

## **UNIT 2 – BIOPSYCHOLOGY**

### **PERCENTAGE ON AP EXAM – 7-9%**

#### **TERMS YOU MUST KNOW**

Axon  
Central Nervous System  
Cerebral Cortex  
Dendrites  
Peripheral Nervous System  
Synapse  
Thalamus  
Autonomic Nervous System  
Gene  
Hypothalamus  
Neurons  
Neurotransmitters  
Sympathetic Nervous System  
Action Potential  
Cerebellum  
Hormone  
Limbic System  
Parasympathetic Nervous System  
Homeostasis  
Chromosomes  
Corpus Callosum  
Myelin Sheath  
Pituitary Gland  
Endocrine System  
Somatic Nervous System  
Medulla  
Sensory Neuron  
Cell Body  
Frontal Lobes  
Glial Cells  
Positron Emission Tomography  
Electroencephalogram  
Endorphins  
Magnetic Resonance Imaging  
Occipital Lobes  
Parietal Lobes  
Temporal Lobes  
Heritability  
Amygdala  
Hippocampus  
Interneurons  
Reticular Formation  
Behavioral Genetics  
Natural Selection  
Pons  
Resting Potential  
Basilar Membrane  
Midbrain  
Motor Neurons  
Receptors  
Identical Twins

#### **PEOPLE YOU MUST KNOW**

- Phineas Gage – damage to frontal lobe, emotional control, rational thoughts, decision making

#### **CONFUSING PAIRS**

- Left brain (language and logic) v. Right brain (creative and spatial).  
- Corpus Callosum (divides the brain) v. Cerebral Cortex (covers the brain)  
- Sympathetic Nervous System (“fight or flight”) v. Parasympathetic (calming – parachute)  
- Neurotransmitters (in the nervous system) v. Hormones (in the endocrine system)  
- Lateral Hypothalamus (stimulates hunger - GO) v. Ventromedial Hypothalamus (suppresses hunger - STOP)  
- Broca’s Area (makes words) v. Wernicke’s area (comprehends words)  
- Identical Twins (same fertilized egg) v. Fraternal Twins (two separate eggs)  
- Afferent Neurons (sensory, body to brain) v. Efferent Neurons (motor, brain to body)

#### **TERMS STUDENTS MAKE MISTAKES ON**

- Thalamus is the SENSATION Switchboard  
- Hindsight Bias – knew-it-all-along effect  
- Sequence of transmission in a Neural Impulse – dendrite, cell body, axon, synapse  
- MRI – Magnets & Radio Waves  
- Parts of the Brain from Oldest to Newest – goes back to front (brain stem to frontal lobe)  
- Brainstem Parts – thalamus, midbrain, pons, medulla  
- Autonomic Nervous System – Reflexes (sympathetic and parasympathetic nervous system – fight or flight)  
- Action Potential – More Excitatory than Inhibitory Inputs  
- Split Brain – Left Eye to Right Brain to Left Hand, Right Eye to Left Brain to Right Hand (Language on Left side)  
- Brain Plasticity – brains ability to make new neural connections (more plastic the younger you are)  
- Peripheral Nervous System – any nerves not encased in bone  
- Central Nervous Systems – all nerves incased in bone  
- Motor Neurons (Efferent) – located in peripheral nervous system and carry neural impulses away from the spine  
- Inter Neurons – located in the spine and brain and help with reflexes and transfer sensory impulses to motor impulses  
- Sensory Neuron (Afferent) Locations – located in our sensory organs and carry signals to the spine and brain  
- Limbic System – emotional control center of the brain  
- Cerebral Cortex – Higher brain functions  
- Neural Network – More for complex activities  
- Acetylcholine – too little Alzheimer’s, too much paralysis  
- Dopamine – too much schizophrenia, not enough Parkinson’s, too little much emotion  
- Norepinephrine – too little depression  
- Serotonin – too little depression, too much anxiety  
- GABA – too little depression and / or Huntington’s  
- Medulla – heartrate and breathing  
- Reticular Formation – Involved in arousal, waking up and feeling alert  
- Thalamus controls SENSATIONS (Pleasure, Pain, Sight, Hearing, Taste)  
- Hippocampus – long term explicit memory  
- Cerebellum – balance and coordination  
- Amygdala – fear, aggression, emotions  
- Occipital Lobe – vision  
- Parietal Lobe – sensory cortex  
- Temporal Lobe – hearing  
- Frontal Lobe – personality, judgement, motor cortex  
- Right Hemisphere – spatial and emotions  
- Left Hemisphere – language and logic  
- Broca’s – broken speech  
- Wernicke’s – language comprehension  
- Biofeedback – control physiological responses (heartrate, etc.)  
- Light Transduction Sequence – enters eye – ganglion cells, bipolar cells, cones and rods, optic nerve

## Unit 2: Biological Bases for Behavior

### Nervous System

- Peripheral (PNS) (all nervous tissue outside of the brain & spinal cord)
- Central (CNS) (brain & spinal cord)
- Autonomic (controls self-regulated action of internal organs & glands)
- Skeletal (somatic) (controls voluntary movement)
- Sympathetic (arousing)
- Parasympathetic (calming)

### Neural Transmission

*How does a message get from my foot to my brain? You should be able to explain this process. Remember the toilet bowl!*

- Dendrites – cell body (or soma) – axon – axon terminal – neurotransmitters – synapse
- Neurotransmitters: dopamine, endorphins *etc.* (effects of too little/too little)
- Agonist vs. Antagonist
  - Agonist – drug that mimics the neurotransmitter (Morphine and heroin, both opiates, are endorphin agonists)
  - Antagonist – drug that blocks the neurotransmitter
- Blood-brain barrier
- L-Dopa
- “all-or-none” response
- Refractory period

### Neural Transmission (cont.)

- Re-uptake
- Action Potential
- Myelin Sheath
- Effects of drugs (like cocaine or heroin)
- Motor neurons /sensory neurons

### Brain Imaging

*How do each of these technologies give us a picture of the brain and/or its activity?*

- CT
- MRI
- PET
- EEG
- fMRI

### Brain Structures

*You should know the order in which brain regions evolved. You should know the major structures AND their functions. What would happen if one of these structures was leisioned (surgically destroyed) or removed? How would behavior change?*

- 4 lobes (frontal, parietal, occipital, temporal)
- Wernicke’s
- Broca’s
- Amygdala
- Cerebral cortex
- Hypothalamus
- Thalamus

### Brain Structures (cont.)

- Cerebellum
- Hippocampus
- Medulla
- Reticular formation
- Corpus callosum
- Association Areas
- Brainstem
- Motor Corex
- Sensory Cortex

### Hemispheric Specialization

*Why would a split brain operation be performed? What is severed in the surgery? What have split brain experiments taught us about what the right and left hemispheres are largely responsible for?*

- Plasticity

### Genetics

*How have adoption and twin studies contributed to our understanding of the nature vs. nurture debate?*

- Dominant vs. recessive genes (Punnet Squares)
- Prenatal environments
- Effects of learning (*stronger neural connections*)
- What are some traits that are inherited vs. those that are due to upbringing (nature vs. nurture)

### Evolutionary Psychology

*Keep in mind that the evolutionary perspective argues that our behavior is the result of traits we have inherited from our ancestors because they are traits that contributed to their survival.*

- Natural selection
- Genetic predispositions
- Living to an age at which one can reproduce

### Endocrine System

*Compare the speed and duration of the endocrine system (hormones) with the nervous system (neurotransmitters)*

- Hormones
- Pituitary gland
- Adrenal gland (*epinephrine, norepinephrine*)
- Thyroid gland