

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