

## **Muscular Tissue** Chapter 10

- I. Background
  - A.muscle fibers/
  - B.Prefixes
    - 1.Myo, Mys, Sarco
  - C.Types
    - 1.Skeletal
    - 2.Cardiac
    - 3.Smooth
- II.Characteristics
  - A.Excitability
  - B.Contractility
  - C.Extensibility
  - D.Elasticity
- III.Functions
- IV.Gross Anatomy
  - A.Nerve & blood supply
  - B.Attachments
    - 1.insertion
    - 2.origin
    - 3.direct attachments
    - 4.indirect attachments
      - a. tendons
      - b. aponeurosis
  - C.Sheaths
    - 1.Epimysium
    - 2.Perimysium
      - a. fascicles
    - 3.Endomysium
- V.Microscopic Anatomy
  - A.Muscle fiber
    - 1.sarcolemma
    - 2.sarcoplasm
    - 3.myofibrils
  - B.Bands
    - 1.Major bands
    - 2.I band
      - 1)Z disc
      - a)sarcomere
    - 3.A band
      - 1)H zone
      - 2)M line
  - C.Molecular Level
    - 1.myosin
      - 1)head
      - 2)tail
        - a. Form A band
    - 2.actin
    - 3.tropomyosin
    - 4.troponin
  - D.Additional structures
    - 1.Sarcoplasmic Reticulum
      - a. terminal cisternae
    - 2.T Tubules
    - 3.terminal cisternae

## VI. Contraction = Sliding Filament Mechanism

### A. Signal

1. motor neuron
2. neuromuscular junction
  - a. synaptic cleft
    - 1) acetylcholine (ACh)

### B. Signal translation

1. polarized
2.  $\text{Na}^+$
3.  $\text{Ca}^{++}$

### C. Muscle Contraction at the molecular level

- a. attach
- b. pivot
- c. pull
- d. release

### 1. Effect

### 2. Notes

### D. Relaxation

## VII. Energy Specializations

### A. mitochondria

### B. lactic acid

### C. glycogen

### D. myoglobin

### E. creatine phosphate

## VIII. Fatigue

### 1. anaerobic

- a. lactic acid

### 2. heat

### A. Recovery from fatigue

- a) cutaneous vasodilation

### 1. low pH

- 1)  $\text{O}_2$  debt

## IX. Muscle Twitch

### A. Phases

1. Latent period
2. Period of contraction
3. Period of relaxation

## X. Odds and Ends

### A. Muscle tone

### B. Contraction states

1. Isotonic contraction
2. Isometric contractions

### C. Muscle size

1. Hypertrophy
2. Atrophy

## XI. Smooth Muscle

### A. Background

### B. Microscopic structure

1. spindle-shaped cells

### 2. Organization

1) peristalsis

### 3. Protein

a. Myosin filaments

b. Actin

c. Intermediate filaments

d. Dense bodies

### C. Contraction

1. gap junctions

2. sliding filament mechanism

a. calmodulin

b. myosin light chain kinase

### 3. Notes

### D. Regulation