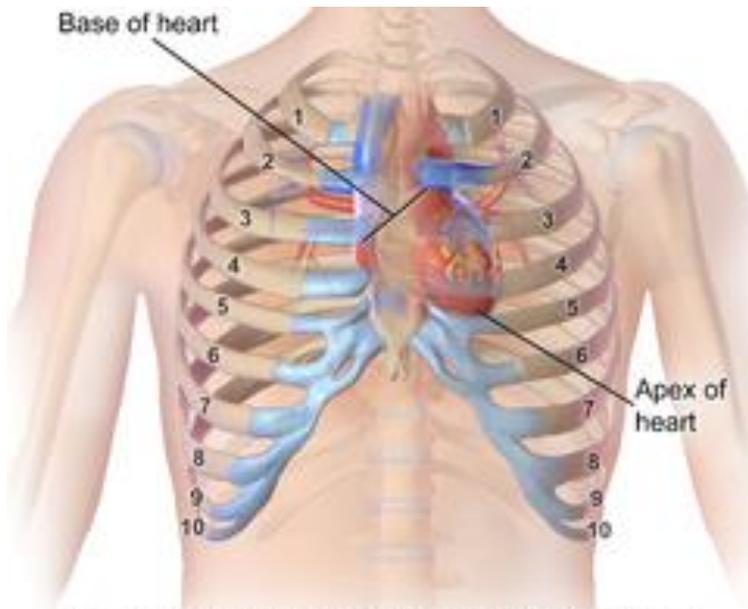


# Cardiovascular System

Vein – Flows TOWARD the heart  
Artery – Flows AWAY from heart

## The Heart

Located in the center chest (Thorax region) between 2 lungs. Below is diaphragm. Apex of heart sticks out to anatomical left into left Lung.



## Heart Position Relative to the Rib Cage

### Systemic Flow – Powered by Left Ventricle

Circulate blood to supply body with oxygen, nutrients, clear waste like CO<sub>2</sub> - Heart feeds itself from systemic flow.

### Pulmonary Flow – Powered by Right Ventricle

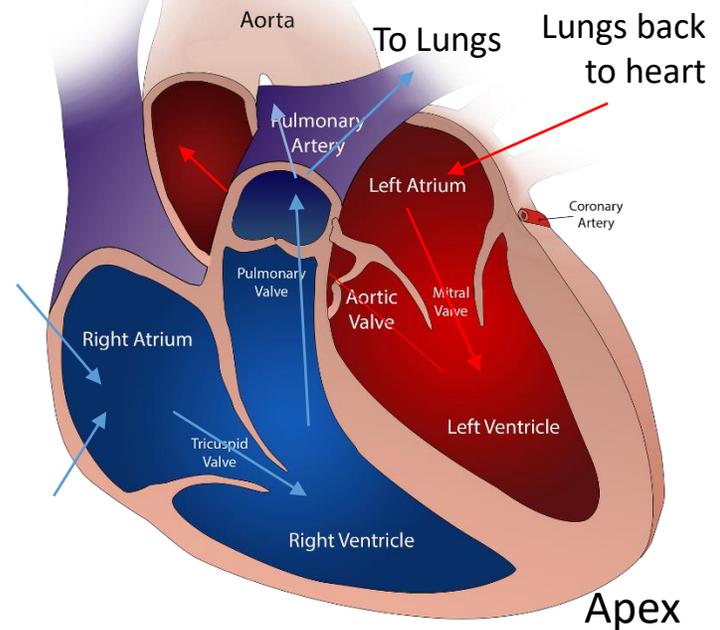
Push blood through lungs to get oxygenated.

## Flow through heart

Inferior Vena Cava + Superior Vena Cava collect from body -> Right Atrium -> Tricuspid Valve -> Right Ventricle -> Pulmonary (semilunar) Valve -> R+L Pulmonary ARTERY -> Lungs -> R+L Pulmonary VEIN -> Left Atrium -> Bicuspid (Mitral) Valve -> Left Ventricle (powerhouse) -> Aortic Semilunar Valve -> Aorta (distribute to body)

● Oxygenated ● Deoxygenated

Base



## Valves

Ensure flow remains in one direction. Disorder of heart valve may lead to heart 'murmurs', unusual sounds on auscultation.

### Pulmonary (semilunar) valve

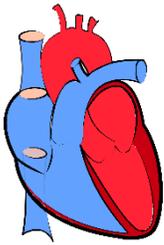
Between right ventricle and pulmonary trunk, the valve the blood passes through before going to lungs in pulmonary circulation.

Can be auscultated at *left sternal border* in 2<sup>nd</sup> intercostal space (ICS).

### Aortic (semilunar) valve

Between left ventricle and Aorta, the valve blood passes through before going to body in systemic circulation.

Can be auscultated at *right sternal border* in 2<sup>nd</sup> intercostal space (ICS).



# Cardiovascular System

## Tricuspid valve

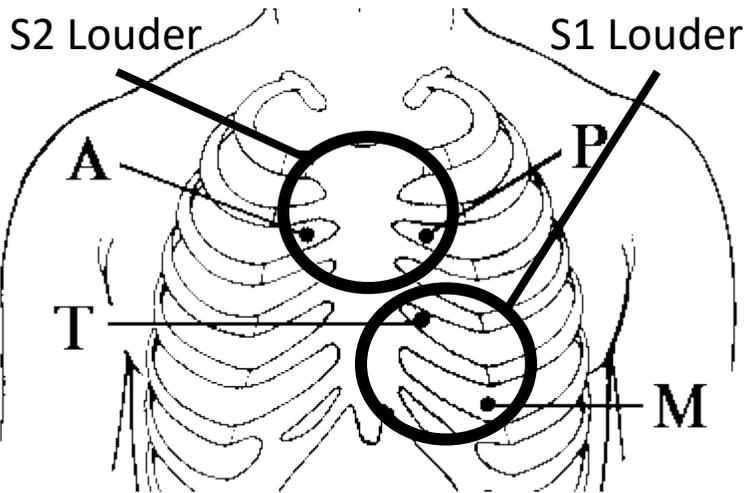
Between Right atrium and Ventricle. 3 chordae tendinae (heart strings) made mostly of collagen and elastin.

Can be auscultated at *left sternal border* in 4<sup>th</sup> intercostal space (ICS).

## Bicuspid (Mitral Valve)

Between Left atrium and Ventricle. 2 chordae tendinae.

Can be auscultated at *midclavicular line* in 5<sup>th</sup> intercostal space (ICS).



All Patients Take Medicine | Aortic Semilunar  
 Patients Take Medicine | Pulmonary Semilunar  
 Patients Take Medicine | Tricuspid  
 Patients Take Medicine | Mitral (bicuspid)

Coronary arteries fed by the Aorta supply heart muscle with oxygen

Coronary veins drain directly back into right atrium

## Heart Sounds

“Lub Dub” sounds also known as  $S_1$  and  $S_2$  originate from heart valves closing.

$S_1$  – Systole – Contraction of Ventricles

$S_2$  – Diastole – Relaxation of Ventricles

Valve	Lub – $S_1$ Systole	Dub – $S_2$ Diastole
Aortic	Open	Shut – Cause of “Dub”
Pulmonary	Open	Shut – Cause of “Dub”
Tricuspid	Shut – Cause of “Lub”	Open
Mitral	Shut – Cause of “Lub”	Open

$S_1$  or **Systole** is when the ventricles are pushing the blood out to the body and through the lungs to get oxygenated. Systole is the maximum pressure in your arteries.

$S_2$  or **Diastole** is when the ventricles relax and fill with blood. In diastole the arteries are at their minimum pressure.

What does it look like with blood flow?

$S_1$

Right Ventricle -> Pulmonary Trunk - Tricuspid closes, Pulmonary opens

Left Ventricle -> Aorta - Mitral closes, Aortic opens

$S_2$

Right Atrium -> Right Ventricle - Pulmonary closes, Tricuspid opens

Left Atrium -> Left Ventricle - Aortic closes, Mitral opens