

Chapter 18A

The Cardiovascular System: The Heart

I. The Pulmonary and Systemic Circuits

II. Heart Anatomy

A. Size , Location and Orientation

B. Heart Valves

1. Atrioventricular valves

2. Semilunar valves

III. Cardiac Muscle Fibers

A. Microscopic Anatomy

1. Cardiac muscle

2. Intercalated disc

B. Mechanism and Events of Contraction

1. Means of stimulation

2. Organ versus motor unit contraction

3. Length of absolute refractory period

C. Energy Requirements

IV. Heart Physiology

A. Electrical Events

1. Setting the Basic Rhythm: The Intrinsic Conduction System

2. Action Potential Initiation by Pacemaker Cells

3. Sequence of Excitation

a. Sinoatrial node

- b. Atrioventricular node
- c. Atrioventricular bundle
- d. Right and left bundle branches
- e. Purkinje fibers

4. Modifying the Basic Rhythm: Extrinsic Innervation of the Heart

- a. cardioacceleratory center
- b. cardioinhibitory center

5. Electrocardiography

B. Heart Sounds

- 1. First sound
- 2. Second sound

C. Mechanical Events: The Cardiac Cycle

- 1. systole
- 2. diastole
- 3. Cardiac cycle
 - a. Ventricular filling: mid to late diastole
 - b. Ventricular systole
 - i. isovolumetric contraction
 - ii. ventricular ejection phase
 - c. Isovolumetric relaxation: earl diastole

D. Cardiac Output

- a. Stroke volume
- 1. Regulation of Stroke Volume

- a. stroke volume
- b. end diastolic volume
- c. end systolic volume

2. Regulation of Heart Rate

- a. Autonomic Nervous System Regulation

V. Erythrocytes

A. Structural Characteristics

B. Function

- 1. Hemoglobin
- 2. Oxyhemoglobin
- 3. Deoxyhemoglobin
- 4. Carbaminohemoglobin