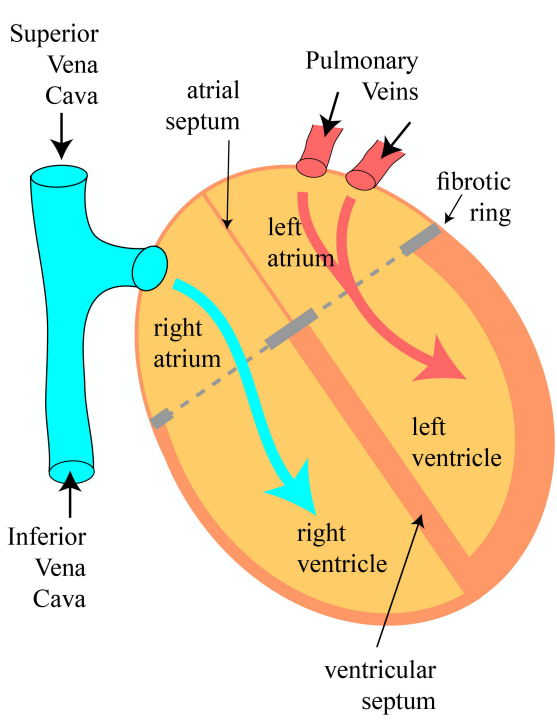


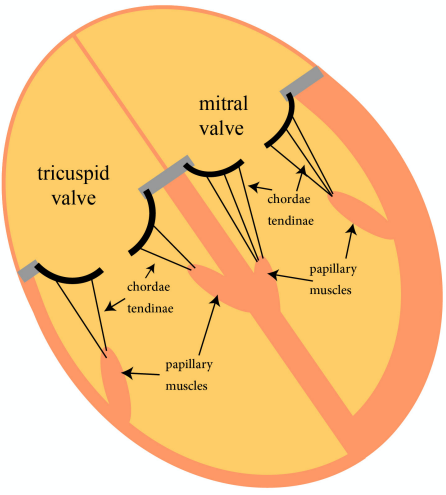
B.2. Structure of the Heart.

A. The heart is a muscle:

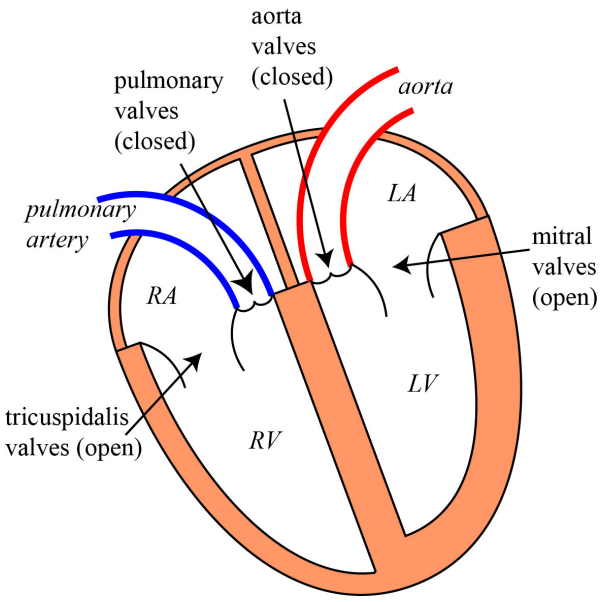
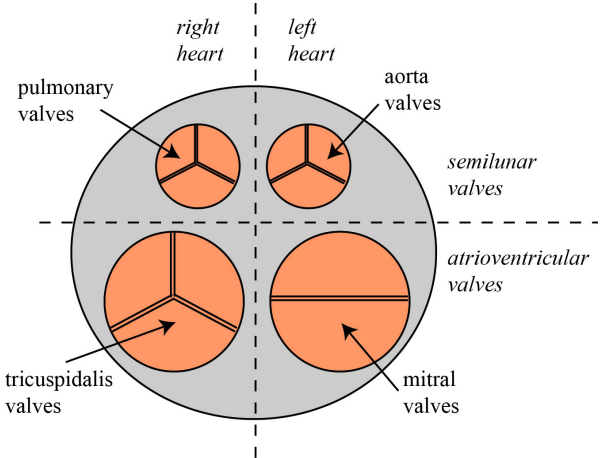
1. The heart is a muscle; also called cardiac muscle (<i>Remember that there are also two other types of muscles in the body; skeletal muscles and smooth muscles; see A.4.1. The Muscle Cell</i>).	2. The heart is actually a complicated muscle as it consists of two parts; the right heart and the left heart.
3. Each heart (right and left) again consists of two parts: - the atrium (plural; atria) - the ventricle (plural; ventricles)	4. The right heart consists of the right atrium and the right ventricle whereas the left heart consists of the left atrium and the left ventricle.
5. Between the right heart and the left heart, there is a wall, a septum . In the atria, this is called the atrial septum . In the ventricles, this is the ventricular septum (which is much thicker).	6. Between the atria and the ventricles, there is also a 'wall', which is called the fibrotic ring , AV fibrous tissue or Annulus Fibrosis . It is actually a rather thick fibrotic plate dividing the atria from the ventricles. It also contains several valves through which the blood can flow from one compartment to the next.
7. In the right heart, the blood flows from the body (= systemic circulation), through the superior and inferior vena cava's, into the right atrium. From there it flows to the right ventricle before it is pumped out into the pulmonary artery towards the lungs. This is the start of the pulmonary circulation.	 Superior Vena Cava atrial septum Pulmonary Veins fibrotic ring left atrium right atrium left ventricle right ventricle ventricular septum Inferior Vena Cava
8. In the left heart, the blood flows from the lungs, through the pulmonary veins, into the left atrium. From there it flows into the left ventricle before it is pumped into a large artery, called the aorta . This is the start of the systemic circulation.	
9. Note, in the diagram, that the walls of the left ventricle are much thicker than that in the right ventricle or in the atria. This is because the left ventricle has to pump the blood at a much higher pressure than in the other compartments (<i>see for more information:</i>	

B.5.1. The Arteries).

B. The Cardiac Valves:

1. To make sure that the blood flows in the correct direction, there are valves located between the atria and the ventricles. These are called the atrio-ventricular valves (= AV-valves).	2. In addition, there are also valves located between the two ventricles and the arteries; the semilunar valves. There are two of them; the pulmonary valve (in the right heart) and the aorta valves (in the left heart).
3. The valves consist of thin but strong cusps or valves. In all these valves except one, there are three slips or cusps.	4. The exception is the AV-valve in the left heart. That particular valve only contains two cusps. We call this valve, the mitral valve (TT: <i>mitral</i> > <i>miter</i> > <i>looks like the hat of a bishop</i> ; <i>kind of a priest</i> . See footnote!)
 The diagram illustrates a cross-section of the heart's interior, focusing on the two atrio-ventricular (AV) valves. On the left, the tricuspid valve is shown with three distinct cusps. On the right, the mitral valve is shown with two cusps. Both valves are anchored to the ventricular walls by chordae tendinae, which are connected to papillary muscles. Labels with arrows point to the tricuspid valve, mitral valve, chordae tendinae, and papillary muscles for both sides.	5. The poor valve in the right heart then also likes to have a 'name'! We call this valve, the tricuspid valve (as it contains three cusps).
	6. Note that there are several additional structures related to the AV-valves; the papillary muscles and the chordae tendinea.
	7. The papillary muscles are connected to the walls of the ventricles at one end, and to the collagen 'wires' at the other end, which are attached to the valves. These are actually tendons connecting the valves to the papillary muscle; hence the name 'chordae tendinea'.
	8. As we shall see later, they take care of a proper functioning of the AV-valves. (xxxxx).

C. The Semilunar Valves:

1. These valves, that prevent blood from flowing back from the arteries to the ventricles, are called the ‘semilunar’ valves. (<i>lunar = moon: because they have the shape of a half-moon!</i>)	
2. There are two semilunar valves; one at the beginning of the pulmonary artery, the pulmonary valves, and one at the beginning of the aorta, the aortic valves.	
3. The semilunar valves don’t have strings (or chordae) attached to help them. They are by themselves strong enough!	
4. In the second figure, you see all the four valves together in one plane, all located in the Annulus Fibrosus. This is a very stiff fibrotic plane in which these four valves are located. It is so strong that it is sometimes called the ‘cardiac skeleton’ (although it is not built of bone cells).	
5. Did you notice, in the diagram, that the mitral valve only consists of two valves whereas all the other valves have three valves (or cusps)? This is the mitral valve!	

Footnote: Mitral Valve = Miter = hat of a bishop:

