

Blood supply of the heart

Editing file

Cardiovascular block-Anatomy-Lecture 5



Objectives

Color guide :

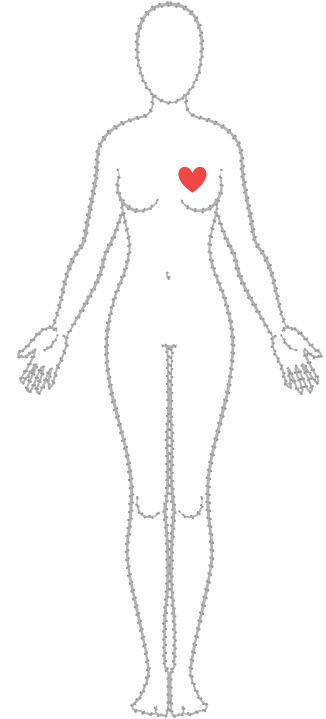
Only in boys slides in **Green**

Only in girls slides in **Purple**
important in **Red**

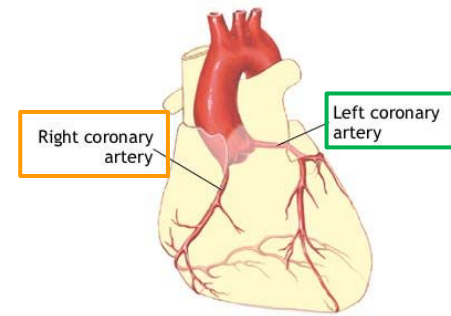
Notes in **Grey**

By the end of the lecture you should be able to describe:

- The arterial supply of the cardiac muscle regarding (**origin, course, distribution and branches**).
- The coronary anastomosis.
- The arterial supply to the conducting system of the heart.
- The venous drainage of the heart regarding (**origin, tributaries and termination**).



Arterial Supply of the heart



ADAM.

- ❑ The arterial supply of the heart is provided by
 - Right coronary artery
 - Left coronary artery
- ❑ They are distributed over the cardiac surface, within the **subepicardial connective tissue**
- ❑ **Origin of coronary arteries :**
They arise from the initial part of the Ascending Aorta (**Aortic Sinus**), immediately above the aortic valve. **aortic sinuses:** three dilatations at the base ascending aorta

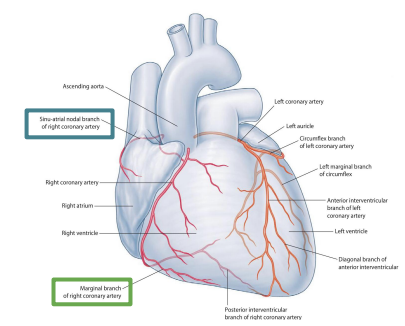
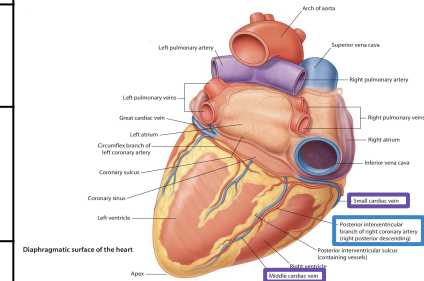
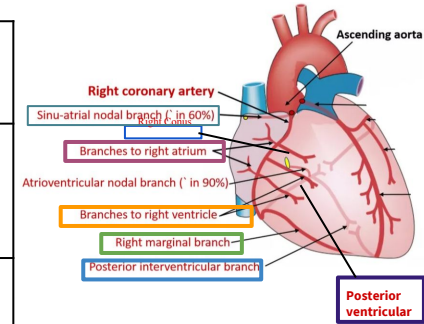
Right Coronary Artery

Origin	Course	Supplies
<p>Arises from the anterior aortic sinus of the ascending aorta.</p>	<ul style="list-style-type: none"> ● Descends in the right atrioventricular groove between the Right Auricle and the Pulmonary trunk. ● At the inferior border of the heart it is continuous posteriorly along the atrioventricular groove to anastomose with the left coronary artery in the posterior interventricular groove. 	<ul style="list-style-type: none"> ● Right atrium ● Right ventricle ● part of Left Atrium ● Left ventricle ● Atrioventricular septum ● Most of conducting system

Branches of Right Coronary Artery

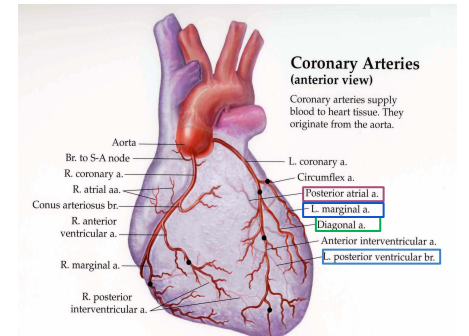
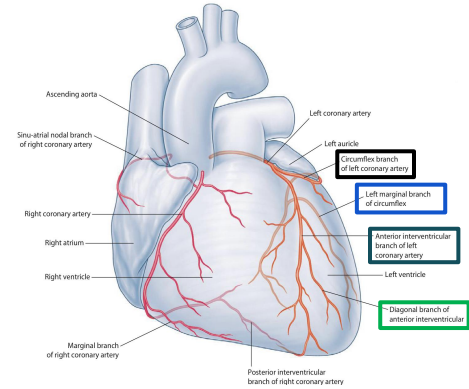
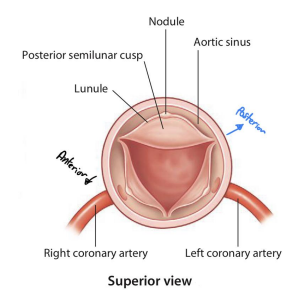
Right Conus	Course: To the infundibulum and upper part of anterior wall of the right ventricle.
Marginal artery (The largest branch)	Course : runs along the lower (inferior) margin of the sternocostal surface toward the apex. It is accompanied by the Small Cardiac vein.
Anterior ventricular (2-3 branches)	Supplies: anterior surface of the right ventricle.
Posterior ventricular (2 branches)	Supplies: the diaphragmatic surface of the right ventricle
Atrial branches	Supplies: -Anterior and lateral surfaces of the right atrium, -Posterior surface of both atria.
Artery of the Sinoatrial Node (SAN)	Supplies: the SAN and both atria In 35% it arises from the left coronary.
Posterior Interventricular artery (PIA)	Runs toward the apex, to supplies: -Diaphragmatic surface of the R & L Ventricles. - Septal branch to the AVN - Posterior part of ventricular septum, (except Apex) Course: -(accompanied by Middle Cardiac vein) -Lies in the posterior interventricular groove

Variations of the Coronary Arteries
-Right dominance: In (90 %) of population, the **PIA** is a branch of the Right Coronary.
-Left dominance: In (10%), the **PIA** arises from the Circumflex branch of the Left Coronary



Left Coronary Artery

- ❑ The **Larger** of the two coronaries.
- ❑ **Origin:** Arises from the **left posterior aortic sinus** of the ascending aorta.
- ❑ **Course:** Passes forward between the pulmonary trunk and the left auricle. Then enters the atrioventricular groove
- ❑ Divides into two branches:



Anterior interventricular artery

- Descends in the anterior interventricular groove toward the apex of the heart
- in most individuals it passes around the apex and **anastomoses** with the right coronary in the posterior IV groove, in one third ends at the apex
- **Supplies** major part of the heart including Right and left ventricles and Anterior part of Ventricular Septum
- It gives :
 1. **Left diagonal artery** ; one of the Ventricular branches, or may arise from trunk of the left coronary
 2. **Left conus artery**: for pulmonary conus.

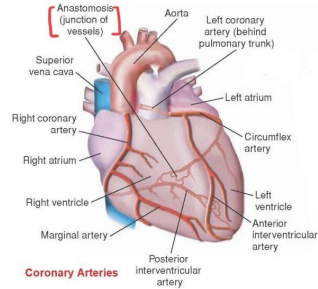
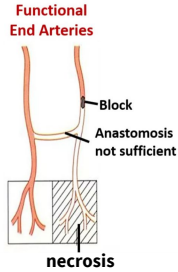
Circumflex artery

- Winds around the left margin of the heart in the atrioventricular groove
- it gives:
 1. **Left Marginal artery** to the left margin of the left ventricle till the apex.
 2. **Anterior ventricular and Posterior ventricular branches***: to the left ventricle
 3. **Atrial branches***: to the left atrium.

*Based on girls slide these branches arise from the Anterior interventricular artery But Based on our reference they arise from circumflex artery

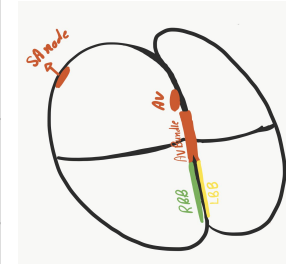
Coronary Anastomosis

- In **MOST** of people, the terminal branches of the right and left coronaries **anastomose in the posterior part of the IV groove**
- However this anastomosis is not large enough to provide adequate blood supply in case of coronary occlusion, (**Functional End Arteries**)



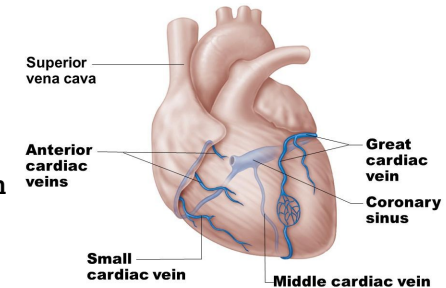
Arterial Supply of Conducting System

Right coronary	<ol style="list-style-type: none"> 1. SA node (SAN) 2. AV node (AVN) 3. AV bundle (AVB)
Both	<ul style="list-style-type: none"> • Left bundle Branch (LBB) of (AVB)
Left coronary	<ul style="list-style-type: none"> • Right Bundle Branch (RBB) of (AVB)



Venous drainage of the heart

- ❑ **Most Blood of the heart** is drained into the right atrium through **Coronary sinus** which is Lies in the posterior part of the AV groove
- ❑ It opens left of the IVC opening and Its guarded by a valve.
- ❑ **Coronary sinus Origin** : It is the direct continuation of the Great Cardiac Vein.
- ❑ **Coronary sinus Tributaries**: Great, Middle ,Small Cardiac Veins and Oblique vein of left atrium (vein of Marshall)
- Veins Draining outside Coronary Sinus:
 1. **Anterior cardiac veins**: Open directly into the Right Atrium.
 2. **Venae Cordis minimae** (small cardiac veins): Open into the heart chambers



MCQs

Question 1: Which of the following arises from the anterior aortic sinus?

- A. Right coronary artery
- B. Anterior Interventricular
- C. Circumflex artery
- D. Left coronary artery

Question 2: Which of the following lies in the Posterior part of the AV groove?

- A. Left coronary artery
- B. Marginal artery
- C. Right coronary artery
- D. Coronary sinus

Question 3: _____ accompanied by Middle Cardiac vein?

- A. Posterior Interventricular artery
- B. Circumflex artery
- C. Marginal artery
- D. Anterior Interventricular artery

Question 4: _____ lies between the pulmonary trunk and the left auricle?

- A. Anterior Interventricular
- B. Circumflex artery
- C. Right coronary artery
- D. Left coronary artery

Question 5: left coronary artery Arises from ?

- A. Left posterior aortic sinus
- B. Anterior aortic sinus
- C. Right posterior aortic sinus
- D. None above

Question 6: left bundle branch is supplied by ?

- A. Left coronary artery
- B. Right coronary artery
- C. Both a&b
- D. Conus artery

Question 7: which structure drains most of Venous blood of the heart ?

- A. Coronary sinus
- B. Circumflex branch
- C. Right coronary artery
- D. Left coronary artery

Question 8: which structure drains outside coronary sinus?

- A. Great cardiac vein
- B. Anterior cardiac vein
- C. Middle cardiac vein
- D. Small cardiac vein

Team members

Boys team:

- Faisal Alqifari
- Salman Alagla
- Ziyad Al-jofan
- Ali Aldawood
- Khalid Nagshabandi
- Omar Alammari

Team leaders

- ★ Abdulrahman Shadid
- ★ Ateen Almutairi

Girls team :

- Ajeed Al Rashoud
- Taif Alotaibi
- Noura Al Turki
- Amirah Al-Zahrani
- Alhanouf Al-haluli
- Sara Al-Abdulkarem
- Rawan Al Zayed
- Renad Al Haqbani
- Nouf Al Humaidhi
- Jude Al Khalifah
- Nouf Al Hussaini
- Alwateen Al Balawi
- Rahaf Al Shabri
- Danah Al Halees
- Rema Al Mutawa
- Amirah Al Dakhilallah
- Maha Al Nahdi
- Ghaida Al Braithen

THANKS!



Anatomy team
med 438

Contact us:

