



Piggly Wiggly Cardiovascular Pump Class

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Objectives

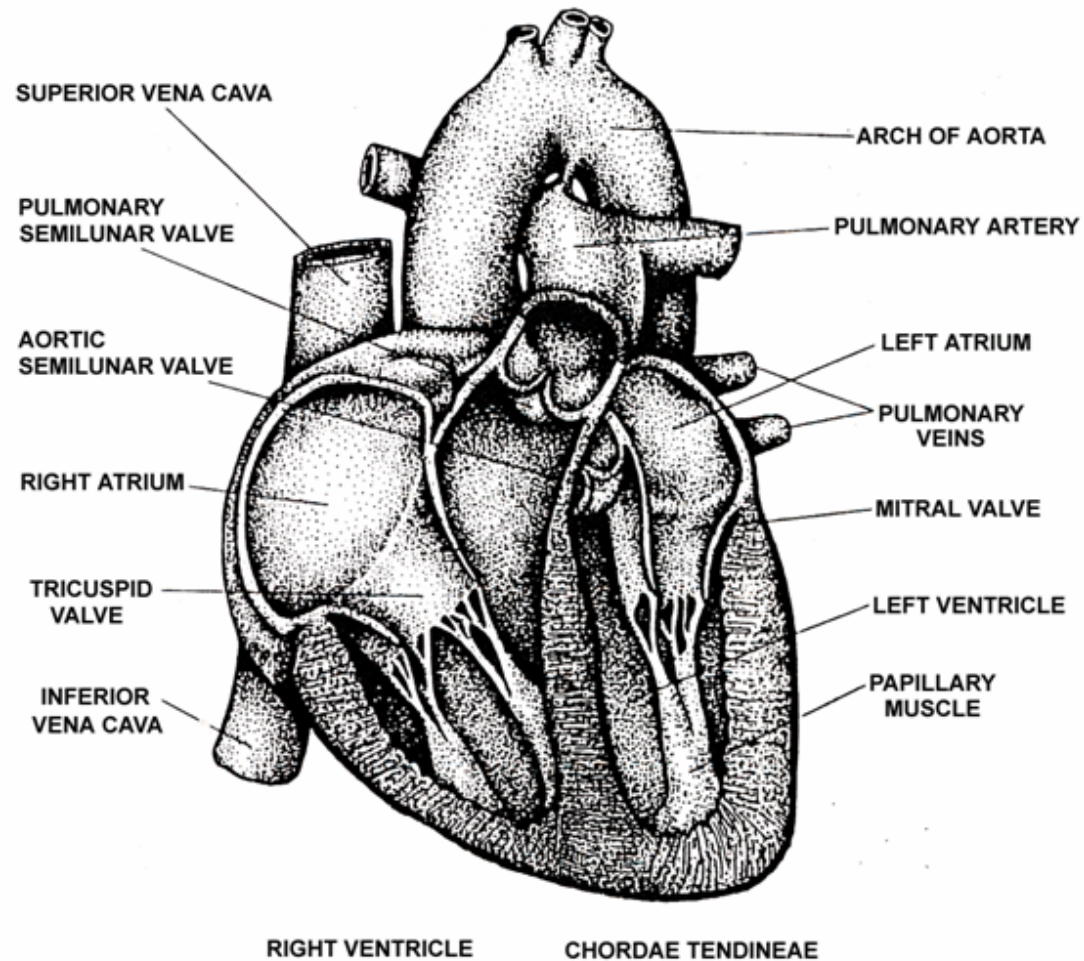
- **Identify cardiac chambers, valves, vessels and structures.**
- **Compare anatomic structures of right and left sides of the heart.**
- **Correlate cardiac vessel occlusion with corresponding cardiac structure damage.**



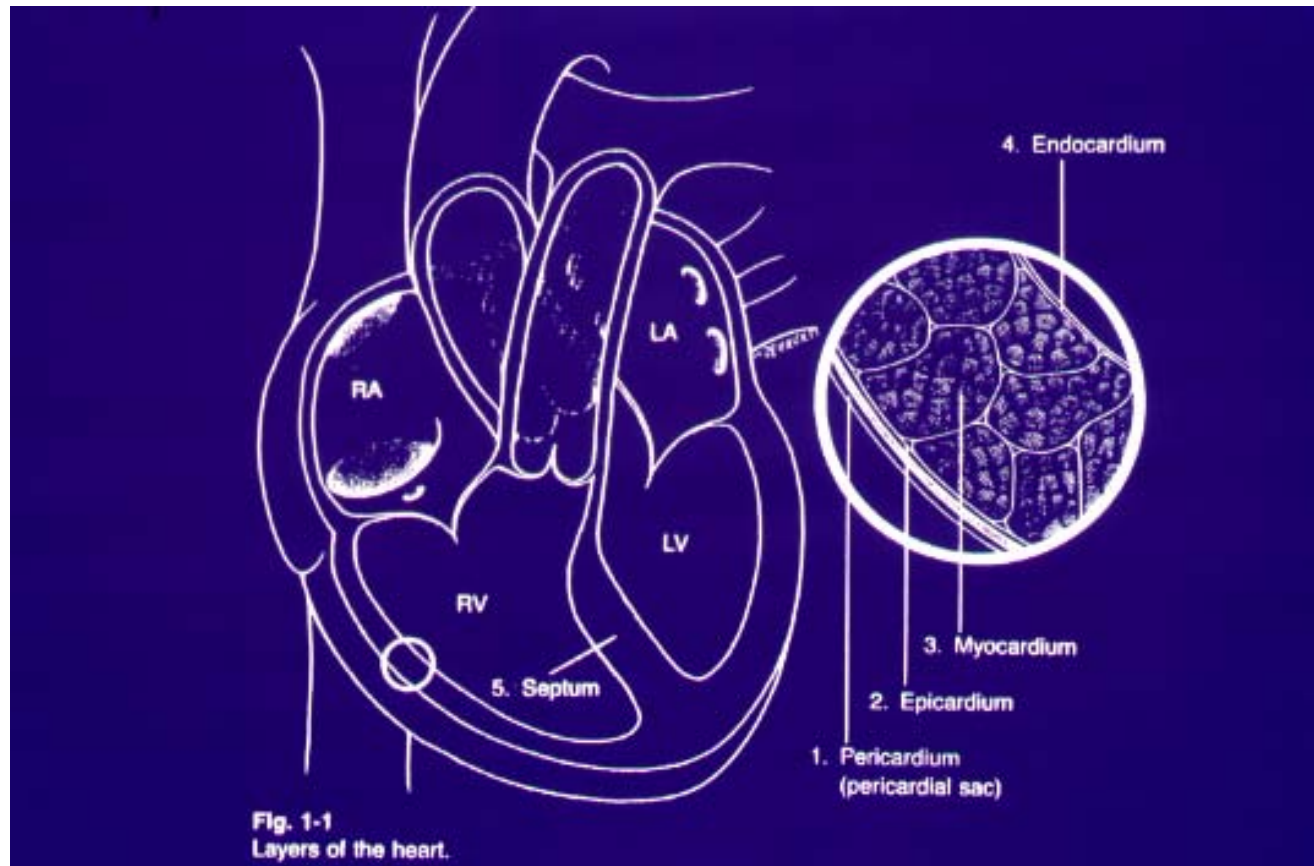
Cardiac Anatomy

- Heart = muscle pump
- Goal: pump blood in volume sufficient to ensure adequate blood flow to deliver oxygen and nutrients and remove waste
- Anatomical Components of heart
 - pericardial sac
 - epicardium
 - myocardium
 - endocardium
 - septum

Cardiac Anatomy



Heart layers





Cardiac Physiology

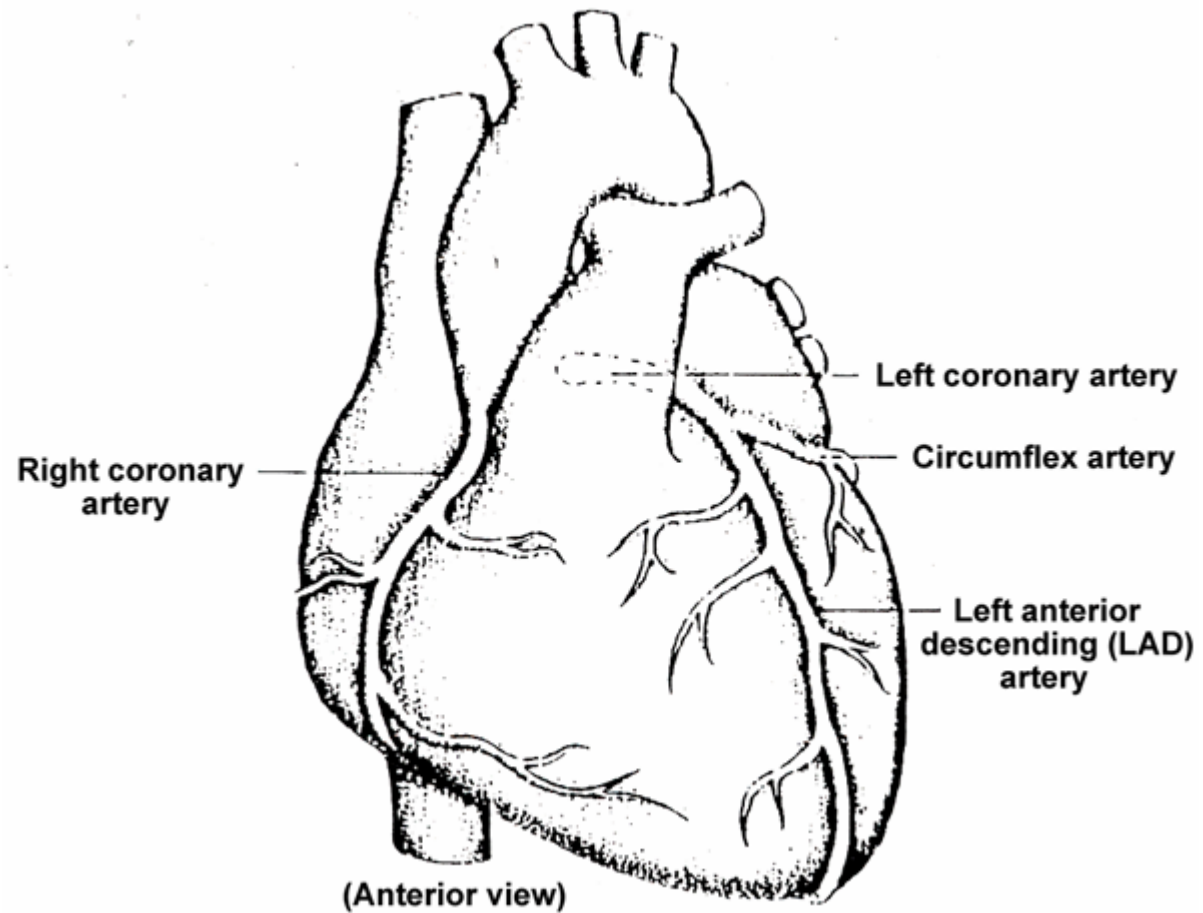
- Greatest flow during diastole
- Heart is only organ that generates its own perfusion
- Extracts all of oxygen delivered
- Increases blood flow to meet increase oxygen demand
- Hypoxia is most potent stimuli to increase blood flow
- Operates on principle of supply & demand



Cardiac Circulation- Arterial

- Coronary Arteries
 - Right Coronary Artery (RCA) = supplies SA & AV nodes, RA, RV
 - PDA = supplies posterior 2/3 intraventricular septum
 - Left Coronary Artery (LCA)
 - Left Main
 - LAD = supplies anterior LV wall, apex, anterior 1/3 ventricular septum
 - Circumflex = supplies lateral & posterior ventricle, SA node (40 %)

Coronary arteries

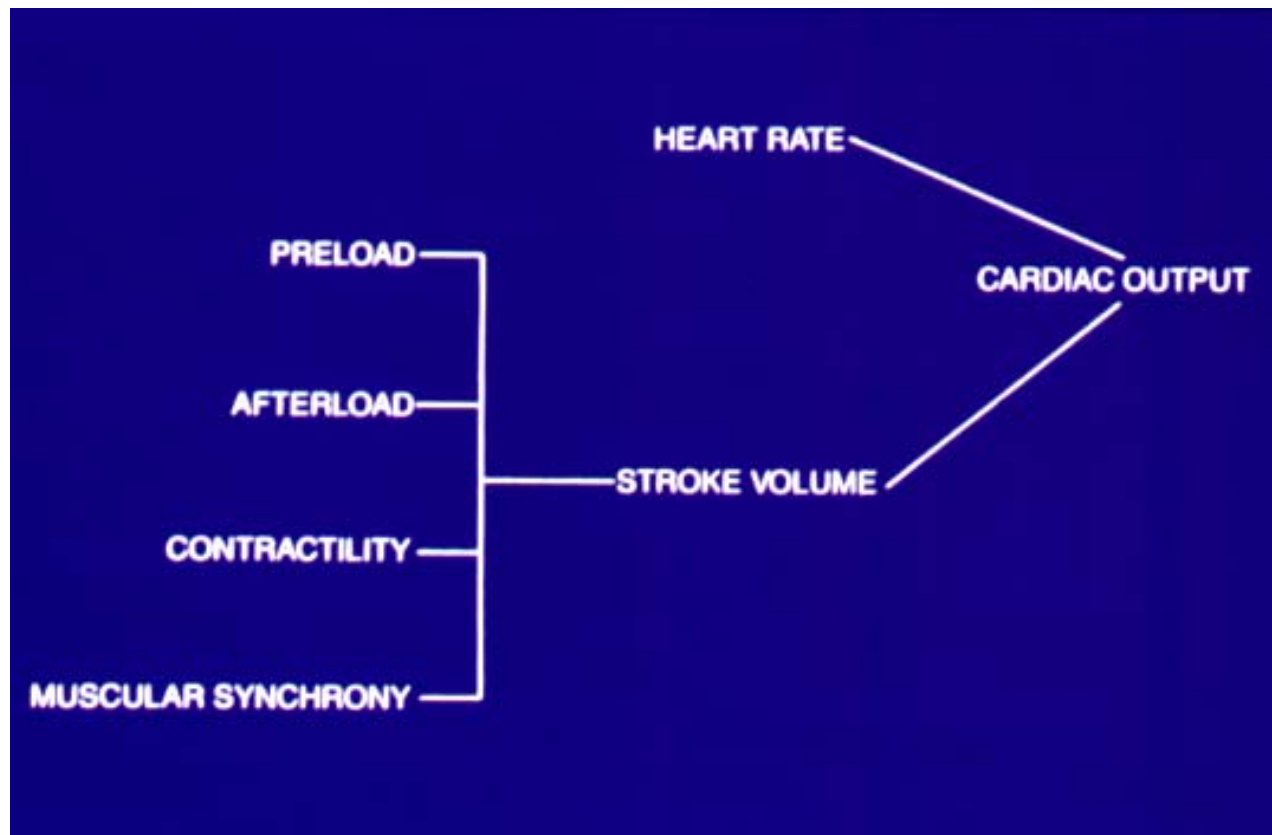




Cardiac Dynamics

- Cardiac Output = $SV \times HR$
 - 4-8 l/min
- Stroke Volume = left ventricular end diastolic volume
 - 60 -100 ml/beat/min
- Blood pressure = $CO \times PVR$
- Starling's Law = “stretch & recoil”
- Preload = volume in Right or Left ventricle in diastole
- Afterload = Resistance to forward flow blood
- Contractility = strength myocardial contraction (Ejection Fraction)

Cardiac Output

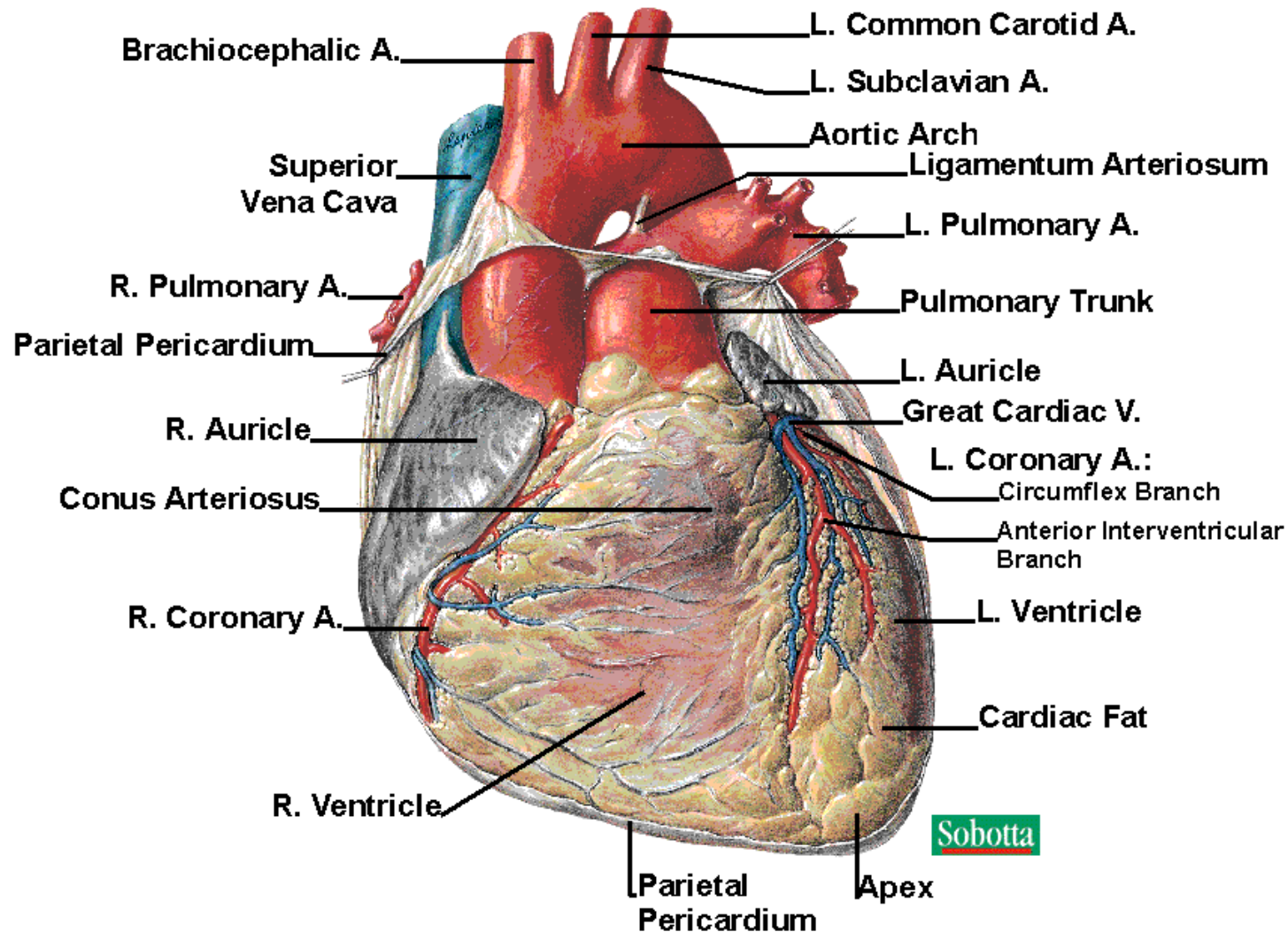




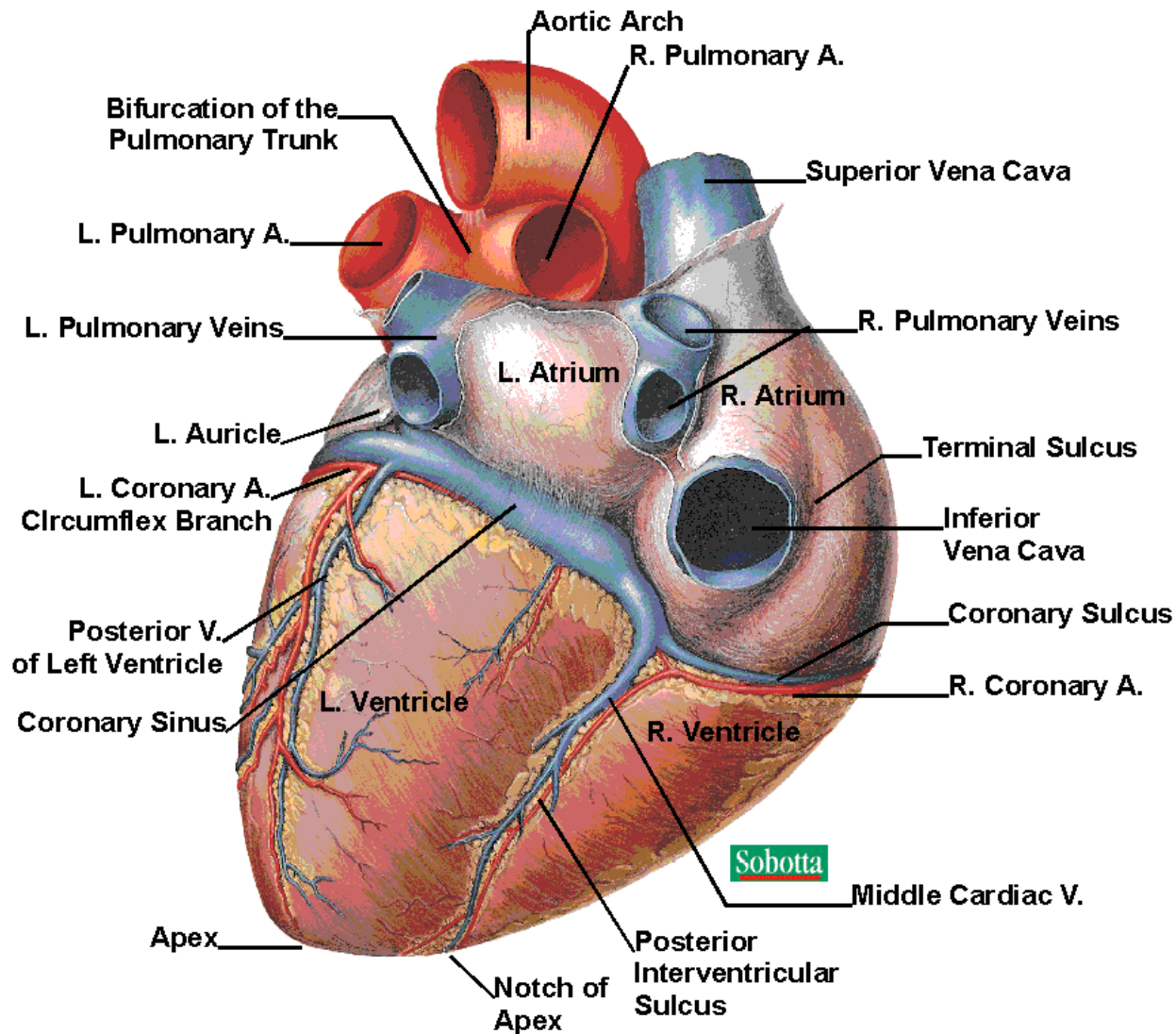
Coronary Artery Disease

- Atherosclerotic plaques obstruct coronary artery blood flow
- Anginal symptoms relate to impedance of oxygen supply to myocardium
- Medical therapy: decreasing myocardium's demand for oxygen by altering cardiac hemodynamics
- Surgical Intervention: “Bypass obstructions” thereby restoring oxygen delivery to myocardium
 - palliative

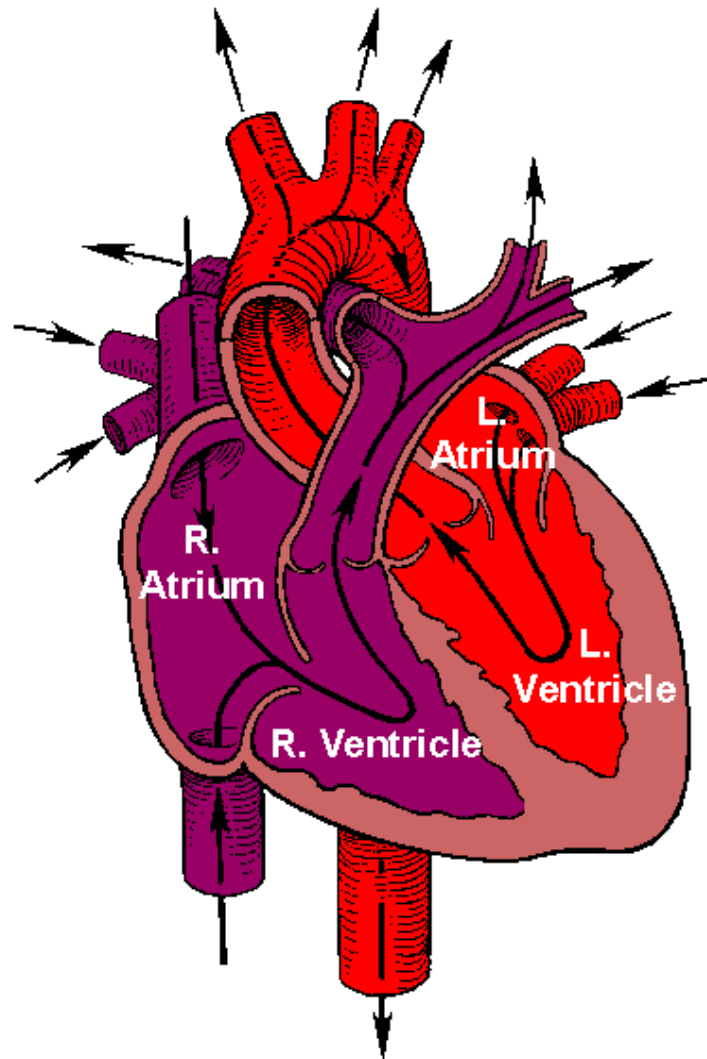
Anterior view of the heart



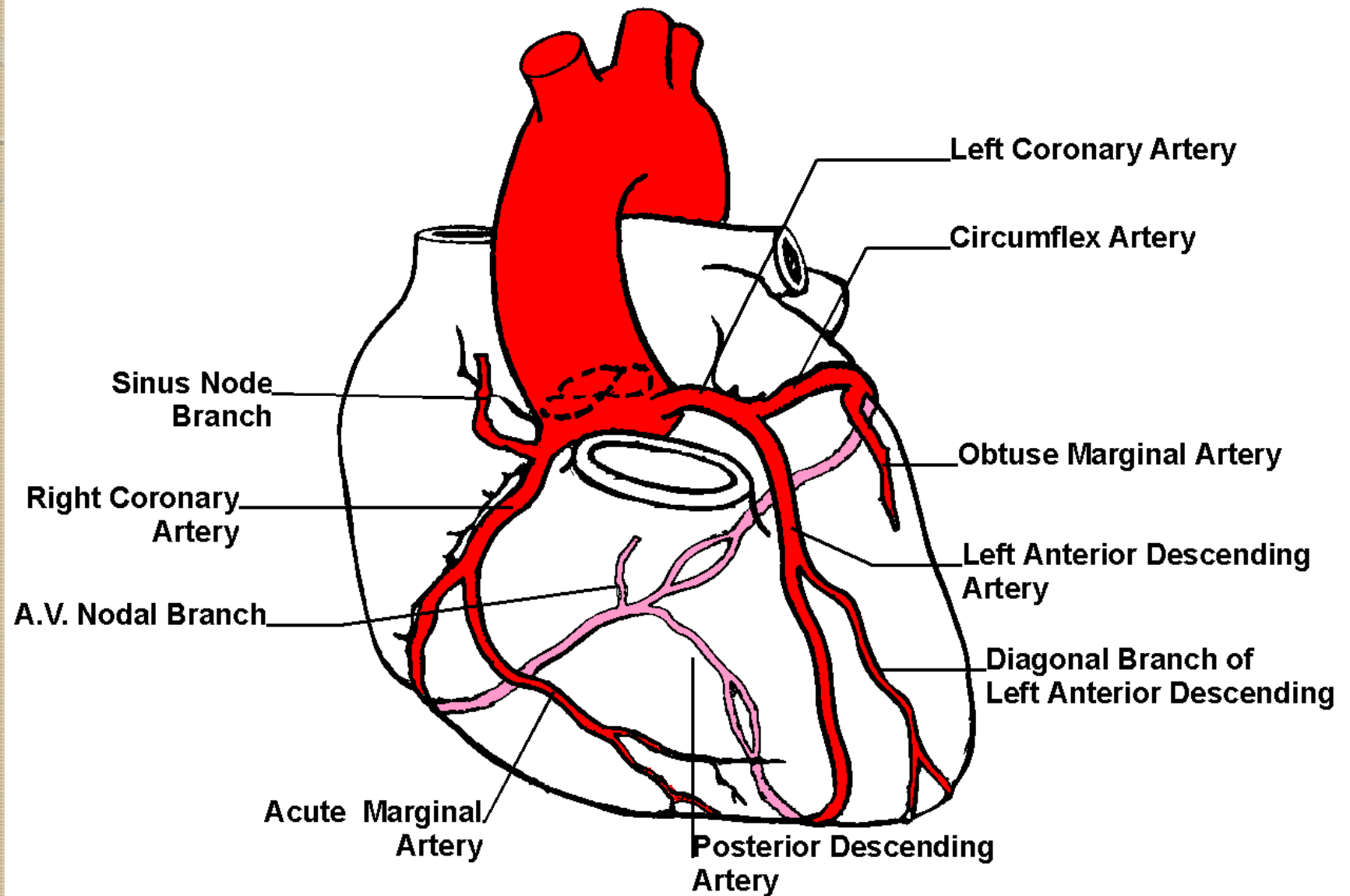
Posterior view of the heart



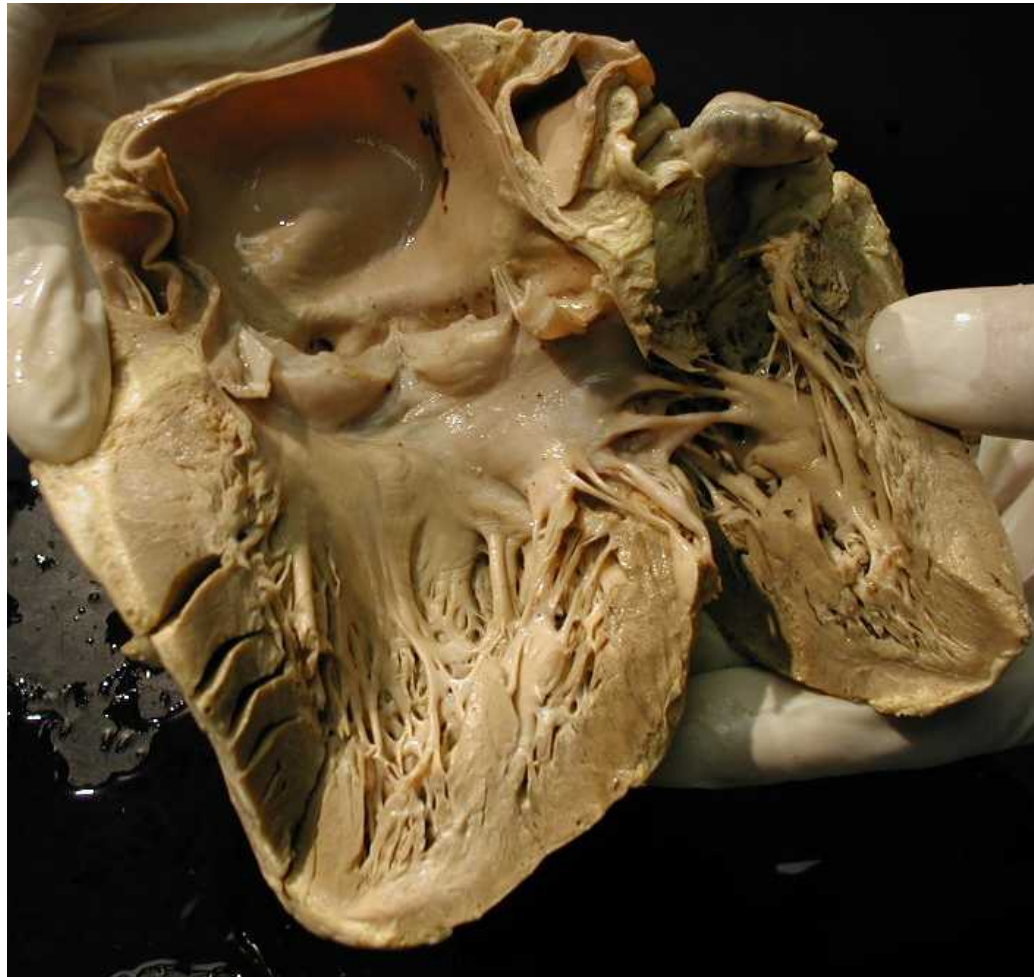
Blood Flow Through the Heart



Coronary Arteries

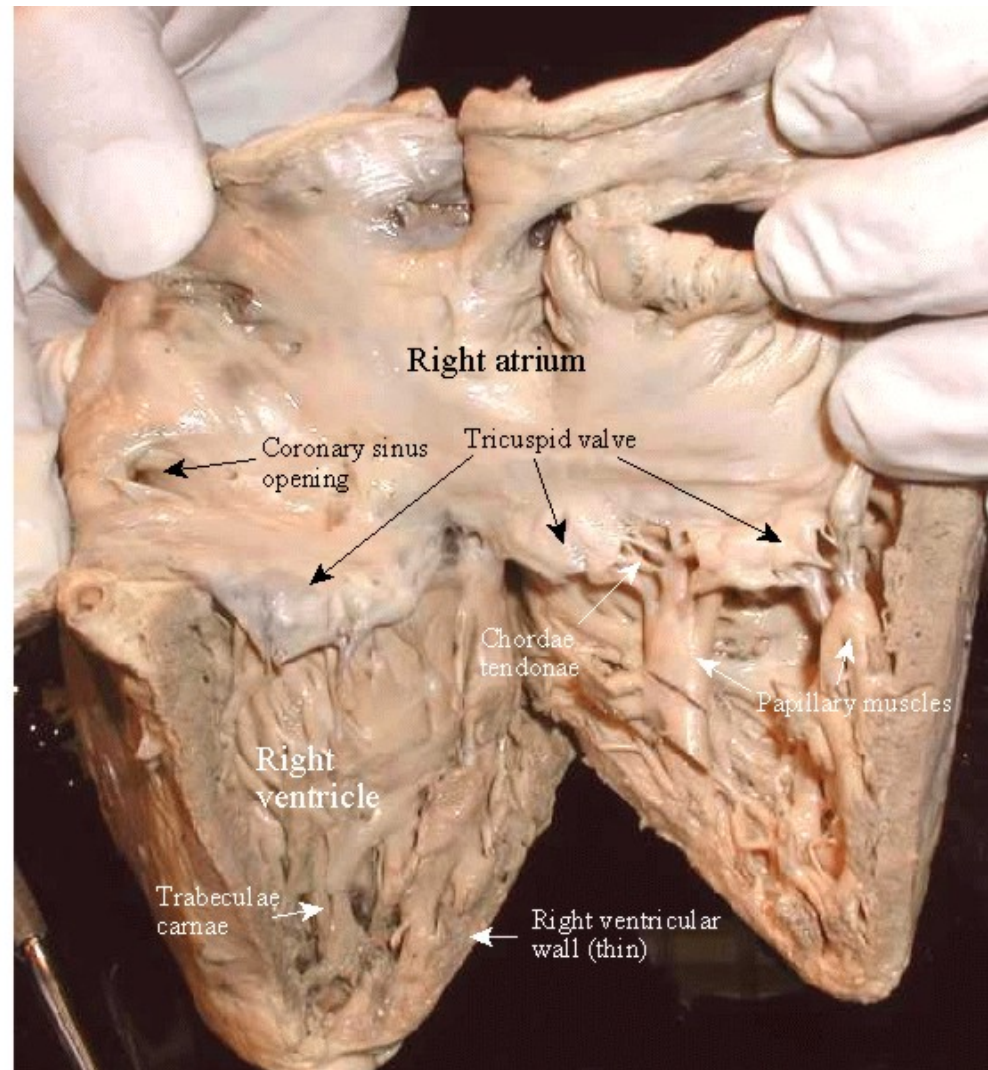


Heart chambers

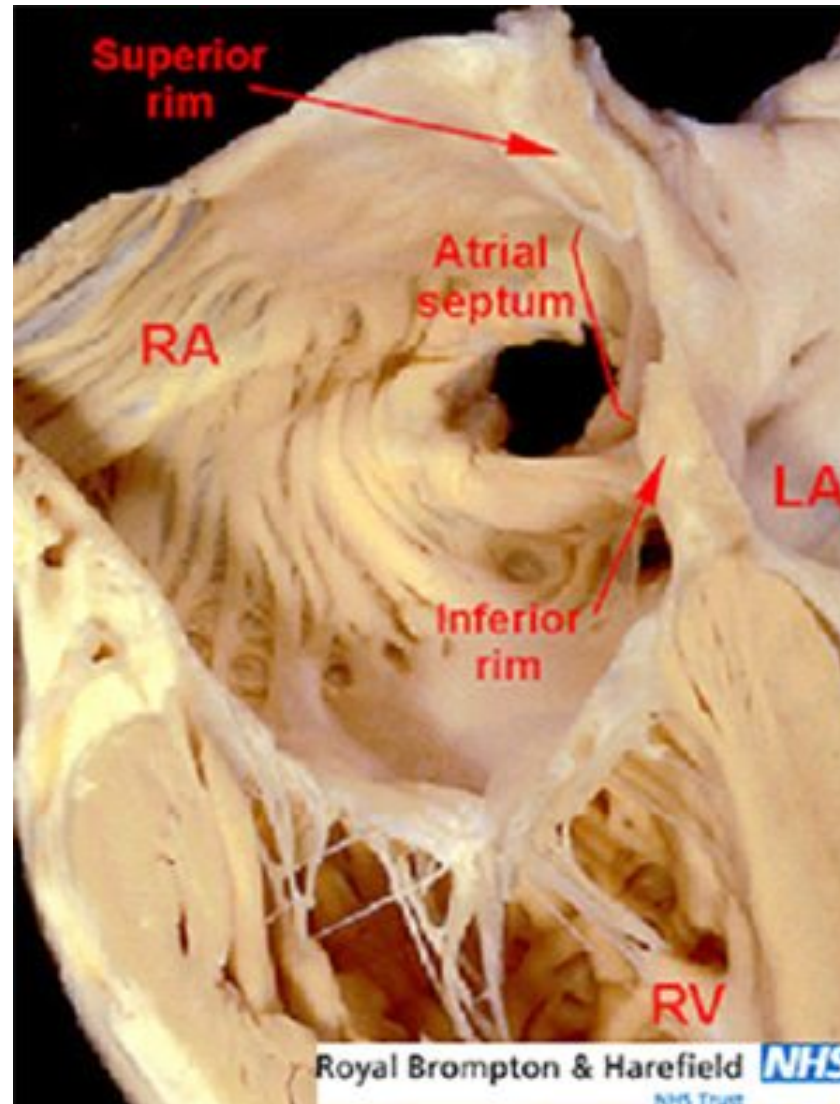


http://biology.clc.uc.edu/fankhauser/Labs/Anatomy_&_Physiology/A&P203/Circulatory_System/Human_Heart/heart_L_P4043324.JPG

Heart Valves

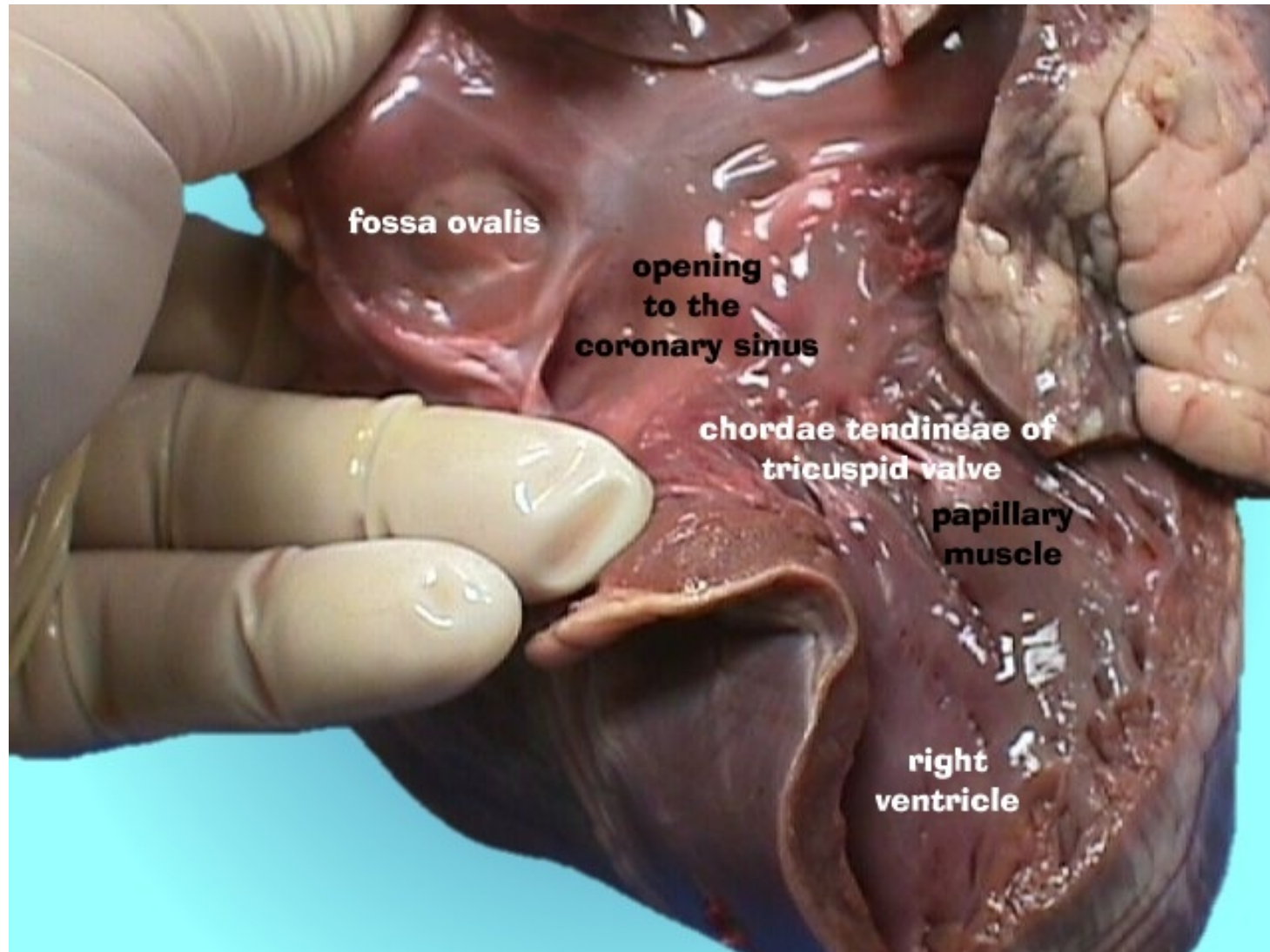


Right atria



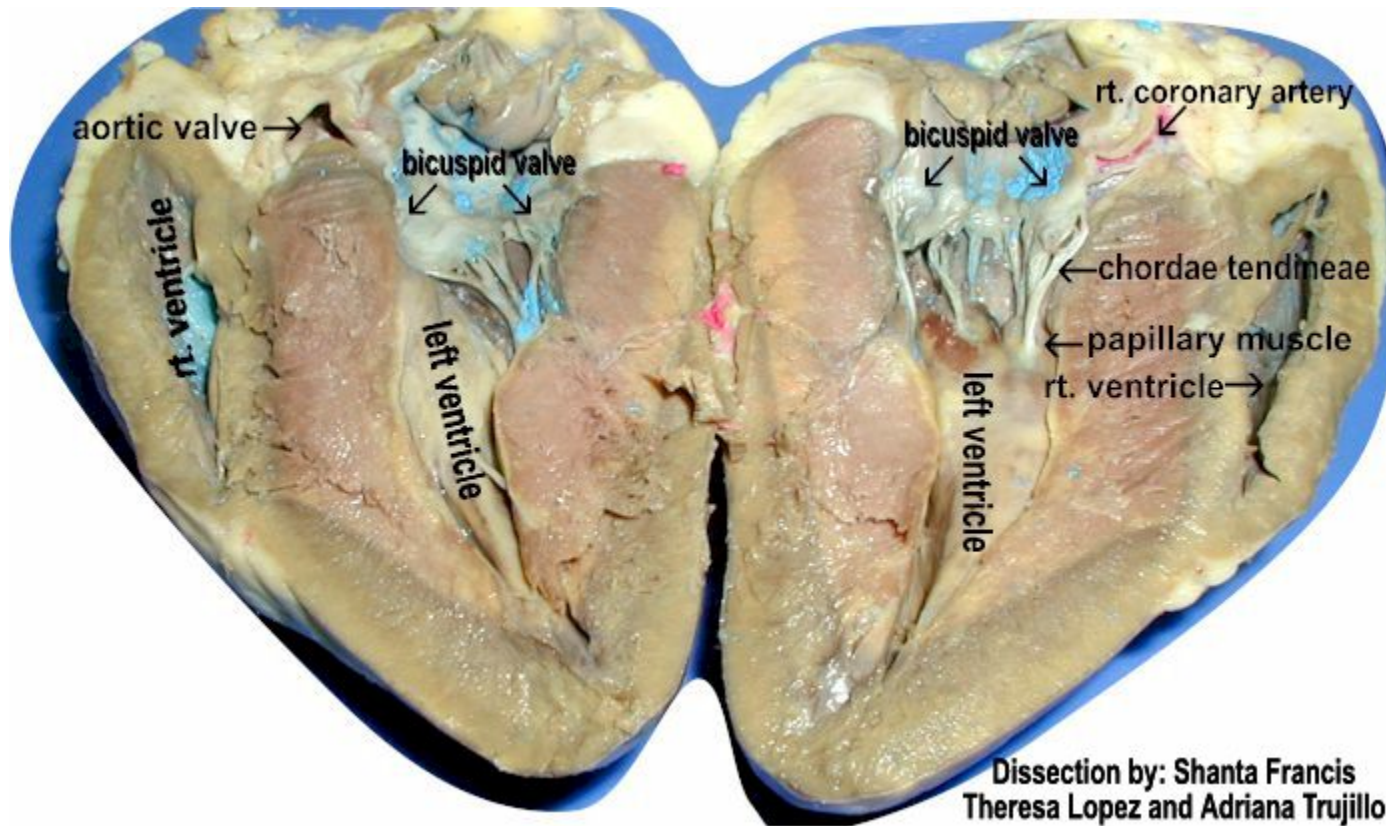
<http://www.health.gov.mt/impaedcard/issue/Issue15/mccarthyk/fig03.JPG>

Coronary Sinus



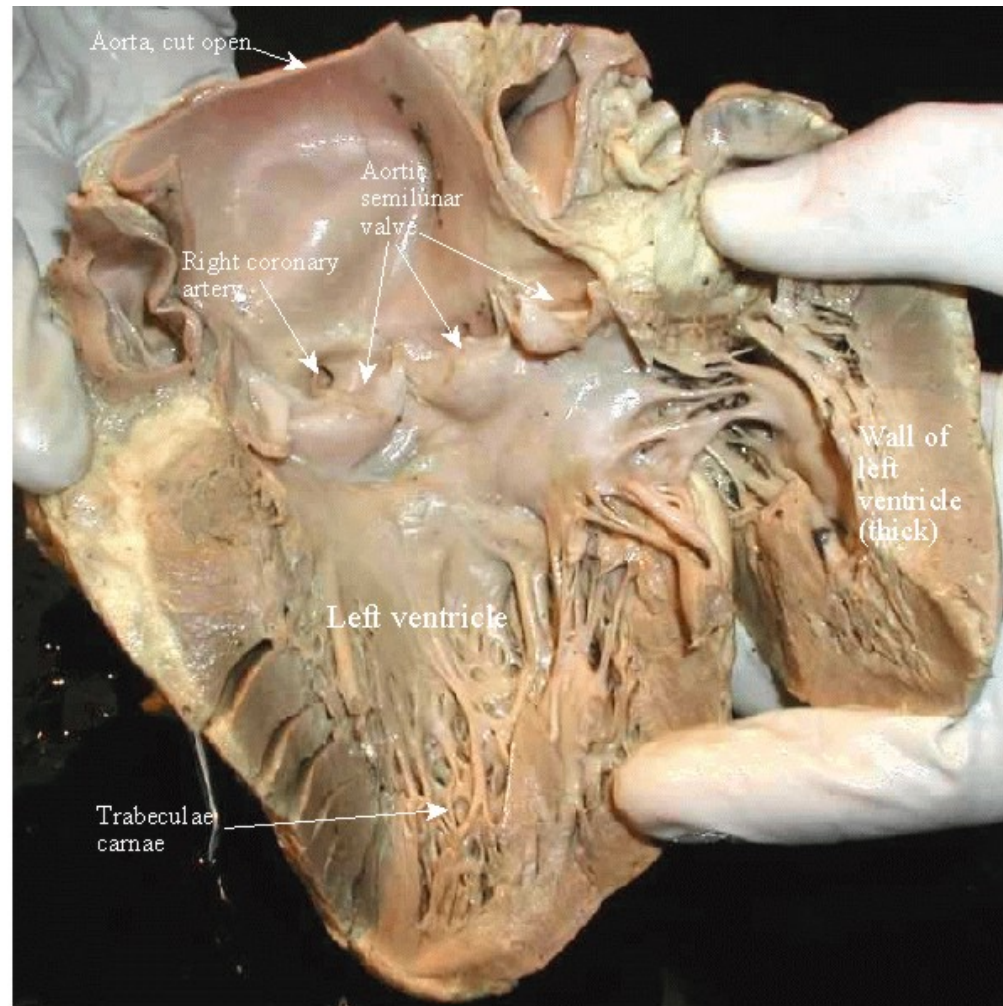
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Left ventricle



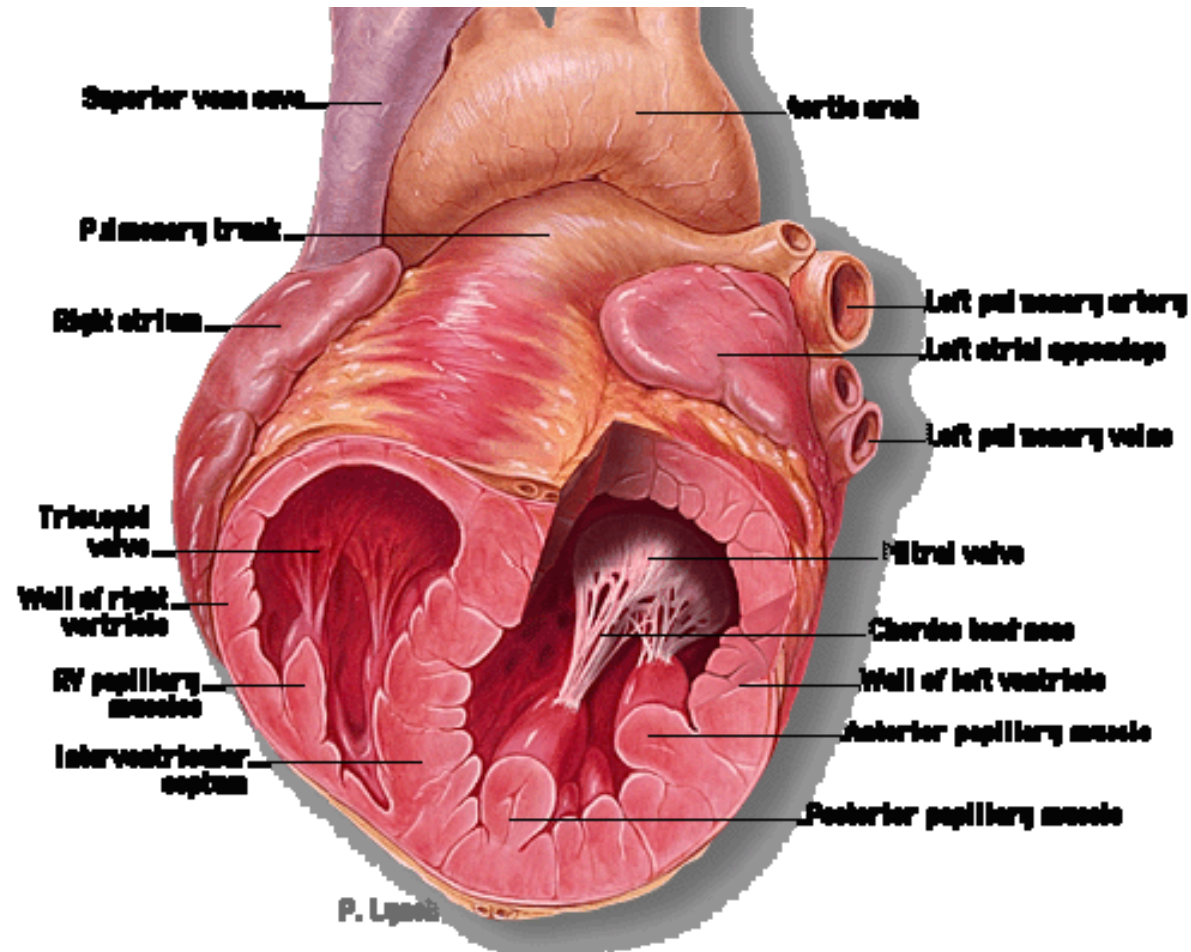
<http://science.nhmccd.edu/BIOL/cardio/leftventricle.jpg>

Left ventricle



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View of papillary muscles



http://info.med.yale.edu/intmed/cardio/echo_atlas/references/graphics/papillary_muscle_art.gif



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- Madison County Rescue Squad
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