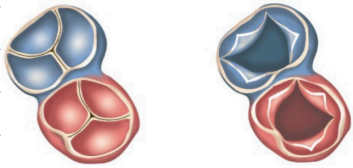
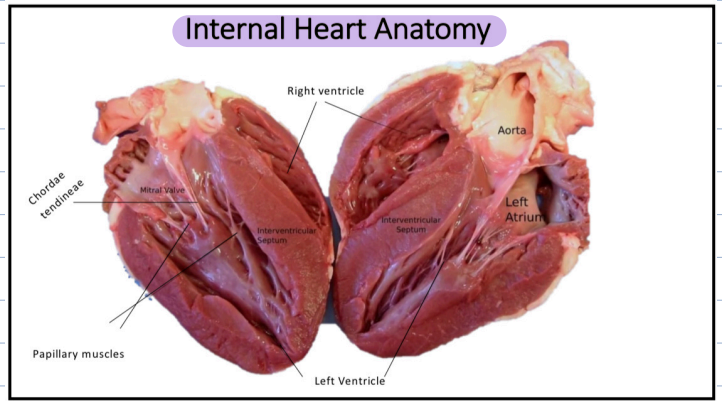


# Heart Basics

## comparative cardiac physiology

### Valves

- **tricuspid valve**  
right atrium & right ventricle
- **pulmonary valve**  
right ventricle & pulmonary artery
- **mitral valve**  
left atrium & left ventricle
- **aortic valve**  
located between the left ventricle and the aorta



### Contraction & Relaxation of Cardiac Cycle

- **systole**: phase of the heartbeat when the heart muscle contracts and pumps blood from the chambers into the arteries
- **diastole**: diastole occurs when the heart relaxes after contraction  
→ during diastole, the coronary arteries receive blood

### What might the ECG of an athlete look like?

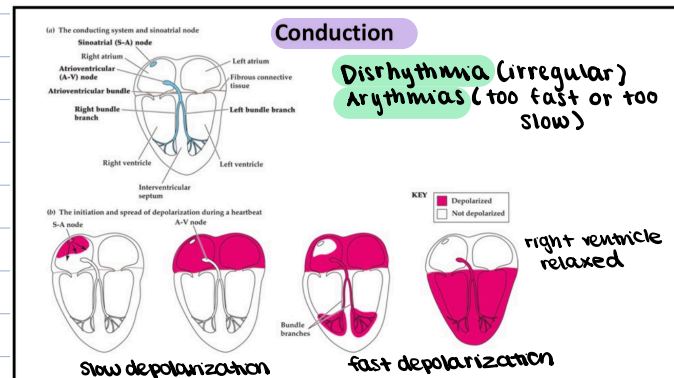
- QRS waves farther apart
- amplitude higher
- t-wave more flattened or inverted

### The Heart's Pumping Action

**conduction** - the process by which depolarization spreads through the vertebrate heart of any other myogenic heart

**conducting system** - specialized muscle cells; sinoatrial node (SA node)

**sinoatrial node (SA node)** - pacemaker of the heart; wall of right atrium; depolarization begins



### Conducting Node and Fibers

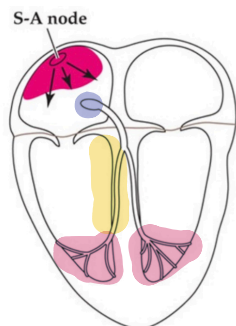
S-A Node

A-V Node

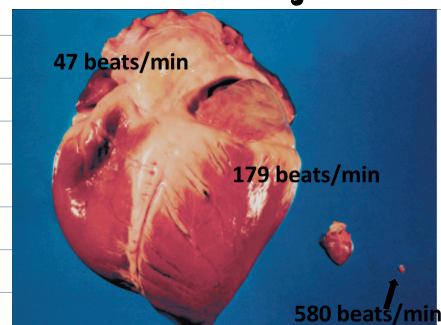
Bundle of His

(Atrioventricular bundle)

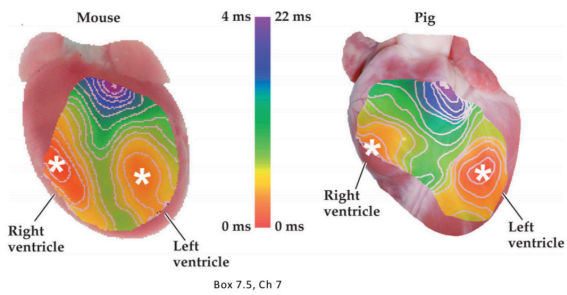
Purkinjee Fibers



### What is the relationship between the rate of contraction and body size?



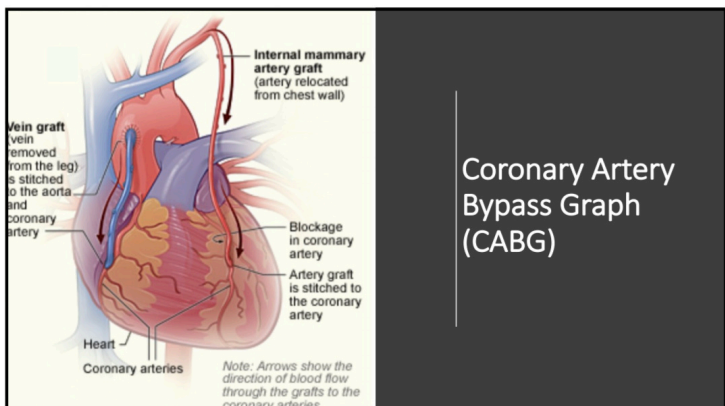
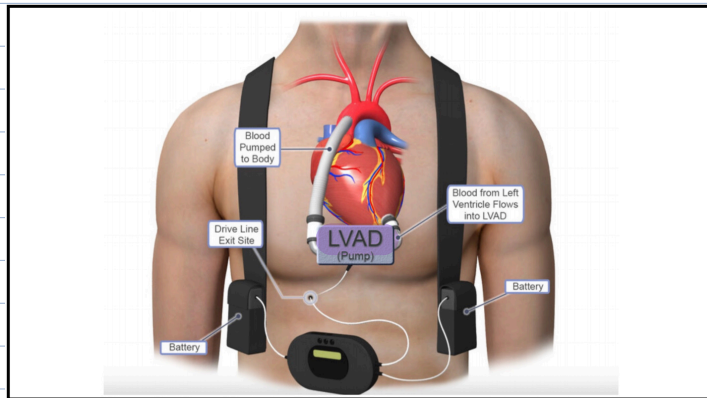
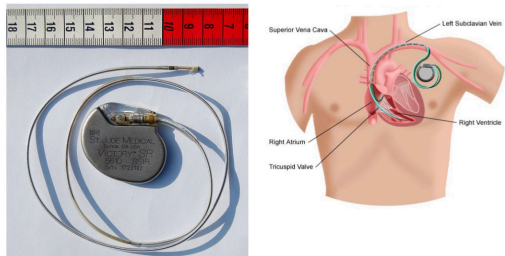
## Patterns & Speed of Contraction



## Arrhythmias

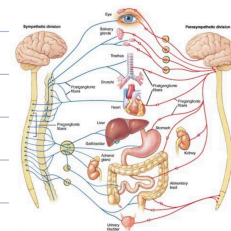
- irregular heartbeats
- uncoordinated action
- tachycardia
- bradycardia

## PACE makers

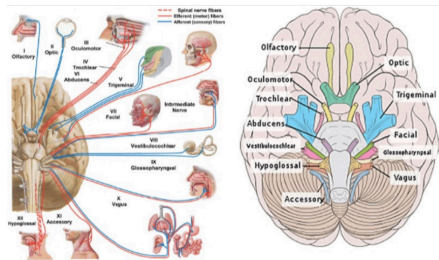


## Role of Central Nervous System

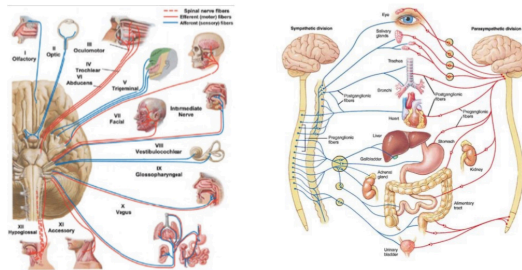
- midbrain, medulla oblongata (respiration, cardiac regulation)
- autonomic nervous system - regulates internal organs
- para sympathetic "rest and digest"
- sympathetic "flee and breed"
- flight, fight, fear, and reproduction



## Cranial Nerves



## Vagus Nerve, X



## SA Node

- stimulation of vagus nerve = decrease in heart rate
- stimulation of SNS = increase in heart rate

- vagus nerve → acetylcholine
- SNS → epinephrine

