



جامعة الدُّنْعَاءُ

# ANATOMY

MORPHINE ACADEMY

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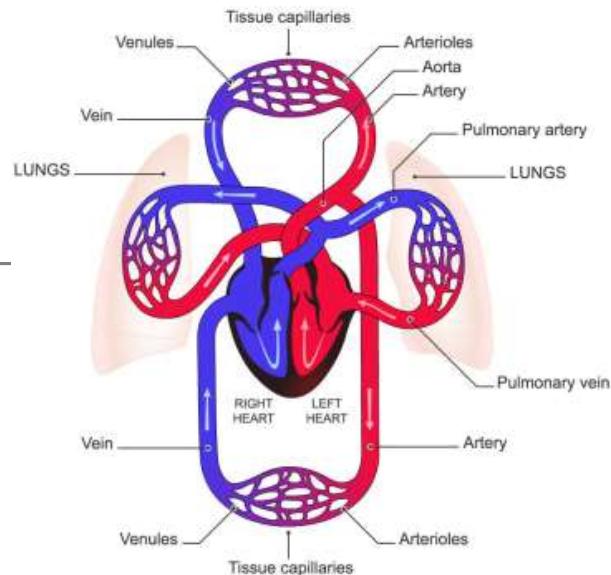
دھانی فیڈیو ۱۱ P1 کی موجود تھم ویشنٹکم ایام عالیل

# The Cardiovascular System

- ① The Blood
- ② The Heart
- ③ and The Vessels

→ موزعین body

مکونات کا  
Cardiovascular system  
بھی اپنی اکٹے ٹھہرائیو  
کہ یعنی تشویہ  
یعنی اسیم الشابی



# Blood

- Fluid connective tissue
  - ① Extracellular matrix = plasma
  - ② Cellular elements = Red blood cells, White blood cells and Platelets
- Functions: wander or static cells
  - 1) Transportation
    - Gases, nutrients, hormones, waste products
  - 2) Regulation
    - pH, body temperature
  - 3) Protection
    - Clotting, white blood cells, proteins

Platelets mainly

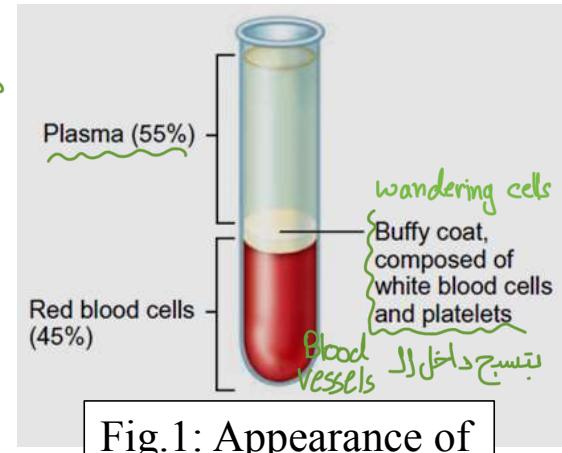


Fig.1: Appearance of centrifuged blood.

مما ينبع منه الازعجا  
ذلك الـ cells إلا إذا  
عملت centrifuged  
بعد تخلص من Plasma cells  
فـ Clotting من ناحية الكتافة  
هـ وأول حلقة دم تكون  
عـ Platelets هي لا Plasma

# Components of Blood

## Blood

### Plasma

55% of blood

نَسْلِيَّةُ  
الْأَجْعَنُ  
الْأَنْفُسُ  
Water  
91% of  
plasma

Solutes  
(mostly protein)

Proteins  
(Mostly  
Albumin)

Other  
Solutes

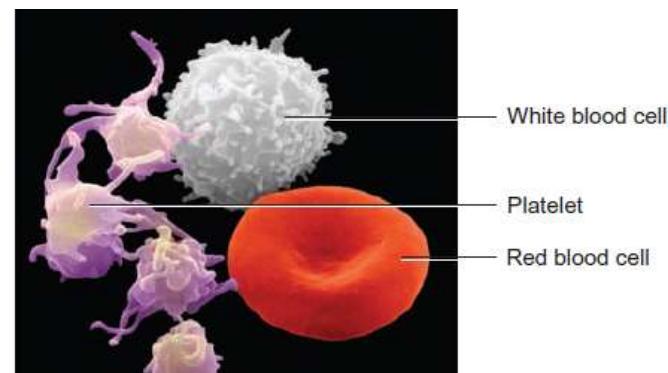
### Formed Elements

45% of blood

Red  
Blood  
Cells

White  
Blood  
Cells

Platelets



مُهِمٌ بِرَوْضَةِ بَحْرَنَ هُوَ حُوَودٌ

# Formed Elements of Blood

وَلِمَكُونِنْ مِنْ الـ Cells الْمُوْجُودَةِ دَاخِلَ الـ Blood

## Red Blood Cells/Erythrocytes

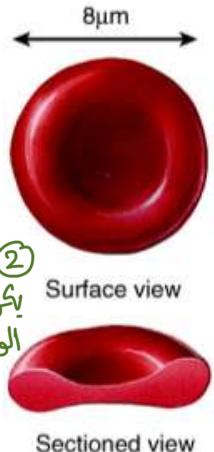
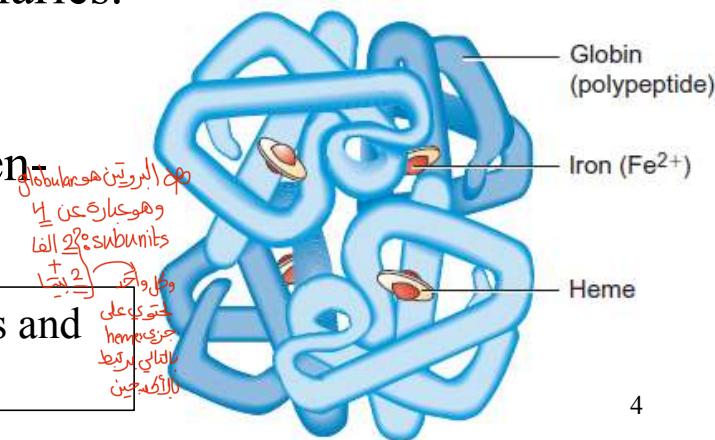


Fig.2: The shape of red blood cells and hemoglobin molecule.



# ① White Blood Cells/ Leukocytes

الخلايا البيضاء White B.C

الخلايا البيضاء من الدم

- ❖ Wandering cells: formed in bone marrow, circulate in blood and enter tissues.  
الخلايا الحرة وتحتاج إلى دماغ لدخولها  
Blood vessels  
هناك بحرين يدخلوا داخل الأنسجة
- ❖ Respond to local factors in inflammation.

function

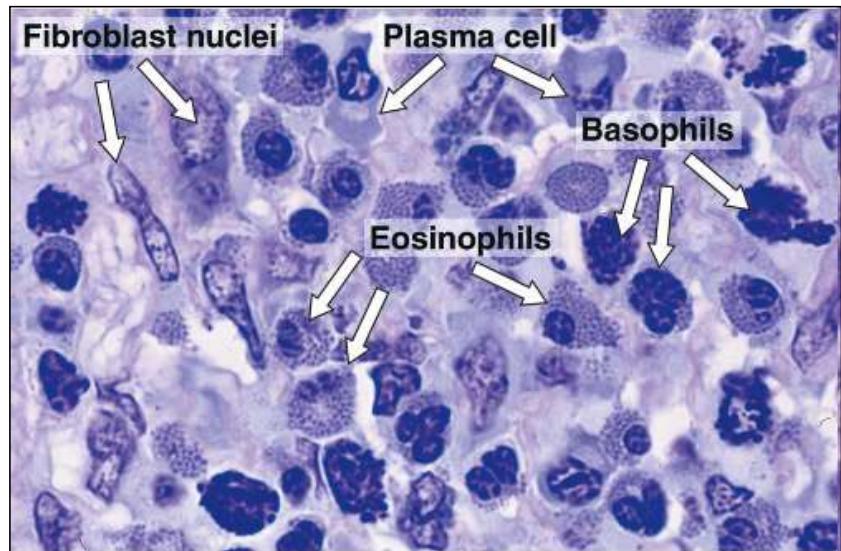
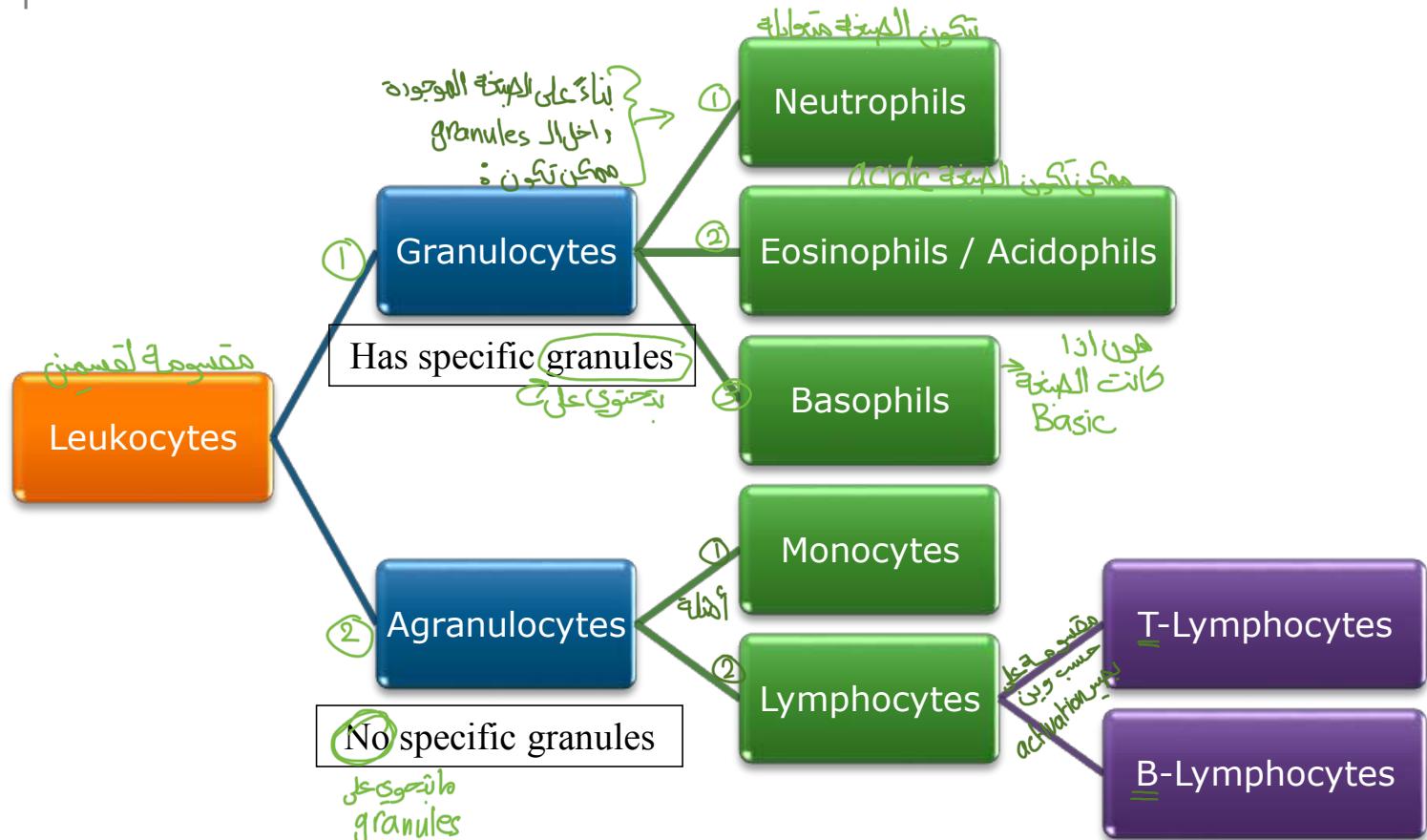


Fig.3: Leukocytes in inflamed tissue.

## Classification of Leukocytes



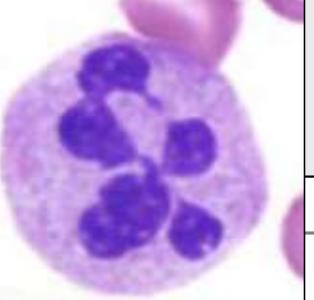
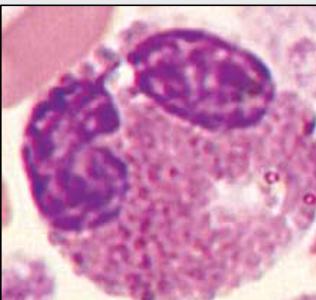
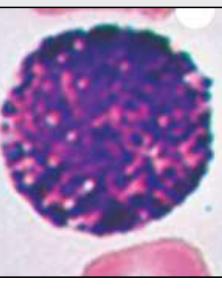
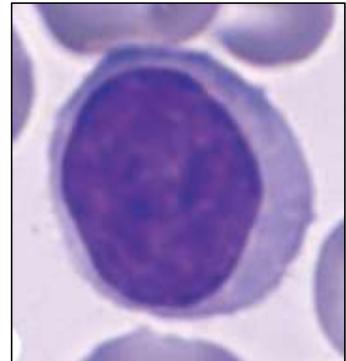
Granulocytes	① Neutrophils	② Eosinophils	③ Basophils
Abundance (% of leukocytes)	بشكل النسبة الأكبر Most common		أقل نفع Least common
Nucleus	شكل الغدة بيكون Multilobed زي المعلم الممسحة	Bilobed	S shaped (obscured by granules)
Granules	متشربة بكل الخلية Sparse and stain variably متشربة لكنها خارقة بحسب طبيعة متصاعدة	Large eosinophilic Acidic	Large basophilic Basic
Function	مسح لعنى الباقي Phagocytosis	<ul style="list-style-type: none"> <li>① Defense against parasitic infection ازماهار عنك عزي الأنسنة</li> <li>② Allergic reactions</li> </ul>	إبعاد Release of inflammatory molecules
Fig.4: Granulocytes.			

Fig.5:  
Agranulocytes.



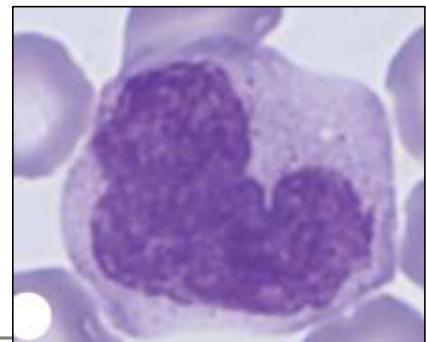
## Agranulocytes:

### Ⓐ Lymphocytes:

- ❖ Variable in size. *اللهم بأحجام مختلفة*
- ❖ Nucleus very dark and occupies most of the cell.
- ❖ **Functions:** T-cells → Cell mediated immunity.  
→ nucleus *الميوز فيهم انه الا*  
*استثنى تقوينا ماحشة اغلب جسم*  
B-cells → Antibody-mediated immunity.  
→ nucleus *استثنى تقوينا ماحشة اغلب جسم*  
*الخلية*  
*حسب وين بيسلا*

### Ⓑ Monocytes:

- ❖ Kidney or U-shaped nucleus.
- ❖ Cytoplasm basophilic.
- ❖ **Function:** formation of macrophages.  
*مسؤولة عن انتاج الـ*



# ③ Platelets/ Thrombocytes

# ABO Blood Group

بالنسبة لمن هم الدم  
عند الذين لا يحسنون

- Blood group is type of blood designated to a person based on the presence/absence of an antigen on the surface of RBCs.
- The ABO blood groups are based on the A and B antigens.
- Reason for antibodies presence not clear.

رُسْمَةُ الدَّم بِحُكْمِ مُنْعَلِّمٍ فِيهَا بُنْعَلِّمُ antigen اَنْتِجَانُ الْRBC، اَنْتِجَانُ عَلَى سُطْحِ

Blood Type	Antigen on RBCs	Antibody in Plasma
A	A	Anti-B
B	B	Anti-A
AB	A & B	None
O	None	Anti-A & Anti-B

Fig.6: Antigens and antibodies in the different blood groups.

BLOOD TYPE	TYPE A	TYPE B	TYPE AB	TYPE O
Red blood cells	A antigen	B antigen	Both A and B antigens	Neither A nor B antigen
Plasma	Anti-B antibody	Anti-A antibody	Neither antibody	Both anti-A and anti-B antibodies

فلا مانع لتبسيع  
بالدم + -  
O بخطي الحال  
AB بخطي الحال

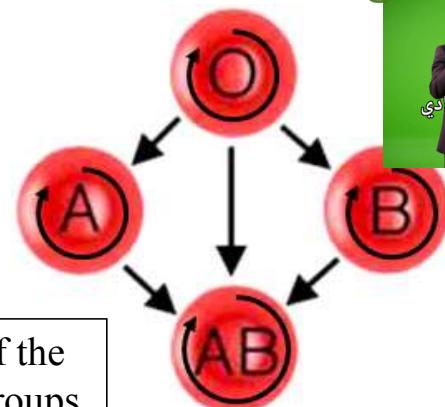


- Each blood group can give to itself
- *AB* is the ***Universal Recipient*** حاله بخطي ايسن
- *O* Is the ***Universal Donor*** يدخل الحال

-O  
هو الممنوع

بالنسبة للعامل الريبيسيون  
يجري + و - فقط

Fig.7: Relation of the different blood groups.

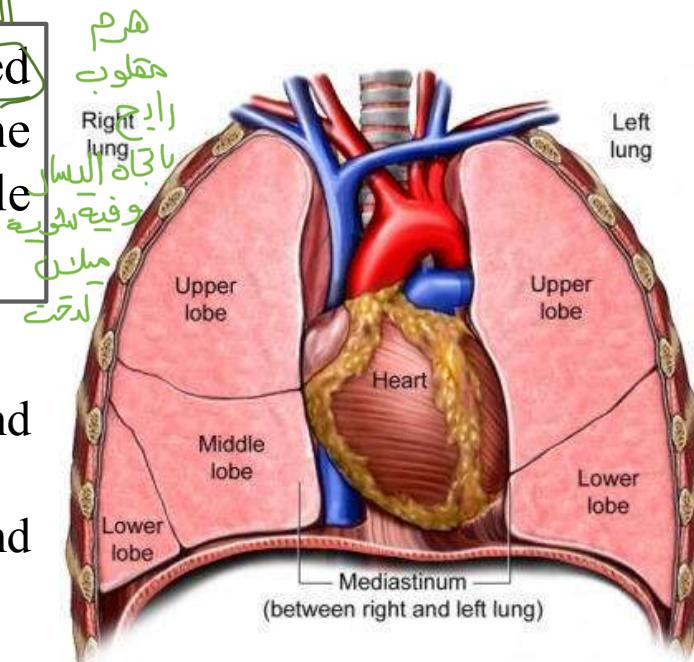


# The Heart

الكون الثاني  
 CVS. ملار

muscular structure of the Heart

A hollow pyramidal shaped muscular organ located within the pericardium in the middle mediastinum in the thoracic cavity.



The heart features:

- 3 surfaces (anterior, inferior and posterior).
- 4 borders (right, inferior, left and superior).
- 1 Apex. القمة
- 4 chambers (right and left atria and ventricles). حجوة

Fig.8: Position of the heart in the chest.

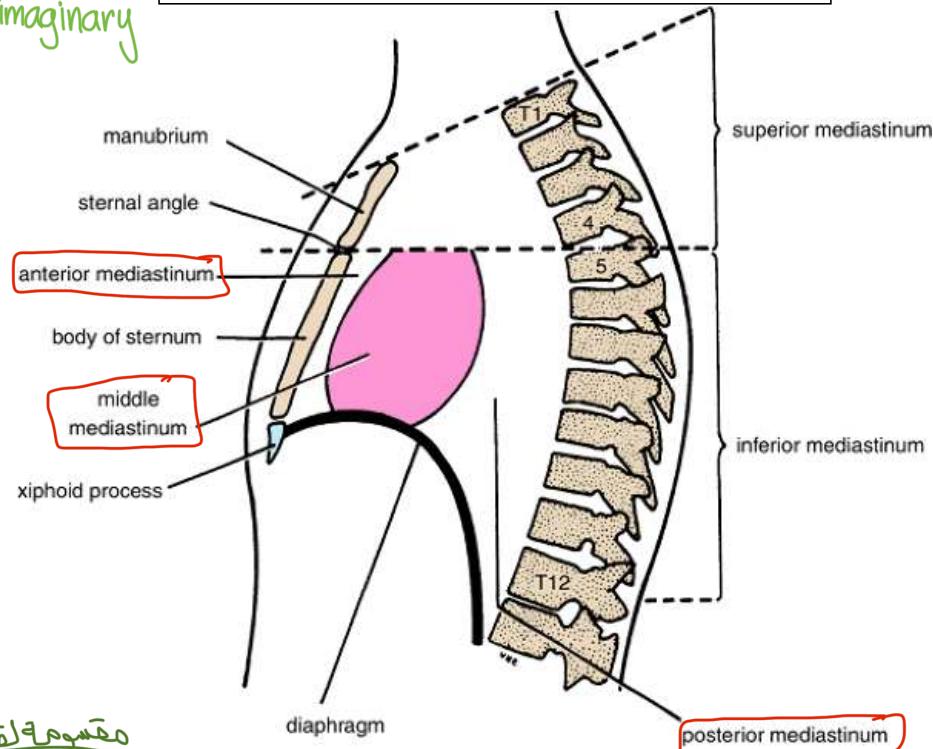
# The Mediastinum:

منطقة موجودة داخل الصدر (الصدر) يمتد من العنق  
من أعلى النصبة لوراسيل انتيليت أو اورتيليت وينتهي لتحت  
الحجاب الحاجز (diphragm).

هذا هي خطبة  
imaginary

- A midline region that extends from the thoracic outlet to the diaphragm. It's bounded by:
  - Anteriorly:** Sternum
  - Posteriorly:** Thoracic vertebrae
  - Laterally:** Lungs and pleurae
  - Inferiorly:** Diaphragm
- The mediastinum is divided into superior and inferior parts by a plane passing from the sternal angle to the lower border of T4. The inferior mediastinum is divided into anterior, middle and posterior parts by the pericardium.

Fig.10: Lateral view of the mediastinum after removing the lung.



النظر الضرورة

# The Pericardium

الخنادق الريحية  
بالـ Heart

- Membrane surrounding and protecting the heart. Formed of 2 main parts:

فهي مقسمة إلى قسمين :-

① الأجنحة الخارجية اسمها

Outer **Fibrous pericardium**: tough layer that protects the heart and anchors it in place.

② الأجنحة الداخلية اسمها

Inner **Serous pericardium** (simple squamous epithelium): thin more delicate membrane. Formed of the parietal layer fused to fibrous pericardium and the visceral layer which is the epicardium.

الـ Parietal الـ هو الجدار  
الـ epicardium الـ هو الجلد

يكون جزءاً من الداخل  
والـ الـ اسم الثاني الذي هو  
epicardium الـ

- Between the two serous layers we have the **pericardial cavity** that's filled with the pericardial fluid **to reduce friction**.

الـ Fluid الـ ملءان بالـ space

pericardial cavity  
space

# Layers of the heart wall

→ very thin الاخفي

1. **Endocardium:** Inner layer of the heart. Lined by endothelium (simple squamous epithelium) continuous with that of the blood vessels.

حصوية  
من نفسها نفس  
البيجي على الـ  
Blood vessels

↓  
الواسط

muscles

2. **Myocardium:** The thickest layer of the heart. Formed of cardiac muscle cells.

آخر طبقتين بعدها  
3. **Epicardium:** The outermost layer. The same as the visceral pericardium.

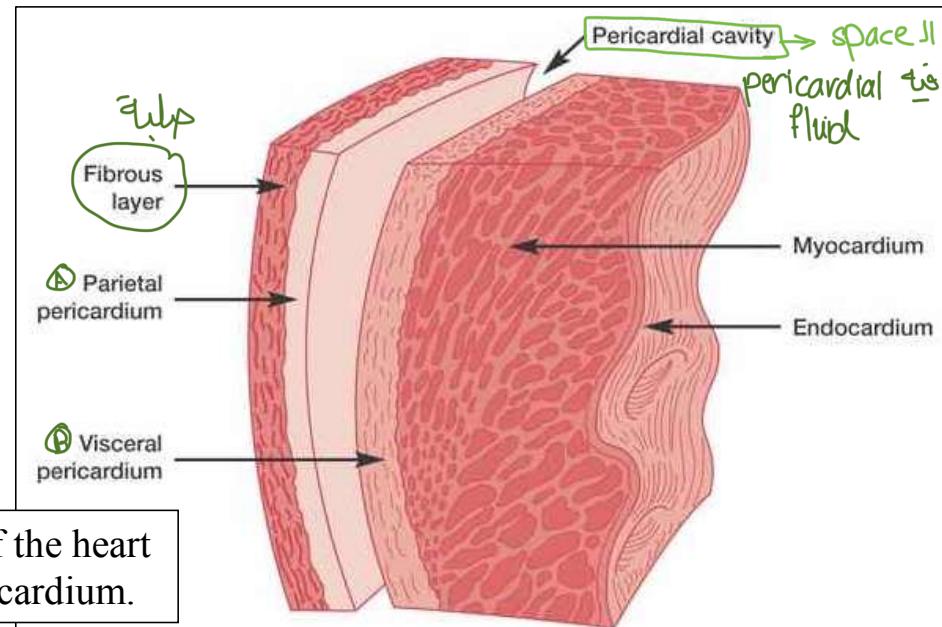


Fig.11: Layers of the heart wall and the pericardium.

# Surfaces of the heart

## ① Anterior Surface:

- Formed by the:
  - Right atrium
  - Right ventricle
  - Left ventricle

Anterior  
الجانب الأمامي

- Related to the sternum.

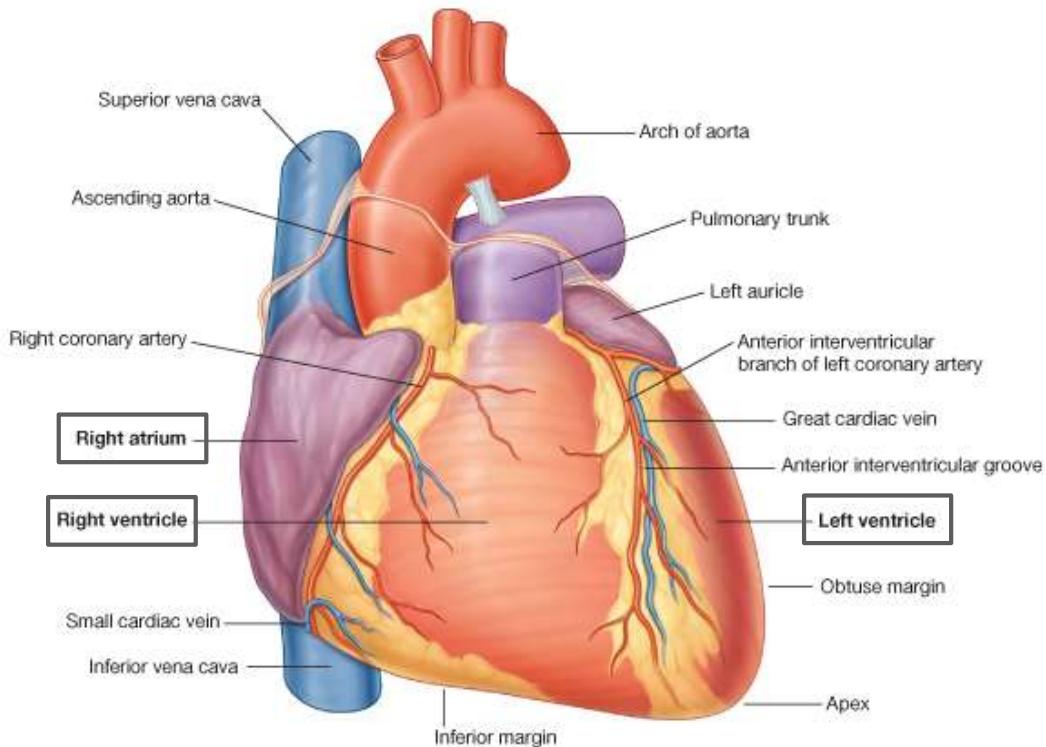
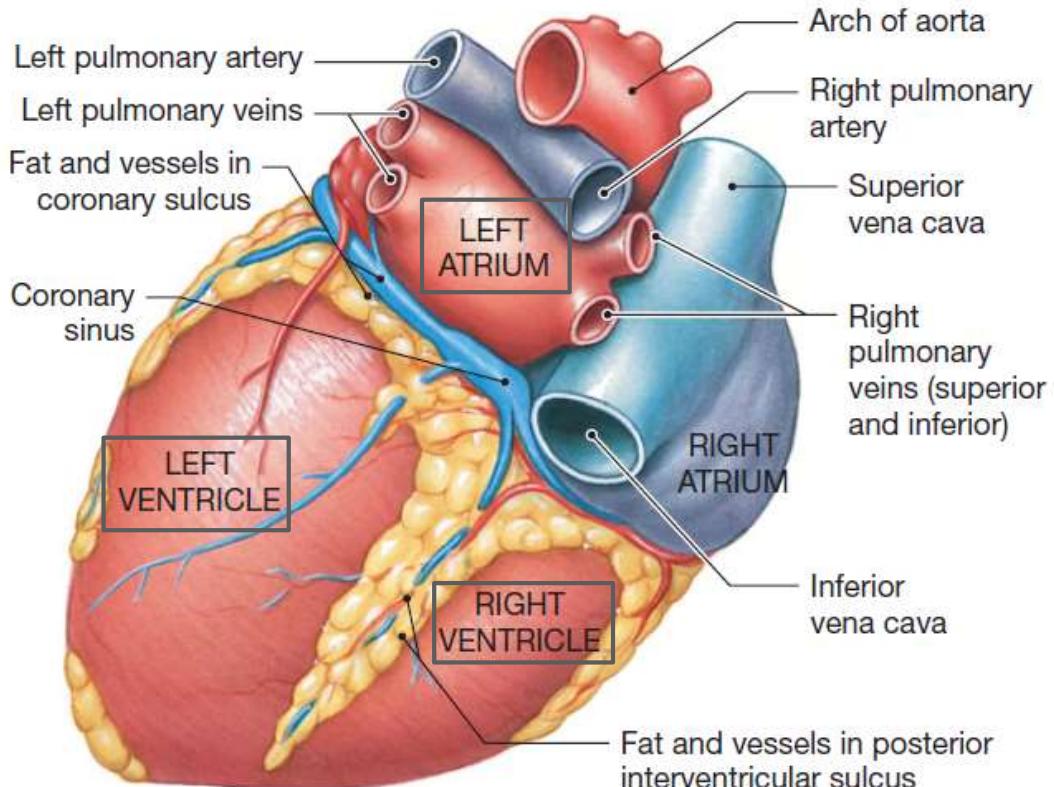


Fig.12: The anterior surface of the heart.

## ② Posterior Surface (Base):

- Formed by the:
  - Left atrium
- Related to the esophagus

Fig.13: The posterior and inferior surfaces of the heart.

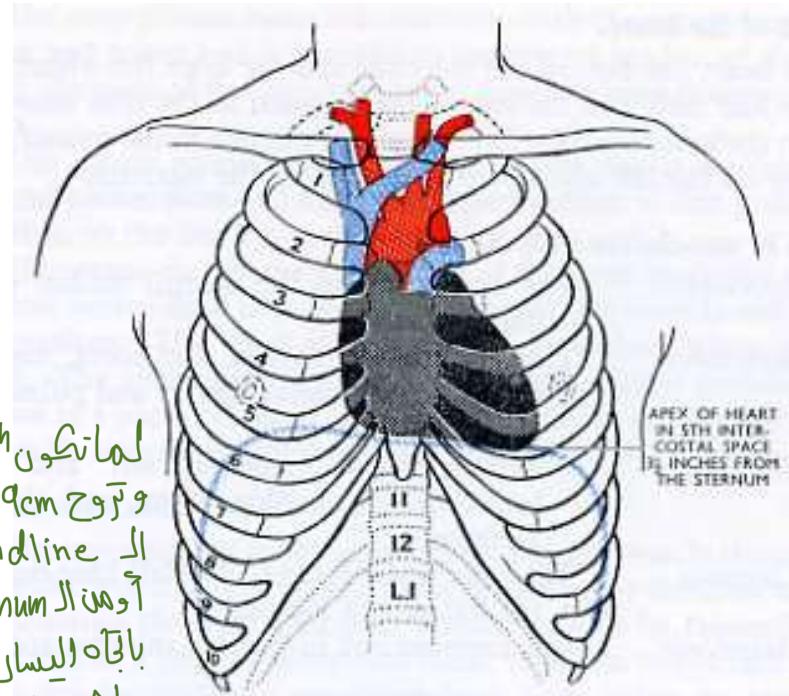


## ③ Inferior Surface:

- Formed by:
  - Right ventricle
  - Left ventricle
- It's the surface upon which the heart rests on the diaphragm.

# Apex of the heart

- Formed by the left ventricle.
- Directed downwards, forwards and to the left.
- Located at the left 5<sup>th</sup> intercostal space 9cm from the midline.
- Can be felt by palpation.



الطب المبسط للطب

5<sup>th</sup> مابين السطرين  
9cm من خط  
النطاق العلوي  
الخط الوسطي  
النطاق العلوي  
خط العضلات  
خط العضلات

Heart Apex على الخط العلوي  
، يقدر بـ 9 سم  
من خط العضلات

Fig.15: Location of the apex of the heart.

# Chambers of the heart

- 2 atria – receiving chambers
  - Auricle: small pouch that increase capacity of atria
- 2 ventricles – pumping chambers
- Sulci – grooves on the surface of the heart that contain the coronary blood vessels.

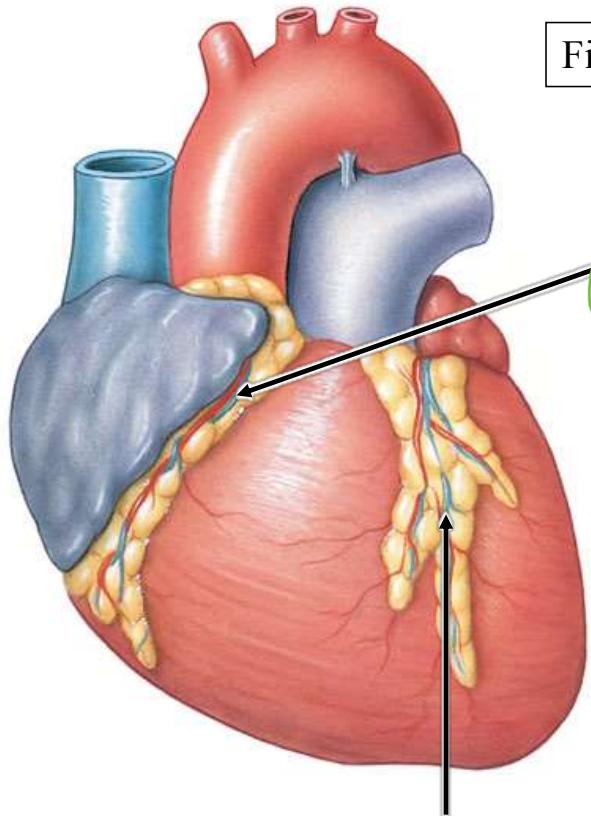
١. ***Coronary sulcus***: separating the **atria** from the **ventricles**.

٢. ***Anterior interventricular sulcus***: between the two ventricles **anteriorly**.

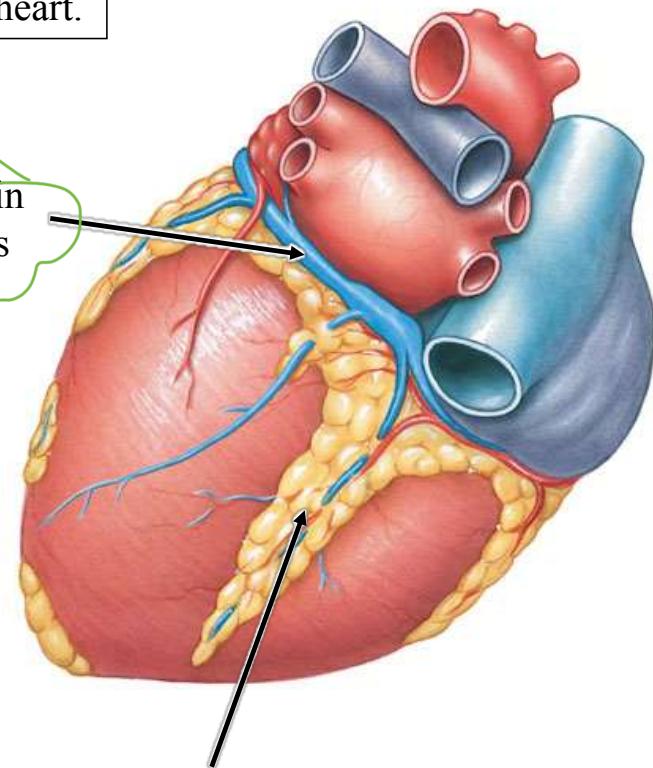
٣. ***Posterior interventricular sulcus***: between the two ventricles **posteriorly**.

fat **بِحُوْنِ sulci**

Fig.16: Sulci of the heart.



Fat and vessels in anterior  
interventricular sulcus



Fat and vessels in posterior  
interventricular sulcus

Anterior view

Posterior view