GENERAL BIOLOGY Lecture 28 - Nervous System

I. The basic unit and function of the nervous system
   A. Basic unit - the nerve cell (neuron)
      1. System is comprised of a system of neurons
      2. Classes of nerve cells
         a) Sensory neurons - the body’s receptors (eyes)
         b) Interneurons - integrators (brain & spinal cord)
         c) Motor neurons - relay information away from brain to muscle, etc. (effectors)

II. Structure of the neuron
   A. Input zone - dendrites (receptors) and cell body (w/nucleus)
   B. Trigger zone - electrical signal produced
   C. Conducting zone - axon
   D. Output zone - axon terminals

III. Mechanism of the neuron
   A. Facilitated by membranes
   B. Ion exchange
   C. Electrochemical gradient (sodium-potassium pump)
      1. At rest, the inside membrane of the neuron is negatively charged
      2. Receptor senses something
      3. Sodium channels open up
      4. Inside of neuron membrane becomes positively charged - creates a gradient
      5. Gradient moves along the axon to the axon terminal
      6. Message can be transferred along the nerve
         a) Synapse - message transferred from axon terminal to another neuron
            1) Control - neuromodulators - responsiveness - excitatory & inhibitory

IV. Vertebrate nervous system
   A. Central nervous system - spinal cord and the brain
      1. Spinal cord
         a) Reflex connections - control limbs and trunk
         b) Interconnections between sensory input & motor output
         c) Major nerve tracks
      2. Brain
         a) Hindbrain
            1) Medulla oblongata - automatic functions - breathing, heart rate, blood pressure
            2) Cerebellum - integration of sensory signals
         b) Midbrain - decision making, reflex to visual input
         c) Forebrain
            1) Thalamus - relay center for shuttling sensory information
            2) Hypothalamus - thirst, hunger, sex
            3) Cerebrum - information processing & control (memory?)
      3. Sides of the brain
         a) Left - controls right side of body & input from right eye, right ear, and left nostril; center for language and mathematics
         b) Right - controls left side of body & input from left eye, left ear, and right nostril; center for spacial perception, music, and creativity