

Advanced Neuroscience Foundations

Neuroscience · Answer Key · 10 Questions

1. Which specific neurotransmitter is primarily responsible for the inhibitory signal in the adult mammalian central nervous system?

- A) Glutamate
- B) GABA**
- C) Acetylcholine
- D) Dopamine

2. In the context of the action potential, what is the primary role of the refractory period?

- A) To accelerate signal conduction speed
- B) To prevent the impulse from traveling backwards**
- C) To initiate neurotransmitter release
- D) To increase the threshold for synaptic firing

3. The Broca's area, essential for speech production, is anatomically located in which lobe of the cerebral cortex?

- A) Frontal lobe**
- B) Occipital lobe
- C) Parietal lobe
- D) Temporal lobe

4. Which glial cell type is primarily responsible for forming the myelin sheath in the peripheral nervous system?

- A) Astrocytes
- B) Microglia
- C) Schwann cells**
- D) Oligodendrocytes

5. What is the primary function of the hippocampus within the limbic system?

- A) Regulation of body temperature
- B) Processing of long-term memory**
- C) Control of heart rate
- D) Regulation of circadian rhythms

6. Long-term potentiation (LTP) is a cellular mechanism most closely associated with which process?

- A) Muscle contraction
- B) Pain perception
- C) Synaptic plasticity and memory formation**
- D) Auditory signal processing

7. The blood-brain barrier is composed primarily of which structure?

- A) Dura mater
- B) Endothelial cells with tight junctions**
- C) Cerebrospinal fluid
- D) Myelinated axons

8. Which cranial nerve is responsible for the parasympathetic innervation of the heart, lungs, and digestive tract?

- A) Trigeminal nerve
- B) Facial nerve
- C) Vagus nerve**
- D) Optic nerve

9. During a neural impulse, which ion flows into the neuron to cause depolarization?

- A) Potassium
- B) Chloride
- C) Sodium**
- D) Magnesium

10. The primary visual cortex (V1) is located within which specific region of the brain?

- A) Superior temporal gyrus
- B) Calcarine fissure of the occipital lobe**
- C) Precentral gyrus
- D) Insular cortex