

DEPARTMENT OF VETERINARY ANATOMY

1ST PROFESSIONAL YEAR, BVSC & AH

Credit Hours: 4+3

UNIT-I

TOPIC- Introduction to Angiology and Structure of Heart

By

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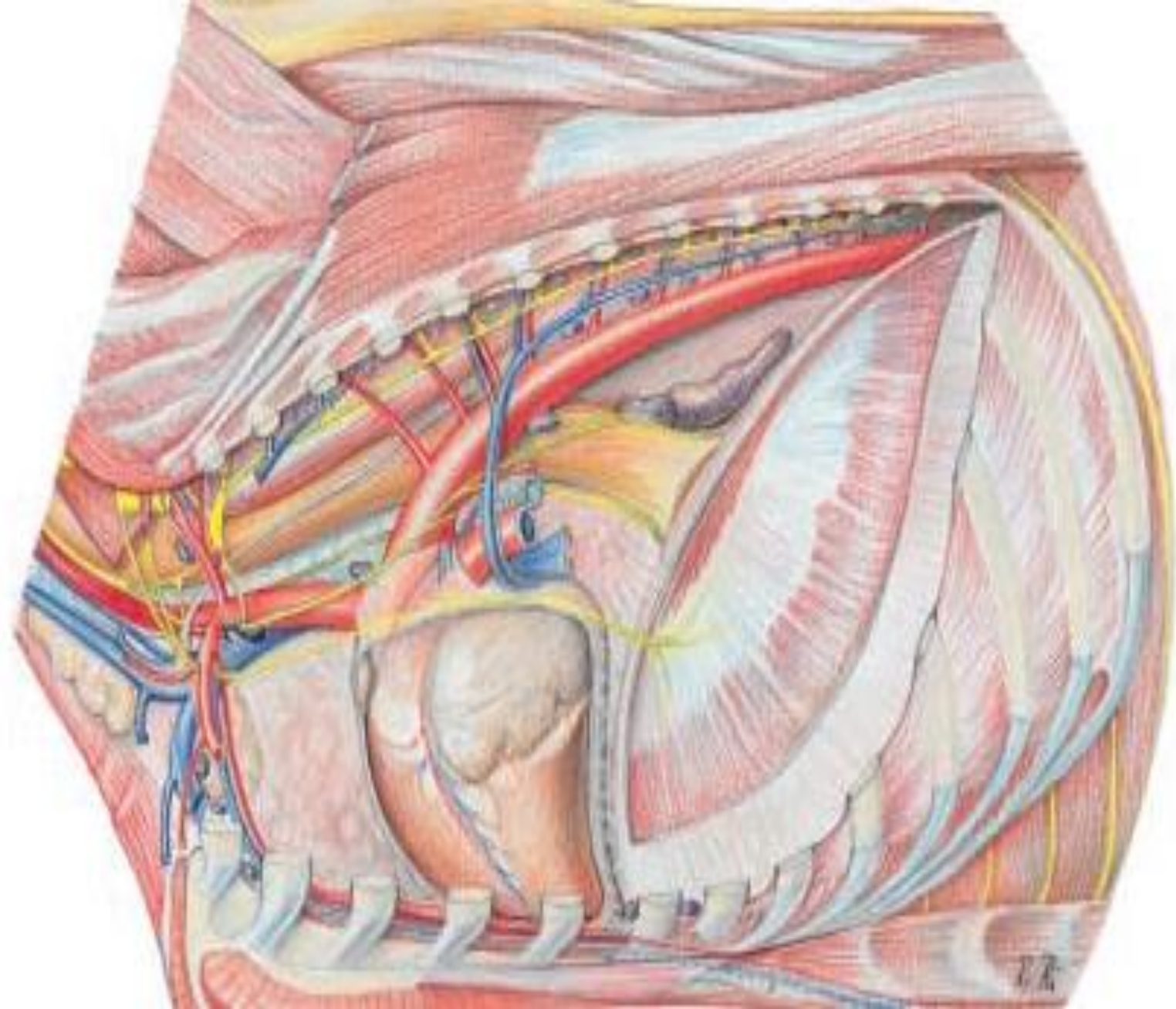
Assistant Professor

ANGIOLOGY

- Angiology is that branch of systematic anatomy which deals with the organs of circulation of blood and lymph.
- It include the **heart and vessels** (blood or lymph vessel)
- Vessels- 1. **Blood Vascular system**
 - A. Arterial System
 - B. Venous system
- 2. **Lymphatic System**
 - A. Lymph Vessel
 - B. Lymph gland

HEART

- The heart is a cone shaped central hollow muscular organ situated in the middle mediastinal space of the thorax.
- It enclosed in a **fibro-serous** sac like structure called **pericardium**.
- It has two layer- a. **Fibrous layer**
 - b. **Serous layer-** consist Parietal and visceral layer

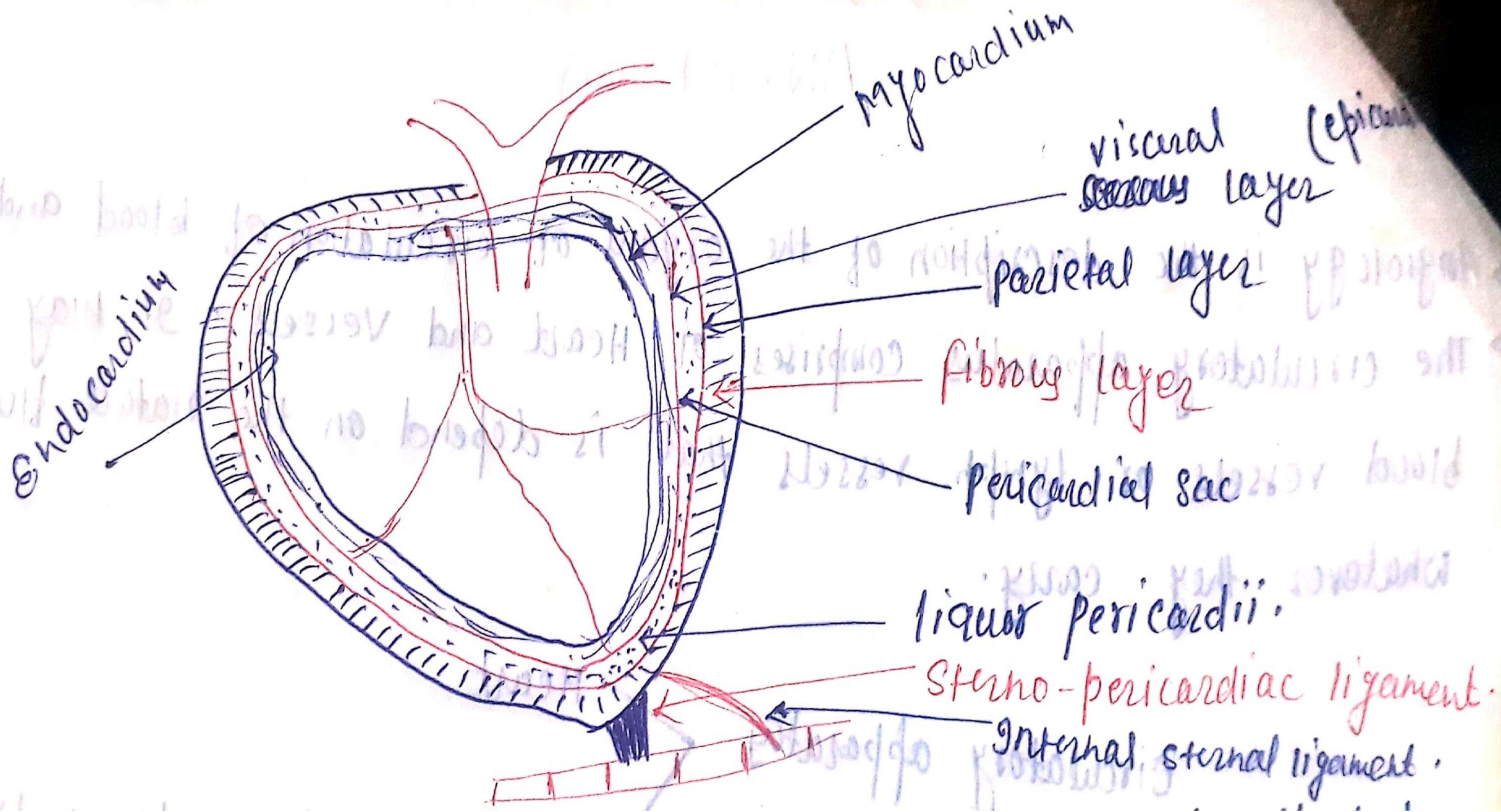


Fibrous layer

- The fibrous layer is thin, strong and inelastic.
- It is attached above to the great blood vessels at the base of the heart and below by **sternopericardiac ligaments** to the dorsal face of the sternum and **internal sternal ligament** between the facets for the 6th costal cartilages.
- In Dog, pericardium is attached to the sternal part of the diaphragm by **pericardioaphragenic ligament** and is connected to the sternum only by mediastinal pleura.

Serous Layer

- It consist parietal and visceral layer.
- Between these two layer a potential space containing a thin film of serous fluid called **liquor pericardii**.
- The parietal layer lines the internal face of the fibrous layer to which it is closely adhered.
- The Visceral layer covered the heart called **epicardium**.



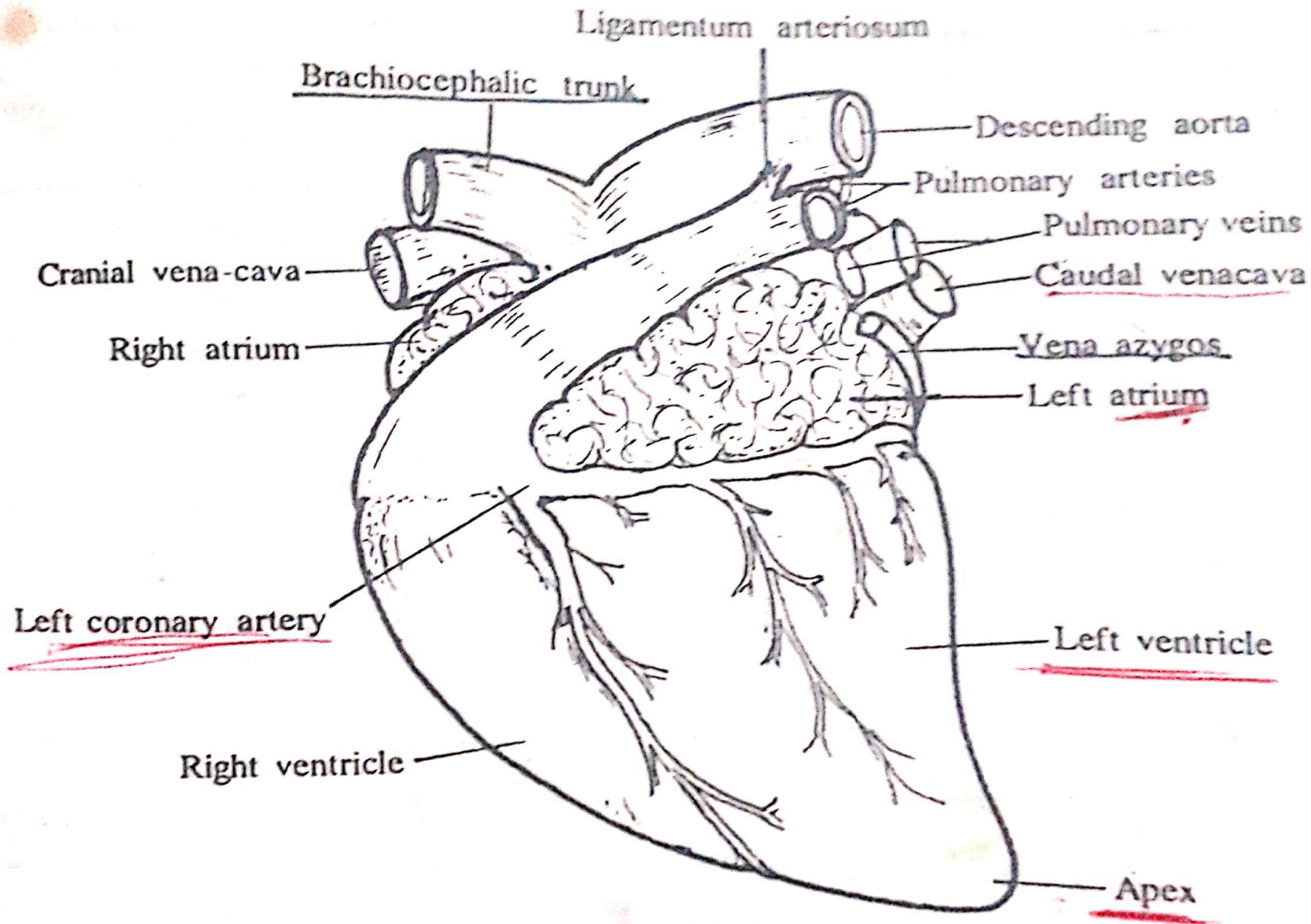
STRUCTURE OF HEART

External appearance

- The heart is an involuntary muscular organ which occupies the greater part of the **middle mediastinal space**.
- The heart presents-
 - Two surfaces,
 - Two borders,
 - A base and
 - A apex
- The base lies opposite to the lateral wall of thorax from the 2nd intercostal space to the 6th rib.
- The apex lies to the left above the sternum at the 6th chondro-sternal joint.

Surfaces of Heart

- The two surfaces i.e left and right are convex and marked by grooves which indicate the division of the heart in to four chambers.
- The **longitudinal grooves** indicate division of the heart into right and left ventricles while **coronary groove** indicates division of heart into atria and ventricles.
- **The coronary or transverse groove** completely encircle the heart at the origin of pulmonary artery.



Contt..

- The left longitudinal groove begins from coronary groove and descend down almost parallel to posterior border.
- The right longitudinal groove begins from coronary groove but it does not reaches upto apex of heart.

Border:-

The **anterior border** is strongly convex, the **posterior border** is shorter, nearly vertical and is opposite the fifth intercostal space.

INTERNAL APPEARANCE OF HEART

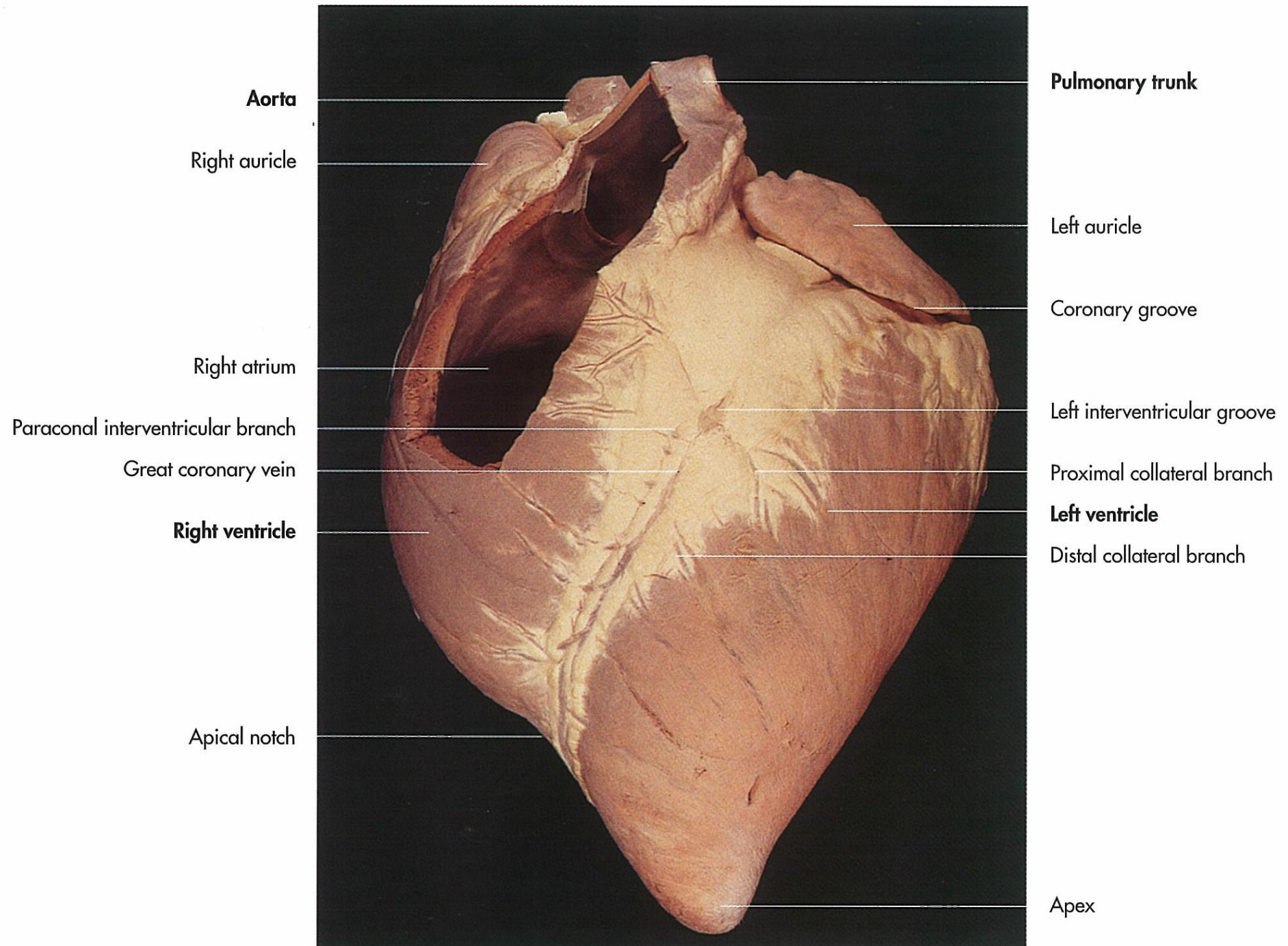
- The interior of the heart is divided by a complete septum into a right and left halves.
- Each half is subdivided into an upper atrium and a lower ventricle. The division is indicated externally by grooves.

A. THE RIGHT ATRIUM (RIGHT AURICLE)

B. THE RIGHT VENTRICLE

C. THE LEFT ATRIUM

D. THE LEFT VENTRICLE



Aorta

Right auricle

Right atrium

Paraconal interventricular branch

Great coronary vein

Right ventricle

Apical notch

Pulmonary trunk

Left auricle

Coronary groove

Left interventricular groove

Proximal collateral branch

Left ventricle

Distal collateral branch

Apex

THE RIGHT ATRIUM

- The right atrium forms the right anterior part of the base and is above the right ventricle.
- It consists of a principle cavity, the **sinus venarum** and the **auricular appendix**.
- The sinus venarum is the cavity into which the posterior venacava, anterior venacava, vena hemiazygous and great cardiac vein open.

Contt..

- The **anterior vena cava** bringing blood from the anterior parts of the body (**head, neck, forelimbs and part of thorax**) and opening into the sinus at the dorsoanterior part.
- The **posterior vena cava** returning blood from the posterior parts of the body and opening into the sinus at the dorsoposterior part.

Right atrium
Right auricle

Coronary groove
with the right coronary artery

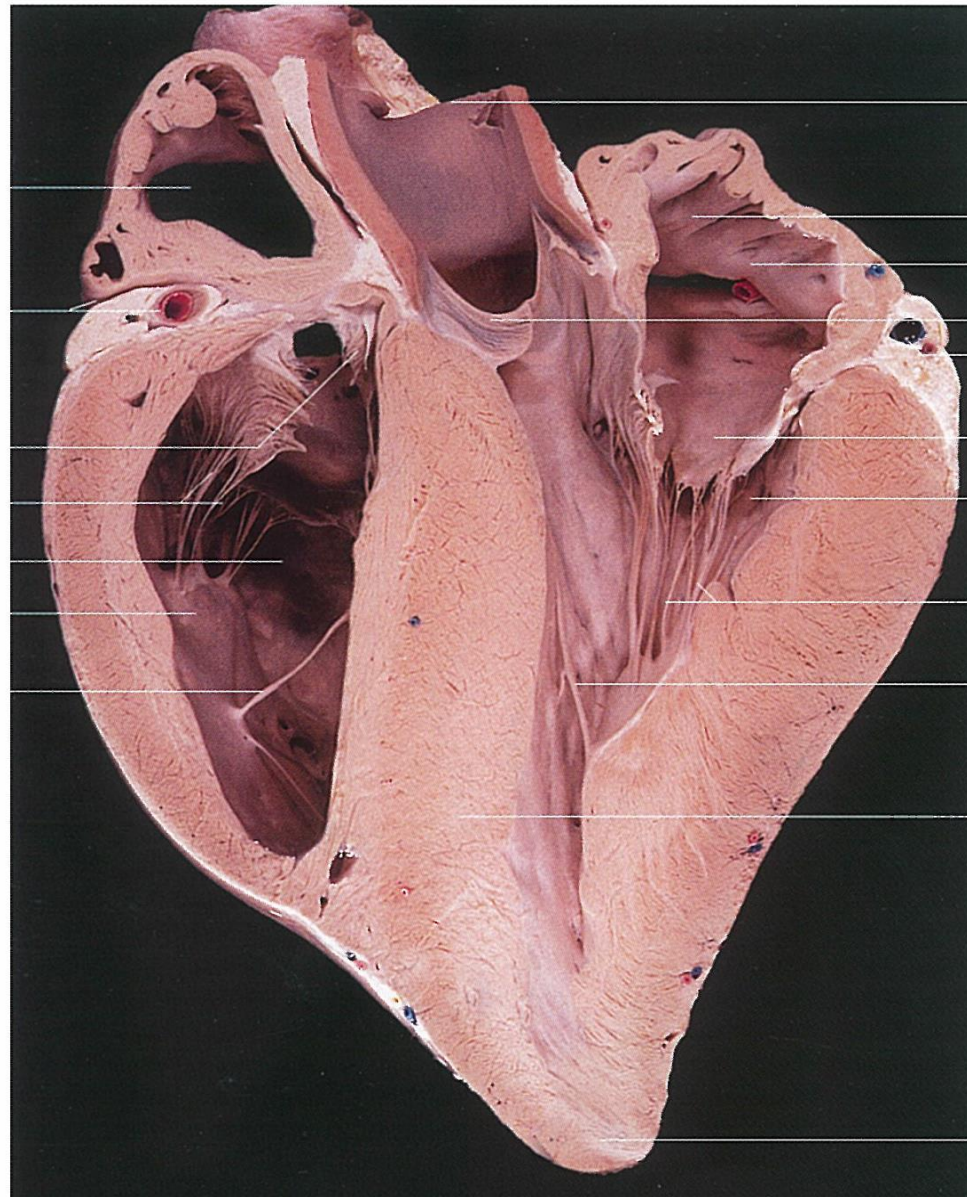
Tricuspid valve

Chordae tendineae

Right ventricle

Papillary muscle

Muscular band
(trabecula septomarginalis
dextra)



Aorta

Left atrium
Left auricle

Pectinate muscles

Aortic valve

Circumflex branch of the left coronary artery and greater coronary vein

Bicuspid valve

Left ventricle

Chordae tendineae

Muscular band
(trabecula septomarginalis
sinistra)

Interventricular septum

Apex

Left coronary artery

Aortic valve

Left atrium

Greater coronary vein

Bicuspid valve

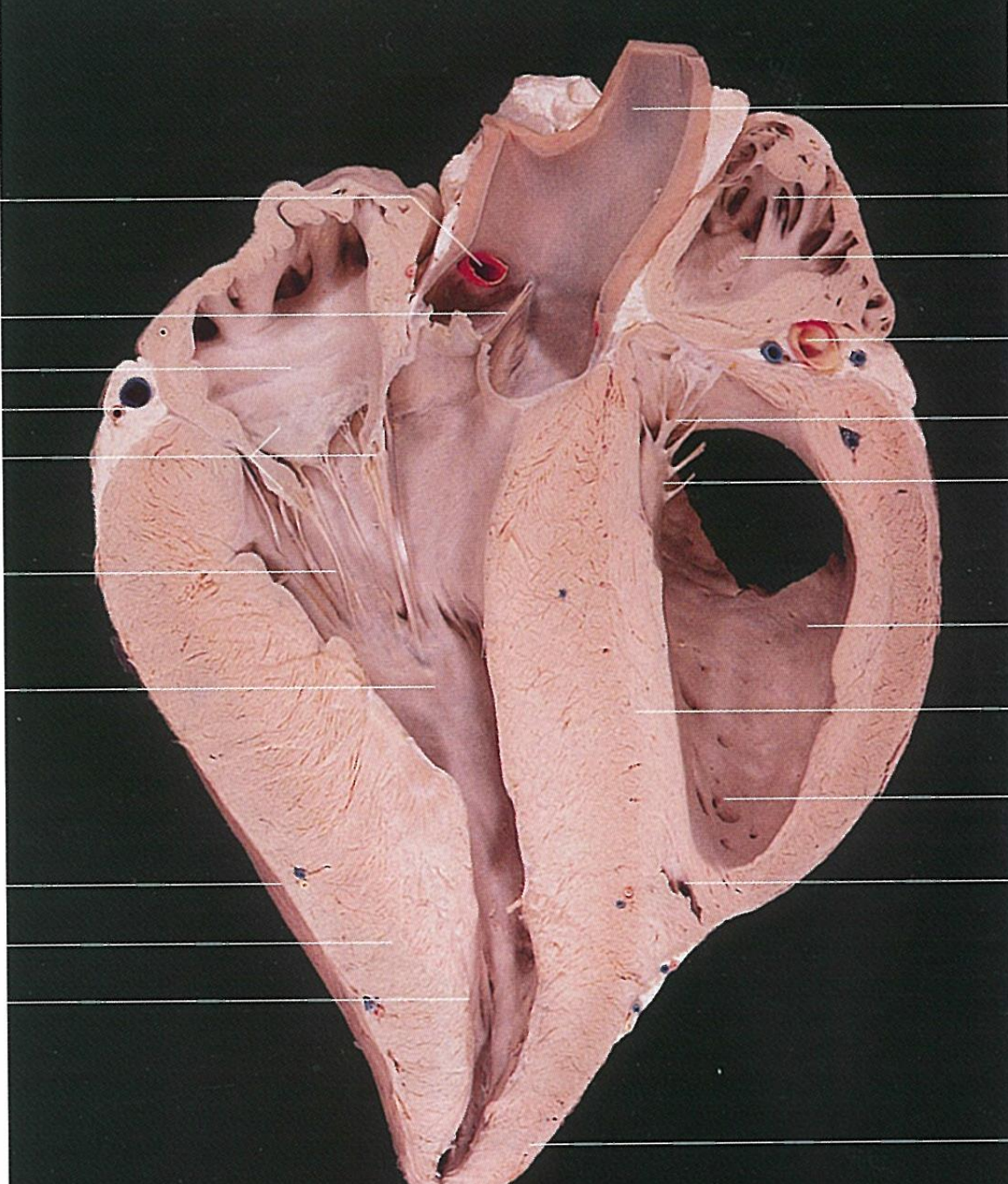
Chordae tendineae

Left ventricle

Epicardium

Myocardium

Endocardium



Aorta

Pectinate muscles

Right atrium

Circumflex branch of the
right coronary artery

Chordae tendineae
of the tricuspid valve
Papillary muscle

Right ventricle

Interventricular septum

Muscular ridges
(trabeculae carneae)

Paraconal interventricular
branch

Apex

Contt..

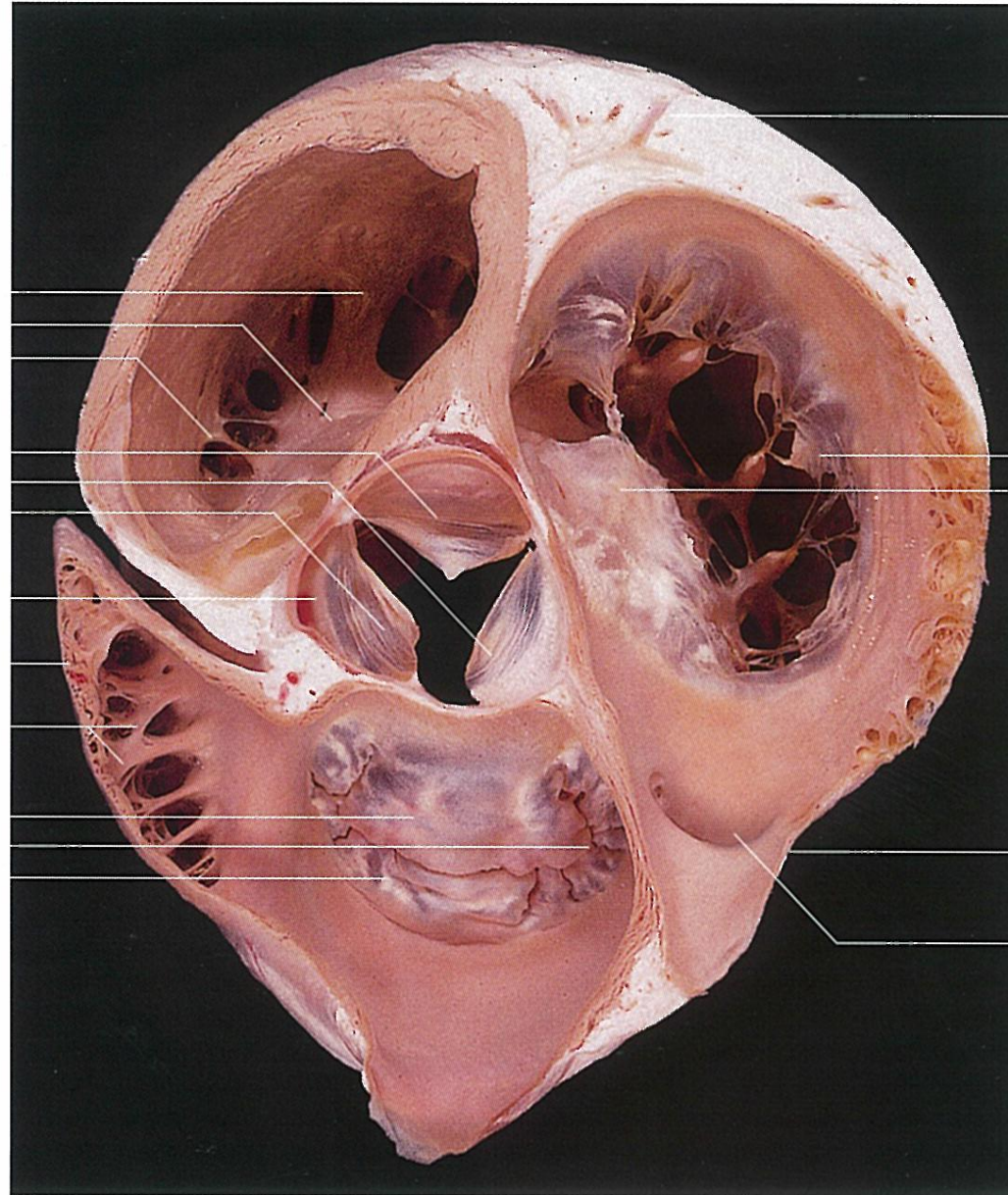
- The **coronary sinus** is the opening of the great cardiac vein and vena hemiazygos into the sinus venorum below the opening of the posterior vena cava.
- The fosa ovalis is an oval depression in the interatrial septum at the point of entrance of the posterior vena cava and which is a remnant of the foramen ovale of the foetus.

**Right atrioventricular
or tricuspid valve**
 Parietal cusp
 Septal cusp
 Angular cusp

Aortic valve
 Septal semilunar valvula
 Left semilunar valvula
 Right semilunar valvula

Right coronary artery
 Right auricle
 Pectinate muscles

Pulmonary valve
 Left semilunar valvula
 Right semilunar valvula
 Intermediate semilunar valvula



Right interventricular groove

**Left atrioventricular
or bicuspid valve**
 Parietal cusp
 Septal cusp

Left interventricular groove

Greater coronary vein

AURICULAR APPENDIX

- The interior of the auricle is not smooth but shows muscular ridges, the **musculi pectinate** crossing in various directions.
- The musculi pectinate terminate above on the curved crest called **crista terminalis**.
- The right atrioventricular orifice is situated at the lower part of the floor of the sinus venarum.
- Several small orifices of small cardiac veins are seen in the depressions between musculi pectinate.

THE RIGHT VENTRICLE

- The right ventricle forms the anterior part of the ventricular mass and forms the anterior border of the heart. It **does not reach the apex** of the heart.
- It is **triangular** in outline and crescentic on cross section.
- It communicates above at the base with the right atrium through the **right atrioventricular orifice**.
- Its left part projects higher forming the **conus arteriosus** from which the **pulmonary artery** arises.

Contt..

- The thick rounded musculotendinous cord like structure called the **moderator band** that extending from the interventricular septum to the lateral wall at the heart.
- It is supposed to prevent overdilation of the wall of heart.
- The walls of the ventricle except in the conus arteriosus bear muscular ridges called **trabeculae carneae**.

Contt..

- A variety of muscular ridges form somewhat conical flattened projections are called **papillary muscle** which is **three** in number in the right ventricle, **two** on interventricular septum and **one** on the lateral wall.
- The Papillary muscles start from the wall of ventricle and attached to end of the cusp of atrio-ventricular valve with the help of a tendinous structure which is a continuation of papillary muscles called **chordae tendinae**.

Contt..

- The right atrioventricular orifices is oval, guarded by the **tricuspid valve** made up of three cusps.
- One of these is situated between the atrioventricular orifice and the conus arteriosus. One is against the ventricular septum and another on the right margin.
- **The pulmonary orifice:** It is circular and is situated at the summit of the conus arteriosus, It is guarded by the pulmonary valve, composed of three semilunar cusps on the medial, lateral and on the posterior aspect.

Left Atrium

- The left atrium forms the posterior part of the base of the heart.
- It lies behind the pulmonary artery and aorta and above the ventricle.
- It consists of a **sinus venorum** and an auricle.
- The later extends on the left side and its blind end lies behind the origin of the pulmonary artery.
- The **sinus venarum** receives the pulmonary veins, about **4 to 7** in number.
- On the lower portion left atrio ventricular opening is present.

Left Ventricle

- The left ventricle forms the left posterior part of the ventricular mass.
- It forms the whole apex of heart.
- It is **circular** in outline on the cross section.
- The moderator bands : commonly **two large ones** and few smaller.
- Two large papillaries muscles which are compound both on the lateral wall of the ventricle.
- The chordae tendinae are fewer but larger than those of the right ventricle.

Contt..

- The left atrio-ventricular opening is circular and guarded by the **bicuspid or mitral valve** i.e anterior and posterior cusps.
- The aortic openings is guarded by **aortic valve composed of three semi lunar cusps.**
- On the left and right side of aortic ring two small bones are present mainly in old aged cattle called **os cordis.**
- Right is larger than the left and is triangular in form.
- They are cartilaginous in young animals.

Contt..

- Aorta is arises from the left ventricle at Bulbous aorticus
- The first branch of Aorta is Coronary Artery.

Thank You