Circulatory system is “closed,” lined with endothelium
"leakage" constitutes lymph, returned via lymphatic system (see previous lecture.)
Draw: 2 circuits, pulmonary & systemic: thus the two pumps of heart. (p 685)

EMBRYOLOGY: future heart first pulsating tubule, pumps back to front
5th week, shaped like S, divides:
  anterior: aorta and pulmonary trunk
  posterior: superior and inferior VC
By seventh week, partitions develop: four chambers result

ANATOMY: occupies space between lungs, mediastinum. (P 687)
  Base (vessel end) behind sternum, level with 2nd intercostal space
  Apex (point) down to L, reaches 5th intercostal space with R ventricle
  resting upon diaphragm

COVERINGS: pericardium: double walled sac, lined with serous membrane,
  folds back on self at large vessels
p 689 Parietal pericardium, two layers: fibrous outer and serous inner
  Pericarditis, serous layers roughened, pain when rub against each other

LAYERS OF THE WALLS: p 689
  Epicardium visceral pericardium
  Myocardium thickest, muscular layer, folds and bridges: trabeculae carnæ (little beams of flesh)
  Endocardium connective tissue covered with squamous cells continuous with lining of blood vessels
  foldings of endocardium form valves (atrioventricular and semilunar valves)

TO DRAW: 1) valves in a diagonal row: pulm, aortic seimi, tricuspid
  place mitral to immediate L of tricuspid.
  in order: 3) draw pulmonary trunk first (front, up to R), then aorta behind
p 676 4) lining of the ventricles, septum
  5) lining of atria (include vena cavae)

Chambers: Atria entrance way, (also auricle) thin walls, load blood into ventricles.
  ventricles little belly, major pumper, R has thin wall, L thick (draw cross section) p 693
  coronary sulcus where atria and ventricles join (coronary artery lies here)
Vessels: Right side: superior and inferior vena cava, pulmonary trunk, divides to R & L pulm. arteries
  Left side: four pulmonary veins, aorta (lifting, heaving)

L walls thicker, force needed is greater to circulate around body but volume pumped by two halves must be same.
  If not, congestive heart failure: weak L side: pulmonary edema lungs fill with fluid
  weak R side: systemic edema ankles swell, liver, high diastolic pressure

SKELETON OF HEART: p 694: fibrous trigones: fibrous rings support valves, separates atria from ventricles, insulates.

VALVES:
  tricuspid between R atrium and R ventricle
  pulmonary semilunar between R ventricle and pulmonary trunk
  bicuspid (mitral) between L atrium and L ventricle
  aortic semilunar between L ventricle and ascending aorta
  Papillary muscles connect via chordae tendineae to AV valve cusps, position valves

CARDIAC CIRCULATION (P 696)
  Coronary vessels R and L coronary arteries exit just above aortic
  semilunar, circle in AV groove, form circumflex
  Coronary Veins coronary sinus drains into R atrium
  Anterior interventricular artery: “heart attack artery”

FUNCTION: Automatic contraction, inherent rhythm, all or none contraction long refractory period. (no tensing of heart muscle)