

- * we have 3 kinds of muscles:-
 - skeletal
 - smooth
 - cardiac (heart)

↑ refers to heart
- * main function of heart → pumping blood

deoxygenated blood enters heart → goes to body → oxygenated blood leaves body → to the lungs

D) oxygenation ج) oxygenated blood in the body

2) metabolism:-

 - ATP catabolism
 - ATP synthesis

→ ATP من حيويات

heart = healthy heart → ألم

- site → middle of the chest
- size → as a fist
- weight → 300 g (maximum)
- Beats → 60-80/min (normal heart rate)

beat > 80 → tachycardia

beat < 60 → bradycardia

athlete جسم عادي مثل *

beat less than 60 وال athlete أقل من 60 *

healthy heart ملحوظة على *

pumps 5-6 L throughout the body

from heart إلى جميع أنحاء الجسم *

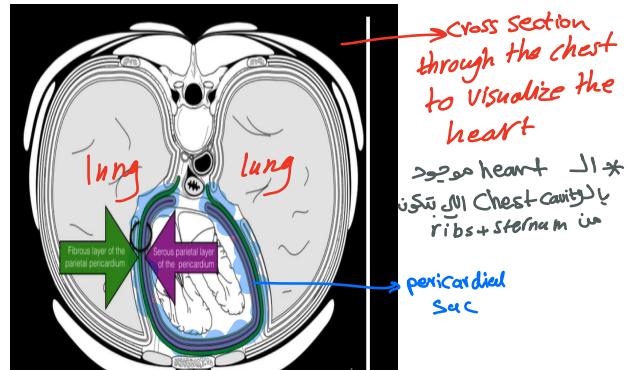
(5-6)L من pomping لـ (5-6) لـ *

لـ (5-6) L من pomping يـ (5-6) لـ *

heart isn't healthy إلى pumping action لـ *

heart isn't healthy إلى pumping action لـ *

* the heart should pump the whole blood which come to it



there is a very important layer surrounded the heart (pocket of the heart) → pericardial sac

around heart pocket

* the heart is between 2 lungs

* Under the heart directly there is a diaphragm → an inspiration muscle جسم

Chest volume ↓ (increasing by getting down, decreasing by getting up)

* the function of the heart (جهاز تنفس) respiratory system

respiratory system heart جهاز تنفس بالقلب، اذن بالقلب، دماغ بالقلب، دماغ بالقلب

pericardial SAC → double layer

facing the heart directly
visceral

الجانب السفلي
Parietal

pericardial space → between the two layers contain a fluid (pericardial fluid)

كثير ماء
قليل سائل

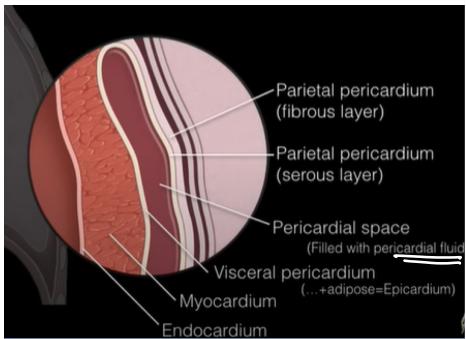
2 layers 1. parietal

1 - fibrous (the most superficial) بشرى

2 - serous (deep to the fibrous layer) سيروس

يتكون جسم سوئ - زجاج ماء و اخون (السوئ)

inside the parietal heart لـ
 pericardial sac surround the heart لـ
 الحجر هو اول جدار



Endocardium → it's look like the epithelium of the blood vessels → it's the first layer faces the blood

Myocardium → muscles + it present 99% of the heart layers (لباقي الـ 1%)

visceral pericardium

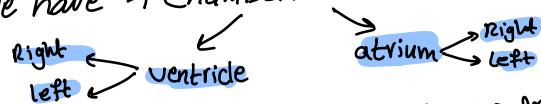
pericardial space

parietal pericardium (serous)

parietal pericardium (fibrous layer)

Heart Chambers → right left atrium / ventricle (as a one organ) Clinically قوية واحدة ولكن مع
 the right side of the heart has a function & the left side of the heart has a function

We have 4 Chambers in the heart



* the atrium is smaller than the ventricle موجود بالذات

base: rich in vessels

* the heart have apex

* vein: blood vessel that take the blood to the heart

* artery: blood vessel that take the blood away from the heart

Superior vena cava → take all the deoxygenated blood that coming above the diaphragm
inf. vena cava → take all the deoxygenated blood that coming below the diaphragm

Coronary sinus → a very great blood vein that take all the non-oxygenated blood from the heart to the right atrium

Sup & inf. Vena Cava + Coronary sinus → large great vessels in the chest heart كما هو من الاكتاف قد اتي و اتطبع على Anteriorly ذيل انتي رأسه من امام Right atrium . Right border of heart

* The function of the right border of the heart: taking the whole deoxygenated blood from below & above the diaphragm & from the heart itself.

* لوردي افتتح اول موجود على الجانب (lateral side) حفاظ عن fossa ovalis

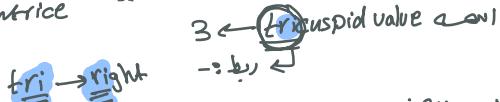
remnant foramen ovale شيكون بلا دخل fetus، يتكون شيكون دخول الى right atrium left atrium لـ fetus لـ right atrium شيكون موجودة في adult heart

* بالـ balloon عصان يفتح الى right atrium يقلل يفتح الى blood myocardium elasticity عصان حيث عصان ينطبق على myocardium myosin و تحصل contraction عصان مثل cross bridging كل ما دخل blood لا يخرج من عصان stretching عصان blood ليس له heart maximum stretching of the myocardium in the right atrium

blown up نوع next step الـ deoxygenated blood Right ventricle يحوله من Right atrium الى

* there is a large difference in size between the right atrium & ventricle حجم اكبر في right atrium

right atrium مع اخر الى هو بين الـ Valve Ventricle



Atrio - Ventricular = AV valve الاسم الـ AV، الـ

Function: Prevent back flow of blood

backflow during the systole of the atrium

عمرطة بفتحها Cardiac cycle

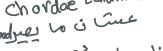
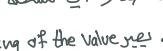
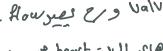
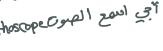
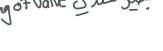
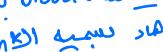
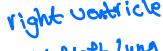


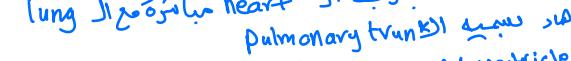
Contraction of myocardium called → systole
relaxation " " " → diastole

* Structure of valve

- [1] Papillary muscle is a projection of myocardium
- [2] at the papillary muscles there is a loose connective tissue called: chordae tendinae → 

mechanism :-

الآن نفتح الـ ventricles لـ blood 
الـ valve papillary muscle  back flow of the blood 
إذا صار أى مكعب  انتفاخ بـ chordae tendinae  closing of the valve 
الـ back flow  valve 
regurgitation of heart 
لـ  during atrium systole by the stethoscope 
 S1 Sound 
(الصوت الطبيعي الذى ينبعث)

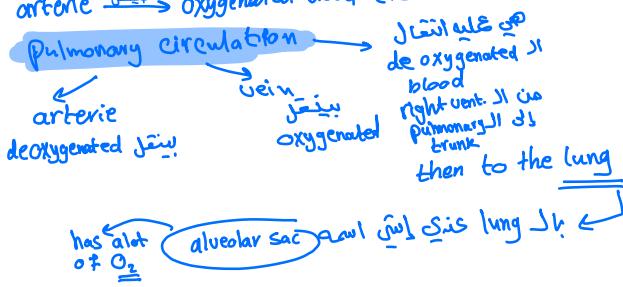
Right pulmonary artery → Right lung

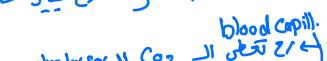
Left pulmonary artery → left lung

-   

Vein deoxygenated blood (blue color)

artery oxygenated blood (red color)



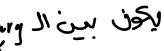
O₂ & CO₂ exchange occurs yes رجوع يس بـ blood capillaries 

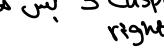
alveolar sac  CO₂  و تأثر الـ O₂ 

pulmonary veins  

exactly to the left side (atrium then ventricle)

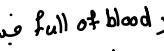
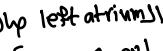
* the pulmonary veins are in the posterior side of the heart
* the pulmonary arteries are in the anterior side of the heart

* the most anterior part of the heart → Right ventricle
Right ventricle & pulmonary valve 

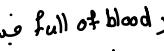
ويكون متكون من 3 cusps  right side

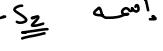
tricuspid  valves 

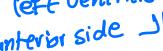
يـ الـ 3 valves  left side

bicuspid  valves 

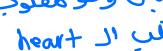
الـ pulmonary valve  anterior side 

semilunar valves  anterior side

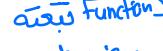
يـ full of blood  left atrium  valve 

during atrium distole  left ventricle  bicuspids value 

يـ left ventricle  left anterior side 

يـ cross section  heart 

Mitral valve  زـ زـ Mitre valve 

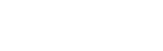
يـ left side  heart 

يـ apex  base  (apex  base  heart)

يـ left side  heart 

Mitral   left side 

يـ valve  function  heart 

يـ valve  mechanism  heart 

* The left ventricle pumping the blood to the Aorta

again we have another valve called

Aortic Valve
or
Semilunar Valve
نفس الـ

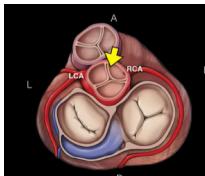
pulmonary valve

* Function → prevent the back flow of the

blood from the aorta to the left ventricle
عندما لا يمتنع في الأذن
injection) rule to heart
left side of the heart
يادع عددها تكون في مجموعاً بالـ

Injection fraction

Aortic Valve \rightarrow in the center between pulmonary
valve \rightarrow above
+ tricuspid \rightarrow right side
+ bicuspid \rightarrow left side



left ventricle \rightarrow ستوه من الجاهز

anteriorly \rightarrow منه

Posteriorly \rightarrow كبير

atrium & ventricle س�ارن الـ thickness

Ventricle is thicker

لأنه هو الذي يتحمل وظيفة تأمين
more thickness

atrium & ventricle سـ pressure

atrium \rightarrow 20 mm Hg

Ventricle \rightarrow 80 mm Hg

Ventricle = 4 atrium

Ventricle Volume \rightarrow بـ

كـ
Volume
pressure

لهـ داخـنا حـكـيـنا عن

pulmonary circulation \rightarrow systemic circulation

Coronary circulation \rightarrow Circulation

2 نـ خـيـر كـافـ

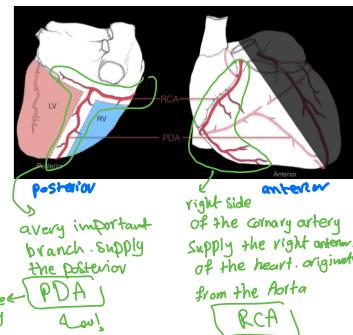
تبـ كـافـ

الـ Myocardium يـخـيـر Coronary arteries
Cardiac veins يـخـيـر deoxygenated blood

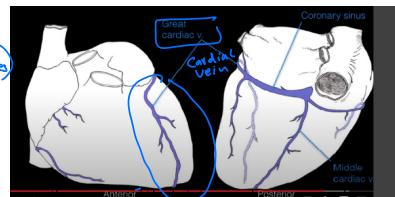
Coronary Veins \rightarrow Coronary circulation
Cardiac Veins \rightarrow left

Aorta \rightarrow Coronary artery
Coronary sinus \rightarrow a and groove
وـ يـخـيـر myocardium \rightarrow oxygenation

Coronary artery \rightarrow
مسـول عن تـخـيـر
right side \rightarrow
of the heart



Coronary
Veins \rightarrow (with very
small branches)



Coronary Veins \rightarrow (Coronary veins)
Posterior side

Coronary Veins \rightarrow (Coronary veins)
Posterior side