Study Guide for Biopsychology Test #2

Anatomy of the Brain and Spinal Cord:

- What are the anatomical terms for directions in the nervous system?
- What structures and fluids support and protect the brain?
- What are the layers of the meninges? What fluid fills the subarachnoid space?
- What is meningitis? Encephalitis? Why are they hard to treat?
- Where is cerebrospinal fluid made? Where does it circulate? What condition can arise if this circulation is impaired? What are the dural sinuses?
- What structures make up the central nervous system?
- What are the divisions of the peripheral nervous system?
- How does the autonomic nervous system differ from the somatic nervous system?
- The sympathetic nervous system is sometimes called the “fight or flight” nervous system and parasympathetic nervous system is sometimes called the “rest and digest” or “protect and preserve” nervous system. Why?
- What does the enteric nervous system do?
- What is a dermatome? Different organ systems and muscle groups are enervated by different spinal nerves that enter and exit the spine at different levels? What implications does this have for predicting the prognosis for individuals with spinal cord injuries at different levels of the spinal cord?
- What does the size of a particular brain region relative to the rest of the brain tell you about the importance of that brain region for the animal?
- The major structures of the adult brain include the hindbrain, the midbrain, and the forebrain. Each of these structures is made up of smaller structures. In class, we talked about the principle structures that make up the hindbrain, the midbrain, and the forebrain. What are they, and in general terms, what do they do?
- What are fissures? sulci? gyri?
- What are the divisions of the cerebral cortex? In general terms, what does each region of cortex do?
- Each location in the sensory cortex receives information about sensation from a different body part. How does this compare with the organization of the motor cortex?
- Why is the limbic system important? What does the medial prefrontal cortex do? The hippocampus? The amygdala?
- Why is the limbic system important? What relatively common disease results from inadequate release of dopamine in this system?

Brain Imaging Techniques:

- A contrast X-ray technique is sometimes used for studying the cerebral vascular system (ex. looking for arthrosclerosis, aneurisms, etc). What is the name of this technique?
- What is a CT scan, and what might it be used for?
- Compare and contrast MRI, fMRI and PET imaging techniques. What are they used for, and what are the advantages and disadvantages of each.
- What is Magnetoencephalography (MEG)?

An Example of a Sensory System – The Visual System:
What physical property of light plays a role in the perception of color? The perception of brightness?

What is the conjunctiva? What is conjunctivitis (aka pink eye)?

What are the principle structures of the eye, and what do they do?

What is accommodation of the lens, and why is it important?

What is the fovea?

Why do we have a blind spot? Why are we normally unaware of our blind spot?

Several common conditions produce errors of refraction (light is not correctly focused on the retina). What are these conditions?

Under the same lighting conditions, is the amount of light getting into your eyes likely to be more or less than that getting into the eyes of your grandparents? Why?

What types of photoreceptors are found in the retina? Compare and contrast their functions.

Bipolar cells and ganglion cells are also found in the retinal – from which cells do they receive information, and to which cells do they transmit that information?

What is convergence? Why are cones associated with high visual acuity and rods with high sensitivity to dim light?

Where in the eye are most of the cones found? Most of the rods? Which are more numerous?

Why do birds of prey have many high acuity receptors on the upper half of their retinas?

Eye movements called saccades connect fixations, keeping the visual imagine in motion on the retina. Why is this important?

What is visual transduction? In general terms, how do photopigments work?

What distinguishes the three types of cones? Why are some people blind to some colors?

Our sensitivity to different wavelengths (colors) of light differs under different lighting conditions. Why are we more able to see blues and greens in dim light?

Information from the left visual field is processed in the right visual cortex. Since information about the left visual field is collected by both eyes, what must happen to information from the left eye at the optic chiasm? What cellular structures form the optic nerve?

Visual information travels from the retina to the lateral geniculate nucleus in the thalamus and on to the primary visual (striate) cortex. What do the receptive fields of the cells along the way look like? What does the receptive field of an On-center cell look like? An off-center cell?

What is contrast enhancement and how does it work?

Cells in the middle layer of the primary visual cortex (close to the input) have patterns of responsiveness similar to those observed in retinal ganglion and lateral geniculate cells (they have circular receptive fields). Is this true of the receptive fields of cells farther from the input?

The organization of the primary visual cortex is said to be columnar. Why?

Why do people with untreated amblyopia or “lazy eye” tend to have poor depth perception?

Information from the primary visual cortex travels to the secondary and association cortex via the dorsal and ventral streams. What is the nature of the information carried by each of these streams?

What is visual agnosia? What is prosopagnosia?