

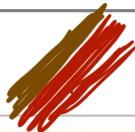


جامعة الدُّنْعَاءُ

ANATOMY

MORPHINE ACADEMY

MORPHINE ACADEMY

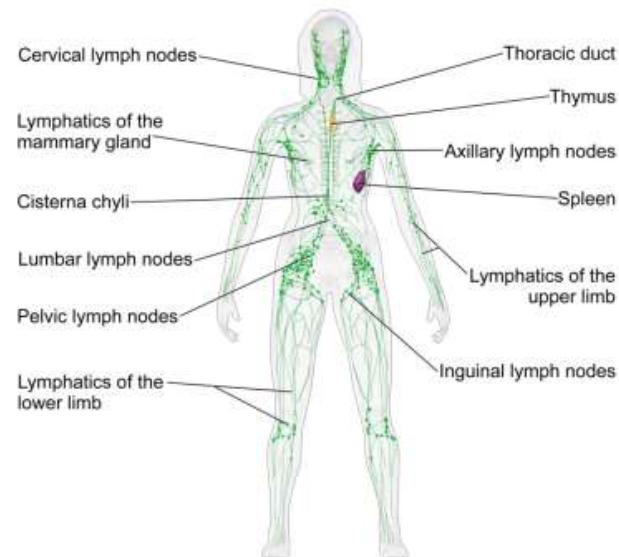


ریکورد 30-12 ، التقریب منش مدقق ف اذانی افاده احمدی عطا

The Lymphatic System

لما اخذ ناعن الـ connective tissue حکیما من
انفاع الـ C.T ای هوا لـ blood و الـ lymphatic

The Lymphatic System



Lymphatic System Structure and Function

□ Consists of - مكون من

1. Lymph → اللى هو السائل
2. Lymphatic vessels → نوعية الارجح يمر بها السائل
3. Structures and organs containing lymphatic tissue → تحتوي الارجح على اندماج
الخلايا الليمفاوية organs بالمقدمة
4. Red bone marrow → الى الجهة واعدهم الى الجهة Primary organs
قبل الشكلوا Bones Lymphocytes

Functions of the lymphatic

Primary system

Trinary system

secondary 1. Drains excess interstitial fluid.

2. Transports dietary lipid from gastrointestinal tract to blood.

GI من الـ Lipid من الـ

Blood من الـ دماغه على الـ

The lipid-containing lymph is called **Chyle**.

Chyle contains lipid

3. Carry out immune responses.

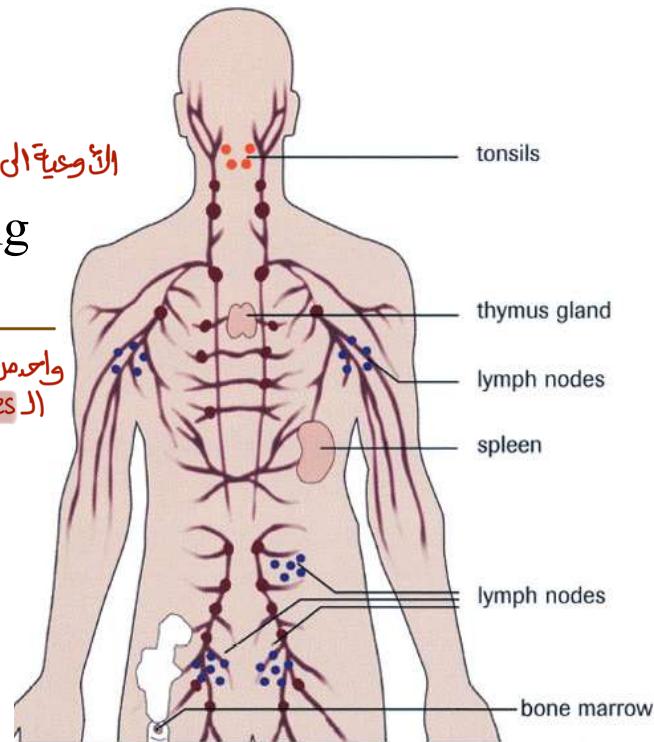


Fig.1: Components of the lymphatic system.

٦٦ Interstitial fluid باک شو المفہود

٢) Extracellular fluid ١) Intracellular fluid - هى احياناً يختلف انتشار fluid بالجسم عن :- Interstitial fluid

Lymph

د. جعفر العامل
عن ملخصها

- ✓ Most components of blood plasma filter through the capillary walls to form **interstitial fluid**.
نحوه **السائل بين الأنسجة** **Interstitial fluid** **أو بين الأنسجة**
قلنا برجع على **الوريدات** **بخصوص** **قليلة** **والحادية** **الزغب**
نحوه **السائل** **أو بين** **الأنسجة** **السائل**
More fluid filters out of blood capillaries than **returns** to **them** by reabsorption.
- ✓ The excess filtered fluid drains into lymphatic vessels and becomes lymph.

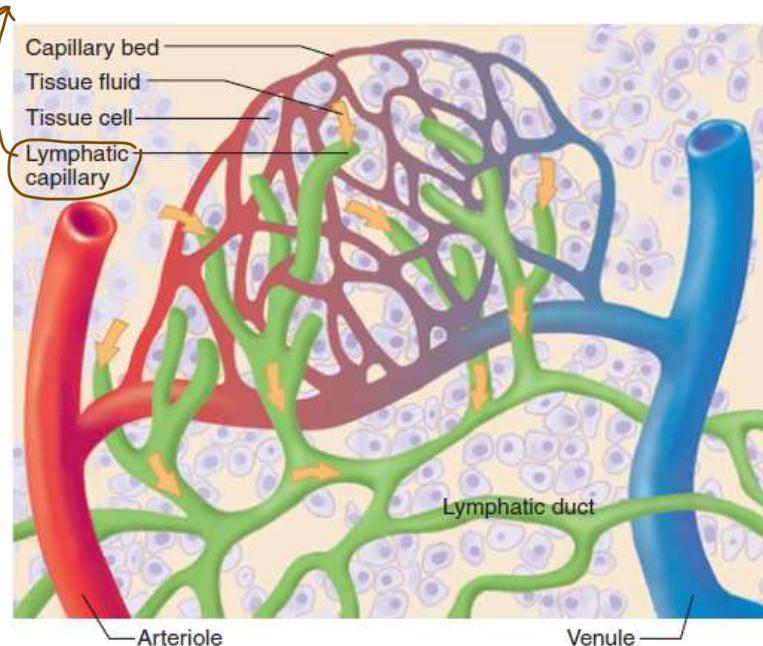


Fig.2: Capillaries and lymphatics.

Lymphatic Vessels

- Vessels begin as lymphatic capillaries. These are closed at one end.

دَرَجَاتٍ وَتَحْوِيلٍ إِلَى

- Lymphatic capillaries unite to form large lymphatic vessels. These resemble veins in structure but thinner walls and more valves.

بالـ veins تكون فم و ينتهي في القلب (المرئان)
الأنماض راجع

- A series of swellings are present along the lymphatic vessels.

يكون فيها تجمعات من السوائل
يسمى بالـ lymph nodes

جبارات من السوائل
(الانفاخات داخل الـ vessels) وأسمهم
مجمعات
ما يحيى عده وحده تكون

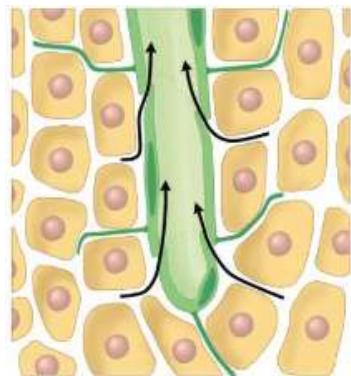
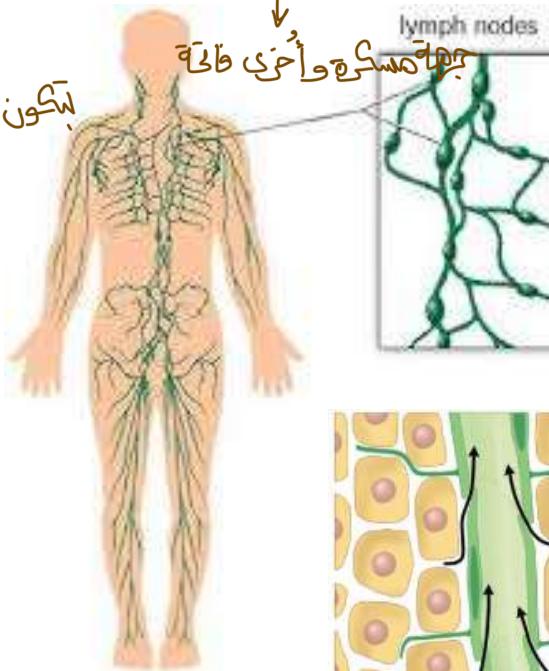


Fig.3: The distribution of lymphatic vessels in the body showing the lymph nodes. Also shown is the closed end of a lymphatic capillary.

- Ultimately, the lymph drains into 2 main channels:

كل الـ Lym. vess. الموجدة بالجهة اليسار والـ جانبي كاملاً 1

Thoracic duct: a long duct that drains lymph from the entire left half of the body and the right half below the ribs including the right lower limb.

2. 2 **Right lymphatic duct**: a short duct that drains lymph from the right side of the body above the ribs including the right upper limb.

These ducts open into the junction of the **subclavian** and **internal jugular** veins as they form the **brachiocephalic veins**; thus, lymph will return to the blood.

طبع هذين وين ينبعون؟
داخل الـ

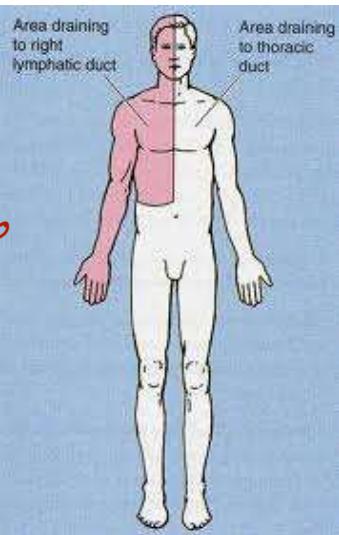
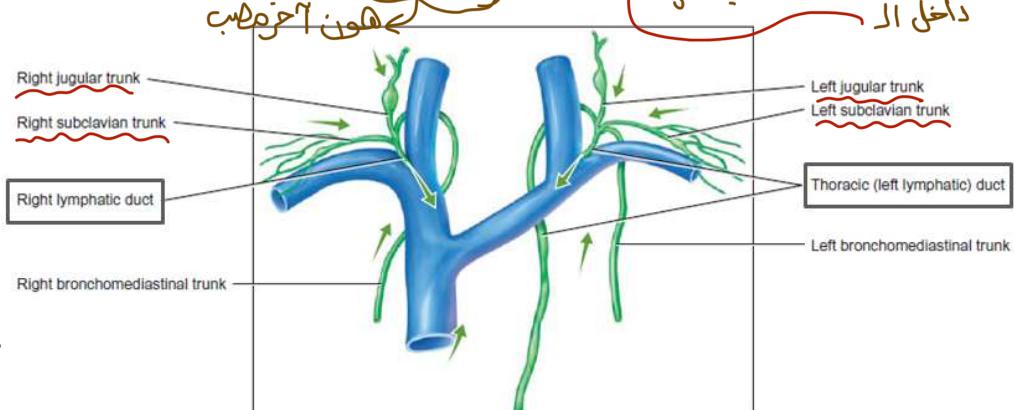


Fig.4: Above, areas of lymph drainage to the two main lymphatic ducts. Left, The opening of the ducts into the veins.

Lymphatic Organs and Tissues

- 2 groups based on function

1. Primary lymphatic organs:

- Sites where B and T lymphocytes are formed and mature.
- Red bone marrow and thymus.

المكان المسئول عن الانتاج والتجدد
maturation & Production

أبواب Agranulocytes
أبواب Granulocytes
فيهم حسارات

2. Secondary lymphatic organs

- Sites where most immune response occurs, meaning that they are the sites where the mature lymphocytes perform their function.

أمثلة

► Lymph nodes, spleen, lymphatic nodules.

The Thymus

The thymus is an asymmetric bilobed organ where mature T-
Thyroid cells are formed.

جس زی اے Thyroid ہیوں
بکھوں دھرہ اکبر من وحہ

➤ It's located in the superior mediastinum just behind the manubrium. It may descend into the anterior mediastinum to lie between the sternum and the pericardial sac. Sometimes it may ascend into the neck reaching as high as the thyroid gland.

يُمْكِنَ تَحْلِيَةُ الْجَهْنَمَ بِرِبَاطَتِ الْجَاهِلَةِ (Thyroid gland) يُمْكِنَ تَطْلُعُ الْجَهْنَمَ لِتَحْمِلُهُ Ascending Thyroid gland

The fibrous capsule that surrounds the gland sends connective tissue trabeculae into the gland dividing it into lobules. Each lobule is formed of a dark outer region with immature T-cells (the cortex) and an inner lighter region with mature T-cells (the medulla). Trabeculae connective tissue Fibrous capsule

هي عبارة عن Projections وهي في Projected Capsule أي تخلخل من الماء $Hymen$ ورح تخل جلا وطي الريتين الرح تخل لخصم $Hymen$ من جواه وحرارات دطا ودرد من حاب الاحمرات لبسمها lobules

كل واحد من lobules المعاين خارجي بسمة cortex \rightarrow داخلي بسمة medulla

medulla بلسم؟ اخلي

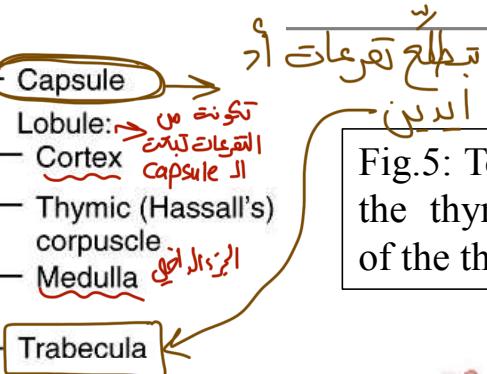
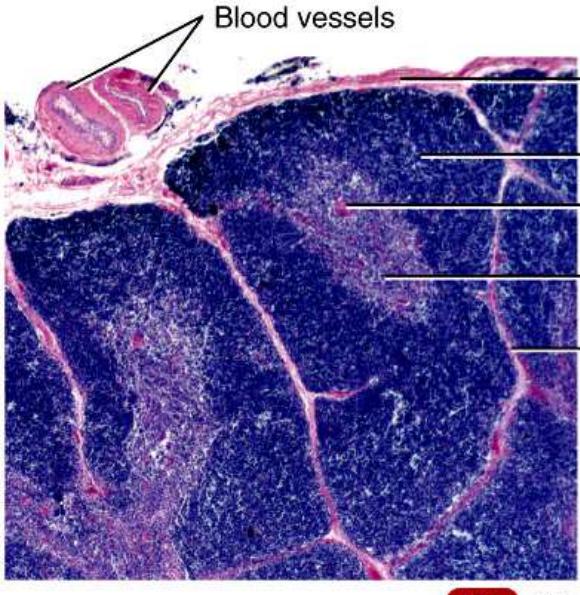
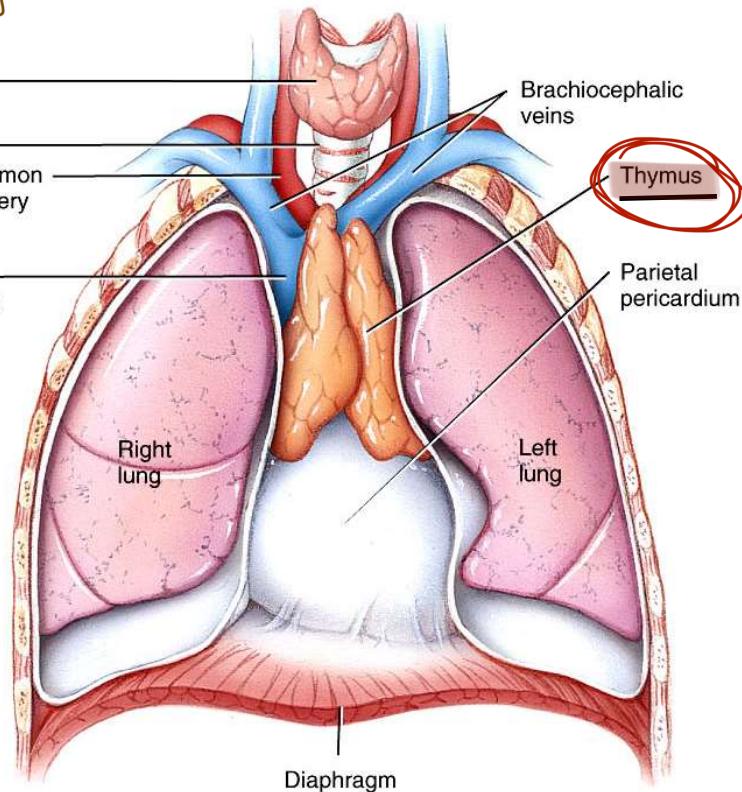


Fig.5: To the left, histology of the thymus. Below, position of the thymus.

- The thymic tissue is most abundant in **younger age**. As the person grows, this tissue is gradually replaced by fatty tissue. **يتحول الدهن** **لـ** **lipid**



Red Bone Marrow

واحد من الـ
Primary organs
Lymph. sys

الـ
Blood cells
مـ

- Red bone marrow is the site of formation of the blood elements: red blood cells, white blood cells and platelets.
- Inside the red bone marrow, B lymphocyte form and mature.
T lymphocytes are formed in the red bone marrow but they're immature. T-cells become mature in the thymus.
- Red bone marrow in adults is present in the flat bones and the epiphyses of some long bones.
الـ الـ

Lymph Nodes \rightarrow Secondary Organs

(Enlargement) عبارة عن انتفاخ

as a cluster

نَصْبَةِ الْفَادِيلَةِ

نَصْبَةِ

- Lymph nodes are **capsulated** **bean shaped** structures that are found along the course of the lymphatic vessels. They're usually present in groups and they're **scattered** all over the body.

رج تدخل نفخ ماء لعنة قبل (توري الدلن بعسووا الحجارة ...)

- The capsule sends trabeculae into the node dividing it into compartments. **mainly lymph nodes** \rightarrow **رج تدخل بطريق** \rightarrow **في جزء يكون** **convex** \rightarrow **جزء يكون** **concave** \rightarrow **رج يدخل** \rightarrow **جزء داخل المفتر** \rightarrow **جزء داخل المفتر والمحرب**
- From the convex side of the lymph node several **incoming** lymphatic vessels enter the node. These are called **afferent** lymphatic vessels.
- The concave side of the node is called the **hilum**. From it, **one or two outgoing** lymphatic vessels leave the node. These are called **efferent** lymphatic vessels. Also through the hilum arteries and nerves enter and veins exit the node.

رج دخ

الجزء المحرب يسمى

الhilum بفتح هـ

وهي من

صفيحة

لـ الـ function

لـ مستويه هـ هـون لـ نـ

الـ يـجـعـتـ ماـ فـهـمـتـ اـشـ

رج تـسـهـلـهـ الـقـدـامـ كـمـ

لـ سـكـ دـلـيـنـ



رج يـخـارـ

رجـ مـوـدـ

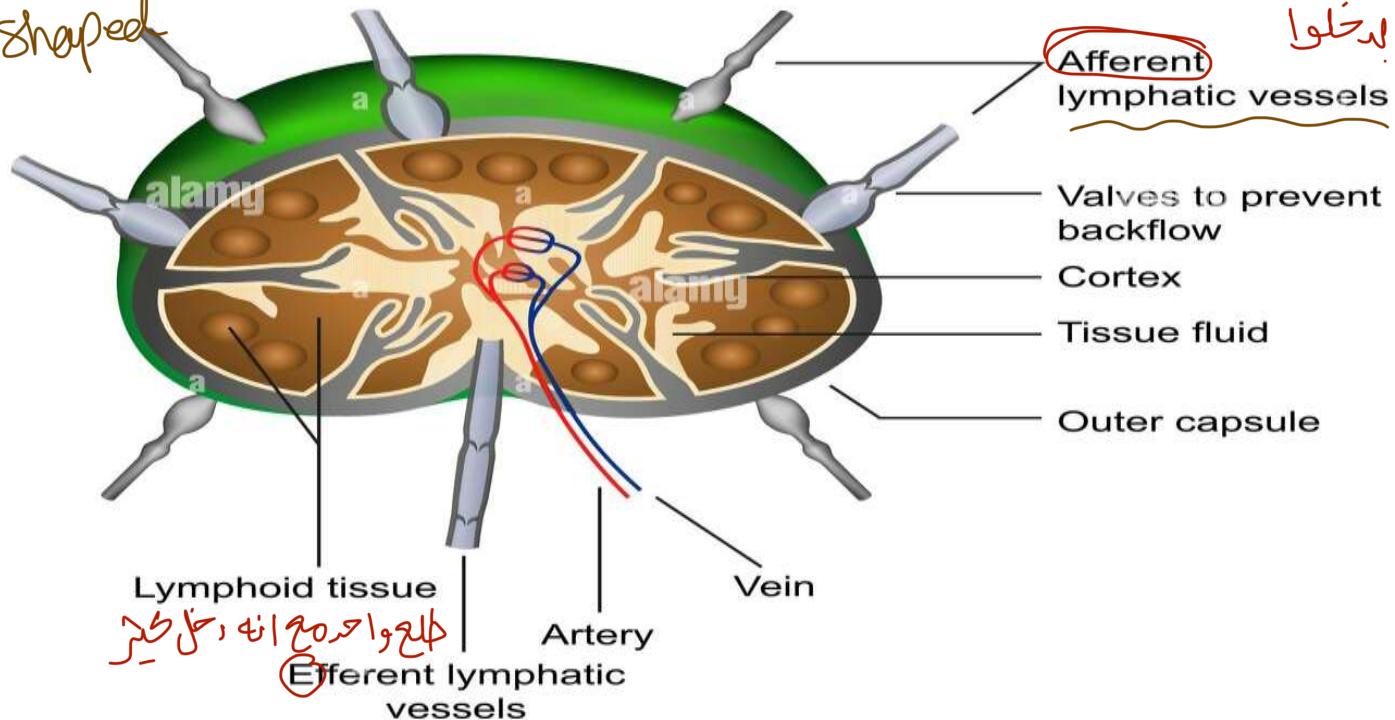
رجـ اـرـجـ اـلـ

رجـ جـوـنـ اـلـ

رجـ المـحـبـ

Lymph nodes structure

bean shaped



alamy

Image ID: TCW6JN
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Functions of lymph nodes: → Filter of lymph

التنفس

1. Antigens in the lymph are trapped and the lymphocytes in the nodes react to it and initiate the immune response.
2. Macrophages ^{بكتيريا على} in the node may directly destroy the antigen.

✓ *It's important to know what lymphatic vessels drain a certain organ and what are the lymph nodes in its course, because this represent a pathway by which infections and cancer cells can spread.*

التنفس ←
الخلايا الليمفية ←

The Spleen

الطباط

من أكبر الـ ^{orga} secon. lem.

سكلاما

- Largest single mass of lymphatic tissue in the body. It's an **oval**, soft organ located in the left hypochondriac region. **حوض**
- Its superior surface is smooth and related to the diaphragm and ribs 9,10 and 11. **rib (9/10/11) & diaphragm** **حوض** **لعمق** **على سطح**
False + floating
- Histologically formed of:
 - White pulp** **surrounds** lymphatic tissue (lymphocytes and macrophages) **surrounds** branches of splenic artery (the artery that supplies the spleen and enters through the hilum). **جذع** **artery** **جذع حوصلة**
 - Red pulp** **blood-filled** venous **sinuses** surrounded by **splenic cords** which **contain** red blood cells, macrophages, lymphocytes, and plasma cells.
- Functions:
 - Destruction** of old red blood cells by macrophages,
 - Storage** of blood,
 - Filter** of blood,
 - Formation** of blood cells during fetal life

SPLEEN ANATOMY

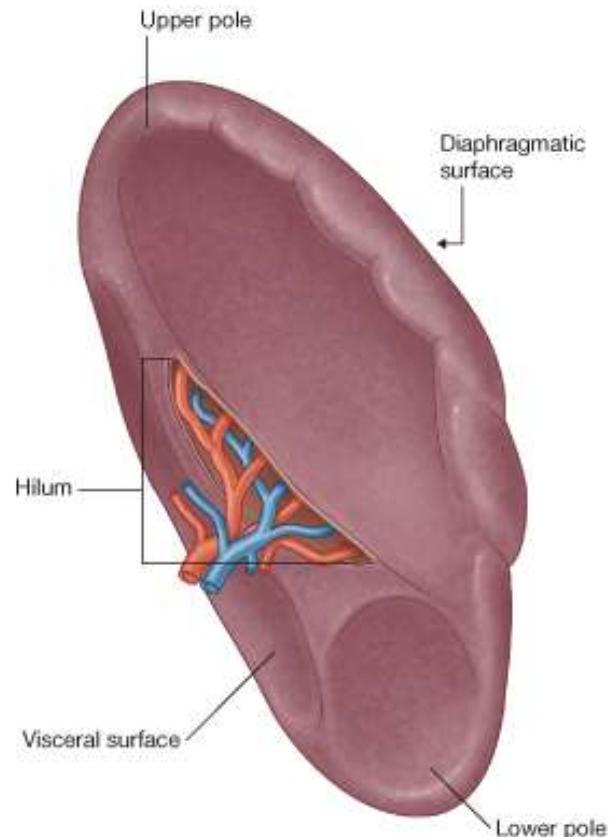
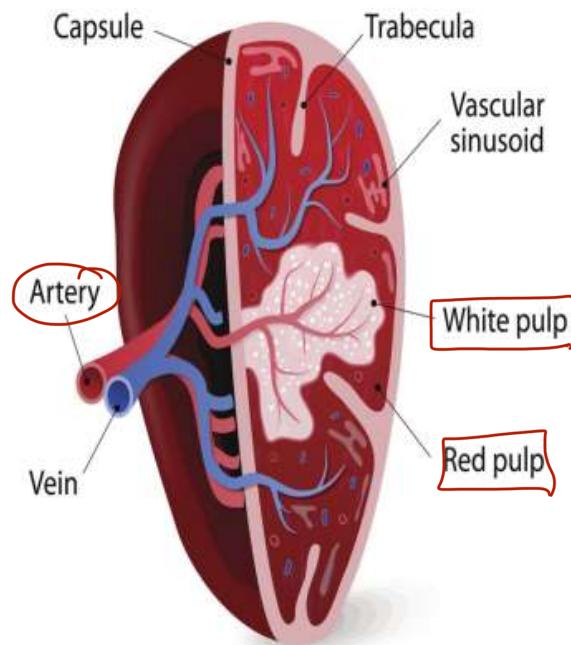


Fig. 7: The spleen and its histology.

Lymphatic Nodules

حاجي حوليها
Capsule

- ❑ Collection of lymphatic tissue not surrounded by a capsule.
بلا غضروف عن بامانن محيطة
- ❑ Scattered throughout lining of gastrointestinal, urinary, reproductive, and respiratory tracts.
- ❑ Most of them are small and solitary.
- ❑ Some are large – tonsils, Peyer's patches, appendix.

الثانية
الثانية
الثانية