**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