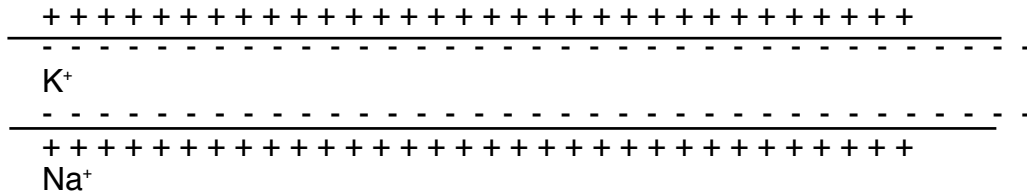
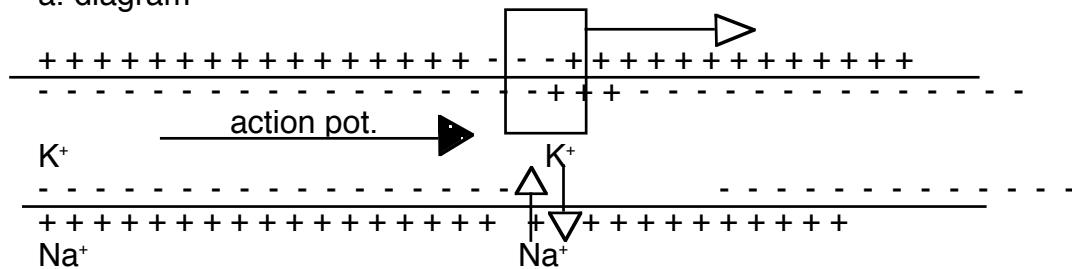


D. Membrane Potential

1. membrane potential - the voltage measured across a cell membrane.
 - a. all cells have a membrane potential
 - b. "excitable cells" (nerve & muscle) can generate changes in membrane potential
2. resting potential - m.p. of an excitable cell in resting or unexcited state (~ -70 mV)
 - a. presence of chloride and negative ions are responsible for the difference
 - b. diagram



3. action potential - a nerve impulse
 - a. diagram



- b. depolarization followed by repolarization
 - c. depolarization occurs as a wave 1/1000 sec.
4. **Threshold** must be reached before a.p. created
 - a. **stimulus** - change in temp., pressure, chemical, electrical condition
 - b. **summation** - many stimuli added together to reach threshold
 - c. **All-or-None**: a.p. either occurs or doesn't (100% or 0%)
strength - frequency of action potentials

E. Nerve Impulse

1. Resting Potential -
 - a. Gated Ion Channels Closed (inside net -, outside net +)
 - b. Action potential is generated by a stimulus of a receptor or from an action potential from another neuron
2. Depolarization Phase -
 - a. sodium channels open, Potassium channels closed
 - b. Na^+ diffuses IN, (inside net +, outside net -)
3. Repolarization Phase -
 - a. sodium gates closed, potassium gates open
 - b. K^+ diffuses OUT (outside net +, inside net -)
 - c. (absolute refractory period - no new impulse)
4. Undershoot
 - a. potential difference - slightly lower than resting, then resting restored
 - b. (relative refractory period - only strong stimulus will trigger impulse)
5. Restore
 - a. Concentration gradients of K^+ & Na^+ must be restored.
 - b. The sodium-potassium pump restores them through active transport