**Nervous System Study Guide**

* What are the two main types of cells in the nervous system? What are each main type responsible for in a general sense?
* Neuron structure- be able to label: axon, dendrite, myelin sheath, nodes of ranvier, cell body, nucleus, synaptic cleft. What is each structure responsible for?
* Neurotransmitters- what are a few examples? What do neurotransmitters do?
  + Acetylcholine- what is this involved with?
  + Monoamines- what are these?
  + Amino acids
  + Peptides
* What are the two main parts of the nervous system? (Central and peripheral)
* Central nervous system- what organs comprise this?
* Peripheral nervous system- what organs comprise this?
  + 2 divisions
    - Somatic- role?
    - Autonomic- role?
      * 2 divisions: parasympathetic and sympathetic
        + What are each involved with?
  + Peripheral nerve anatomy (labeling!)
    - Fascicle
    - Epineurim, perineurium, endoneurium, neurilemma
* Describe how the peripheral and central nervous system work together- sensory, integration, and motor effect
* Classification of neurons by structure (be able to identify)
  + Unipolar
  + Bipolar
  + Multipolar
* Functional classification of neurons
  + Sensory/afferent neuron- what do these do?
  + Interneuron- what do these do, where are they found?
  + Motor neuron/efferent neuron- what do these do?
* Neuroglial cells
  + What is one function of an astrocyte?
  + What is one function of a Schwann cell?
  + What is one function of an oligodendrocyte?
* Resting membrane potential
  + What is the charge of a neuron when it is at rest/not firing?
  + Why is this so?
  + Where are there more potassium ions?
  + Where are there more sodium ions?
  + What is the role of the sodium/potassium pump?
* Action potential
  + A neurotransmitter is released into the synaptic cleft and is received by a dendrite of a neighboring neuron.
  + The neurotransmitter binds to a ligand-gated sodium ion channel. It allows the gate to open. Sodium flows in because of the simple rules of diffusion.
  + Sodium is positively charged and the inflow causes the region of the gate to become more positive.
  + Neighboring voltage-gated sodium channels will open when the threshold is reached, allowing more sodium ions to flow in. This causes a “wave” reaction towards the axon terminals.
  + Sodium gates will close and to restore the negative voltage, potassium gates will open and potassium will flow out. The sodium/potassium pump also helps to restore the negative potential.
  + When the action potential reaches the axon terminal, voltage-gated calcium channels will open and calcium will enter in. Calcium causes the release of neurotransmitters into the synaptic cleft. The process repeats.
* What is depolarization? Hyperpolarization? Refractory period?
* Know the graph for an action potential. Be able to describe what is happening when.
* What is a pre-synaptic neuron? Post-synaptic?
* How does myelin allow for faster signaling?
  + Saltatory conduction
* Synaptic potentials
  + Excitatory postsynaptic potential (EPSP)- what is this?
  + Inhibitory postsynaptic potential (IPSP)- what is this?
* How do drugs disrupt normal neuronal signaling?
* Brain structure
  + Meninges- what are these? Be able to identify them on a diagram of brain or spine
    - Dura mater
    - Arachnoid mater
      * What does the sub-arachnoid space hold?
    - Pia mater
  + Ventricles- what are these? What are they responsible for?
  + Cerebrospinal fluid (CSF)- what is one function?
  + Spinal cord
    - Identify gray matter and white matter in diagram. What makes up gray matter and white matter?
    - What are the two main functions of the spinal cord?
    - What is their involvement with reflexes?
  + What are the three parts to the brainstem and what are their functions? Be able to label them on a diagram
  + Cerebrum- functions and identification
    - Corpus callosum-what does this do?
    - Gyri, sulcus
      * Why is it important that the brain is so folded?
    - Cerebral cortex
    - Frontal lobe, parietal lobe, occipital lobe, temporal lobe, insula lobe- identify functions and label them on a diagram
    - Diencephalon- be able to label it
      * Hypothalamus- label and function
      * Thalamus- label and function
      * Pituitary gland- label and function
      * Pineal gland
* Cerebellum- label and function
* Brainstem structure
  + Midbrain- label and provide a function
  + Pons- label and provide a function
  + Medulla oblongata- label and provide a function
* Hemisphere dominance
  + What goes on?
* Reflex arc
  + What is the structure involved with the reflex arc?
  + A reflex arc carries out a simple reflex
  + Steps of a reflex arc
    - Receptor at end of sensor neuron
    - Interneurons in spinal cord
    - Effectors
  + Reflexes are involuntary
* REM sleep- what happens in it?
* Non-REM sleep/slow-wave- what happens in it?
* Nerves- what are these?
  + Cranial nerves vs. spinal nerves
  + Dorsal root vs. ventral root