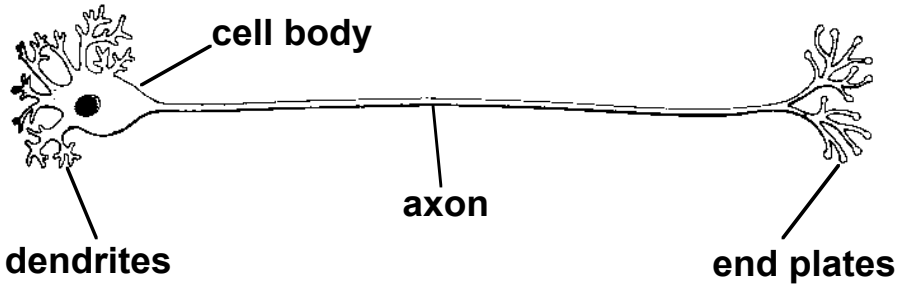
Review 13

Communication within the body

HORMONES	NERVES
① travel through blood to target--slower acting	① impulses travel directly to target--faster acting
② target groups of cells or entire organs	② target specific cells or groups of cells
③ may have short to long term effect on target	③ once impulses cease, no more effect on target

Neurons

- DENDRITES receive incoming information
- AXONS rapidly conduct impulses to end plates

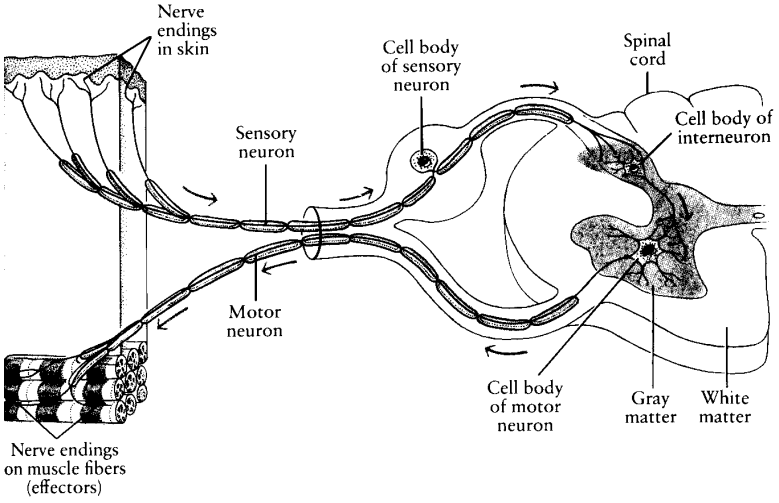


- END PLATES (SYNAPTIC TERMINALS) transmit impulse to next cell

Types of neurons

- SENSORY: respond to environmental stimuli; feed information into nervous system
- ASSOCIATIVE: serve to inc numbers of connections within CNS
- MOTOR: trigger contraction of muscle
- INHIBITORY: help to regulate activity of central nervous system & muscles
- NEUROSECRETORY: upon stimulation, release hormones

Reflex arc: simple "wiring diagram"



Review 13, con't

Nature of the nerve impulse:

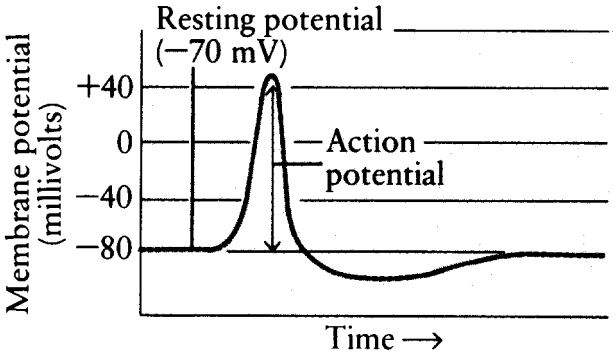
- electrical activity
- EXTRACELLULAR RECORDINGS
  - "WAVE OF NEGATIVITY"
- INTRACELLULAR RECORDINGS
  - ✓membrane potential (in nerves, called *resting potential*)
  - ✓sodium/potassium pump in membrane, resulting in hi conc K^+ inside cell; hi conc Na^+ outside cell
  - ✓mem potential caused by leakage of K^+ back out of cell
  - ✓mem potential most commonly in range of ≈–70 mv

Electrically excitable cells have special ion gates (gated channels) for K^+ and Na^+ in their cell membranes

- ✓when Na^+ gates open, Na^+ rushes into the cell
- ✓when K^+ gates open, K^+ rushes out of the cell
- ✓the movements of these ions creates the nerve impulse!

Action Potential = nerve impulse

- SODIUM GATES open with depolarization (= loss of polarity) of cell to ≈–50 mv (=CRITICAL LEVEL OF DEPOLARIZATION)
  - sodium floods in
  - gates close quickly after being momentarily open
  - influx of sodium ions causes inside to become positive with respect to outside



- POTASSIUM GATES open with reversal of membrane potential
  - potassium rushes out
  - gates close quickly after being momentarily open
  - outflux of potassium ions causes inside to again become negative with respect to outside
- SODIUM/POTASSIUM PUMP cleans up the mess