MUSCLE AND NERVE

- unique to animals
- conduct electricity (controlled fashion)
- allow for movement
Molecular Basis of Muscle Function

Actin-Myosin model (board) EXPLAINS:

- MUSCLE SHORTENING
- MUSCLE FORCE GENERATION OR “CONTRACTION”
Mechanics of Contraction

- Muscle cell is unit
- Role of actin/myosin
- Action potential or depolarization of membrane makes cell “contract”
- (motor neuron action potential stimulates muscle membrane depolarization)
Visualizing muscle contraction

How actin-myosin complex (sarcomere) shorten muscle
From Actin-Myosin to Whole Muscle

M & M, Fig. 4.17 for muscle types
Skeletal Muscle Tissue
(each skeletal muscle is an organ)

- **Cells**
  - Long and cylindrical, in bundles
  - Multinucleate
  - Obvious Striations

- **Skeletal Muscles-Voluntary**

- **Connective Tissue Components:**
  - Endomysium-between fibers
  - Perimysium-surrounds bundles
  - Epimysium-surround whole muscle
  - Attached to bones, fascia, skin
  - Origin & Insertion
Smooth Muscle Tissue

- **Cells**
  - Single cells, uninucleate
  - No striations

- **Smooth Muscle-Involuntary**
  - 2 layers-opposite orientation (peristalsis)

- **Surrounds hollow organs, blood vessels**

- **Connective Tissue Component**
  - Endomysium: surrounds cells
Cardiac Muscle

- **Cells**
  - Branching, chains of cells
  - Single or Binucleated
  - Striations
  - Connected by **Intercalated discs**

- **Cardiac Muscle-Involuntary**
- **Myocardium-heart muscle**
  - Pumps blood through vessels

- **Connective Tissue Component**
  - Endomysium: surrounding cells

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NERVOUS TISSUE

- Neurons are biggest cells in body
- Two basic types
  - motor
  - sensory
- Messages travel by membrane depolarization
- Schwann cells are insulation in peripheral nerves (none in CNS)

[Thought game: trip from sensory input (e.g., hot stove) to motor response (e.g., pull back hand)]
NEURONAL JUNCTIONS
Neuron-neuron or neuron-muscle

NEURO-MUSCULAR JUNCTION
Where neuron transmits signal to muscle to generate action potential

SYNAPSE: cell junction where neurons communicate