

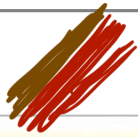


لجان الرِّفْعَات

ANATOMY

MORPHINE ACADEMY

MORPHINE
ACADEMY

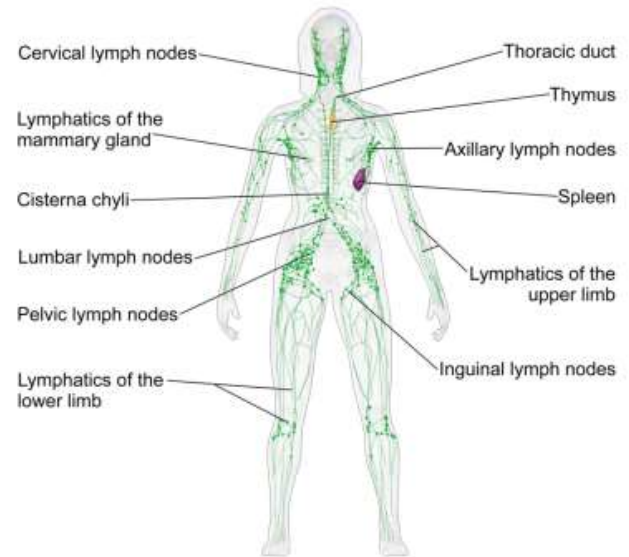


ريكورد 30-12 ، التفرغ من مش هدي في اذاني اغلظ احكي لي عنها

The Lymphatic System

لما اتخزن ناعن ال *connective tissue* حكييا من
أنواع ال *C.T.* الي هو ال *blood* و ال *lymphatic*

The Lymphatic System



Lymphatic System Structure and Function

❑ Consists of: - **الـ L.S مكون من**

1. Lymph → **الـ هو السائل**
2. Lymphatic vessels → **الـ وعية الـ رح يـ فيها السائل**
3. Structures and organs containing lymphatic tissue → **هـ بـ سـ مـ secondary organs**
4. Red bone marrow → **واحد من الـ Primary organs الـ بـ سـ مـ الـ B or T Lymphocytes**

↓ **مـ بـ سـ مـ على**
Mature lymphocytes
 ↓
فـ بـ سـ مـ الـ الـ
 ↓
بـ سـ مـ

Functions of the lymphatic system

1. Drains excess interstitial fluid.
2. Transports dietary lipid from gastrointestinal tract to blood.
3. The lipid-containing lymph is called **Chyle**.
3. Carry out immune responses.

↓ **مـ بـ سـ مـ**
GI الـ الـ
 ↓
وـ بـ سـ مـ على الـ Blood

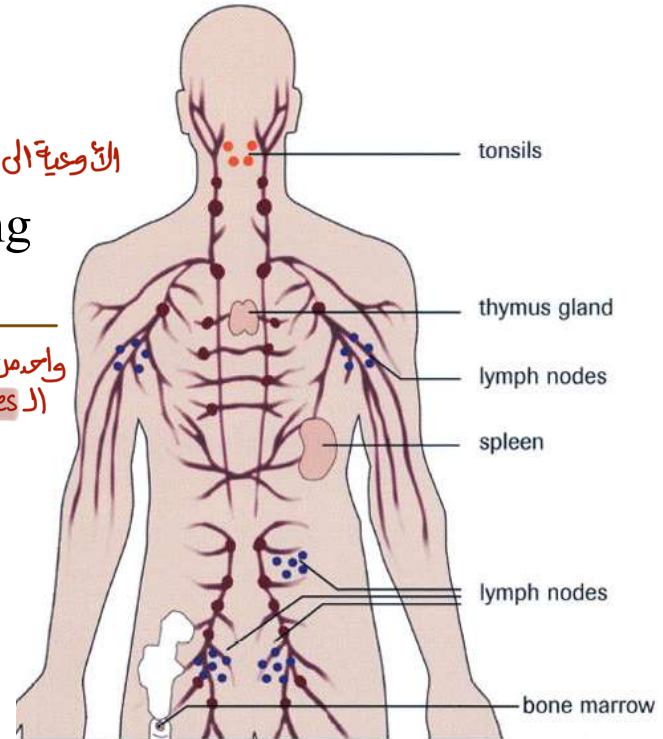


Fig.1: Components of the lymphatic system.

❗️ شئ المقصود بال Interstitial fluid ؟؟

هنا احنا بنعرف انه عنا ال Capillaries ← Arterioles ← small arteries ← Big arteries ← Aorta
↓
small venules → veins → Big veins → SVC → IVC
شرح ؟

ال Capillaries شئ وظيفتها ؟ احنا بنعرف انه بيعمل فيها Exchange ، بالنسبة ال gas والنسبة ال Nutrients ، فالتالي بيعمل ال filtration

داخل ال Capillaries ، ال Capillaries بيكوني حولين ال tissues ، فهناك رح يتقلت كل إشي ، كل إشي رح يطلع من هاي ال Capillaries

عشان نخد هاي ال tissues وال cells ، بعدين يرجع عن طريق ال veins & venules . كل إشي رح يتقلت من ال Capillaries بسموه

Interstitia fluid ، ههنا احنا بنعرف انه ال fluid بالجسم عنا :-
① Intracellular fluid ^{بيكون داخل الخلية} ② Extracellular fluid ^{بيكون به الجسم والبلد زما}

وال Interstitia fluid ③ ← هاهن السائل بيكون بين الليتين الي ههنا ، وهاهن السائل رح يرجع أغلبه عن طريق ال venules ، أغلبه عبارة عن fluid

وال fluid لما يرجع عن طريق ال venules ما يرجع كامل ، في جزء منه يرجع وجزء بيفضل بال Interstitia fluid ، وهاهن السائل لازم يتأخذ عشان

ما بيعمل في تجمع بالتالي بيعمل في عندك إشي موضح بالفويس ، ههنا هاهن السائل مين الي بوحده ؟ ال Lymphatic system ، أو mainly بوحده

ال Lymphatic capillaries ، هاهن السائل الي رح بوحده ال Lymphatic system ، ويدخله جواته بعين اسمها lymph ← اذا هو عبارة عن Interstitia fluid تقلت من

ال Capillaries ، ما رجعه كله وأخذته ال Lymphatic capillaries ومشتة خلال ال vessels عشان بدحوّل اسمه إلى Lymph

Lymph

- ✓ Most components of blood plasma filter through the capillary walls to form interstitial fluid.

قلنا يرجع على الـ Venules بكمية قليلة والكمية الزائدة
تخرج عن طريق الـ Lym.
داخل الـ Tissues
أدين الـ Cells
More fluid filters out of blood capillaries than returns to them by reabsorption.

- ✓ The excess filtered fluid drains into lymphatic vessels and becomes lymph.

رجع السائل
عن طريقها

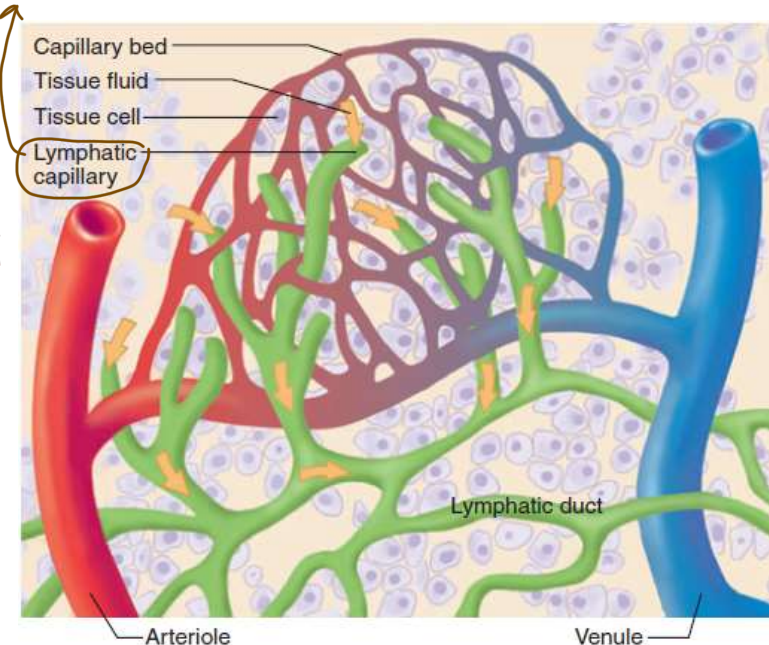


Fig.2: Capillaries and lymphatics.

هذا هو الفرق بين الـ capillaries بالـ L.S وبين الموحدة بالـ Blood vessels

Lymphatic Vessels

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

- ❑ Lymphatic capillaries unite to form large lymphatic vessels.

These resemble veins in structure but thinner walls and more valves.

بالـ veins كلهم يكون قفص
له تشتمل زي القلب (مفتوح)
الها مسار واحد

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

These are the lymph nodes.

ما بيتجى عقدة وحدة بتكون
مجموعة

أما كذا
يكون قفص
تجمعات بتكون
عبارة عن swellings
انتفاخات داخل الـ vessels واسمهم

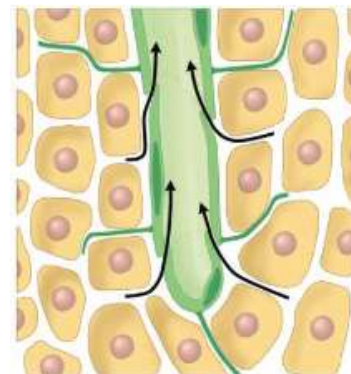
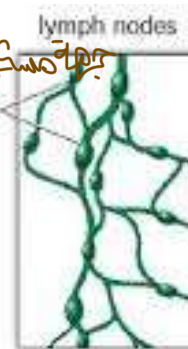
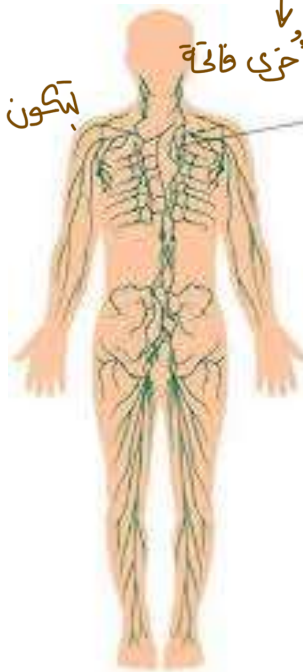


Fig.3: The distribution of lymphatic vessels in the body showing the lymph nodes. Also shown is the closed end of a lymphatic capillary.

- Ultimately, the lymph drains into 2 main channels:

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. **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.

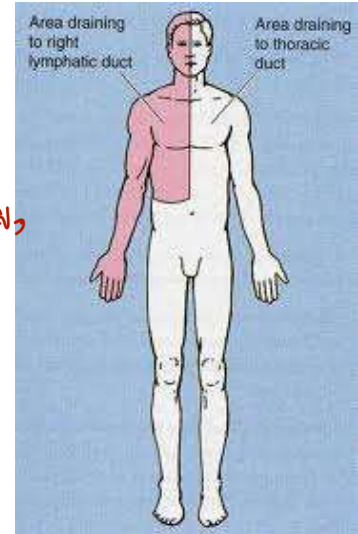
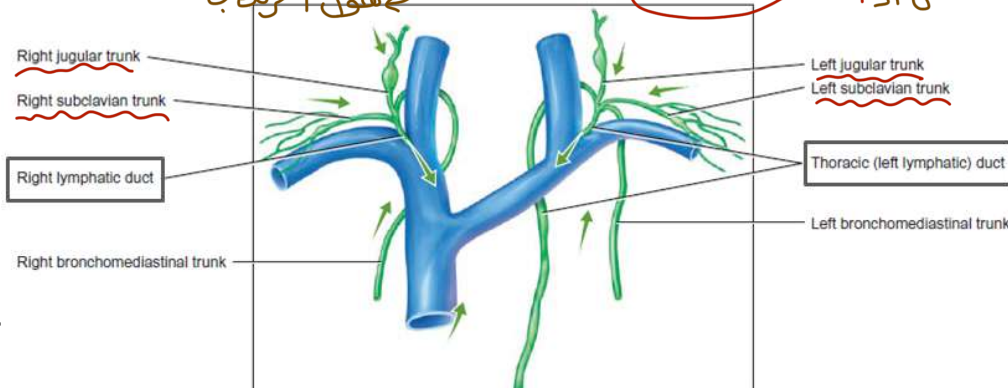


Fig.4: Above, areas of lymph drainage to the two main lymphatic ducts. Left, The opening of the ducts into the veins.



Lymphatic Organs and Tissues

حكيما أول الشيء في organs
بسموهم Primary و secondary

- 2 groups based on function

1. Primary lymphatic organs:

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

كم للمكان المسؤول عن ال maturation & Production الناتج والنضج

سمناءهم Agranulocytes مش
Granulocytes لانظوما
فيهم حسيات

2. Secondary lymphatic organs

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

المكان الى
ايهم فيه

أمثلة → Lymph nodes, spleen, lymphatic nodules.

The Thymus

هم T & B-lymphocytes ف بالتالي هم جزء من الـ white blood cells وانا يعرف الـ B cells من

بشكلها؟ بلعنا؟ Red Bone marrow محققا عندهم انهم produced ولكن يكون Immature ، inactive هسما بيدي (ياهم يتحولوا إلى mature عشان
B ← الـ Bone marrow بتعالها mature T ← Thymus (لكن الـ Thymus produced by Red bone marrow)

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

مش زي الـ Thyroid هون
بكون وحدة اجبرون وحدة

➤ 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.

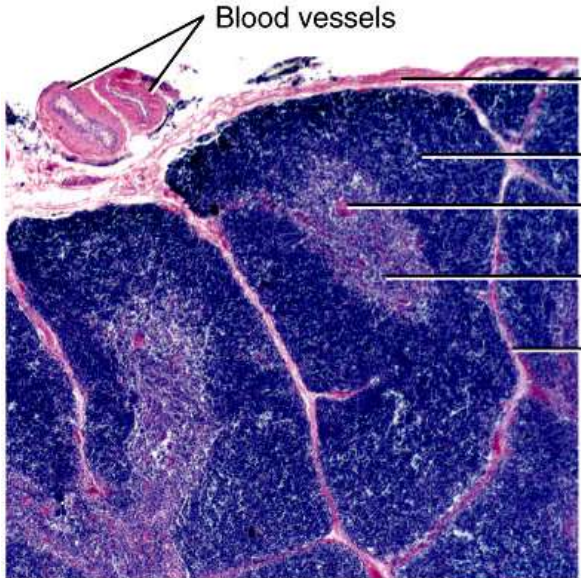
Thyroid gland يعني تطلع لضيق لتوصل الـ Thyroid gland
هنا الـ thymus محاولة بـ زيهازي (Thyroid gland)

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 الـ capsule رح تودي ايدن ، وهاي الـ ايدن عبارة عن Trabeculae

Projections وهاي الـ Projections هي عبارة عن ثغرات رح تطلع من الـ capsule ثغرة الـ thymus ورح تطلع لها

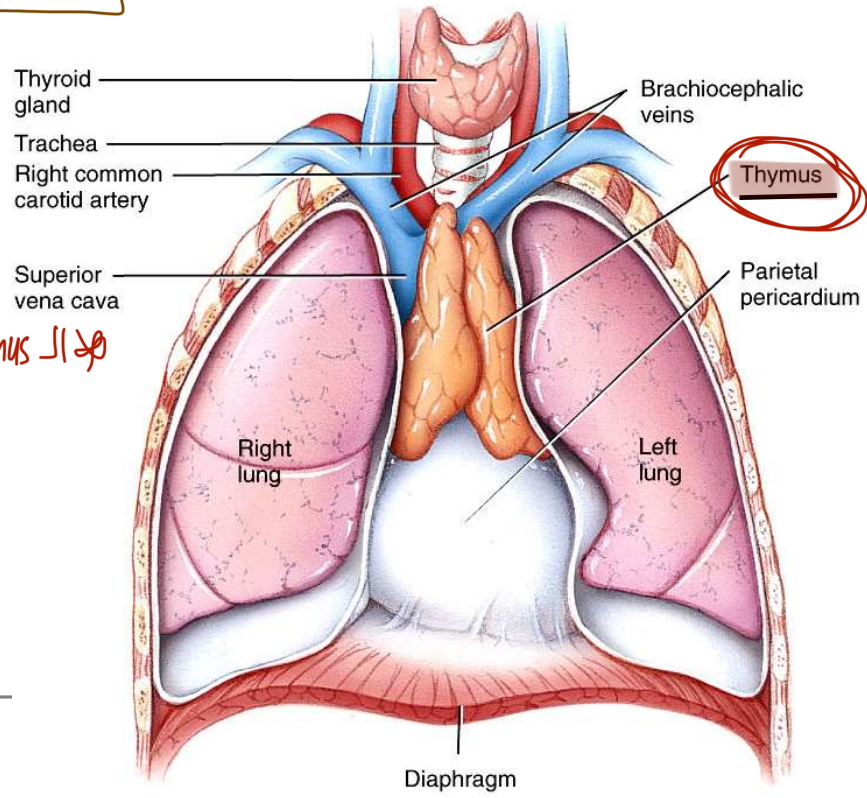
داخلية بسمي medulla



Capsule
 Lobule: *تكونت من الشعاعية تسمى ال capsule*
 Cortex
 Thymic (Hassall's) corpuscle
 Medulla *الجزء الداخلي*
 Trabecula

تبطلع رعرعات ادين
 ادين

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



➤ *Thymus* *تكون active بال*
 The thymic tissue is most abundant in younger age
 As the person grows, this tissue is gradually replaced by fatty tissue.
بس الواحد يكبر تبحول الى lipid

Red Bone Marrow

→ Primary organs واحد من الأعضاء
باللغ. sys

↓
مسؤول عن إنتاج blood cells

- 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 ^{فقط} formed in the red bone marrow but they're immature. T-cells become mature in the thymus.
- Red bone marrow ² in adults is present in the ^{موجود به شكل} flat bones and the epiphyses of some long bones.
الأطراف

Lymph Nodes → secondary organs

- ❖ 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.

(Enlargement) هم عبارة عن انتفاخات
as a cluster عليها
روح تكمل نفس ما عدت قبل (تؤدي اليدين بقسمها الجرات - - -)

- ❖ The capsule sends trabeculae into the node dividing it into compartments. **lymph nodes** هي mainly روح تكون بطريق **convex** يكون جزء في جزء **Concave** الجزء الداخلي المنحني والمحبب **lymphatic vess.** فرح يدجيجا **lym. nod.** روح تدخل على ال **multiple lymph. vess.** **afferent** lymphatic vessels.

- ❖ From the convex side of the lymph node several **afferent** 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.

ال hilum بطلع منه **hilum** الجزء المحبب بسميه **ly. vess.** فقط روح من **ال روح لداخل**

روح يتخار **lym. nodes** من الجزء الى **Concave** المحبب

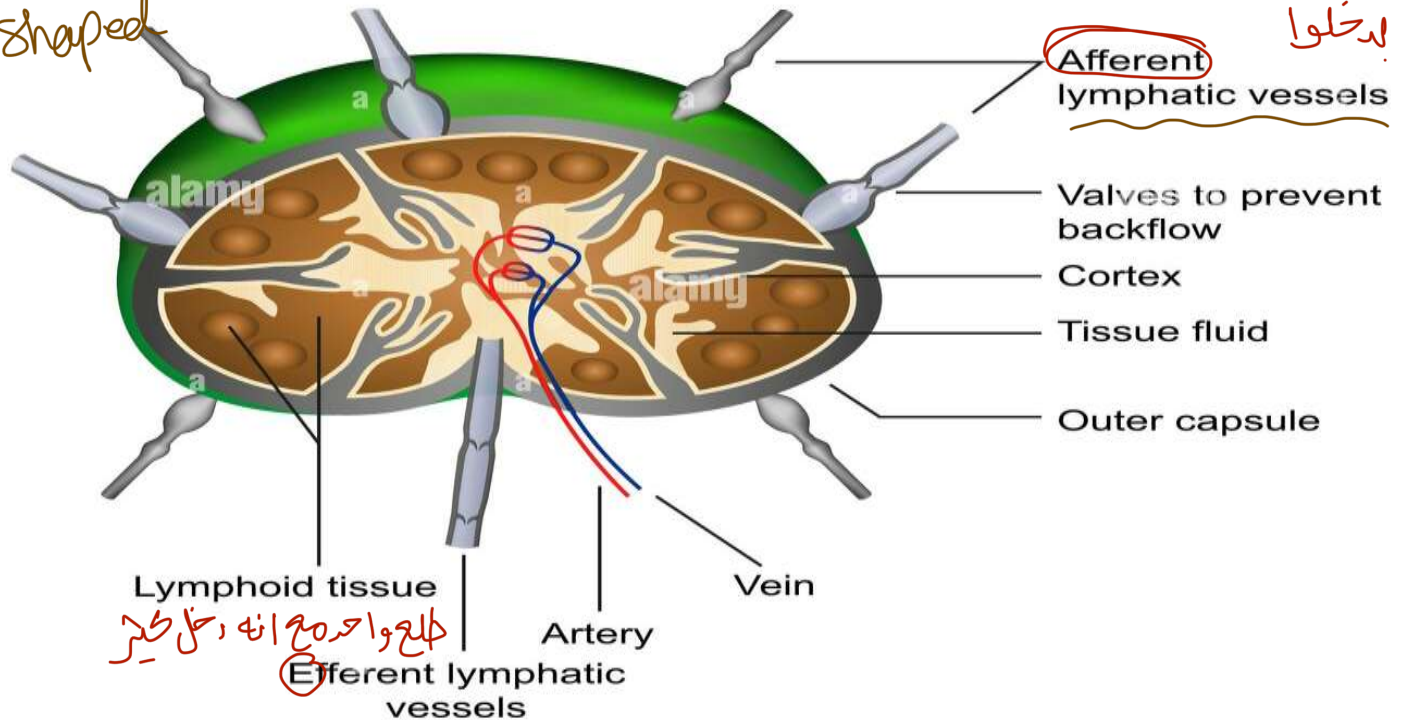
تشو ال **function** **لسمونه من هون لانه** **انججعت ما فهمت اش** **روح تشوفها القدام كمان** **ملك يدين**



Lymph nodes structure

bean shaped

بدخلوا



alamy

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

1. Antigens in the lymph are trapped and the lymphocytes in the nodes react to it and initiate the immune response.
2. Macrophages^{بختوي 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.*

← يستقل عن طريق الليمفات lymphatic vessels

The Spleen

الطحال

من اعضاء ال. le. m. secon.

شكلا

- Largest single mass of lymphatic tissue in the body. It's an oval, soft organ located in the left hypochondriac region. ← موقعها
- Its superior surface is smooth and related to the diaphragm and ribs 9,10 and 11.
ribs (9/10/11) & diaphragm ممكن تمتد لفرق لتوصل على سوا ال
False + floating
- Histologically formed of:
 - 1. ① White pulp ^{لحمية} lymphatic tissue (lymphocytes and macrophages) surrounds branches of splenic artery (the artery that supplies the spleen and enters through the hilum).
الى هو الشريان الى يترى branches splenic artery يتكون جاية حولن متماثلة
 - 2. ② Red pulp ^{خضراء} blood-filled venous sinuses surrounded by splenic cords which contain red blood cells, macrophages, lymphocytes, and plasma cells.
- Functions: ① Destruction of old red blood cells by macrophages, ② Storage of blood, ③ Filter of blood, ④ Formation of blood cells during fetal life

SPLEEN ANATOMY

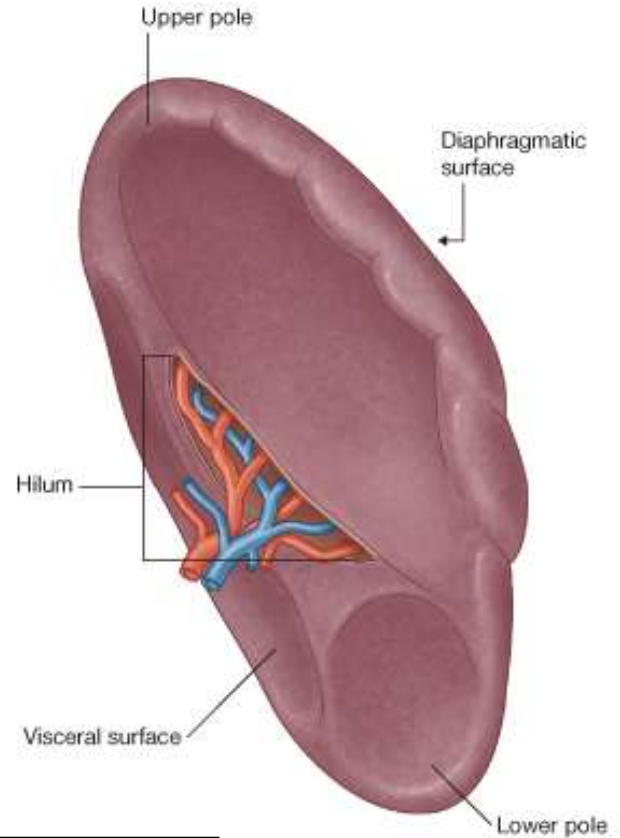
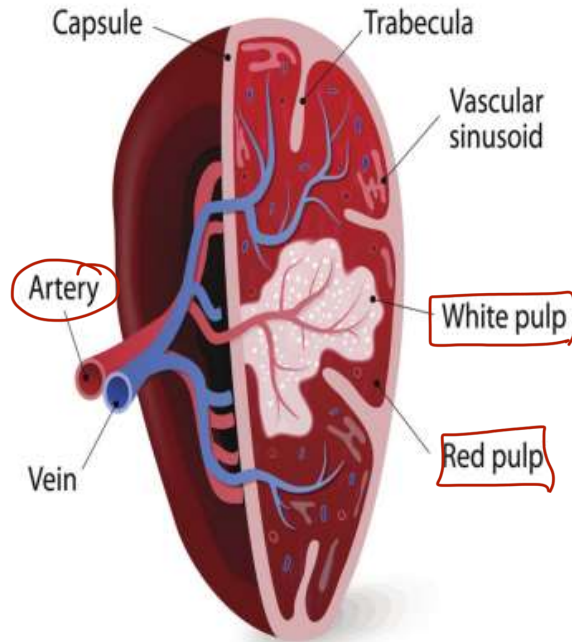


Fig.7: The spleen and its histology.

Lymphatic Nodules

حائي حولها
capsule

- Collection of lymphatic tissue not surrounded by a capsule. ليس موزعين بأماكن معينة
- 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. بعضهم كبير

بعضهم كبير
بعضهم أصغر