

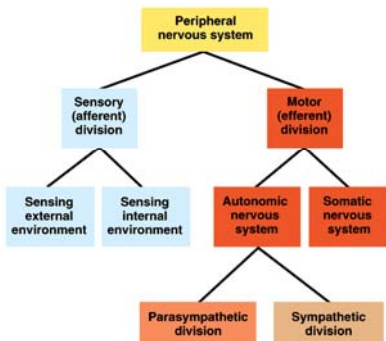
Nervous System

Divisions

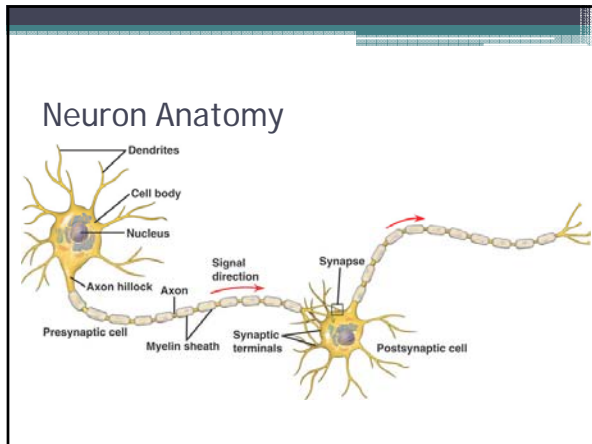
- Central nervous system (CNS).
 - Brain and spinal cord.
 - Both contain fluid-filled spaces which contain **cerebrospinal fluid (CSF)**.
 - The **central canal** of the spinal cord is continuous with the **ventricles** of the brain.
 - **White matter** is composed of bundles of myelinated axons
 - **Gray matter** consists of unmyelinated axons, nuclei, and dendrites.
- Peripheral nervous system.
 - Everything outside the CNS.

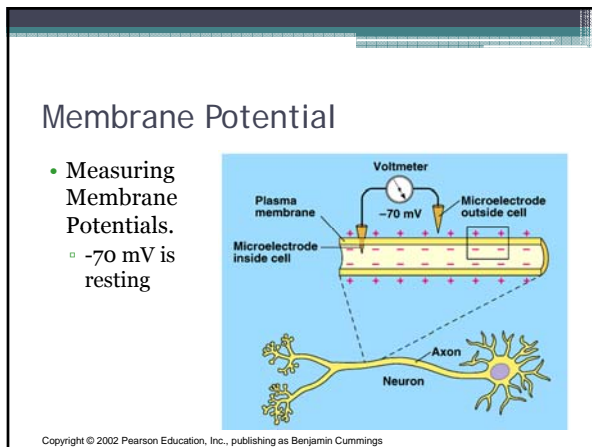
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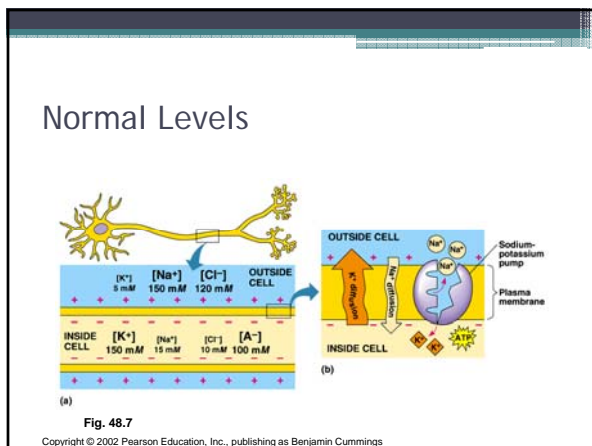
PNS



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Hyperpolarization.

- Gated K^+ channels open
 $\rightarrow K^+$ diffuses out of the cell
 \rightarrow the membrane potential becomes more negative.

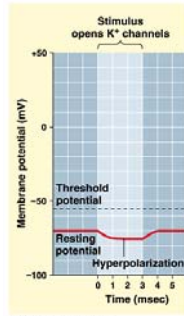


Fig. 48.8a

(a) Graded potential: hyperpolarization

Depolarization

- Gated Na^+ channels open
 $\rightarrow Na^+$ diffuses into the cell
 \rightarrow the membrane potential becomes less negative.

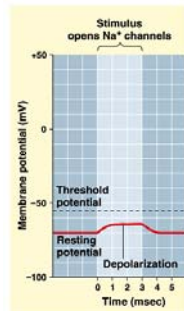


Fig. 48.8b

(b) Graded potential: depolarization

Action Potential

- The Action Potential: All or Nothing Depolarization.
 - If graded potentials sum to $\approx -55mV$ a **threshold potential** is achieved.
 - This triggers an **action potential**.
 - Axons only.

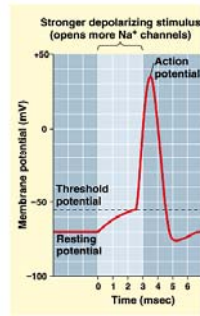
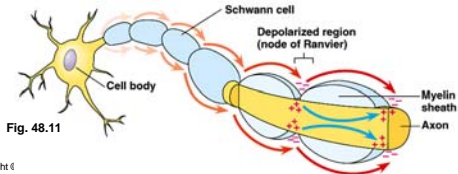


Fig. 48.8c

(c) Action potential

Saltatory conduction

- In myelinated neurons only unmyelinated regions of the axon depolarize.
 - Thus, the impulse moves faster than in unmyelinated neurons.



Synapses

- Electrical Synapses.
 - Action potentials travel directly from the presynaptic to the postsynaptic cells via gap junctions.

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Chemical Synapses

- More common than electrical synapses.
- Postsynaptic chemically-gated channels exist for ions such as Na^+ , K^+ , and Cl^- .
 - Depending on which gates open the postsynaptic neuron can depolarize or hyperpolarize.

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