

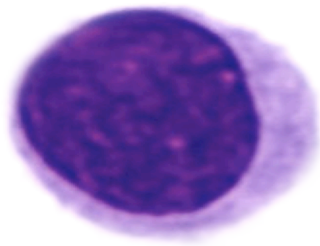


Lecture Objectives:

- By the end of the lecture, the student should describe the microscopic structure of the following organs in correlation with their functions:
 - Lymph nodes
 - Spleen
 - Tonsils
 - Thymus

الفهم فقط:

The lymph is a fluid from the blood capillaries and cells aren't taking all of it.



Lymphocyte

It is type of white blood cells

Formation in bone marrow

LYMPHOID TISSUE

Main function is immunity , & it's rich of lymphocytes.

A) Diffuse lymphoid tissue.
(It's scattered in the connective tissue)

B) Encapsulated lymphoid organs:

1- Lymph nodes.

2- Spleen.

3- Tonsils (are incompletely encapsulated)

4- Thymus.

N.B. Both red bone marrow & thymus are considered 1ry lymphoid organs

LYMPH NODES (L.N.)

Filtration of lymph

All of them are connective tissue

(A) Stroma:

(B) parenchyma: (lymphoid tissue + lymph sinuses):

The functional part

1- Capsule

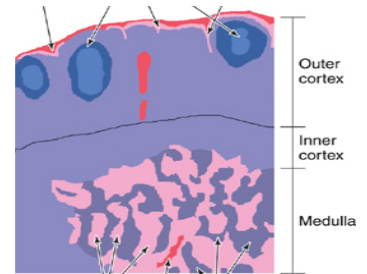
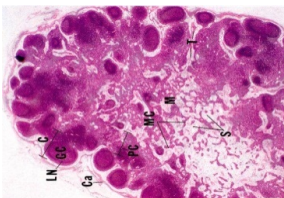
2- Trabeculae (septa)

3- Reticular C.T.

1- Cortex

2- Paracortex

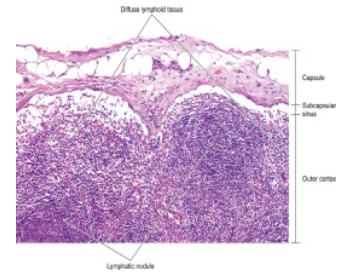
3- Medulla



It is mainly composed of connective tissue form like network to arrange the content of the node .

1. Cortex of L.N.

- 1- Lymphatic nodules (follicles)
 - a- 1ry: without germinal center
 - b- 2ry: with germinal center: Lighter.
- (Germinal center is the active form of B lymphocytes).
- 2- Cortical lymph sinuses.

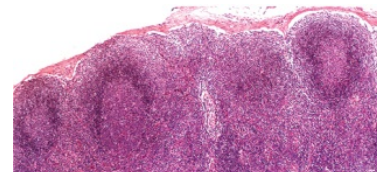


2. Paracortex of L.N.

- It is **the thymus-dependent zone of L.N.**
- It is composed mostly of T-lymphocytes.

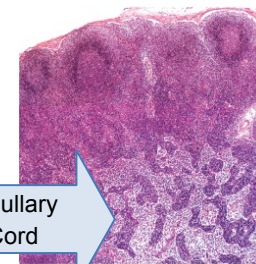
T-lymphocytes take a place in paracortex after puberty when thymus disappear.

When microbes enter our body the T-lymphocytes activated and stimulated to make mitosis division .



3. Medulla of L.N.

- (1) **Medullary cords:** are formed of lymphoid cells (B & T lymphocytes, plasma cells, macrophages).
- (2) Medullary lymph sinuses.



Medullary Cord

Functions of L.N.

1- Production of immunocompetent cells. (because the B lymphocytes are converted to plasma cells (which are immune cells) in the L.N.

2- Filtration of lymph.

N.B. No cortex, No medulla

SPLEEN

A. Stroma:

1- Capsule.

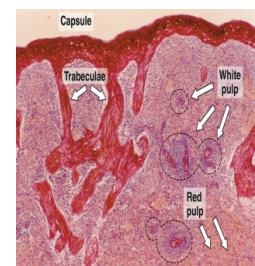
2- Trabeculae.

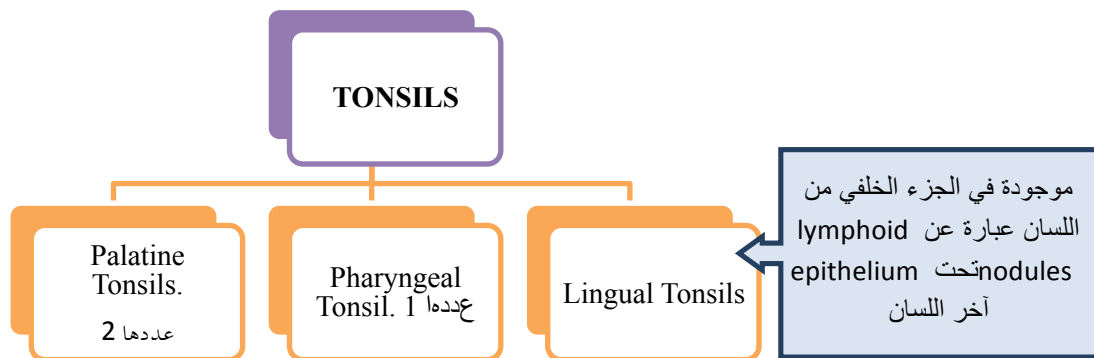
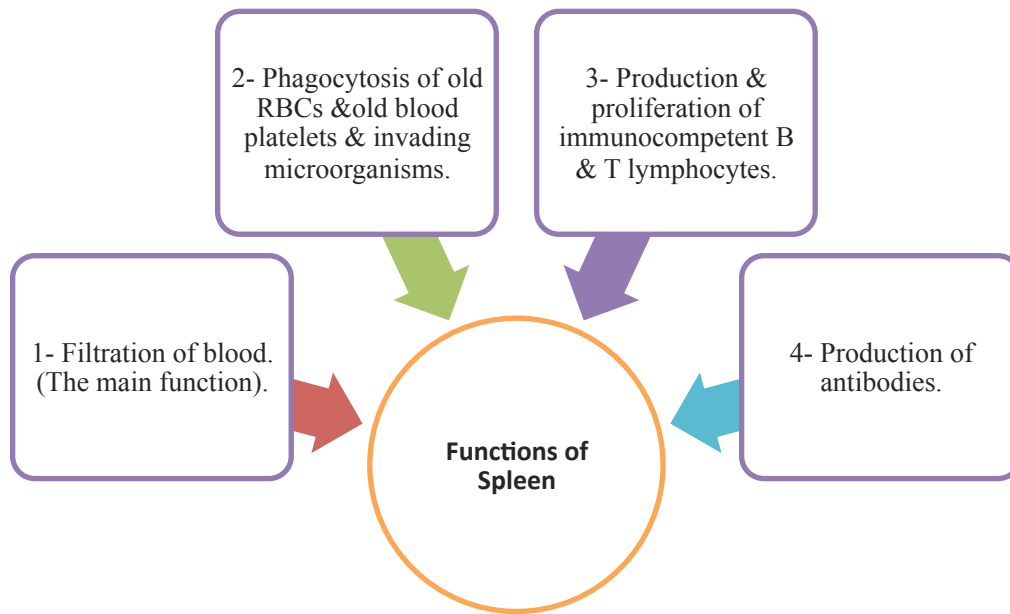
3- Reticular C.T.

B. PARENCHYMA:

(A) White pulp.

(B) RED PULP.





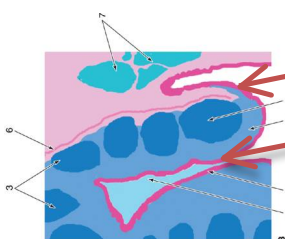
PALATINE TONSILS

Structure:

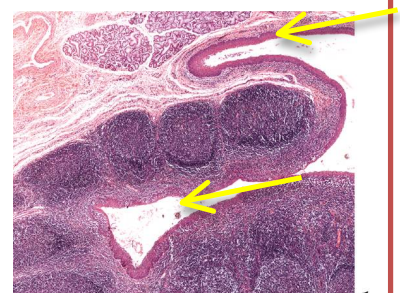
- 1- Epithelium: non-keratinized stratified squamous.
- 2- Tonsillar crypts (folds). (Function: It allows large area for exposition of the food to the immune cells).
- 3- Lymphatic nodules.
- 4- Capsule: partial.

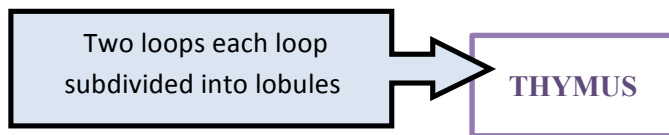
Function of Tonsils

- Production of antibodies.



The food enter here to be more likely filtered by lymphoid nodules





(A) stroma:

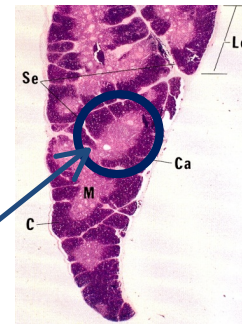
1- Capsule:

2- Interlobular trabeculae: incomplete

B) Thymic lobule:

1- Cortex

2- Medulla



Cortex of Thymic Lobule

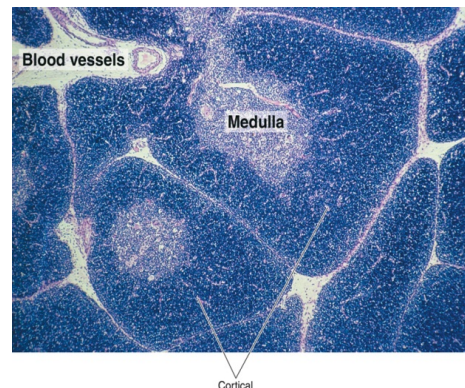
Immature T-lymphocytes come from bone marrow

A) It contains developing (immature) T-lymphocytes (thymocytes). 98% of thymocytes die?

B) Epithelial reticular cells (Exist only in the thymus), (* secretes certain hormone to make T-lymphocytes mature)

(*make like a net work)

C) Macrophages. (*eat the dead T-lymphocytes)



N.B.

No lymphatic nodules

No plasma cells

No B-lymphocytes (which is the reason of having no lymphatic nodules & no plasma cells)

Medulla of Thymic Lobule

1-hassall's (thymic) corpuscles:

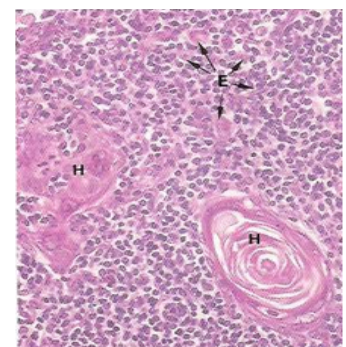
-Concentrically arranged epithelial reticular cells in the medulla.

2-Mature small T lymphocytes

3- Macrophages.

4-Epithelial reticular cells.

There is keratin on it.

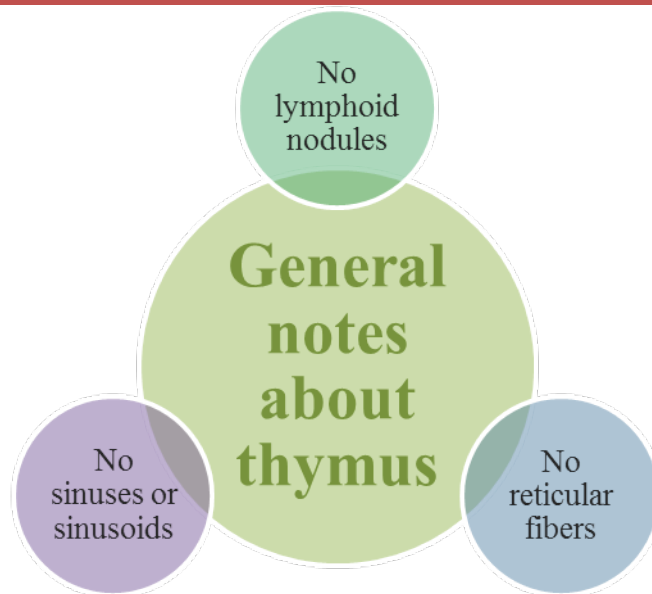


N.B. Medulla of adjacent thymic lobules are interconnected - Why? Incomplete trabeculae

Function of Thymus:

Maturation of T lymphocytes.

(Immunoincompetent T cells → Immunocompetent T cells).



Clinical Applications Palpable lymph node

- The presence of antigen or bacteria leads to rapid proliferation of lymphocytes of the lymph node (L.N), leading to increase of L.N. to several times of its normal size, so the L.N. becomes enlarged and palpable to the touch.

Clinical Applications Rupture of the Spleen

- Spleen is a fragile or friable organ, so major trauma to the upper left abdominal quadrant usually leads to rupture of the spleen . Surgical removal of that ruptured spleen is essential.

Note :

*B-lymphocyte originate from bone marrow then go to spleen , lymph nodes and diffuse .

plasma cells *خاملة وماتكون نشطة الا عند دخول جسم غريب وتنتج لي اجسام مضادة عندما تتحول الى