- Action Potentials
  - “very rapid reversal of the membrane potential”
  - “constitutes the message carried by the axon from the cell body to the terminal buttons”
  - Electrical message
  - caused by a brief increase in permeability of the membrane to the Na+ (sodium) to immediately followed by transient increase in the permeability of the membrane to K+ (potassium)
    - is this why we need so much of this stuff in our diet
  - Conduction of the action potential
    - **all or none law:** once an action potential is triggered it won’t stop until it reaches the end of the fiber
    - **Rate law:** variations in stimulus intensity or other info are represented by variations in the rate at which the axon fires
    - **Saltatory conduction:** jumping node to node
      - AP is retriggered at each node
- Membrane Potential
  - **Diffusion**: movement of molecules from regions of high concentrations to regions of low concentration
    - EX: sugar dissolving in a glass of water; distributes evenly after a certain period of time
    - Diffusion= trying to become even
  - **Electrostatic pressure**: the attractive force btw atomic particles charged w/ opposite signs
    - the repulsive force btw atomic particles charged w/ the same sign
    - the force is electrostatic
- Tools to measuring electrical potentials
  - can really only measure in giant squids- we can SEE their axons
  - **Electrodes**: measures electrical charges generated by axon
  - Microelectrodes: very small electrode, made of metal or glass
    - glass cannot conduct electricity thus glass microelectrode is filled w/ a liquid that does (i.e., KCl)
    - measures membrane potential; electrical charge across a cell membrane (difference in electrical potential inside and out)
  - **Oscilloscope**: displays a graph of voltage as a function of time on the face of cathode ray tube
- Action Potential State
  - threshold of excitement- charge that must be reached for AP to be triggered
    - -70 mV
  - When at -60 mV, Na+ channels open; sodium begins to enter the cell
    - depolarization
  - K+ channels open, K+ begins to leave cell
  - At about +40 mV, Na+ channels become refractory, no more Na+ enters cell
  - K+ continues to leave cell, causes membrane potentials to return to resting level
    - refractory state
  - K+ channels close. Na+ channels reset
    - REPOLARIZATION- trying to get back to its resting place (-70 mV)