



**Anatomy  
Team  
431**

# The heart

4 chambers

2 atria

2 ventricles

Pyramidal in shape, having

Apex

Sterno-costal  
(anterior surface)

Base (posterior surface).

Diaphragmatic  
(inferior surface)

Surrounded by

Pericardium

Inner

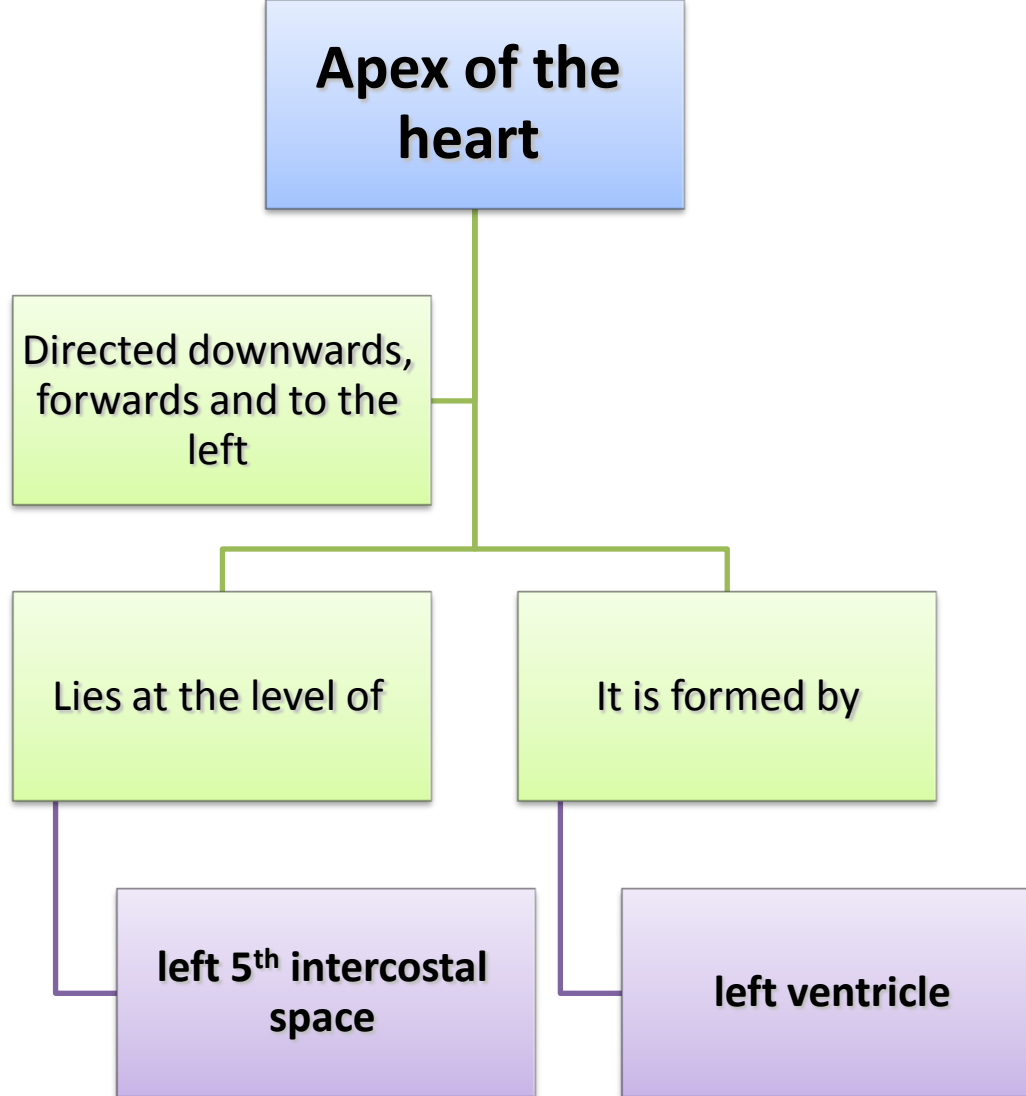
Serous pericardium

Outer

Fibrous pericardium

Location

Middle mediastinum



**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**

# Sterno-costal (anterior) surface

**2 ventricles are separated by**

Anterior interventricular groove  
Which lodges :

Anterior interventricular artery (branch of left coronary).

Great cardiac vein

The coronary groove lodges:

The right coronary artery.

**Divided by**

Coronary (atrio-groove ventricular) into:

Atrial part

Formed mainly by right atrium.

**Formed By**

Right atrium

Right ventricle

Ventricular part

The right 2/3 is formed by right ventricle, while the left 1/3 is formed by left ventricle.

# Diaphragmatic (inferior) surface

Directed inferiorly & backward.

The 2-ventricles are separated by

Posterior  
interventricular groove  
Which lodges:

Posterior  
interventricular artery

Middle cardiac vein

Separated from base  
Of heart by

Posterior part of  
coronary sulcus

Slightly concave as it  
rests on diaphragm

Formed by

2-ventricles, mainly left  
ventricle(left 2/3).

# Base of the heart (posterior surface)

It is directed backwards.

Bounded inferiorly by :

Posterior part of coronary sulcus , which lodges the coronary sinus

Is separated from the vertebral column by

Descending aorta

Esophagus

Oblique sinus of pericardium

Lies

Opposite middle thoracic vertebrae( 5-7)

Formed by

2 atria, mainly left atrium, into which open the 4 pulmonary veins.

## Borders of the heart

### Left border:

Is formed mainly by left ventricle + auricle of left atrium

### Right border:

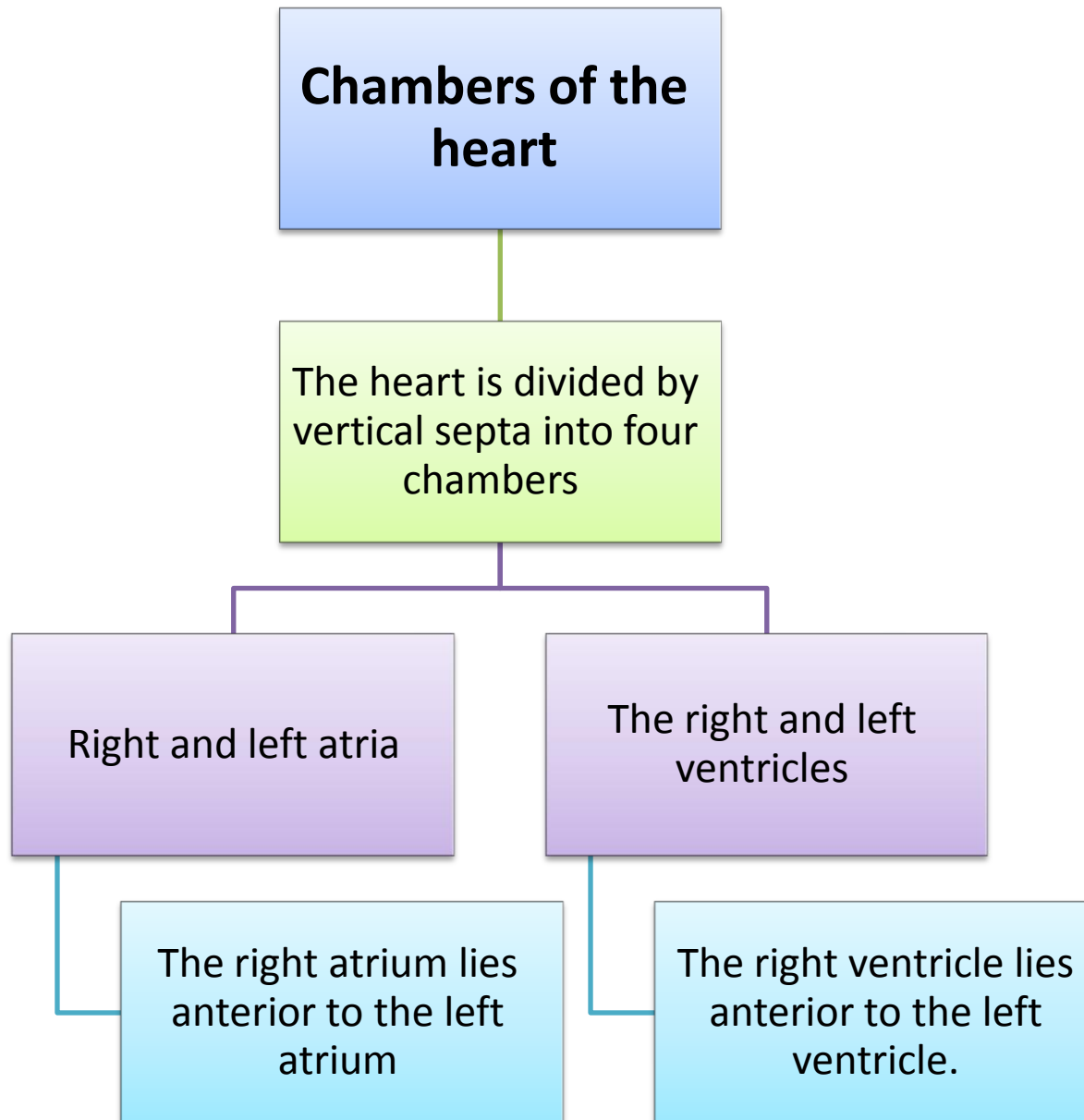
Is formed by right atrium

### Lower border:

Is formed mainly by right ventricle + apical part of left ventricle.

### Upper border:

Is formed by the 2 atria.  
It is concealed by ascending aorta & pulmonary trunk.



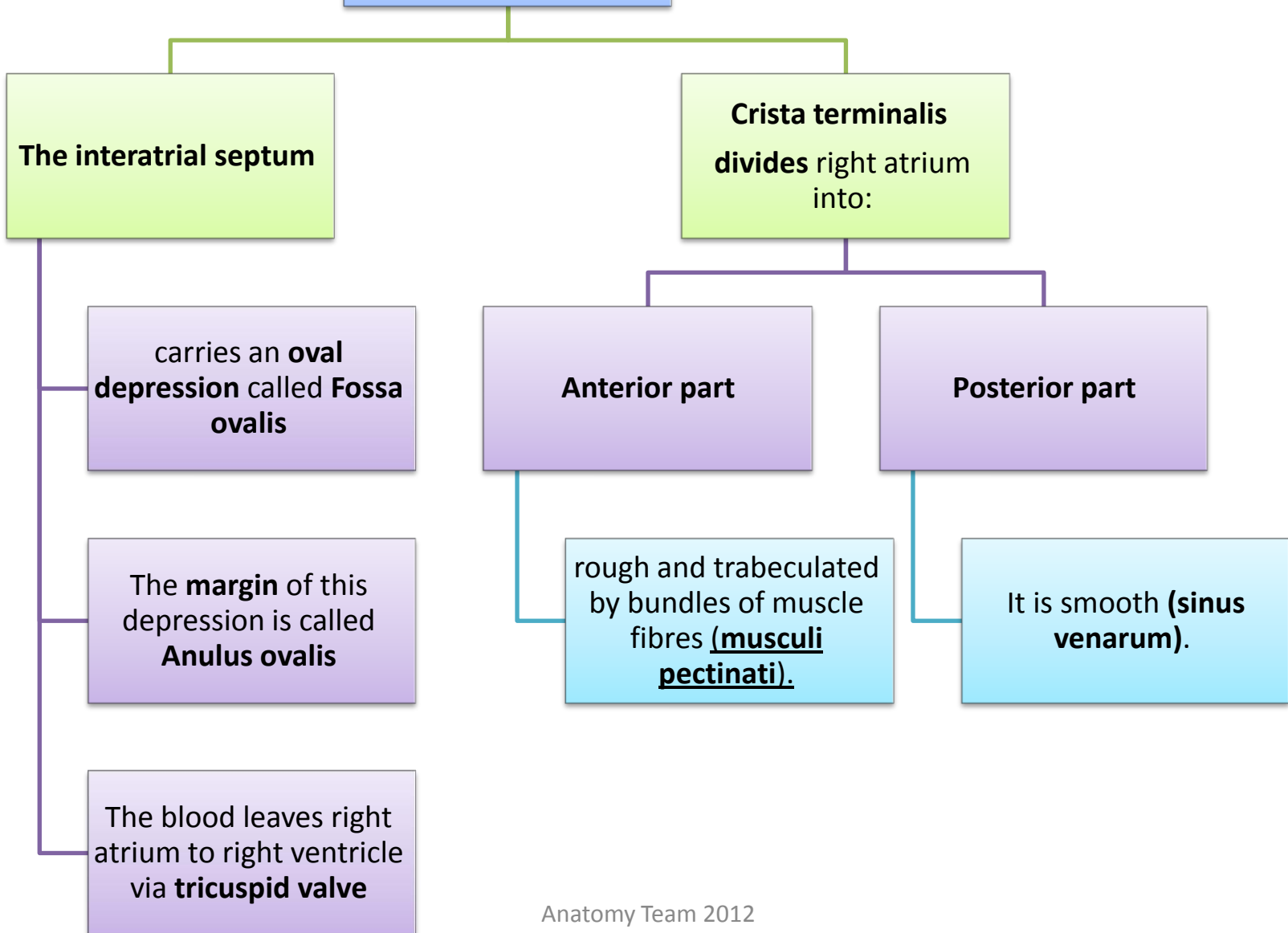


## Right Atrium

- \* The right atrium consists of a main cavity and a small out pouching, the auricle.
- \* On the outside of the heart at the junction between the right atrium and the right auricle is a vertical groove

This is called the sulcus terminalis, which on the inside forms a ridge, the crista terminalis.

# Cavity of Right Atrium



# Cavity of Right Atrium

Openings in right atrium:

superior vena cava (SVC)

has no valve

inferior vena cava (IVC)

guarded by a valve

Coronary sinus

has a well-defined valve

Right atrioventricular orifice

lies anterior to IVC opening, it is surrounded by a fibrous ring which gives attachment to the tricuspid valve

Small orifices of small veins

# Right ventricle

The right ventricle communicates with the right atrium through

atrioventricular orifice

It also communicates with the pulmonary trunk through

pulmonary orifice

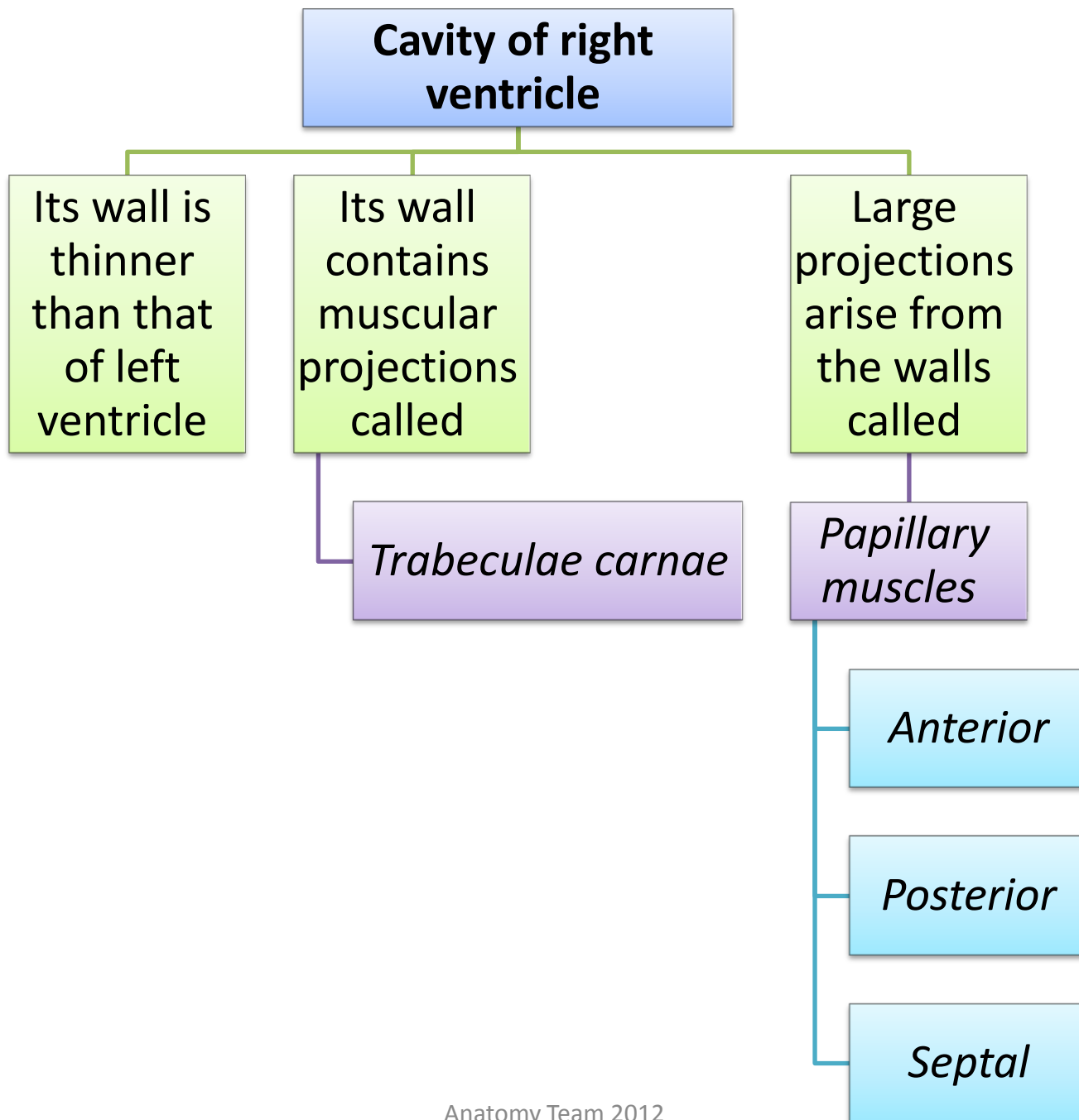
As the cavity approaches the pulmonary orifice it becomes funnel shaped, at which point it is referred to as the

**infundibulum**

infundibulum  
على شكل قمع ((مخروط))

Funnel  
قمع





## Cavity of right ventricle

Each papillary muscle is attached to the cusps of tricuspid valve by tendinous threads called

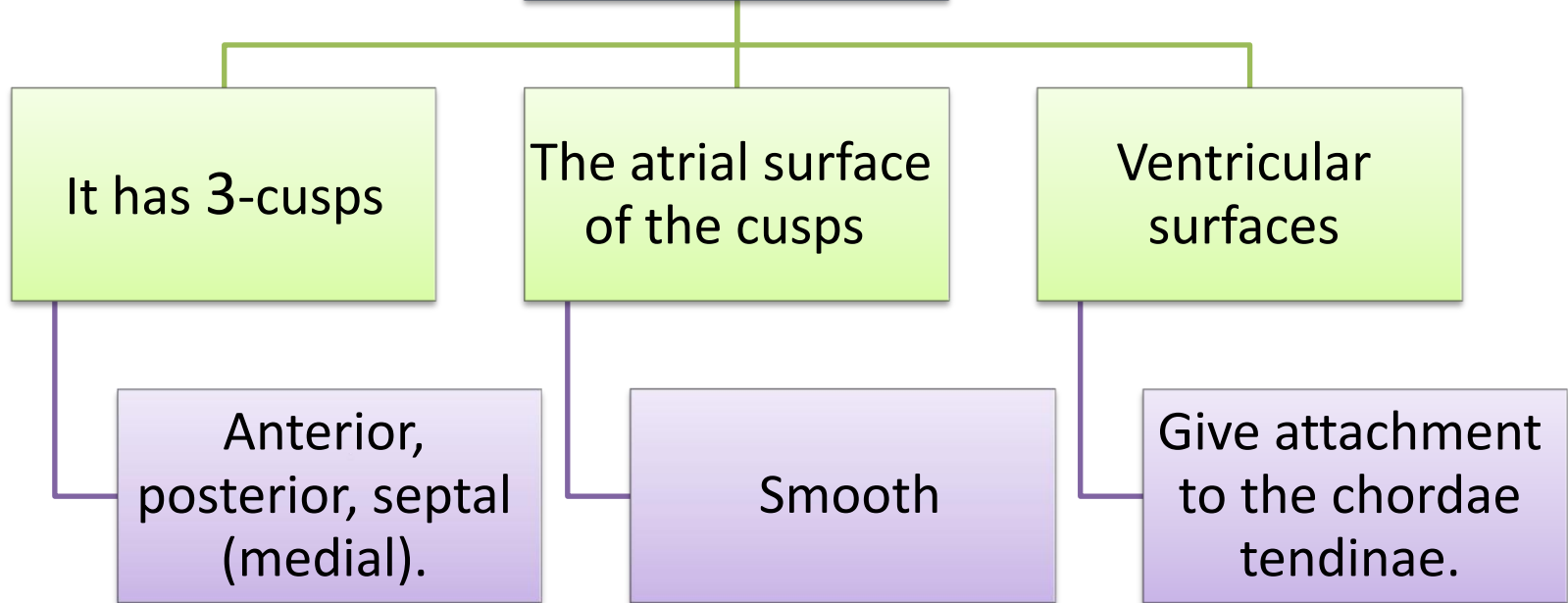
**Chordae tendinae.**

Interventricular septum is connected to anterior papillary muscle by a muscular band called

**Moderator band**

The wall of infundibulum is smooth and contains no trabeculae.

**Right atrio-ventricular (tricuspid) orifice**



# Pulmonary Orifice

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

The valve is formed of

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

3 semilunar cusps  
one anterior only.



# Left atrium of the heart

The left atrium communicates with the

It forms the greater part of base of heart.

Its wall is smooth **EXCEPT** for small muscoli pectinati in the left auricle.

Receives 4 pulmonary veins which have no valves.

Sends blood to left ventricle through

Left ventricle through

The left atrioventricular orifice which is guarded by mitral valve.

Left atrioventricular orifice

# Left ventricle of the heart

Its wall is thicker than that of right ventricle.

It receives blood from left atrium through

Its wall contains trabeculae canae.

Its wall contains 2 large papillary muscles (anterior & posterior).

The blood leaves the left ventricle to the ascending aorta through the

The part of left ventricle leading to ascending aorta is called

Left atrio-ventricular orifice which is guarded by mitral valve.

They are attached by chordae tendinae to cusps of mitral valve.

Aortic orifice.

Aortic vestibule.  
The wall of this part is fibrous and smooth

# Left atrio-ventricular (mitral) orifice

Smaller than the right

Guarded by

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

Mitral valve is composed of 2 cusps:

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

mitral valve.

Anterior cusp :  
lies anteriorly  
and to right.

Posterior cusp :  
lies posteriorly  
and to left.

# Aortic orifice

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

**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 one posterior**.

# Nerve supply of the heart

By sympathetic & parasympathetic fibers via the cardiac plexus

The sympathetic fibres

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

The parasympathetic fibres

arise from the vagus nerves.

# Conduction system of the heart

Its function is to ensure the heart contract in the proper rhythm and sequence:

The main center is the **sinoatrial (SA) node**

The **atrioventricular (AV) node**

The **atrioventricular (AV) bundle (bundle of His)**

The **Purkinje fibers**

located in the right atrium

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

is located at the junction of the atria and the ventricles

located in the interventricular septum

are located inside the walls of the ventricles

## Most important note you should remember:

- Apex of the heart: is **formed** by the **left ventricle** and Lies at the level of **left 5<sup>th</sup> intercostal space**
- Sterno-costal (anterior) surface: **formed mainly by the right atrium**
- Diaphragmatic (Inferior)surface: **Formed mainly by left ventricle(left 2/3).**
- Base of the Heart (posterior surface):
  - formed mainly by left atrium**, into which **open the 4 pulmonary veins**.
  - And** Lies opposite **middle thoracic vertebrae(5-7)**
  - Is separated from the vertebral column by descending aorta, esophagus and **oblique sinus of pericardium**

## Cavity of Right Atrium:

- The **interatrial septum** carries an oval depression called **Fossa ovalis**
- The margin of this depression is called **Anulus ovalis**
- **هامة جدا** The blood leaves right atrium to right ventricle via **tricuspid valve**
- Openings in right atrium:
  - SVC
  - IVC
  - Coronary sinus

## Right ventricle :

- Its wall is **thinner** than that of left ventricle
- Its wall contains muscular projections called **trabeculae carnae**.
- Large projections arise from the walls called **papillary muscles**

## Cavity of right ventricle:

- Each papillary muscle is attached to the cusps of tricuspid valve by tendinous threads called **chordae tendinae**.



## Right atrio-ventricular (tricuspid) orifice:

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

## Pulmonary orifice:

- The valve is formed of **3 semilunar cusps**
- **No** chordae tendineae or papillary muscles are attached to these cusps

## Left atrium of the heart:

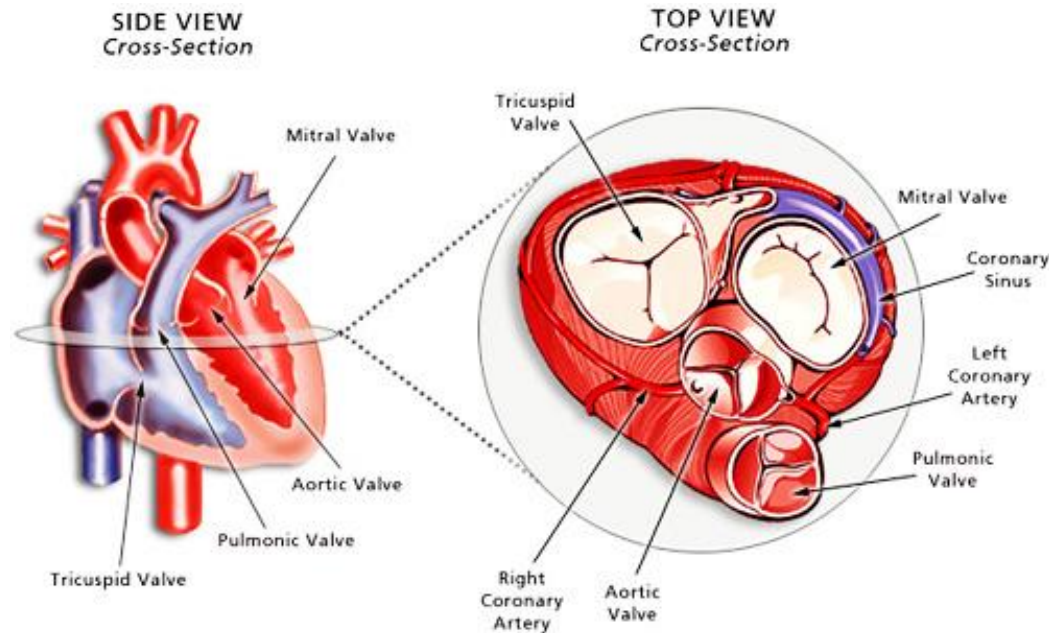
- Its wall is smooth **except** for small muscoli pectinati in the **left auricle**.
- **Receives 4 pulmonary veins which have no valves.**
- **Sends blood to left ventricle** through the **left atrioventricular orifice** which is guarded by **هَام جَدَا** mitral valve.

## Left ventricle of the heart:

- Its wall is **thicker** than that of right ventricle.
- **It receives blood from left atrium** through left atrio-ventricular orifice which is guarded by **mitral valve**.
- Its wall contains **2 large papillary muscles** (anterior & posterior). They are attached by **chordae tendinae** to cusps of mitral valve.

# Valves:

## We have 4 valves:



### 1-Aortic valve:

he aortic valve lies between the left ventricle and the aorta.

### 2-Pulmonary valve:

lies between the right ventricle and the pulmonary artery

### 3-Mitral valve:

It allows the blood to flow from the left atrium into the left ventricle

### 4-Tricuspid valve:

between the right atrium and the right ventricle

## اسئله من الدكتور سناء

### 1. In the interior of right ventricle :

- a. It has crista terminalis.
- b. Its wall is thicker than the left one.
- c. It has rough infundibulum toward the pulmonary trunk.
- d. It has 3 papillary muscles.

### 2. Which one of the following is correct regarding the valves of heart ?

- a. The pulmonary valve has chordae tendineae attached to its cusps.
- b. The tricuspid valve guards the left A-V orifice.
- c. The tricuspid valve has attachment to chordate tendineae.
- d. The coronary sinus has no valve.

**3. Which one of the following vessels open into the base of the Heart ?**

- a. The ascending aorta.
- b. The four pulmonary veins.
- c. The left pulmonary artery.
- d. The right pulmonary artery.

**4. The apex of the heart lies :**

- a. At the left 4<sup>th</sup> costal cartilage.
- b. At the left 5<sup>th</sup> costal cartilage.
- c. At the 4<sup>th</sup> intercostal space.
- d. At the left 5<sup>th</sup> intercostal space.

**5. Which part of the heart contributes mainly in the sternocostal surface ?**

- a. Right ventricle.
- b. Left ventricle.
- c. Left atrium.
- d. Left auricle.

**6. Which chamber of the heart contributes mainly in the diaphragmatic surface ?**

- a. Right atrium.
- b. Right ventricle.
- c. Left atrium.
- d. Left ventricle.

**7. Oblique sinus of pericardium lies :**

- a. Behind the base of the heart.
- b. Behind the pulmonary trunk.
- c. In front of base of the heart.
- d. Behind ascending aorta.

**8. The left atrium of the heart :**

- a. Has fossa ovalis in its interior.
- b. Forms the base of the heart.
- c. Receives the superior vena cava.
- d. Has rough wall containing muscoli pectinati.

**9. The left ventricle of the heart :**

- a. Has thinner wall than the right one.
- b. Represents mainly the diaphragmatic surface.
- c. It has pulmonary orifice.
- d. It has three papillary muscles.

**10. His bundle of the heart lies in :**

- a. Right atrium.
- b. Interatrial septum.
- c. Walls of ventricles.
- d. Interventricular septum.

## Answers

1. D
2. C
3. B
4. D
5. A
6. D
7. A
8. B
9. B
10. D

اللهم صلي وسلم وبارك على نبينا محمد