X - B. RELEVANT NORMAL FEATURES OF BODY ORGANS

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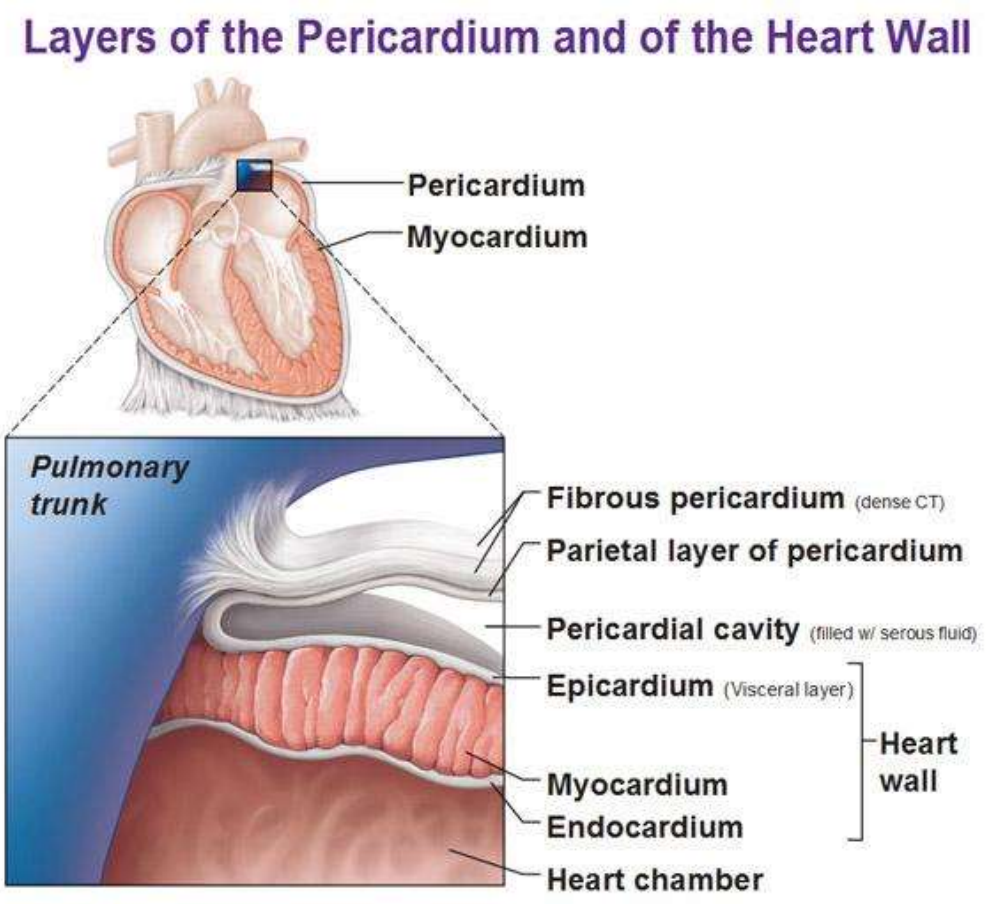
- The following morphologic data are **simply a guide to the average anatomical features** of some organs in the body of a healthy moderately built adult male or female).
- For facilitation, and to include all this matter in a small space and in a concise manner, it was necessary to employ a **very condensed language** and make frequent use of contractions.
  - The **weights are given in grams**,
  - The measurements in centimeters and
  - The organs described are arranged in the order of their systems.

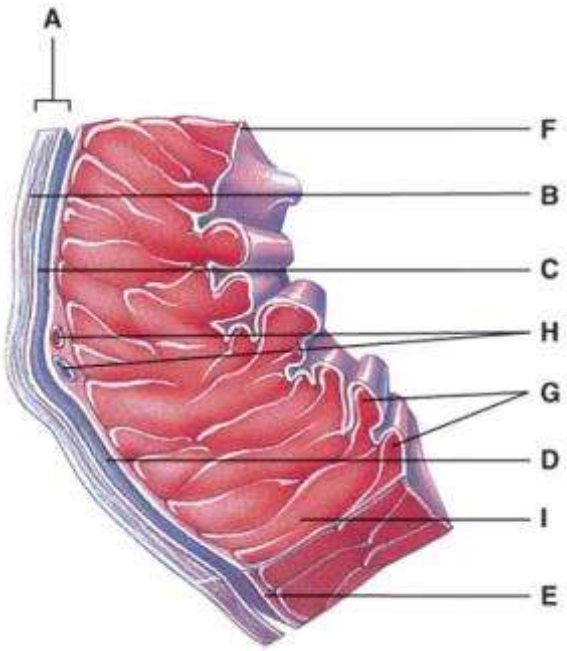
HEART AND PERICARDIUM

PERICARDIUM



A fibro-serous sac containing:

- **Heart**
- **Cardiac vessels**
- **Cardiac nerves**
- **Ascending aorta**
- **Pulmonary trunk**
- **Parts of pulmonary veins**
- **Lower of I.V.C.**
  (inferior vena cava)



Has got :

- *Apex*
- *Base*

Two layers:

I. Fibrous pericardium

- External
- Thin
- Strong
- *Conical*

II. Serous pericardium

Closed invaginated sac

Formed of:

1. Parietal layer

Adherent to inner surface of fibrous pericardium; forms its lining

2. Visceral layer (epicardium)

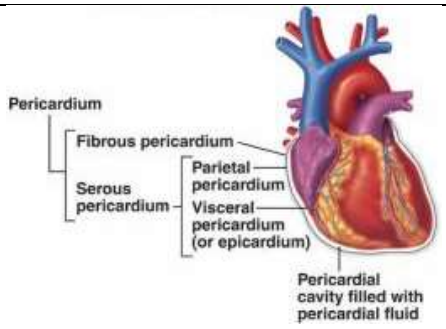
- Envelops heart & roots of great vessels
- Thin
- Transparent

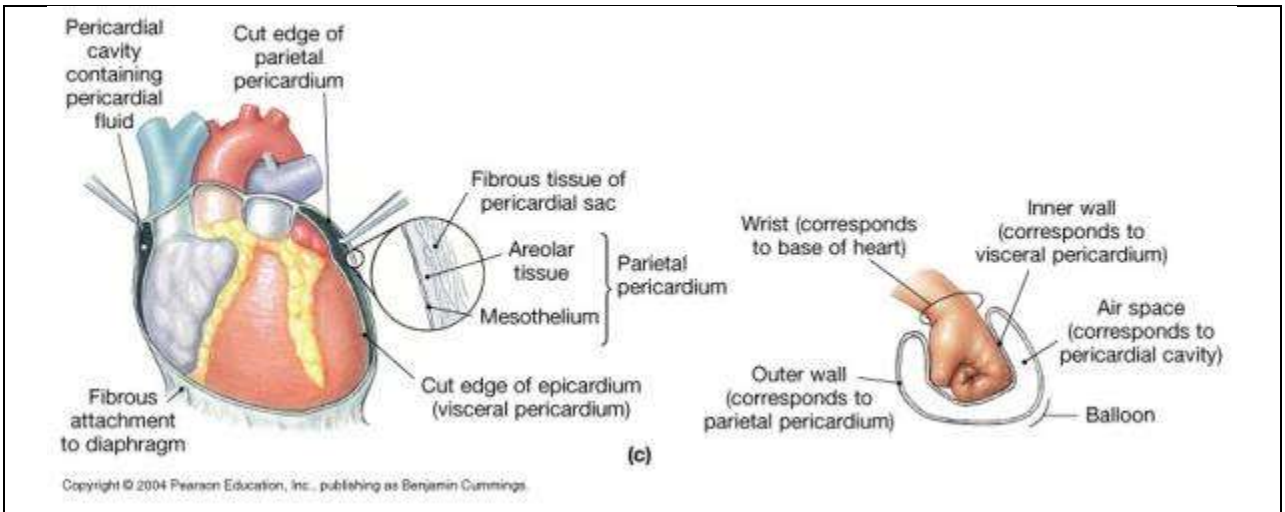
Opposed surfaces of layers 1 & 2 are

Smooth

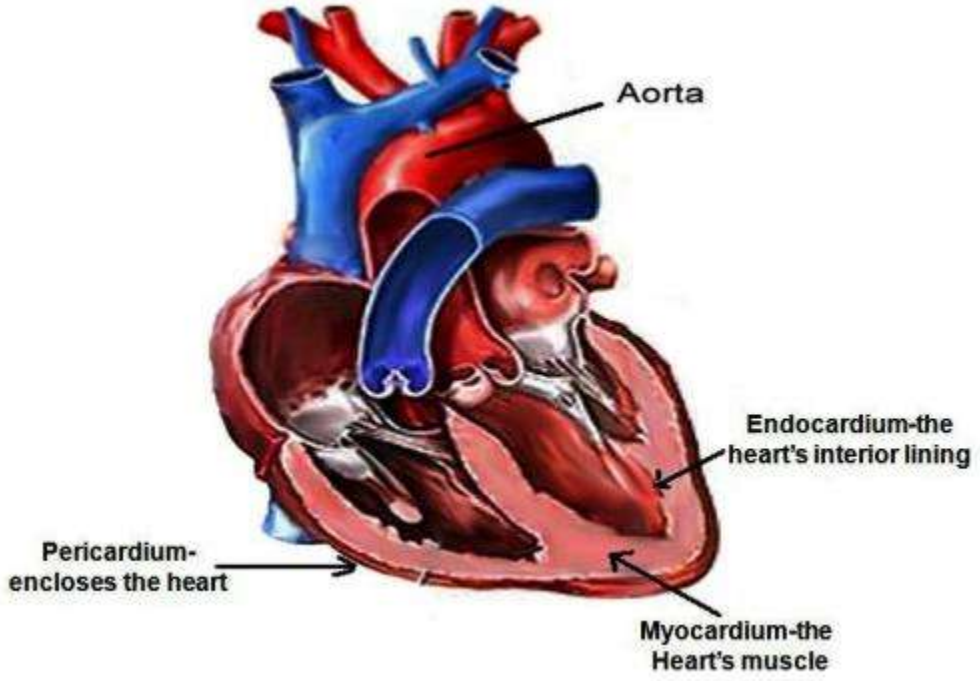
Glistening

Contain a thin layer of clear fluid, about 20-50 cc.

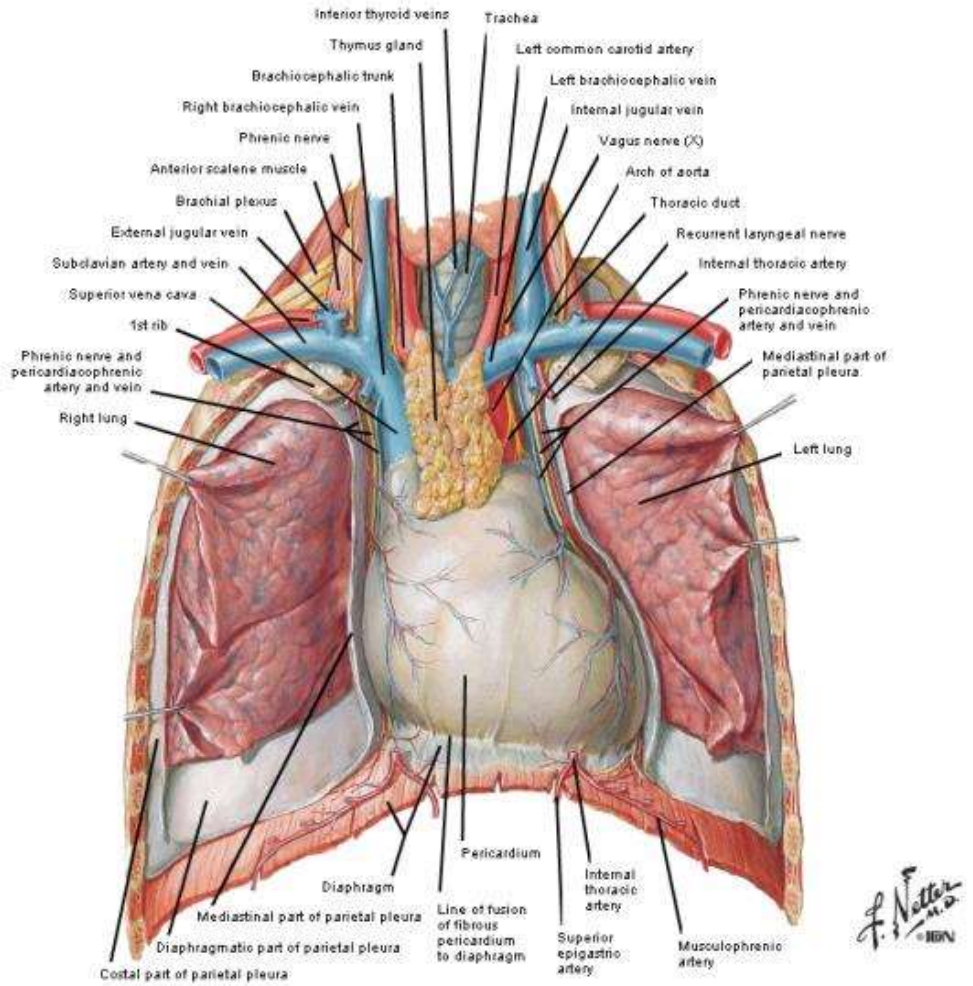




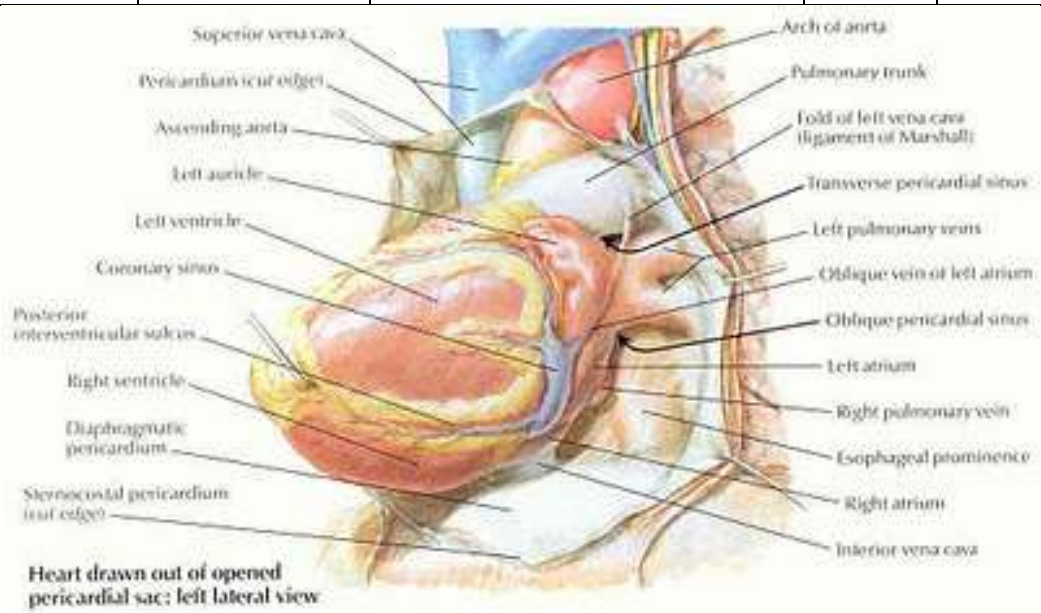
HEART	• A hollow organ • Muscular • Somewhat conical		
Weight:	**270—330 g. (male)** **240-290 g. (female)**	300 + or – 30 265 + or - 25	
Shape:	Like fist of hand (conical)		
Size:	***Length:***	**12 cm. (base-to-apex)**	
	Breadth:	**9 cm. (transversely at broadest part)**	
	Thickness:	**6 cm. (antero-posteriorly)**	

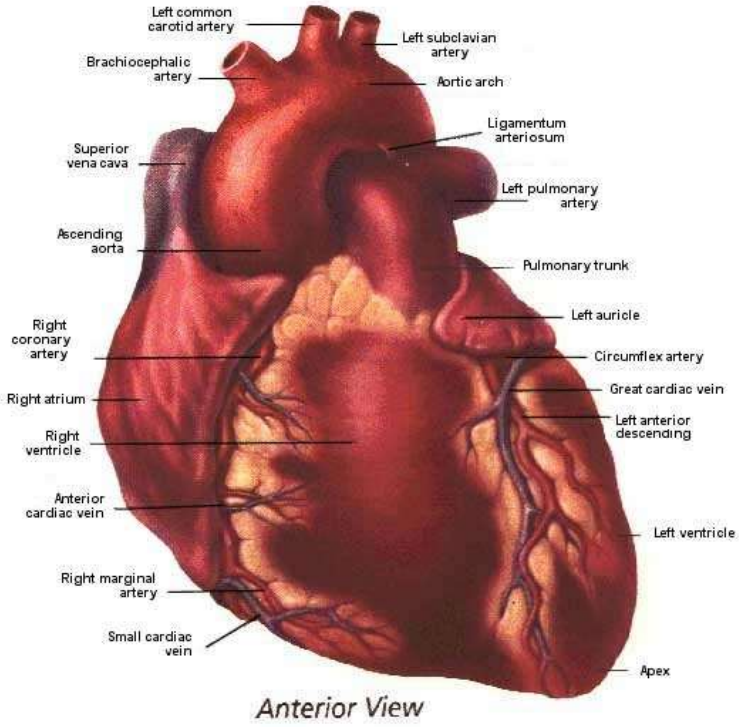


Heart In Situ



Surfaces	***Anterior (sterno-costal):***		Uneven	
	Inferior (diaphragmatic):		Flat or concave	
	Left:		Wide Convex Narrows towards apex	
Borders	***Upper:***	• Atria		
	Lower:	• Right ventricle • Apical portion of left ventricle		
	Right:	• Right atrium		
	Left:	• Left ventricle • Left auricle		
Apex	• Blunt • Formed of left ventricle			

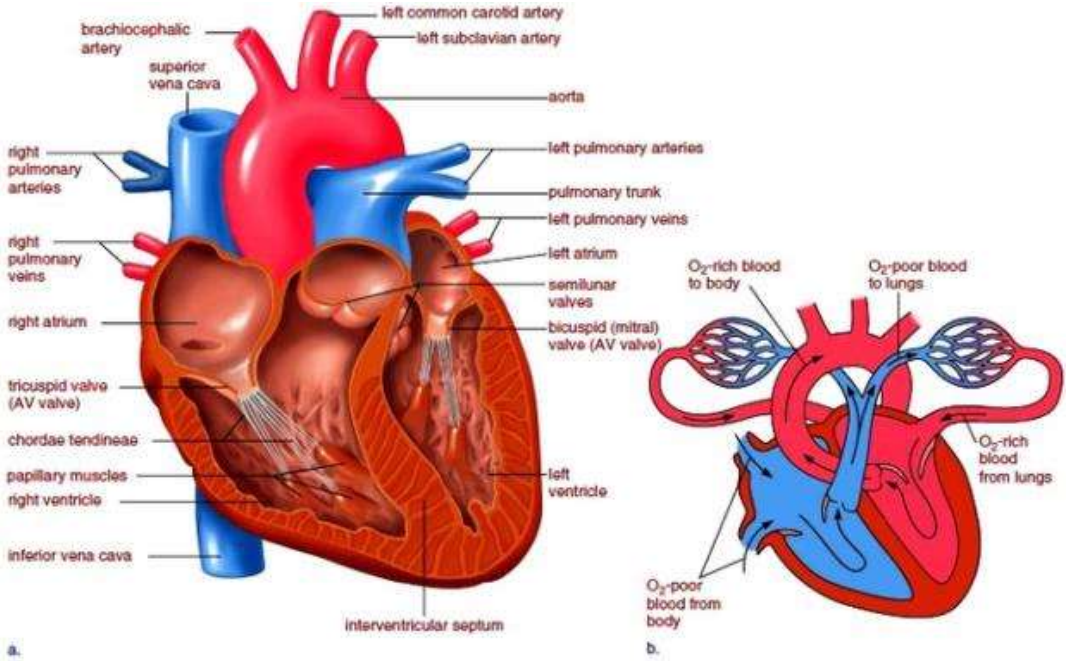
Base	• Plane-vertically • Curved-horizontally • Quadrilateral • Formed of • Two atria			
Circumference:	**28 cm.**			
 **Heart drawn out of opened pericardial sac; left lateral view**				



Anterior View

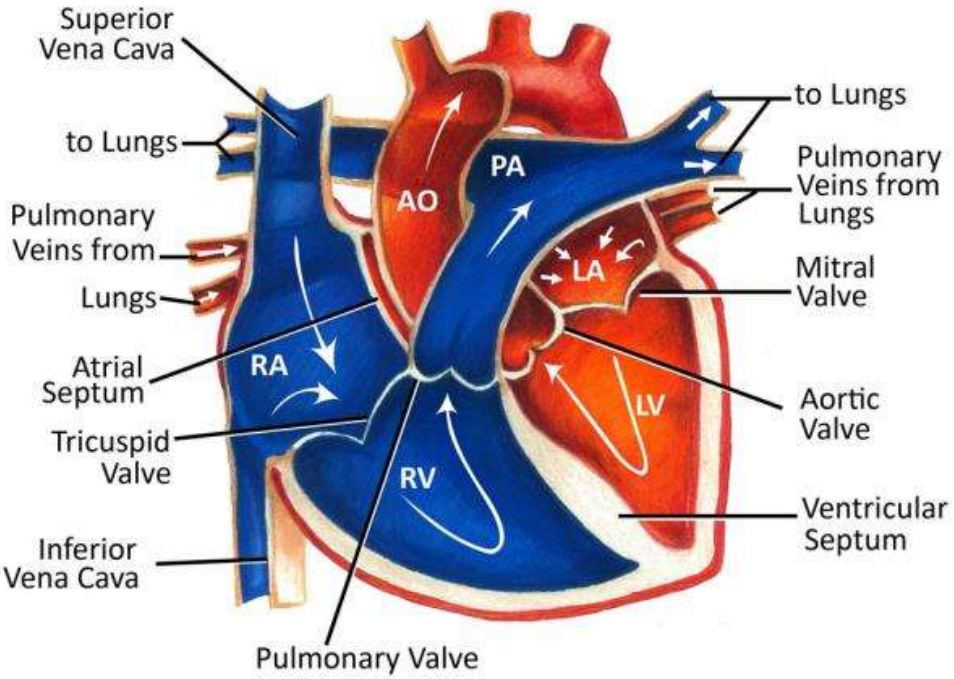
:

X. Relevant Normal Features

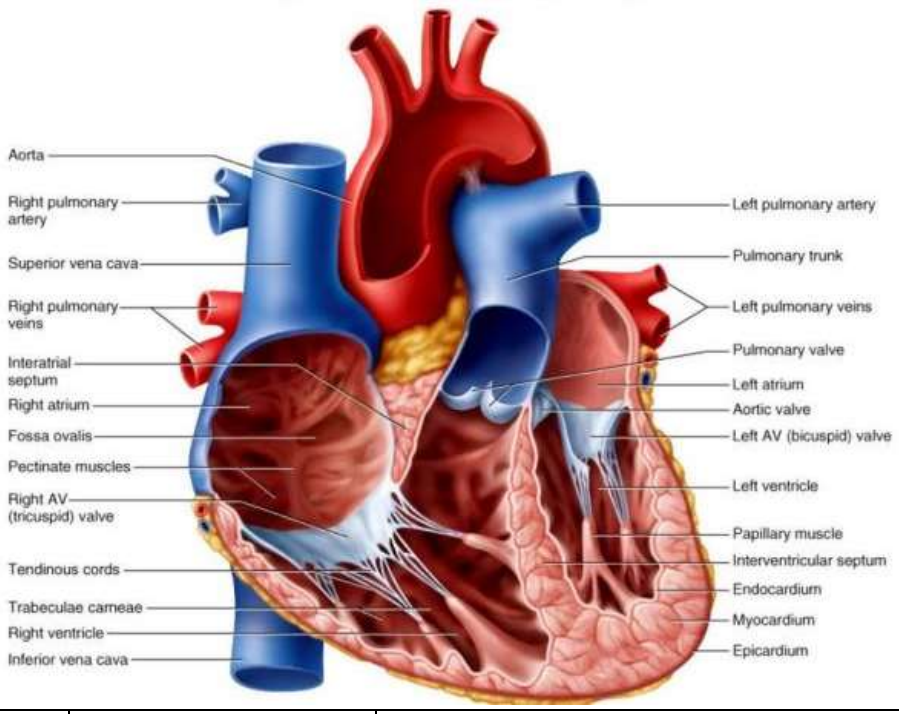


Grooves	***Inter-atrial:***	Vertical Ill-defined		
	Atrio-ventricular:	For coronary vessels		
	Inter-ventricular			
Divisions:	Four chambers indicated by grooves on the surface			
Chambers	***1. Right atrium*** *(with an ear-shaped prolon*gation = auricle)			
	Quadrangular			
	Openings of:	• Superior vena cava • Inferior vena cave (larger opening) • Atrio-ventricular orifice (right) • Coronary sinus • Anterior cardiac veins • Venae minimi		
	Other findings:	• Fossa ovalis • Annulus ovalis • Foetal foramen ovale (any persistence) • Crista terminalis • Musculi pectinate		

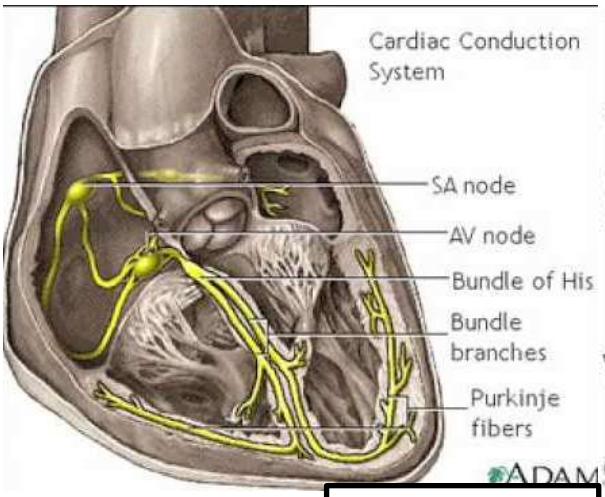
	2. Right ventricle:		
		Triangular (outline) Semi-lunar (transverse section) Ventricular septum: Convex	
	Walls:	• Thicker than right atrium • Thinner than left ventricle • Thickness: 0.3-0.5 cm.	
	Openings:	• Atrio-ventricular orifice (tricuspid) • Pulmonary trunk	
	Other findings:	• **Tricuspid valve** • **Trabeculae carnae** (coarse spongy network on wall; largest is moderator band) • **Papillary muscles** (conical projections) • **Chordae tendinae** (thin terminal fibrous threads of papillary muscles)	

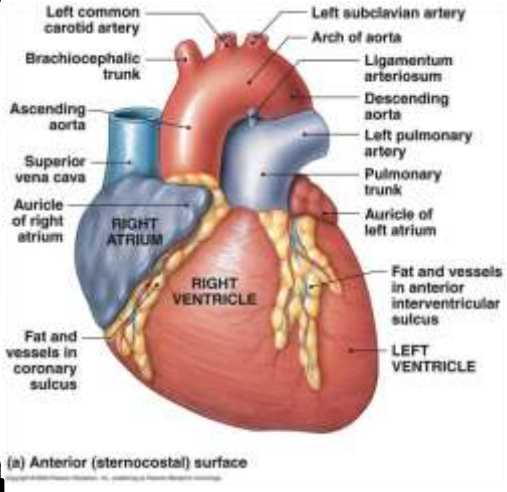


	3. Left atrium (with a small auricle)		
		• Cuboidal • Smaller than right	
	Walls:	• Thicker than right • Thickness: 0.3 cm.	
	Interior:	Smooth (except at auricle)	
	Openings:	Pulmonary veins (not provided with valves) Atrio-ventricular orifice (left)	



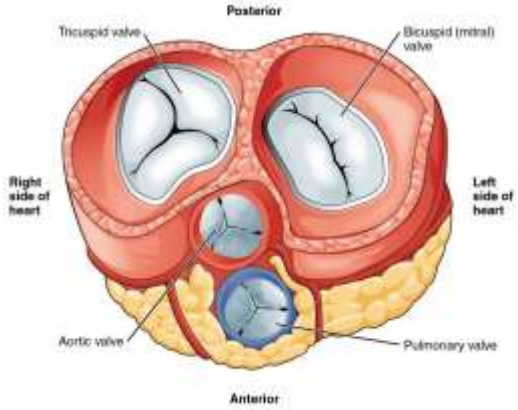
	4. Left ventricle	• Forms apex of heart • Conical in shape • Longer and narrower than right • Circular or oval (transverse section)	
	Walls:	• Thicker than right • Thickness: **1.2-1.4 cm.** (not including the thickness of papillary muscles)	
	Trabeculae carnae:	Finer than right More numerous No moderator band (usually)	
	Papillary muscles:	Stronger than right Larger Less numerous	
	Chordae tendinae:	Thicker Less numerous	
	Openings:	Left atrio-ventricular orifice **(mitral)** · Aorta	
	Other findings:	**Mitral valve**	

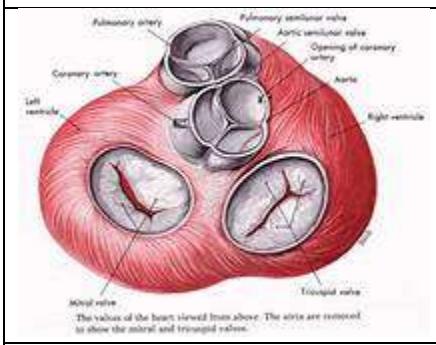


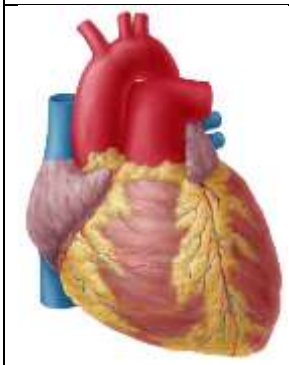


Cardiac conduction system

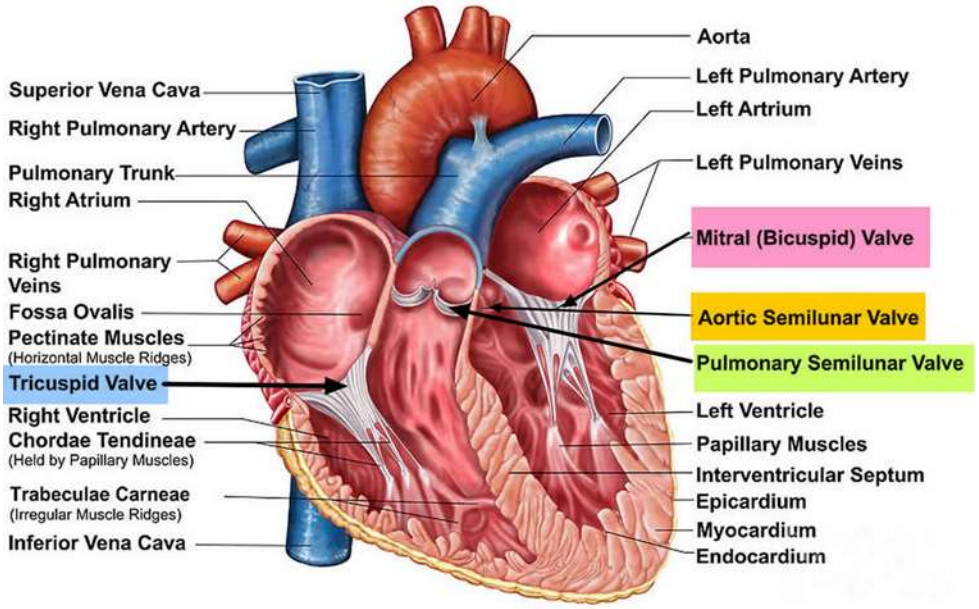
Valves				
Four valves	***Valvular leaflets:***	Delicate Translucent No grossly-evident vascularity		
	Line of closure:	Marked by a linear thickening		
Tricuspid Valve Cusps				
	• Three flaps (anterior is largest) • Triangular			
	Central part:	**Thick** **Strong**		
	Marginal part:	**Thin** **Translucent**		
	Orifice:	**Large** **Oval** **Admits tips of 3 fingers**		
	Circumference:	**12 cm.**		

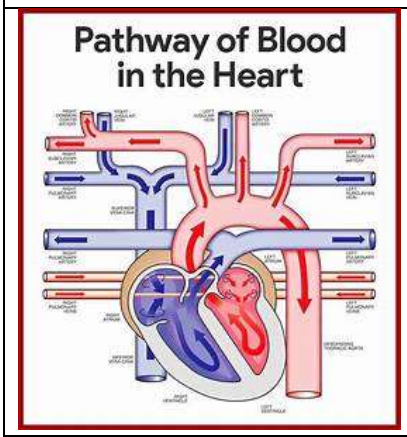


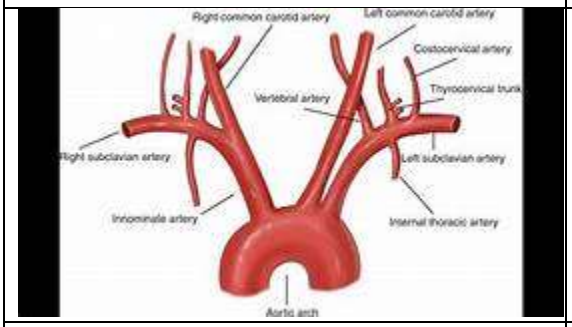
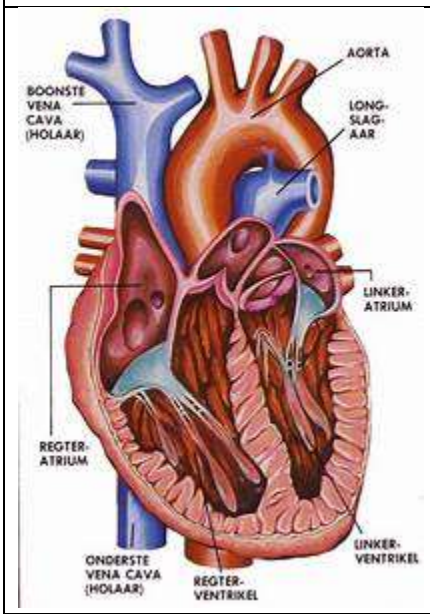
Pulmonary Valve				
	Cusps :	Three Semilunar		
	Orifice :	Circular		
		Diameter :	**2.5—3 cm.**	
		Circumference :	**8.5 cm.**	
Mitral Valve	**Cusps :**	**Two :**	**A large anterior** **A small posterior**	
		Triangular Larger than of tricuspid Thicker Stronger		
		Chordae tendinae:	Thicker (than right) Stronger Less numerous **Orifice : Small**	
	Orifice :	Admits	**Tips of 2 fingers**	
		Circumference:	**10.cm.**	
Aortic Valve	**Cusps**	**Three**	**Semilunar**	
		Larger	than of pulmonary	
		Thicker Stronger		
		Nodules :	Thick Prominent	
	Orifice	Circular		
		Diameter:	**2.5 cm.**	
		Circumference:	**7.5 cm**	
Ventricular septum	**Membranous fibrous upper part :**		Small Oval Thick	
AORTA	**Main systemic arterial trunk**			
	muscular part : **Below**	Anteriorly Convex	(towards right ventricle)	
Endocardium	Thin Glistening Lines chambers of heart			

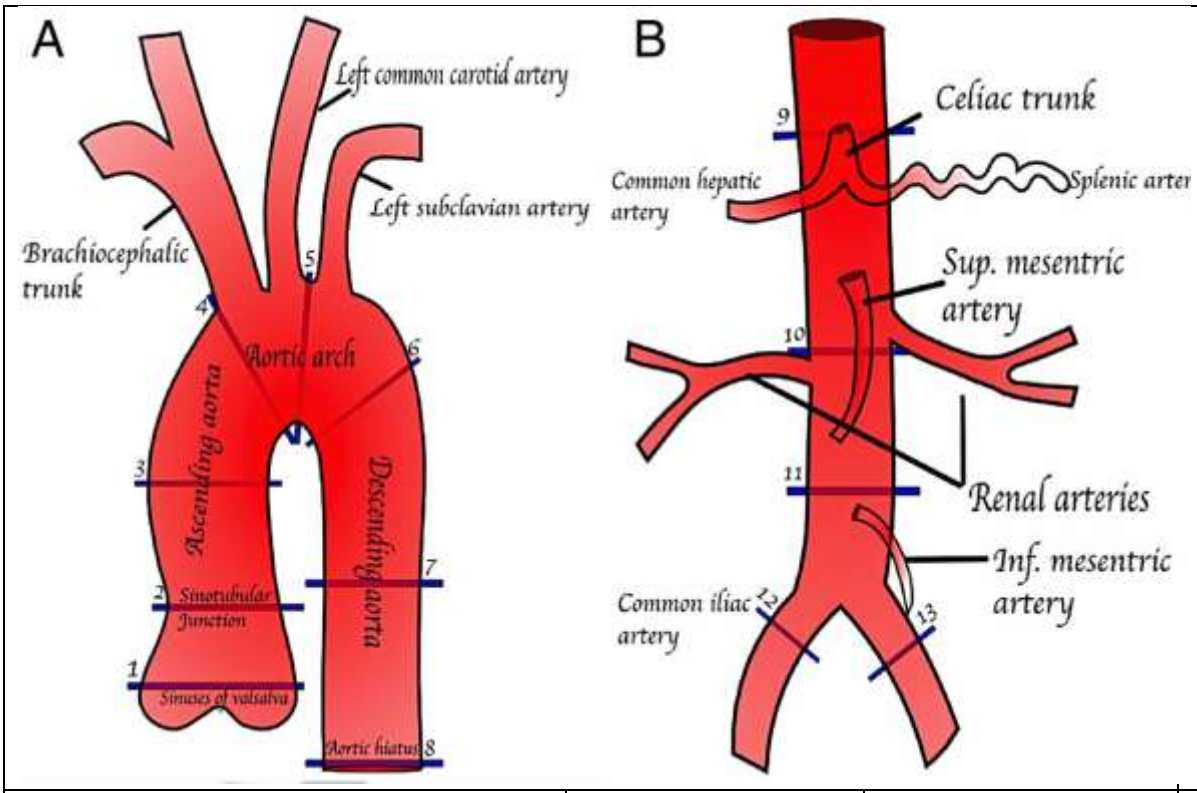
Cut surface: ***Starts from:***	Depends on site of cross section	**Crescentic** (at right ventricle) **Nearly circular** (at left ventricle)	
Left ventricle	Includes: 1. Ascending aorta		
Myocardium	***Thickness***	**Right atrium:**	**0.1-0.2 cm.**
		Left atrium :	**0.15- 0.25 cm.**
		Right ventricle:	**0.6 cm.**
		Left ventricle:	***1.5 cm.***
	Colour :	*Brownish-red*	
	Consistence :	*Fleshy*	
Other features			
	Basal part of heart	Thin-walled Flaccid Soon loses its shape after removal	
	Middle of free edge of cusps of arterial valves	Thickened nodule	
	Each side of free edge of cusps of arterial valves	Thin	
	***Fat covering heart***	Abundant :	In grooves Along borders
	Fleshy fibers of atria	Separated from those of ventricles by fibrous rings around orifices	
	Sino-atrial fibro cellular node	In atrial wall	
		Length:	**1 cm**
		Thickness: *(about 0.5 inch in length & one line-thick)*	**0.05 cm**
	Atrio-ventricular bundle	Pale muscle fibres (& nerves) Begins above opening of coronary sinus Lies in septum	
		Thickness:	**0.3 cm**

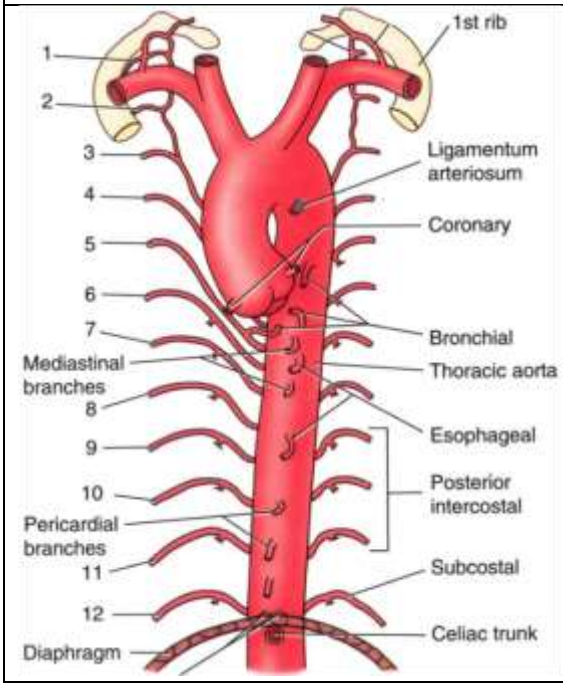
	Size of heart		
	Increases:	Rapidly up to 20 years Gradually till 50 years	
	***Visible coronary arteries***	Lie within the subepicardial fibrofatty tissue	
	Nutrient branches	Extremely small Pass into the myocardium	
	Dimensions of the heart	Depend upon whether it has **stopped in systole or diastole** prior to death	



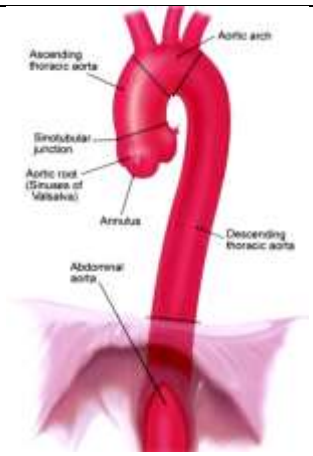
Aorta	**Starts from:**	Left ventricle	
Includes:	**1. Ascending aorta**		
	***Has:***	3 aortic sinuses opposite cusps of valves	

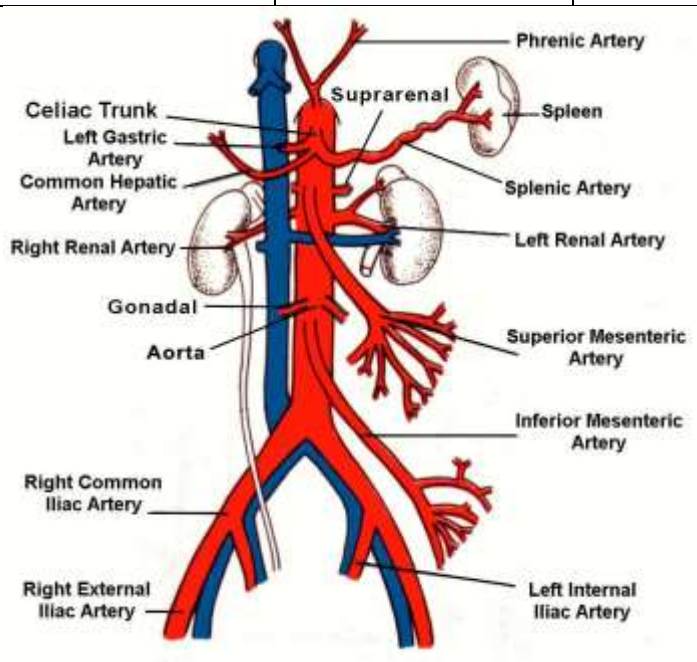
	Lies:	Within fibrous pericardium	
	Enclosed in:	Serous pericardium	
	Branches:	Coronary artery **(right & left)**	
	2. Arch of aorta		
	**Lies:**	Within superior mediastinum	
	Concavity :	Downwards	
	First 2.5cm:	Transverse	
	Remainder:	Directed backwards	
	Branches	(from upper border)	
	**1** **Innominate** **2** **Common carotid (left)** **3** **Subclavian (left)**		



	3 Descending aorta (a) Thoracic :	In posterior mediastinum	
	Ends in	aortic opening of diaphragm	
	**Branches:**		

1	**Intercostals (9 pairs)**
2	**Subcostals (one**
3	**pair) Phrenic (a few)**
4	**Bronchial (2 left)**
5	**Bronchial (1 right)**
6	**Mediastinal**
7	**Oesophageal**
8	**Pericardial**

	***(b) Abdominal :***		
	Begins :	Between crura of diaphragm	
	Ends by :	Common iliac artery: Left Right	



Branches :	Paired: • Middle suprarenal Renal • Testicular (or ovarian) • Phrenic • Lumbar (4)	Unpaired: • Coeliac • Superior mesenteric • Inferior mesenteric • Median sacral