

## THE HEART

**Study Objectives:** You are responsible to understand the basic structure of the four chambered heart, the position and structure of the valves, and the path of blood flow through the heart.

### Structure--The Outer Layer

**pericardium:** a specialized name for the celomic sac that surrounds the heart.

**fibrous pericardium:** the most outer, fibrous layer of the pericardium.

**serous pericardium:** there are two surfaces (layers) to this tissue

- a) **parietal layer:** the outer layer of the serosa surrounding the heart. Lines the fibrous pericardium, and the combination of the two layers is also called the **parietal pericardium**.
- b) **visceral layer:** the inner layer of the serosa surrounding and adhering to the heart. Also called the **visceral pericardium** or **epicardium**.

**pericardial cavity:** the potential space between the parietal and visceral layers of the serous pericardium. The cavity is filled with serous fluid

### Structure--The Heart:

⇒ Blood is delivered to the **right atrium** from the coronary sinus, inferior vena cava and superior vena cava

⇒ Blood travels to the **right ventricle** from the right atrium via the right atrioventricular valve

⇒ Blood travels from the left atrium to the **left ventricle** via the left atrioventricular valve

⇒ Blood leaves the heart via the pulmonary valve to the **pulmonary trunk**, is delivered to the lungs for oxygenation and returns via the **pulmonary veins** to the **left atrium**

- a) **crista terminalis:** separates the anterior rough-walled and posterior smooth-walled portions of the right atrium.
- b) **right auricle:** small, conical, muscular, pouch-like appendage.
- c) **musculi pectinate (pectinate muscles):** internal muscular ridges that fan out anteriorly from the crista terminalis. This portion of the right atrium corresponds to the primitive atrium of the embryonic heart.
- d) **sinus venarum:** the smooth-walled cavity extending posteriorly from the crista terminalis.
- e) **interatrial septum:** forms posteromedial wall of the right atrium.
- f) **fossa ovalis:** located on the interatrial septum; a remnant of the fetal foramen ovale through which oxygenated blood from the placenta passed from the right atrium to the left atrium.
- g) **right ventricle:** mainly derived from the bulbus cordis; forms the largest part of the sternocostal surface of the heart. The walls are thicker than those of the right atrium.
- h) **conus arteriosus (infundibulum):** superoanterior end of right ventricle tapers into this

smooth-walled, cone-shaped structure that gives rise to the pulmonary trunk.

- i) **trabeculae carneae:** muscle ridges and bulges lining the right ventricle (trabs=wooden, carneus=fleshy).
- j) **septomarginal trabeculae (moderator band):** a trabeculae carneae, elevated into a free band, that crosses the cavity of the ventricle from the interventricular septum to the base of the anterior papillary muscle. It carries the right band of the AV bundle.
- k) **papillary muscles:** irregular muscle bundles lining the wall of the ventricle except at the infundibulum. They connect the ventricular wall to the atrioventricular valve and are important in atrioventricular valve integrity. The papillary muscles contract before the ventricle does.

**anterior:** largest papillary muscle; located on anterior wall and attached to anterior and posterior cusps of valve.

**posterior:** located on inferior wall and attached to posterior and septal cusps of valve.

**septal:** located on interventricular septal wall and attached to anterior and septal cusps of valve.

- l) **chordae tendinae:** slender, fibrous threads that arise from apices of the papillary muscles. These insert into the free edges and ventricular surfaces of the valve cusps.
- m) **right atrioventricular (tricuspid) valve:** located between the right atrium and right ventricle. This valve blocks the reflux of blood into the right atrium when the right ventricle contracts. The valve is formed by three fibrous cusps covered by endocardium and surrounded by a fibrous ring that provides attachment for the cusps.
- n) **pulmonary valve:** lies at the apex of the conus arteriosus. It consists of three semilunar valve cusps that are concave when viewed superiorly. When the ventricle relaxes, these cusps open up like pockets to prevent the backflow of blood. The cusps are classified on their position in the fetal heart before rotation.
- o) **left atrium:** forms most of the base and posterior surface of the heart.
- p) **left auricle:** pouch-like appendage of the left atrium, containing musculi pectinate.
- q) **pectinate muscles:** found only in the auricle. The other walls of the atrium are smooth.
- r) **valvule of foramen ovale:** functions as a valve in the fetal heart, preventing blood from flowing backward from the left atrium into the right atrium.
- s) **Left ventricle:** forms apex of the heart.

**atrioventricular (mitral or bicuspid) valve:** blocks the backflow of blood from the left ventricle into the left atrium. The valve is formed by two cusps, anterior and posterior. Of all the valves, the mitral valve is most frequently diseased.

**papillary muscles:** two large muscles, anterior and posterior, which are connected to the mitral valve.

**chordae tendinae:** thicker but less numerous than in the right ventricle.

**aortic valve:** similar in structure to the pulmonary valve, but its cusps are thicker. The right and left coronary arteries drain into two sinuses located in the concave spaces behind two of the cusps.

Books: B D Chaurasia's Human Anatomy  
Gray's Anatomy