LECTURE notes for Wednesday OCTOBER 30, 2002

Outline

• Heart structure cont.: vessels
• Circulatory systems
• Myocardium
• Conduction system

Valves of the heart (x4)

• Atrioventricular (AV) valves
  — Tricuspid valve - RIGHT A/V
  — Bicuspid valve/ “mitral valve” - LEFT A/V
  — Prevent BACKFLOW of blood from the ventricles to atria when ventricles CONTRACT

• Semilunar valves
  — Pulmonary SV - between right ventricle & pulmonary artery
  — Aortic SV - between left ventricle and aorta
  — Prevent BACKFLOW from blood vessels back into ventricles

Valves

• Open when pressure is greater in the “pre” chamber than the “post” chamber
• Close when the pressure is greater in the “post” chamber than the “pre” chamber

Valvular Heart Disease

• Malfunction of a heart valve - causing regurgitation and other problems with blood flow through the heart
• Due to:
  — rheumatic fever
  — congestive heart failure
• Typically produce heart murmur
• Artificial valves

Circulation of Blood
• Systemic circulation
  - delivers OXYGENATED blood to all cells
• Pulmonary circulation
  - delivers DEOXYGENATED blood to lungs

Coronary circulation
• Blood supply to heart:
  - L & R coronary arteries branch off aorta
  - Coronary sinus drains into RIGHT atrium

Coronary Artery Disease
• Degenerative changes in coronary circulation
• Reduced oxygen supply to cardiac muscle
• Atherosclerosis
  — thickening & toughening of arterial walls
• Coronary ischemia => hypoxia
• Angina pectoris = chest pain
• Myocardial infarction = heart attack
• Diagnosis:
  - ECG = electrocardiogram
  - Coronary angiogram

Treatment options
• Balloon angioplasty
• Laser surgery
• Coronary artery bypass graft

Cardiac muscle = myocardium
• Striated sarcomeres: actin & myosin
• One nucleus
• Short & branched
• Connected by intercalated disks

**AP in myocardium**
• AP flows from one muscle fiber to another across the intercalated disks causing excitation to spread through all fibers

**Conduction System**
• Autorhythmic cells = self-excitble specialized cardiac muscle fibers
• Myogenic contractions 80-100 times/minute
• SA node = pacemaker
• Atrioventricular (AV) node
• AV bundle = bundle of His
• Purkinje fibers

• Dysrhythmia
• Bradycardia = less than 50 beats/min
  — Artificial pacemaker
• Tachycardia = over 100 beats/min

**Cardiac muscle contraction**
• Similar to skeletal muscle
• BUT refractory period is longer than contraction
• NO TETANUS