

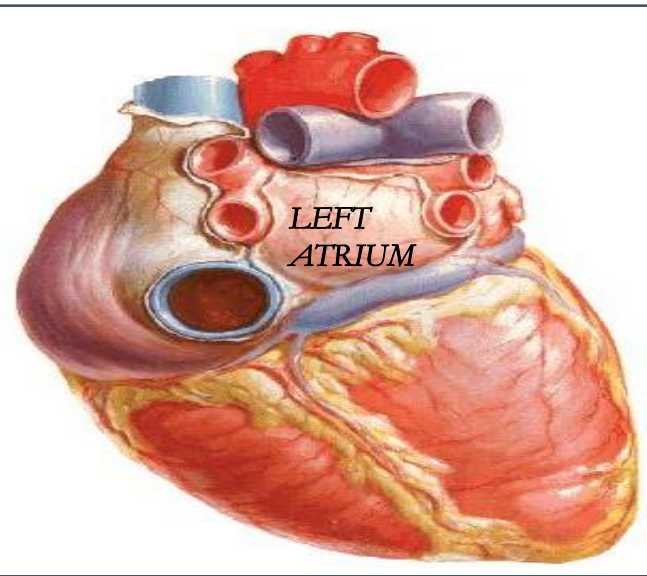


*Respiratory Block*  
**ANATOMY**  
team 435

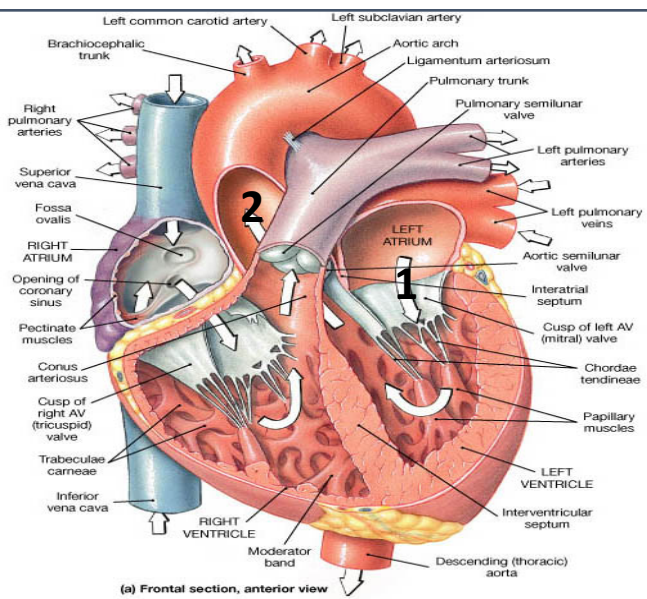
C O L O R C O D E S

- IMPORTANT NOTES
- EXTRA NOTES
- DEFINITION

# Left atrium of the heart



- It forms the greater part of **base of heart**.
- Its wall is smooth except for **small musculi pectinati** in the left auricle.
- Receives **4 pulmonary veins** which have no valves.



- The **left atrium** communicates with;
  - 1- **left ventricle** through the **left atrioventricular orifice** guarded by **mitral valve (Bicuspid valve)**.
  - 2- **aorta** through the **aortic orifice**.

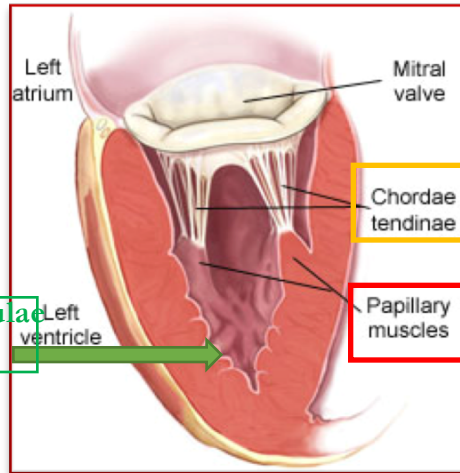
# Left ventricle of the heart

1

The wall:

- thicker than that of right ventricle.
- contains **trabeculae carneae**.
- contains **2 large papillary muscles** (anterior & posterior). They are attached by **chordae tendinae** to cusps of mitral valve.

trabeculae carneae

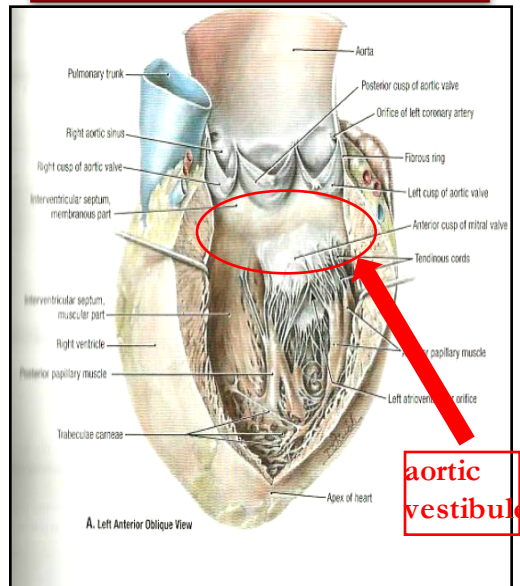


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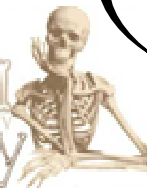
- It receives blood from left atrium through left atrio-ventricular orifice which is guarded by **mitral valve (bicuspid)**

3

- The **blood** leaves the **left ventricle** to the **ascending aorta** through the **aortic orifice**.
- The **part of left ventricle** leading to ascending aorta is called **aortic vestibule**
- The wall of this part is **fibrous** and **smooth**.

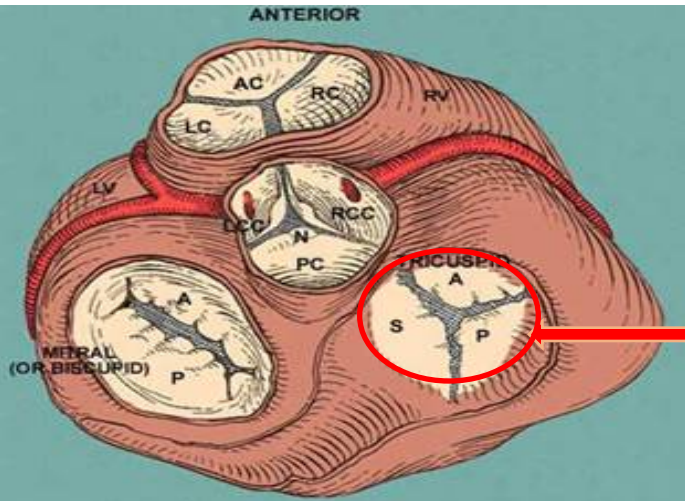


aortic vestibule





# heart valves: 1- Right atrio-ventricular (tricuspid) orifice

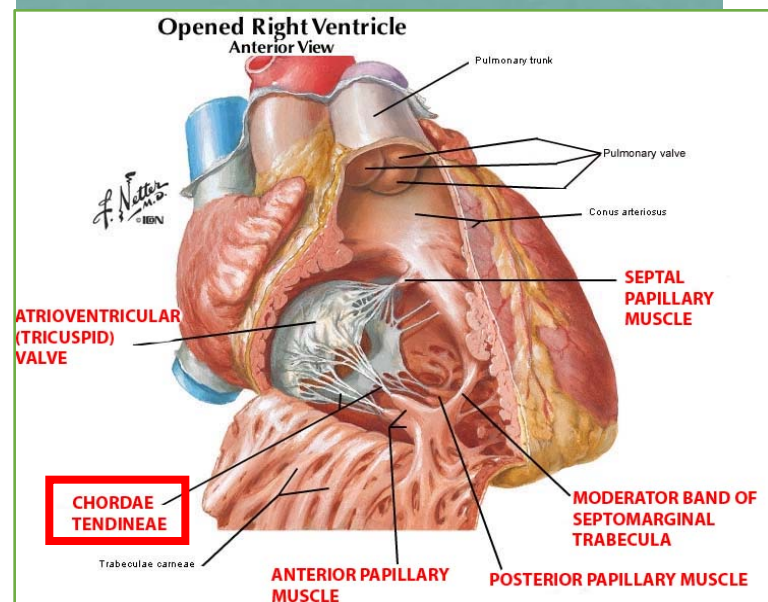


- About one inch wide, admitting tips of 3 fingers.
- It is **guarded** by a **fibrous ring** which gives attachment to the **cusps of tricuspid valve**.

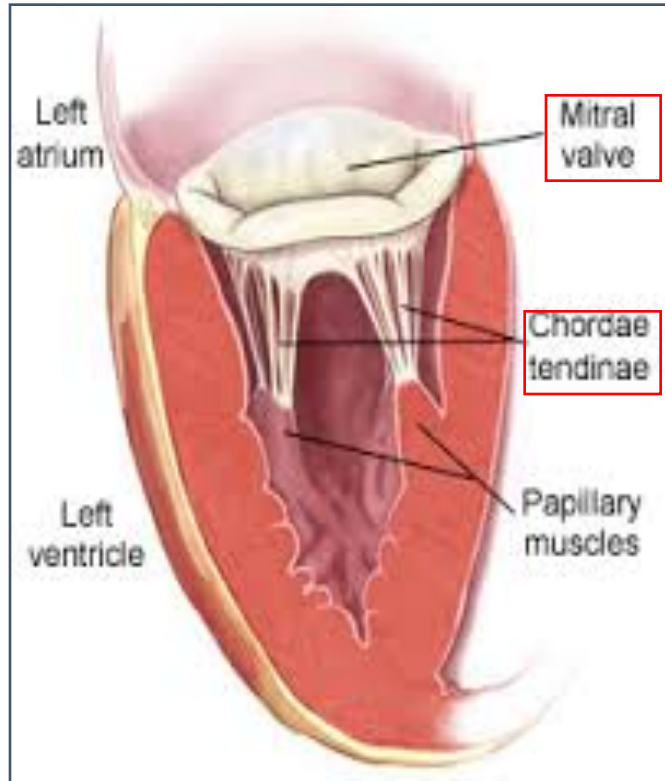
It has 3-cusps:

(anterior-posterior-septal or medial).

- The atrial surface of the cusps are smooth
- while their ventricular surfaces give attachment to the **chordae tendinae**.



# 2-Left atrio-ventricular (mitral) orifice



- **Smaller** than the right, admitting only tips of 2 fingers.
- **Guarded** by a **mitral valve**.
- **Surrounded** by a fibrous ring which gives attachment to the cusps of mitral valve.

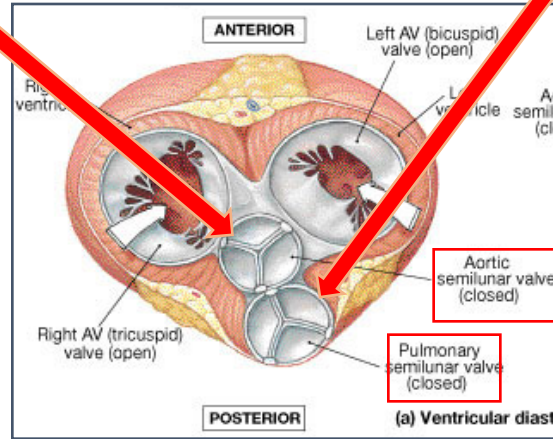
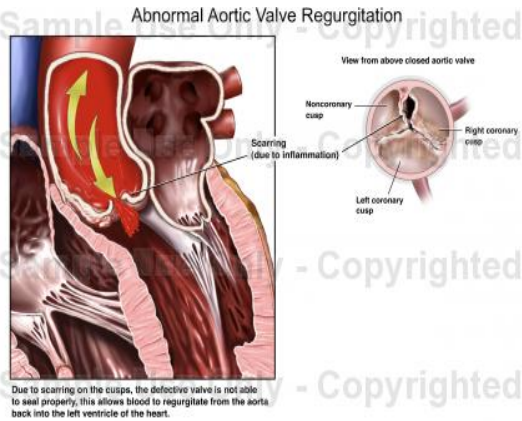
Mitral valve is composed of 2 cusps:

**Anterior cusp :**  
lies anteriorly  
and to right.

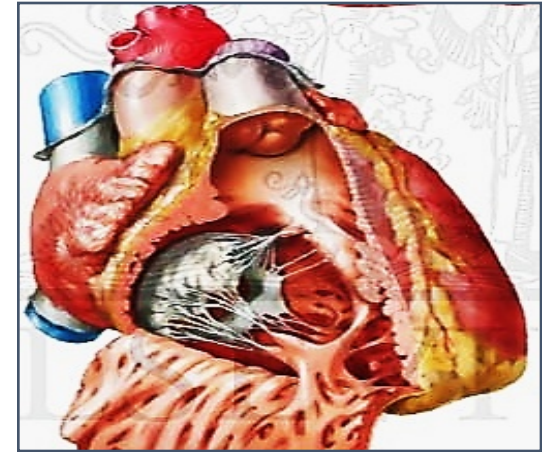
**Posterior cusp :**  
lies posteriorly  
and to left.

- The atrial surfaces of the cusps are smooth, while ventricular surfaces give attachment to **chordae tendinae**.

# 3-Aortic orifice



# 4-Pulmonary orifice



Surrounded by a **fibrous ring** which gives attachment to the **cusps** of **aortic valve**.

**is formed of 3 semilunar cusps:** which are similar to those of pulmonary valve, but the position of the cusps differs being **one anterior** and **2 posterior**.

Surrounded by a **fibrous ring** which gives attachment to the **cusps** of the **pulmonary valve**.

**is formed of 3 semilunar cusps :**

**2 anterior** and **one posterior** which are concave superiorly and convex inferiorly.

**No chordae tendineae** **or** **papillary muscles** are attached to these cusps



# Nerve supply of the heart

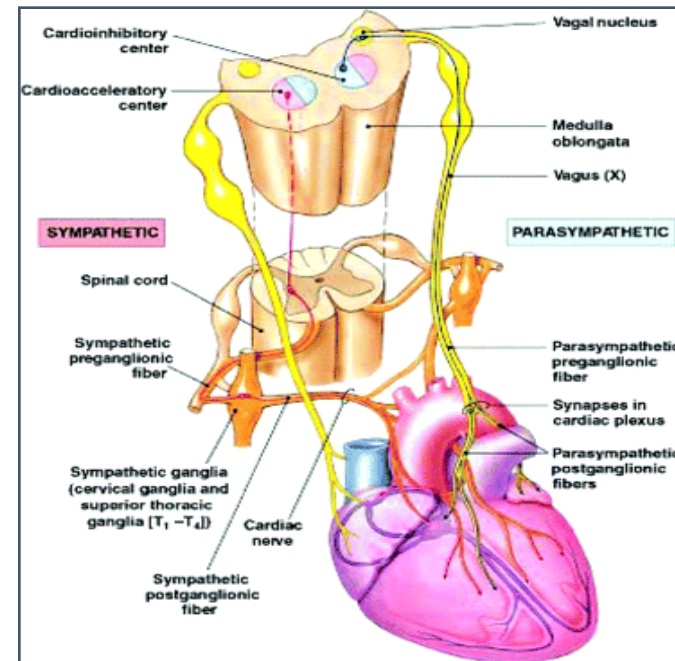
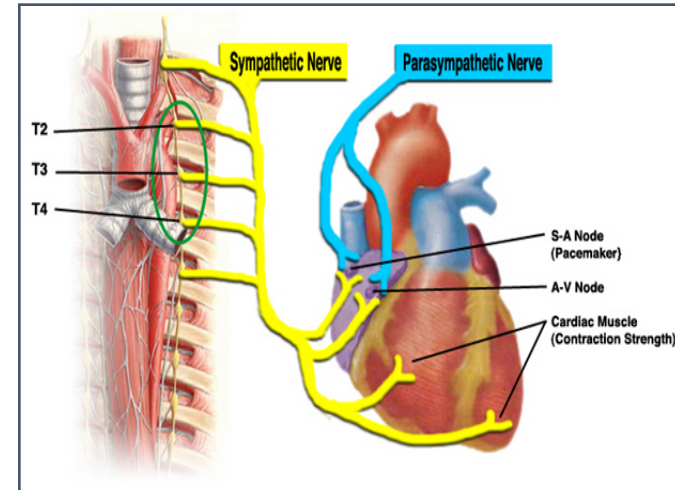
By **sympathetic & parasympathetic fibers** via the **cardiac plexus** situated below arch of aorta.

The **sympathetic fibers** arise from the cervical & upper thoracic ganglia of sympathetic trunks.

The **parasympathetic fibers** arise from the vagus nerves.

**Postganglionic fibres** reach heart along (SAN<sup>1</sup>, AVN<sup>2</sup> & nerve plexus around coronary arteries).

- **Symp. Fibers** -> accelerate heart rate but
- **Parasymp. Fibers** -> slow heart rate (constriction of coronary arteries)



<sup>1</sup> Sinoatrial Node

<sup>2</sup> Atrioventricular Node





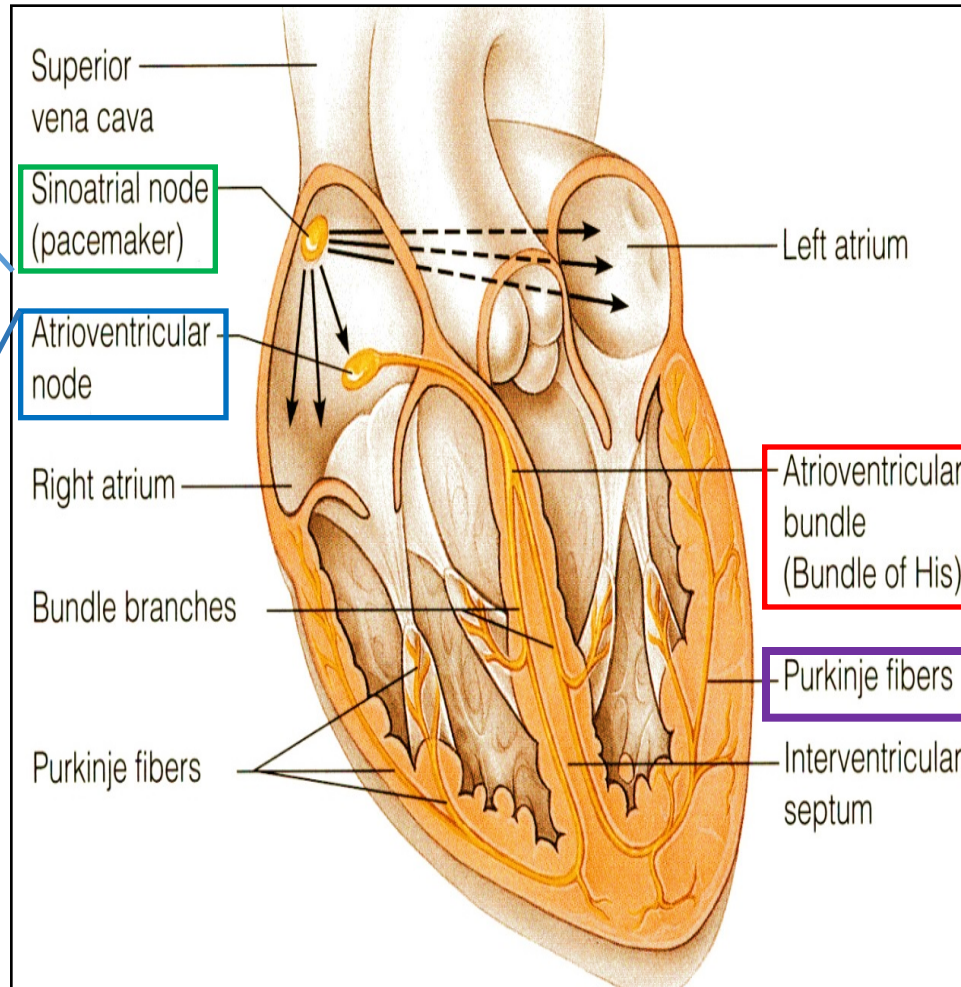
# Conduction system of the heart

- The **beating of the heart** is regulated by the **intrinsic conduction (nodal) system**
- **Its function** is to ensure that the chambers of the heart contract in the proper rhythm and sequence:

The **main center** is the **sinoatrial (SA) node**, located in the right atrium

The **atrioventricular (AV) node** is located at the junction of the atria and the ventricles

\*the SA node is called the **pacemaker** of the heart, because it generates the impulse.



The **atrioventricular (AV) bundle (bundle of His)** is located in the interventricular septum

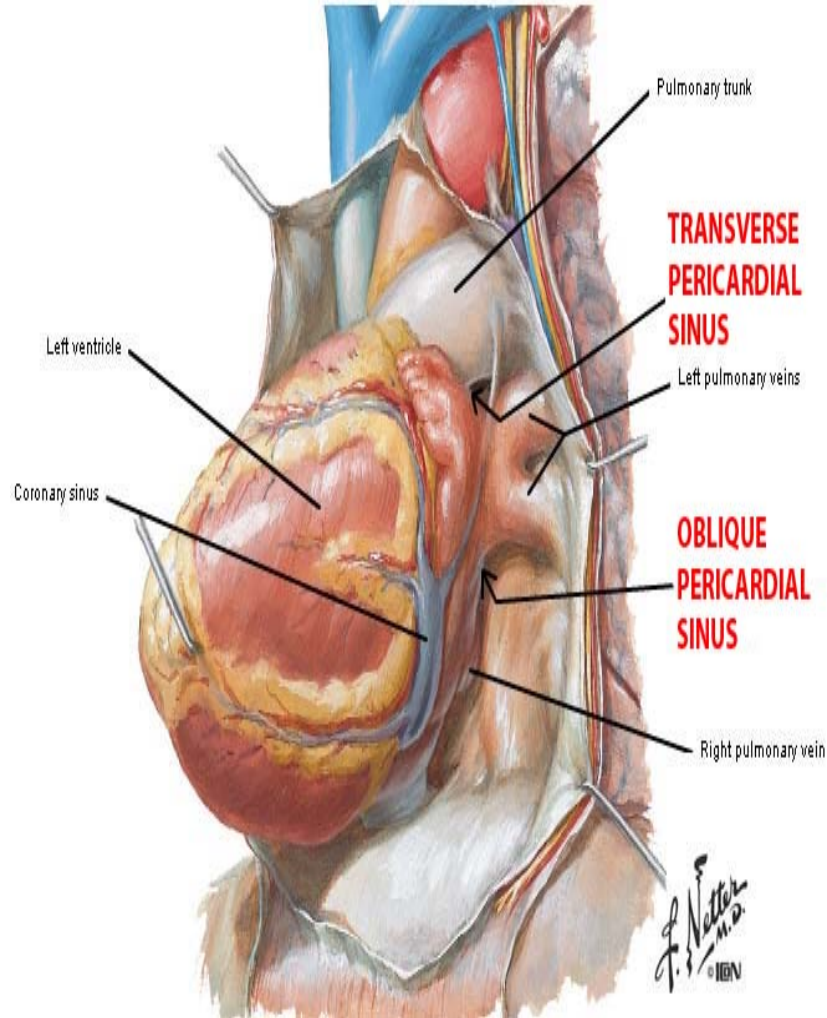
The **Purkinje fibers** are located inside the walls of the ventricles



# Pericardial Sinuses

Pericardial Sac - Heart Drawn Out

Left Lateral View



➤ **Transverse Sinus:** It is a recess of serous pericardium between ascending aorta & pulmonary T. anteriorly, and upper parts of 2 atria & S.V.C<sup>1</sup> Posteriorly.

➤ **Oblique Sinus :** It lies posterior to the heart. It is a recess of serous pericardium behind the base of heart (left atrium), separate base from descending aorta & esophagus.

<sup>1</sup> Superior vena cava

# The Heart

<b>Location :</b>	The heart lies in the middle mediastinum
<b>The Heart surrounded by :</b>	a fibroserous sac called <b>pericardium</b> . which is differentiated into: 1- an outer fibrous layer ( <b>Fibrous pericardium</b> ) 2- inner serous sac( <b>Serous pericardium</b> ).
<b>Shape of the Heart :</b>	The Heart is somewhat pyramidal in shape, having: - <u>Apex</u> - <u>Sterno-costal (anterior surface)</u> - <u>Base (posterior surface)</u> . - <u>Diaphragmatic (inferior surface)</u>
<b>Chambers of the Heart :</b>	It consists of 4 chambers, 2 atria (right& left) 2 ventricles (right& left).



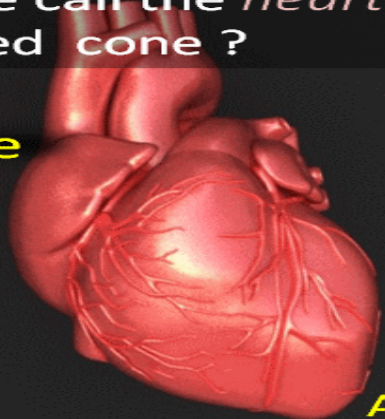
<p><b>Apex of the Heart :</b></p>	<p>Directed downwards, forwards and to the left.          It is formed by the <b>left ventricle</b>.          Lies at the level of <b>left 5<sup>th</sup> intercostal space</b> 3.5 inch from midline.</p>		
<p><b>Sterno-costal (Anterior surface ) :</b></p>	<p>Divided by <b>coronary (atrio-ventricular )groove</b> into :</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> <p><b>1- Atrial part :</b></p> <ul style="list-style-type: none"> <li>- Formed mainly by right atrium.</li> </ul> </td> <td style="width: 50%; vertical-align: top;"> <p><b>2- Ventricular part :</b></p> <ul style="list-style-type: none"> <li>- The right 2/3 is formed by the right ventricle , while the 1/3 is formed by left ventricle.</li> </ul> </td> </tr> </table> <p>- The 2 ventricles are separated by <b>(Anterior interventricular groove )</b> which lodge :</p> <ul style="list-style-type: none"> <li>1- Anterior interventricular artery ( branch of left coronary )</li> <li>2- Great cardiac vein.</li> </ul> <ul style="list-style-type: none"> <li>- <b>The coronary groove</b> lodges The right coronary artery.</li> <li>- <b>*SO,</b> the surface is formed <u>mainly</u> by the Right atrium and right ventricle. But it also formed of some of the left ventricle</li> </ul>	<p><b>1- Atrial part :</b></p> <ul style="list-style-type: none"> <li>- Formed mainly by right atrium.</li> </ul>	<p><b>2- Ventricular part :</b></p> <ul style="list-style-type: none"> <li>- The right 2/3 is formed by the right ventricle , while the 1/3 is formed by left ventricle.</li> </ul>
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<p><b>Diaphragmatic (Inferior surface )</b></p>	<ul style="list-style-type: none"> <li>- <b>Directed</b> : inferiorly and backward.</li> <li>- Slightly concave at it rest on diaphragm.</li> <li>- <b>Formed by</b> the 2-ventricles , <u>mainly left ventricle</u> (left 2/3) .</li> <li>- The 2-ventricles are separated by <b>Posterior interventricular groove</b> which lodges : <ul style="list-style-type: none"> <li>- 1- posterior interventricular artery.</li> <li>- 2- middle cardiac vein.</li> </ul> </li> <li>- <b>Separated from</b> the base of the heart by (Posterior part of coronary sulcus ) .</li> </ul>
<p><b>Base of the Heart ( Posterior surface ) :</b></p>	<ul style="list-style-type: none"> <li>- <u>It is formed by</u> the 2 atria , <u>mainly left atrium</u> , into which open the 4 pulmonary vein.</li> <li>- <u>Directed</u> : backward , And <u>lies opposite</u> middle thoracic vertebrae (5-7).</li> <li>- <u>Is separated from the vertebral column by</u> : <ul style="list-style-type: none"> <li>-1- Descending Aorta    2- esophagus    3- oblique sinus of pericardium</li> </ul> </li> <li>- <u>Bounded inferiorly</u> by : Post part of coronary sulcus , which Lodges the coronary sinus.</li> </ul>



Can we call the *heart* as a inverted cone ?

Base



Apex

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Borders of the Heart :	
Border :	Formed by :
Upper border :	the 2 atria . It is connected together by ascending aorta and pulmonary trunk.
Right border :	Right atrium
Lower border :	Mainly by right ventricle and upper part of left ventricle.
Left border :	Mainly by left ventricle and auricle of left atrium.

Note that the base of the heart is called the base because the heart is pyramid shaped; the base lies opposite the apex. The heart does not rest on its base; it rests on its diaphragmatic (inferior) surface

# Chambers of the heart :

The heart is divided by vertical septa into four chambers.  
**The right atrium** lies anterior to the left atrium, and the **right ventricle** lies anterior to the left ventricle.

<p><b>Right Atrium:</b></p>	<p>- The right atrium consists of a <b>main cavity</b> and a small out pouching, the <b>auricle</b>.                  -On the <b>outside</b> of the heart at the junction between the right atrium and the right auricle is a <u>vertical groove</u>, the <b>sulcus terminalis</b>, which <b>on the inside</b> forms a <u>ridge</u>, the <b>crista terminalis</b>.</p>
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## Cavity of Right Atrium :

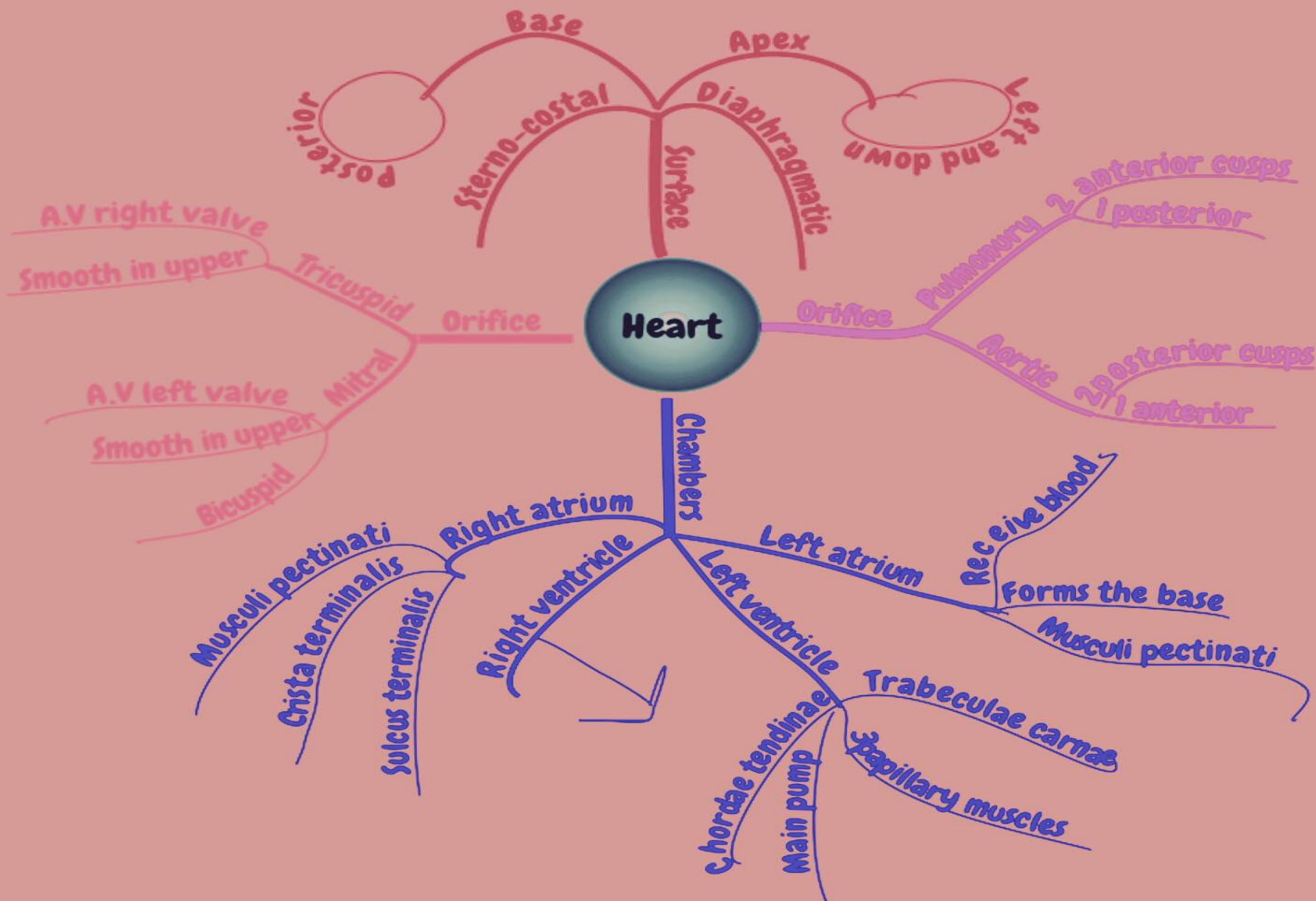
- **Crista terminalis** divides right atrium into :
  - **1- Anterior part : (musculi pectinati)**  
Rough and trabeculated by bundles of muscle fiber
  - **2- Posterior part (sinus pectinati)**  
Smooth
- The **interatrial septum** carries an oval depression called **Fossa ovalis**. The margin of this depression is called **Anulus ovalis**.
- The blood leaves right atrium to right ventricle via **tricuspid valve**.

### Opening in right atrium :

1. **SVC**---Has no valve
2. **IVC**---guarded by valve
3. **Coronary sinus**--- has a well defined valve
4. **Right atrioventricular orifice**---lies anterior to **IVC** opening , it is surrounded by fibrous ring which gives attachment to **Tricuspid valve**
5. **Small orifice** of small vein

## Cavity of Right Ventricle :

- Its wall is **thinner** than the left ventricle and contains projection called **trabeculae carneae**.
- It communicates with :
  - Right atrium through** -> **Right atrioventricular orifice**.
  - Pulmonary trunk through** -> **pulmonary orifice**.
- As **the cavity** approaches the pulmonary orifice it **becomes funnel shaped**, at which point it is referred to as the **infundibulum**.
- Large projection arises from the wall called **papillary muscle** : (3 in number )
  - **Anterior , Posterior and septal papillary muscle** .
  - Each papillary muscle is attached to the cusps of tricuspid valve by tendinous threads called **chordae tendinae**
- Blood leaves the right ventricle to pulmonary trunk through **pulmonary orifice**.
- The wall of **infundibulum** (conus arteriosus) is smooth and contains no trabeculae.
- **Interventricular septum** is connected to **anterior papillary muscle** by **Moderator band** .



**Q1- The heart is located in which anatomical subdivision of the mediastinum?**

- A- anterior
- B- middle
- C- posterior
- D- lateral
- E- superior

ANSWER: B

**Q2- The Apex of the heart lies at level of?**

- A- Right 5<sup>th</sup> intercostal space
- B- Right 5<sup>th</sup> rib
- C- Left 5<sup>th</sup> intercostal space
- D- Left 5<sup>th</sup> rib
- E- none of the above

ANSWER: C

**Q3- The coronary groove lodges:**

- A- The left coronary artery
- B- The right pulmonary artery
- C- the right coronary artery
- D- the left pulmonary artery
- E- the phrenic nerve

ANSWER: C



**Q4- The diaphragmatic surface separated from base of the heart by:**

- A- Anterior part of coronary sulcus
- B- Posterior part of coronary sulcus
- C- Middle part of coronary sulcus
- D- Superior part of coronary sulcus

ANSWER: B

**Q5- The heart is made of**

- A- 4 chambers
- B- 3 chambers
- C- 5 chambers
- D- 2 chambers

ANSWER: A

**Q6- The left border is formed mainly by:**

- A- Right atrium
- B- Left ventricle + auricle of the left atrium
- C- Right ventricle + apical part of left ventricle
- D- the two atria

ANSWER: B

**Q7- Where does the vertical groove located?**

- A- Between The right atrium and the right auricle on the inside
- B- Between The right atrium and the left auricle on the outside
- C- Between The right atrium and the right auricle on the outside
- D- Between The left atrium and the right auricle on the outside

ANSWER: C

**Q8- The blood leaves the right atrium to right ventricle via:**

- A- Mitral valve
- B- tricuspid valve
- C- Cusp of right AV
- D- A & B
- E- B & C

ANSWER: E

**Q9: IVC**

- A-Has no valve
- B- Has two valves
- C- Has a well-defined valve
- D- Guarded by a valve

ANSWER: D

**Q10- When does the Cavity of the right ventricle becomes funnel shaped?**

- A- At a point which called trabeculae carnae
- B- At a point which called infundibulum
- C- At a point which called pulmonary trunk
- D- At a point which called chordae tendinae

ANSWER: B

**Q11- Interventricular septum is connected to anterior papillary muscle by a muscular band called?**

- A- infundibulum band
- B- Moderator band
- C- chordae tendinae
- D- trabeculae carnae

ANSWER: B

**Q12- The atrial surface of the cusps is:**

- A- ridge
- B- smooth
- C- B & A

ANSWER: B

**Q13: Papillary muscles are attached to the 3 semilunar cusps**

A-False

B-True

ANSWER: A

**Q14: Which one of the following is NOT Ventricular Papillary muscle:**

A- Posterior papillary muscle

B- inferior papillary muscle

C- Septal papillary muscle

D- Anterior papillary muscle

ANSWER: B

**Q15: In the pulmonary orifice we have 3 semilunar cusps and they are:**

A- 1 anterior and 2 posterior

B- 2 inferior and 1 posterior

C- 2 anterior and 1 posterior

ANSWER: C



**Q16: The left atrium communicate with the left ventricular by:**

- A- Right atrioventricular orifice
- B- Chordae tendinie
- C- Left atrioventricular orifice

ANSWER: C

**Q17: In the aortic orifice we have 3 semilunar cusps and they are:**

- A- 1 posterior 2 anterior
- B- 2 inferior and 1 posterior
- C- 1 anterior and 2 posterior

ANSWER: C

**Q18: The beating of the heart is regulated by:**

- A- Sympathetic trunk
- B- Intrinsic conduction system
- C- parasympathetic

ANSWER: B

هذا العمل إجتهد من طلاب و طالبات  
إن أصبنا فمن الله وإن أخطأنا فمن أنفسنا ومن الشيطان

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