Chapter 42 Exercises

Review Questions

1. Neurons contain _____, which can receive signals from other neurons.
- **a.** axons
- **b.** mitochondria
- **c.** dendrites
- **d.** Golgi bodies

2. A(n) _____ neuron has one axon and one dendrite extending directly from the cell body.
- **a.** unipolar
- **b.** bipolar
- **c.** multipolar
- **d.** pseudounipolar

3. Glia that provide myelin for neurons in the brain are called _____.
- **a.** Schwann cells
- **b.** oligodendrocytes
- **c.** microglia
- **d.** astrocytes

4. Meningitis is a viral or bacterial infection of the brain. Which cell type is the first to have its function disrupted during meningitis?
- **a.** astrocytes
- **b.** microglia
- **c.** neurons
- **d.** satellite glia

5. For a neuron to fire an action potential, its membrane must reach _____.
- **a.** hyperpolarization
- **b.** the threshold of excitation
- **c.** the refractory period
- **d.** inhibitory postsynaptic potential

6. After an action potential, the opening of additional voltage-gated _____ channels and the inactivation of sodium channels cause the membrane to return to its resting membrane potential.
- **a.** sodium
- **b.** potassium
- **c.** calcium
- **d.** chloride

7. What is the term for protein channels that connect two neurons at an electrical synapse?
- **a.** synaptic vesicles
- **b.** voltage-gated ion channels
- **c.** gap junction protein
- **d.** sodium-potassium exchange pumps

8. Which of the following molecules is *not* involved in the maintenance of the resting membrane potential?
- **a.** potassium cations
- **b.** ATP
- **c.** voltage-gated ion channels
- **d.** calcium cations

9. The _____ lobe contains the visual cortex.
- **a.** frontal
- **b.** parietal
- **c.** temporal
- **d.** occipital

10. The _____ connects the two cerebral hemispheres.
- **a.** limbic system
- **b.** corpus callosum
- **c.** cerebellum
- **d.** pituitary

11. Neurons in the _____ control motor reflexes.
- **a.** thalamus
- **b.** spinal cord
- **c.** parietal lobe
- **d.** hippocampus

12. Phineas Gage was a nineteenth century railroad worker who survived an accident that drove a large iron rod through his head. If the injury resulted in him becoming temperamental and capricious, which part of his brain was damaged?
- **a.** frontal lobe
- **b.** hippocampus
- **c.** parietal lobe
- **d.** temporal lobe

13. Activation of the sympathetic nervous system causes _____.
- **a.** increased blood flow into the skin
- **b.** a decreased heart rate
- **c.** an increased heart rate
- **d.** increased digestion

14. Where are parasympathetic preganglionic cell bodies located?
- **a.** cerebellum
- **b.** brainstem
- **c.** dorsal root ganglia
- **d.** skin

15. Motor nerve endings release _____ onto muscle.
- **a.** acetylcholine
- **b.** norepinephrine
- **c.** dopamine
- **d.** serotonin

16. Parkinson's disease is caused by the degeneration of neurons that release _____.
- **a.** serotonin
- **b.** dopamine
- **c.** glutamate
- **d.** norepinephrine

17. Patients with ADHD are often treated with _____ medications.
- **a.** tranquilizer
- **b.** antibiotic
- **c.** stimulant
- **d.** anti-seizure

18. Strokes are often caused by _____.
- **a.** neurodegeneration
- **b.** blood clots or burst blood vessels
- **c.** seizures
- **d.** viruses

19. Why is it difficult to identify the cause of many nervous system disorders?
- **a.** The genes associated with the diseases are not known.
- **b.** There are no obvious defects in brain structure.
- **c.** The onset and display of symptoms varies between patients.
- **d.** all of these

20. Why do many patients with neurodevelopmental disorders develop secondary disorders?
- **a.** Their genes predispose them to schizophrenia.
- **b.** Stimulant medications cause new behavioral disorders.
- **c.** Behavioral therapies only improve neurodevelopmental disorders.
- **d.** Dysfunction in the brain can affect many aspects of the body.

Critical Thinking Questions

21. How are neurons like other cells? How are they unique?

22. Multiple sclerosis causes demyelination of axons in the brain and spinal cord. Why is this problematic?

23. Many neurons have only a single axon but many terminals at the end of the axon. How does this end structure of the axon support its function?

24. How does myelin aid propagation of an action potential along an axon? How do the nodes of Ranvier help this process?

25. What are the main steps in chemical neurotransmission?

26. Describe how long-term potentiation can lead to a nicotine addiction.

27. What methods can be used to determine the function of a particular brain region?

28. What are the main functions of the spinal cord?

29. Alzheimer's disease involves three of the four lobes of the brain. Identify one of the involved lobes and describe the lobe's symptoms associated with the disease.

30. What are the main differences between the sympathetic and parasympathetic branches of the autonomic nervous system?

31. What are the main functions of the sensory-somatic nervous system?

32. Describe how the sensory-somatic nervous system reacts by reflex to a person touching something hot. How does this allow for rapid responses in potentially dangerous situations?

33. Scientists have suggested that the autonomic nervous system is not well adapted to modern human life. How is the sympathetic nervous system an ineffective response to the everyday challenges faced by modern humans?

34. What are the main symptoms of Alzheimer's disease?

35. What are possible treatments for patients with major depression?