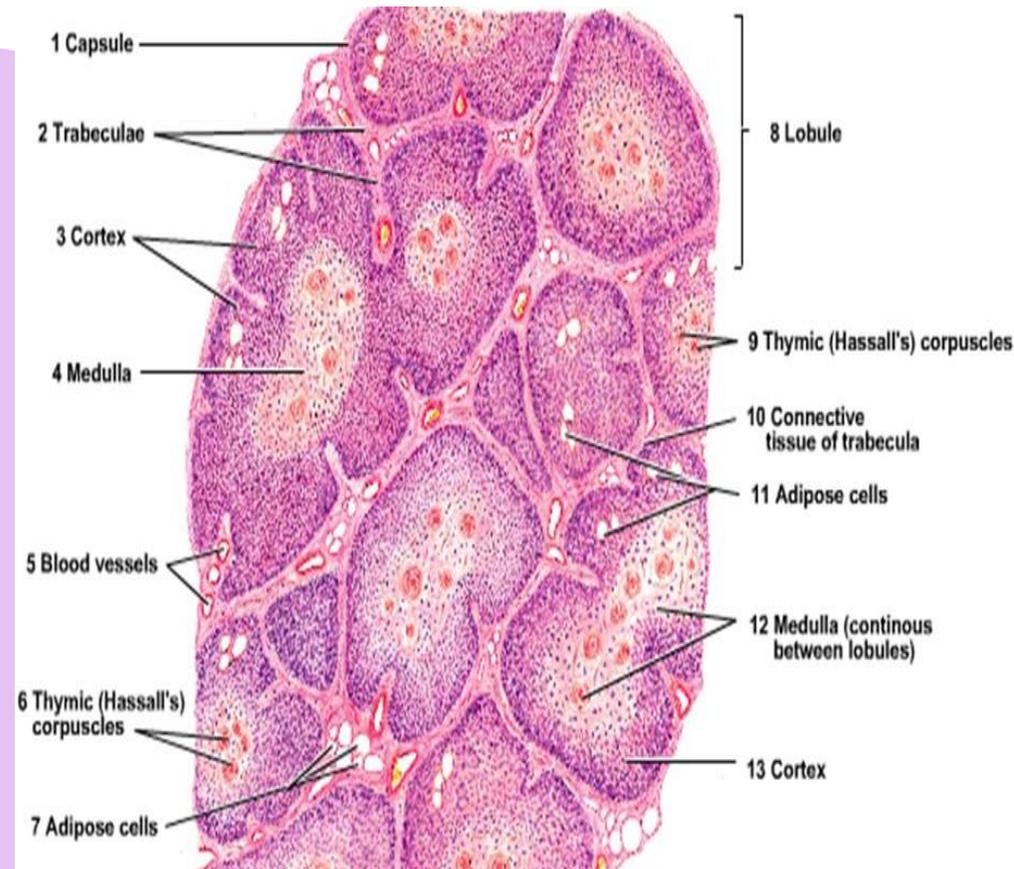
- 2-Reticular epithelial cells.

- 3-Hassall's corpuscles:

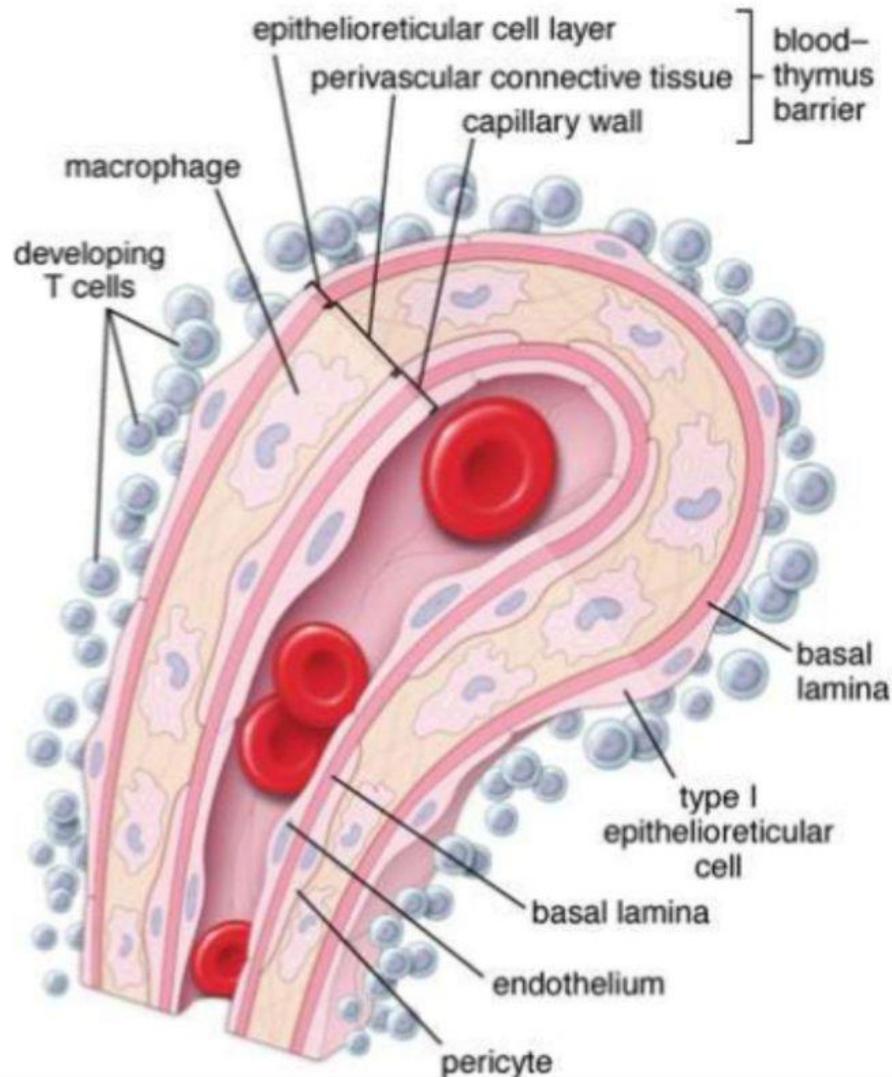
- central hyaline acidophilic mass surrounded by concentric layers of reticular epithelial cells.

- The acidophilic mass is degenerated cells.

- 4-Few macrophages.



# The thymus barrier:



**It is a wall of cells and tissues which separate the developing T-lymphocytes in the thymus gland from the antigens in the circulating blood.**

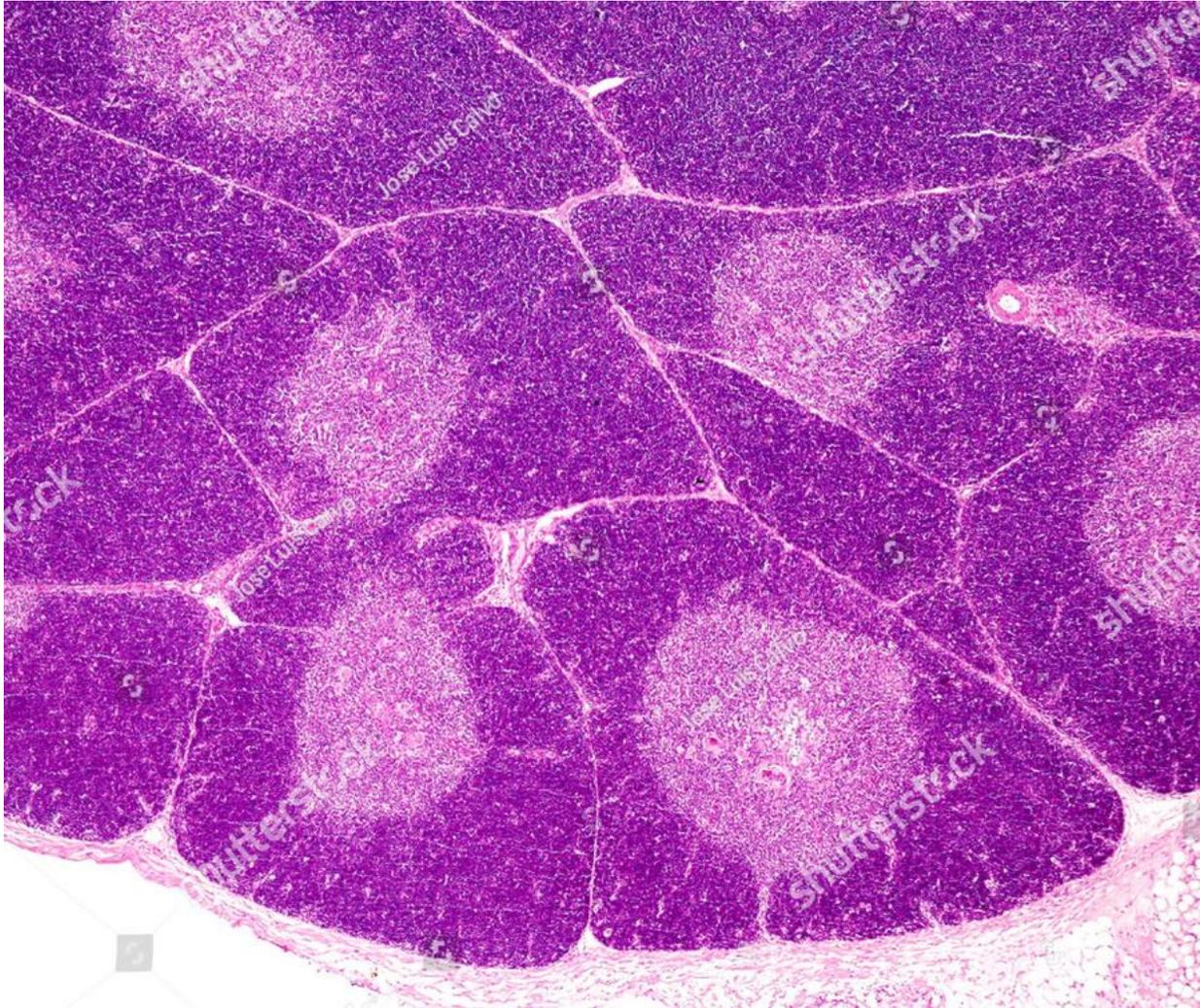
## **Site:**

**It is found in the cortex of thymus lobule because the development of T- lymphocytes occurs in the cortex.**

## **Structure:**

- 1- **Continuous capillary endothelium.**
- 2- **Complete basement membrane (around the endothelium).**
- 3- **Perivascular space:** around the capillary that contains **macrophages** which phagocytose the antigens that escape outside the capillary.
- 4- **complete layer of reticular epithelial cells.**

**Function: Protection of T- lymphocyte during development from being exposed to any circulating antigens.**



## **Function of thymus gland:**

**1- Production of T-lymphocytes.**

**2- Endocrine Function:  
Secretion of the thymus hormones by the reticular epithelial cells.**



**THANKYOU!**

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## **References**

- **Junqueira LC, Carneiro J: Junqueira's Basic Histology. Text and Atlas, fourteenth edition, Copyright © 2016 by McGraw-Hill Education.**
- **Student medical histology book, Mansoura university.**