

## The Great Brain Drain Review

I. Which specific brain functions or nervous system is affected in the following examples:

- a. Following a head injury, Jack has ongoing problems staying awake and focusing attention. Reticular formation.
- b. After a gunshot wound, Sandy is uninhibited, irritable, and profane. Frontal lobe
- c. A rat attacks another rat in the same cage after this area is electrically stimulated. amygdala
- d. Roger wets his pants while running away from a bear that is chasing him through the wood. Hypothalamus or sympathetic nervous system
- e. Kathy cannot remember last Christmas after this area was damaged. hippocampus
- f. Jessica has difficulty keeping her balance after receiving a blow during a gymnastics routine. cerebellum
- g. Cindy, who was conscious during a medical procedure, reported a “pins and needles” sensations after her neurosurgeon electrically stimulated this area. Sensory cortex (parietal lobe)

II. a. What is aphasia? (You may need your book for this one.)

- b. Give two specific examples of how this problem can occur.

III. Multiple Choice:

1. A split-brain patient has a picture of a knife flashed to her left hemisphere and that of a fork to her right hemisphere. She will be able to **A**
  - A. identify the fork using her left hand.
  - B. identify a knife using her left hand.
  - C. identify a knife using either hand.
  - D. identify a fork using either hand.
  - E. stand on her head and eat with both hands.
2. Dr. Frankenstein made a mistake during neurosurgery on his monster. After the operation, the monster “saw” with his ears and “heard” with his eyes. It is likely that Dr. Frankenstein “rewired” neural connections in the monster’s **D**
  - A. hypothalamus
  - B. cerebellum
  - C. frontal lobe
  - D. thalamus
  - E. pituitary gland
3. A scientist from another planet wishes to study the simplest brain mechanisms underlying emotions. You recommend the scientist study the **B**
  - A. brainstem of a frog.
  - B. limbic system of a dog
  - C. cortex of a monkey.
  - D. cortex of a human
  - E. parietal lobe of a human
4. A body builder friend of yours suddenly seems to have grown several inches in height. You suspect that your friend has been using drugs that affect the **D**
  - A. thalamus
  - B. adrenal glands
  - C. medulla
  - D. pituitary gland
  - E. dopamine
5. Dr. Johnson briefly flashed a picture of a key in the right visual field of a split-brain patient. The patient could probably **E**
  - A. write the word “key” using the left hand.
  - B. draw a picture of a key using the right hand.
  - C. do none of the above.
  - D. Draw a picture of a key using the left hand.
  - E. verbally report that a key was seen

IV. Which type of procedure is described in each of the following methods of evaluation?

- a. Uses radio waves and magnetic fields to produce computer generated images to distinguish among different types of brain tissue. MRI
- b. Uses glucose to develop a visual display of brain activity. PET
- c. Measures electrical activity across the surface of the brain. EEG

V. As a summer camp counselor, you have been able to identify your ten-year-old campers as either “right-brained” or “left-brained”. After dividing them into two groups based on their thinking styles, decide on three group tasks that you could assign to each group that should correspond to their cognitive abilities.

### Left-brained campers

Language activities  
Logical, sequential activities  
Details

### Right-brained campers

spatial tasks  
Emotional activities  
Musical activities  
Big picture

VI. The more official name for a brain cell is a neuron. The part that receives the message is called the dendrites and the part that sends the message is called the axon. The sending part of the nerve cell is often covered in myelin which speeds up the rate of transmission. Chemicals that cross the synapse are called neurotransmitters. Schizophrenia and Parkinson's disease are both caused by an imbalance of the chemical, dopamine in the brain. When we experience extreme pain, the body releases endorphins. acetylcholine is the chemical found at neuromuscular junctions. The poison of a black widow spider affects it by mimicking it. Therefore, the poison from a black widow spider is an agonist. Acetylcholine must also be involved in memory because decreased amounts of it in the brain are associated with the disease, Alzheimers. Neurotransmitters can be excitatory or inhibitory. GABA is an example of an inhibitory neurotransmitter. The neural impulse that travels down a nerve cell is called an action potential. The neural impulse will only be sent if the signal in the cell body reaches threshold. The nerves in the feet are of the peripheral nervous system. The nerves in the brain and spinal cord are part of the central nervous system. The peripheral nervous system is broken down into the somatic nervous system, which controls conscious thoughts and movements, and the autonomic nervous system which controls unconscious thoughts and behaviors. The sympathetic nervous system controls the fight-or-flight response. Examples of things this nervous system might stimulate include pupils dilating, heartbeat increasing, breathing rate increasing, slowed digestion, adrenaline release. The part of the brainstem that sits on top of the spinal cord is the medulla. It regulates heartbeat, blood pressure, coughing, and breathing. Also in the brainstem is the reticular formation which filters information from the body and relays it to the rest of the brain. Brent and Jennifer are stars in part because of their super coordination. The part of the brain that helps them with this is the cerebellum. They fortunately also have many neurons in their motor (sensory?) cortex. Jen is a happy, emotion, creative right-brained person. If you slap Amy or Nora in the back of the cerebrum, you may cause blurred vision because of damage to the occipital lobe. Deb and Connie are good friends. The pituitary gland (also known as the master gland) has a best friend in the limbic system, the hypothalamus. I can't remember how I got started on this task. My hippocampus is involved in memory and is also in the limbic system. If I were to separate the two hemispheres of your great brain, I would snip the corpus callosum.

### Objectives

- ☐ Structure of a neuron
- ☐ Electrical and chemical transmission of a neural impulse
- ☐ 6 neurotransmitters, their functions, associated diseases, agonist vs. antagonist
- ☐ organization of the nervous system (peripheral, central, somatic, autonomic, sympathetic,...)
- ☐ Types of brain scans
- ☐ Parts of the brains (location and function)
- ☐ Hemisphere specialization and split-brain patients
- ☐ Role of the endocrine system