Neurophysiologyco 12/16/2014

- Neurophysiology
  - Electrical properties of neurons
  - Lies in membrane physiology
  - Great diversity of nervous systems
  - Model organism: squid
    - Ganglia
  - Functions of nervous system
    - Signal transduction: reception – transduction – response
    - Homeostatic regulator: receptor – controller – effector
    - 1. Gathers sensory info via peripheral NS
    - 2. Integrates information within CNS
      - brain and spinal cord
    - 3. Responds with motor output
      - effector organs – PNS – muscles
  - 1. Peripheral NS
  - 2. CNS
  - 3. Peripheral NS

- Pathway of a nervous system

    - Reception – afferent neurons
    - Transduction – interneurons
    - Effector – efferent neurons
- Reflex arc: unconscious rapid response via spinal cell and effector cell electrical impulses
    - Knee jerk reflex
- Model system of reflex: neuro muscular junction

- Structure of neuron
    - Cell body: cytoplasm and organelles
    - Dendrites: cylindrical outgrowths carry signal into cell
    - Axon: long outgrowth carry signal to next neuron
    - Schwann Cell: surrounds peripheral neuron
        - Myelin sheath: insulate axon
    - Nodes of ranvier: space between schwann cell and axon
        - Non-myelinated
        - INCREASES SPEED OF CONDUCTION
    - Synaptic Knob: holds neurotransmitters in vesicles
    - Glia cells: provide support and function as blood-brain barrier

- Resting Potential
    - Resting Potential: electrical charge by cells at rest

        - Negative charge
    - Potential: electric charge at one point compared to electric charge at another point
        - Measured with volt-meter
        - Multi-meter
        - Circuit tester
        - Oscilloscope
        - There is a microelectrode inside of a cell and a microelectrode outside of a cell
        - SGA, Frog Muscle Fibers, Nitella have – mVI
        - Valonia have +mVI

- Causes of Resting Potential
    - Determine ions might be moving by passive vs. active
    - Use Earnst Potential
    - ENa = +62
    - EK = -90
    - ECl = -67
    - Active transport of Na and K
        - Na is outside in concentration
        - K is inside in concentration
        - Na pumped outside and K pumped inside
        - Active transport