Test Bank
to accompany
Behavioral Neuroscience, Ninth Edition
S. Marc Breedlove and Neil V. Watson

Chapter 2: Functional Neuroanatomy: The Cells and Structures of the Nervous System

TEST BANK QUESTIONS

Multiple Choice

1. Which histological technique is used for tract tracing?
a. labeled pseudorabies virus
b. In situ hybridization
c. Golgi stain
d. Nissl stain
Answer: a
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.1 Give a brief historical account of the study of cellular neuroanatomy.
Bloom's Level: 1. Remembering

2. The adult human brain contains
a. 100–150 billion circuits.
b. 80–90 billion neurons.
c. 100–150 million neurons.
d. 100–150 million glial cells.
Answer: b
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.1 Give a brief historical account of the study of cellular neuroanatomy.
Bloom's Level: 1. Remembering

3. The neuron doctrine
a. was confirmed using electron microscopy.
b. proposed the existence of synaptic contacts between neurons.
c. stemmed from the work of the great neuroanatomist Ramón y Cajal.
d. All of the above
Answer: d
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.1 Give a brief historical account of the study of cellular neuroanatomy.
Bloom's Level: 2. Understanding

4. The “giant” axons of some invertebrate animals can have diameters as large as
a. 20 μm.
b. 1 mm.
c. 500 μm.
d. 20 nm.
Answer: c
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.1 Give a brief historical account of the study of cellular neuroanatomy.
Bloom’s Level: 1. Remembering

5. Which statement does *not* describe a reason that tract-tracing studies have been difficult to perform?
a. Fibers with different destinations often travel together.
b. Axons have very small diameters and therefore are hard to see.
c. Axons from different sources look alike.
d. All of the above are reasons for the difficulty.
Answer: d
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.1 Give a brief historical account of the study of cellular neuroanatomy.
Bloom’s Level: 2. Understanding

6. The size range of most nerve cell bodies is
a. 1–10 μm.
b. 1–10 mm.
c. 10–100 nm.
d. 10–100 μm.
Answer: d
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.2 Name and describe the general functions of the four main parts of a neuron.
Bloom’s Level: 1. Remembering

7. The range of diameters of mammalian axons is
a. 1–10 mm.
b. 0.2–20 μm.
c. 0.05–2.0 μm.
d. 100–300 μm.
Answer: b
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.2 Name and describe the general functions of the four main parts of a neuron.
Bloom’s Level: 1. Remembering

8. In which way(s) are dendrites and axons similar?
a. Both are characterized by branching.
b. They have similar lengths.
c. Both exhibit a tapering of diameter with increasing distance from the cell body.
d. All of the above
Answer: a
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.2 Name and describe the general functions of the four main parts of a neuron.
Bloom's Level: 2. Understanding

9. Dendrites are
a. a type of glial cell.
b. the input zone of a nerve cell.
c. the output zone of a nerve cell.
d. small cerebellar neurons.
Answer: b
Textbook Reference: 2.1 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.2 Name and describe the general functions of the four main parts of a neuron.
Bloom's Level: 1. Remembering

10. The "slow" rate of axonal transport is
a. 400 mm/day.
b. 1 m/day.
c. less than 8 mm/day.
d. 40 mm/day.
Answer: c
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.2 Name and describe the general functions of the four main parts of a neuron.
Bloom's Level: 1. Remembering

11. Which statement about dendritic spines is true?
a. Alzheimer's disease is associated with a pathological change in dendritic spines.
b. Dendritic spines are outgrowths on the surface of dendrites that are modified by experience.
c. Dendritic spines are neuronal structures found along the axon.
d. Only the structure of dendritic spines can be altered by experience.
Answer: b
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.2 Name and describe the general functions of the four main parts of a neuron; 2.1.4 Outline the key components of a synapse and the major steps in neurotransmission.
Bloom's Level: 2. Understanding

12. Which statement about dendrites is *false*?
a. A single cell's dendrites form a dendritic tree.
b. The diversity of neuronal shapes is caused primarily by variation in the form and shape of dendrites.
c. Dendrites may be several meters in length in giraffes.
d. Dendritic spines appear to be subject to modification as a result of experience.
Answer: c
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.2 Name and describe the general functions of the four main parts of a neuron.
Bloom's Level: 3. Applying

13. Substances are conveyed from the cell body of the neuron to the distant reaches of the axon through the process of
a. innervation.
b. axonal transport.
c. neurotransmission.
d. conduction.
Answer: b
Textbook Reference: Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.2 Name and describe the general functions of the four main parts of a neuron.
Bloom's Level: 2. Understanding

14. Although nerve cells typically have only one axon, an axon may divide into numerous axon
a. hillocks.
b. receptors.
c. conduction zones.
d. collaterals.
Answer: d
Textbook Reference: Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.3 Classify neurons according to both structure and function.
Bloom's Level: 1. Remembering

15. Which neurons can collect the most information?
a. Bipolar
b. Monopolar
c. Multipolar
d. Unipolar
Answer: c
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.3 Classify neurons according to both structure and function.
Bloom's Level: 1. Remembering

16. Every neuron has all of these components *except*

a. myelin.
b. dendrites.
c. axons.
d. a nucleus.
Answer: a
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.3 Classify neurons according to both structure and function.
Bloom's Level: 2. Understanding

17. Most neurons
a. receive input related to changes in the environment.
b. are classified as motoneurons.
c. are classified as sensory neurons.
d. are classified as interneurons.
Answer: d
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.3: Classify neurons according to both structure and function.
Bloom's Level: 1. Remembering

18. Synaptic vesicles are found in the
a. cell body.
b. dendritic spines.
c. axon hillock.
d. synaptic boutons.
Answer: d
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.4 Outline the key components of a synapse and the major steps in neurotransmission.
Bloom's Level: 1. Remembering

19. Axon terminals form the _____ side of a synapse, and dendrites form the _____ side of a synapse.
a. presynaptic; postsynaptic
b. input; output
c. postsynaptic; presynaptic
d. conduction; integration
Answer: a
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.4 Outline the key components of a synapse and the major steps in neurotransmission.
Bloom's Level: 2. Understanding

20. The gaps between segments of myelin are known as
a. synaptic clefts.
b. nodes of Ranvier.
c. terminal boutons.

d. neuromuscular junctions.
Answer: b
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.4 Outline the key components of a synapse and the major steps in neurotransmission.
Bloom's Level: 1. Remembering

21. The width of the synaptic cleft is about
a. 200 nm.
b. 200 μm.
c. 20 μm.
d. 20 nm.
Answer: d
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.4 Outline the key components of a synapse and the major steps in neurotransmission.
Bloom's Level: 1. Remembering

22. Synaptic boutons are
a. found within synaptic vesicles.
b. protrusions occurring along the length of dendrites.
c. swellings found at axon terminals.
d. specialized synapses occurring on muscles.
Answer: c
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.4 Outline the key components of a synapse and the major steps in neurotransmission.
Bloom's Level: 1. Remembering

23. The electrical impulse that stimulates neurotransmitter release, thereby transmitting information to other neurons, arises in the
a. dendrites.
b. axon hillock.
c. axon.
d. dendritic spine.
Answer: b
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.4 Outline the key components of a synapse and the major steps in neurotransmission.
Bloom's Level: 2. Understanding

24. The two major cell types that make up the nervous system are _____ cells and _____.
a. mitochondria; ribosomes
b. collateral; terminals
c. glial; neurons

d. axons; dendrites
Answer: c
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.5 Describe the four principal types of glial cells and their functions.
Bloom's Level: 1. Remembering

25. The major function of Schwann cells is the
a. transmission of nutrients to neurons.
b. myelination of peripheral nerve fibers.
c. scavenging of cellular debris.
d. myelination of axons in the brain.
Answer: b
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.5 Describe the four principal types of glial cells and their functions.
Bloom's Level: 2. Understanding

26. In the disease multiple sclerosis, myelin in the brain is lost. Which cells are responsible for myelination in the brain?
a. Oligodendrocytes
b. Schwann cells
c. Astrocytes
d. Both a and b
Answer: a
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.5 Describe the four principal types of glial cells and their functions.
Bloom's Level: 1. Remembering

27. Which type of cells give rise to brain tumors?
a. Pyramidal cells
b. Multipolar cells
c. Glial cells
d. Granule cells
Answer: c
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.5 Describe the four principal types of glial cells and their functions.
Bloom's Level: 1. Remembering

28. Which glial cells have sucker-like extensions that contact blood vessels?
a. Oligodendrocytes
b. Astrocytes
c. Microglial cells
d. Stellate cells

Answer: b
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.5 Describe the four principal types of glial cells and their functions.
Bloom's Level: 1. Remembering

29. Fibers that carry information away from the brain are called _____, whereas fibers that carry information toward the brain are called _____.
a. efferents; afferents
b. output zones; input zones
c. cranial nerves; spinal nerves
d. sensory nerves; motor nerves
Answer: a
Textbook Reference: The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.2.1 Describe the composition of nerves, and distinguish between somatic and autonomic nerves.
Bloom's Level: 1. Remembering

30. The three main components of the peripheral nervous system are the _____ nerves, the _____ nerves, and the _____ nervous system.
a. frontal, parietal, and temporal
b. cranial, spinal, autonomic
c. motor; somatic, sensory
d. central, peripheral, autonomic
Answer: b
Textbook Reference: The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.2.1 Describe the composition of nerves, and distinguish between somatic and autonomic nerves.
Bloom's Level: 2. Understanding

31. Which three cranial nerves are involved in the control of eye movements?
a. Oculomotor, trochlear, vagus
b. Oculomotor, trochlear, abducens
c. Trochlear, abducens, vagus
d. Abducens, oculomotor, vagus
Answer: b
Textbook Reference: 2.2 The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.2.2 Give a general description of the naming conventions and functions of the cranial and spinal nerves.
Bloom's Level: 2. Understanding

32. How many pairs of spinal nerves do humans have?
a. 5
b. 12
c. 31

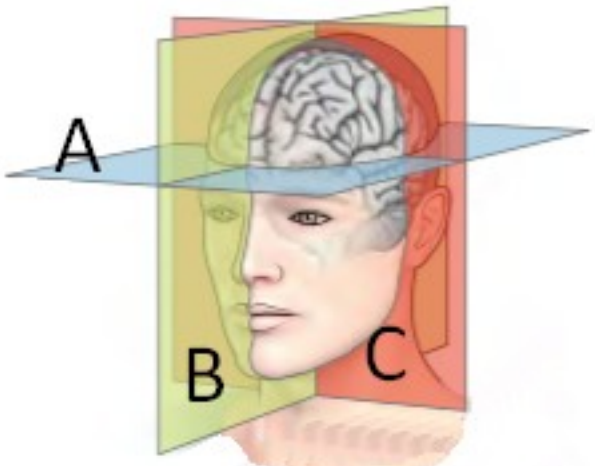
d. It varies, depending on an individual's age and height.
Answer: c
Textbook Reference: 2.2 The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.2.2 Give a general description of the naming conventions and functions of the cranial and spinal nerves.
Bloom's Level: 1. Remembering

33. Which cranial nerve carries both motor and sensory information?
a. Facial
b. Olfactory
c. Optic
d. Hypoglossal
Answer: a
Textbook Reference: 2.2 The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.2.2 Give a general description of the naming conventions and functions of the cranial and spinal nerves.
Bloom's Level: 1. Remembering

34. The preganglionic neurons of the sympathetic nervous system are found in the
a. basal ganglia.
b. sympathetic chain.
c. spinal cord.
d. muscles.
Answer: c
Textbook Reference: 2.2 The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.2.3 Name and describe the key structures, innervation patterns, and general functions of the sympathetic, parasympathetic, and enteric divisions of the autonomic nervous system.
Bloom's Level: 2. Understanding

35. Which bodily response is a consequence of sympathetic activation?
a. Increased salivation
b. Increased heart rate
c. Decreased blood pressure
d. Increased digestion
Answer: b
Textbook Reference: 2.2 The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.2.3 Name and describe the key structures, innervation patterns, and general functions of the sympathetic, parasympathetic, and enteric divisions of the autonomic nervous system.
Bloom's Level: 2. Understanding

36. Refer to the figure.



The plane labeled A is called the _____ plane, the plane labeled B is the _____, and the plane marked C is the _____.
a. dorsal; sagittal; posterior
b. sagittal; ipsilateral; coronal
c. horizontal; sagittal; coronal
d. coronal; horizontal; sagittal
Answer: c
Textbook Reference: 2.2 The Nervous System Consists of Central and Peripheral Divisions;
Learning Objective: 2.2.4 Provide an inventory of the main anatomical structures that make up the two cerebral hemispheres.
Bloom's Level: 3. Applying

37. The left and right portions of the body are divided by the _____ plane.
a. sagittal
b. frontal
c. coronal
d. horizontal
Answer: a
Textbook Reference: 2.2 The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.2.4 Provide an inventory of the main anatomical structures that make up the two cerebral hemispheres.
Bloom's Level: 1. Remembering

38. The four major lobes of the cerebral cortex are named for
a. the skull bones lying over them.
b. their anatomical positions relative to one another.
c. their major functions.
d. their gross appearance.

Answer: a
Textbook Reference: 2.2 The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.2.4 Provide an inventory of the main anatomical structures that make up the two cerebral hemispheres.
Bloom's Level: 1. Remembering

39. In which plane of section would it be easiest to see the corpus callosum?
a. Sagittal cut directly down the midline
b. Horizontal cut at the level of the brainstem
c. Coronal cut at the level of the cerebellum
d. Sagittal cut at the level of the temporal lobe
Answer: a
Textbook Reference: 2.2 The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.2.4 Provide an inventory of the main anatomical structures that make up the two cerebral hemispheres.
Bloom's Level: 3. Applying

40. What percentage of the surface of the cortex is hidden within the convolutions of the brain?
a. 2%
b. 25%
c. 33%
d. 66%
Answer: d
Textbook Reference: 2.2 The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.2.4 Provide an inventory of the main anatomical structures that make up the two cerebral hemispheres.
Bloom's Level: 1. Remembering

41. Which region of the cortex is crucial for motor control?
a. Postcentral gyrus
b. Parietal lobe
c. Precentral gyrus
d. Prefrontal cortex
Answer: c
Textbook Reference: 2.2 The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.2.4 Provide an inventory of the main anatomical structures that make up the two cerebral hemispheres.
Bloom's Level: 1. Remembering

42. The ridges of tissue on the convoluted surface of the cortex are called
a. gyri.

b. sulci.
c. nuclei.
d. ganglia.
Answer: a
Textbook Reference: 2.2 The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.2.4 Provide an inventory of the main anatomical structures that make up the two cerebral hemispheres.
Bloom's Level: 1. Remembering

43. Almost all incoming sensory information passes through the _____, which sends the information on to the overlying cortex.
a. medulla
b. basal ganglia
c. thalamus
d. cerebellum
Answer: c
Textbook Reference: The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.2.4 Provide an inventory of the main anatomical structures that make up the two cerebral hemispheres.
Bloom's Level: 2. Understanding

44. The hypothalamus is located _____ to the thalamus.
a. inferior
b. superior
c. dorsal
d. ventral
Answer: ventral
Textbook Reference: The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.2.4 Provide an inventory of the main anatomical structures that make up the two cerebral hemispheres.
Bloom's Level: 2. Understanding

45. A collection of neurons in the nervous system is known as a
a. nodule.
b. nucleus.
c. fiber.
d. plexus.
Answer: b
Textbook Reference: 2.2 The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.2.5 Explain the difference between gray matter and white matter, with examples.
Bloom's Level: 2. Understanding

46. The pons is part of the

a. diencephalon.
b. mesencephalon.
c. metencephalon.
d. myelencephalon.
Answer: c
Textbook Reference: 2.2 The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.2.6 Summarize the sequence of events in the development of the fetal nervous system.
Bloom's Level: 2. Understanding

47. The brainstem contains which structure?
a. Medulla
b. Inferior colliculus
c. Corpus callosum
d. Central sulcus
Answer: a
Textbook Reference: 2.2 The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.2.6 Summarize the sequence of events in the development of the fetal nervous system.
Bloom's Level: 1. Remembering

48. How many distinct layers are observed in the human neocortex?
a. One
b. Three
c. Six
d. About one-million
Answer: c
Textbook Reference: 2.3 The Brain Shows Regional Specialization of Functions
Learning Objective: 2.3.1 Describe the cellular structure and organization of the cortex.
Bloom's Level: 1. Remembering

49. Which statement about allocortex is true?
a. It has six cell layers.
b. It is found in the frontal lobe.
c. It can have an unlayered organization.
d. It is organized into columns.
Answer: c
Textbook Reference: 2.3 The Brain Shows Regional Specialization of Functions
Learning Objective: 2.3.1 Describe the cellular structure and organization of the cortex.
Bloom's Level: 1. Remembering

50. In the cerebral cortex, layers V and VI are unique in that they
a. are a different color than the other layers.
b. contains many neurons with large cell bodies.

c. contains many fibers.
d. are quite variable from region to region.
Answer: b
Textbook Reference: 2.3 The Brain Shows Regional Specialization of Functions
Learning Objective: 2.3.1 Describe the cellular structure and organization of the cortex.
Bloom's Level: 1. Remembering

51. The structures of the limbic system are critical in
a. emotion and learning.
b. sensation.
c. motor control.
d. sympathetic nervous system control.
Answer: a
Textbook Reference: 2.3 The Brain Shows Regional Specialization of Functions
Learning Objective: 2.3.2 Identify the major components of the basal ganglia and the limbic system, and state some of the behavioral functions of each.
Bloom's Level: 2. Understanding

52. Which structures are part of the basal ganglia?
a. Globus pallidus, caudate nucleus, amygdala
b. Caudate nucleus, putamen, fornix
c. Putamen, amygdala, mammillary bodies
d. Globus pallidus, substantia nigra, putamen
Answer: d
Textbook Reference: 2.3 The Brain Shows Regional Specialization of Functions
Learning Objective: 2.3.2 Identify the major components of the basal ganglia and the limbic system, and state some of the behavioral functions of each.
Bloom's Level: 1. Remembering

53. Which structure contains the reticular formation?
a. Diencephalon
b. Brainstem
c. Metencephalon
d. Telencephalon
Answer: c
Textbook Reference: 2.2 The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.3.3 Name the major divisions of the brainstem and midbrain, and identify key functions performed by each.
Bloom's Level: 1. Remembering

54. Parallel fibers are a feature of the
a. basal ganglia.
b. superior colliculus.
c. corpus callosum.
d. cerebellum.

Answer: d
Textbook Reference: 2.3 The Brain Shows Regional Specialization of Functions
Learning Objective: 2.3.3 Name the major divisions of the brainstem and midbrain, and identify key functions performed by each.
Bloom's Level: 1. Remembering

55. Two important motor nuclei, the substantia nigra and the _____ nucleus, are contained within the _____.
a. caudate; brainstem
b. oculomotor; diencephalon
c. raphe; telencephalon
d. red; midbrain
Answer: d
Textbook Reference: 2.3 The Brain Shows Regional Specialization of Functions
Learning Objective: 2.3.3 Name the major divisions of the brainstem and midbrain, and identify key functions performed by each.
Bloom's Level: 1. Remembering

56. Within the midbrain, the _____ receive auditory (sound) information.
a. inferior colliculi
b. red nucleus
c. superior colliculi
d. reticular formation
Answer: a
Textbook Reference: The Brain Shows Regional Specialization of Functions
Learning Objective: 2.3.3 Name the major divisions of the brainstem and midbrain, and identify key functions performed by each.
Bloom's Level: 1. Remembering

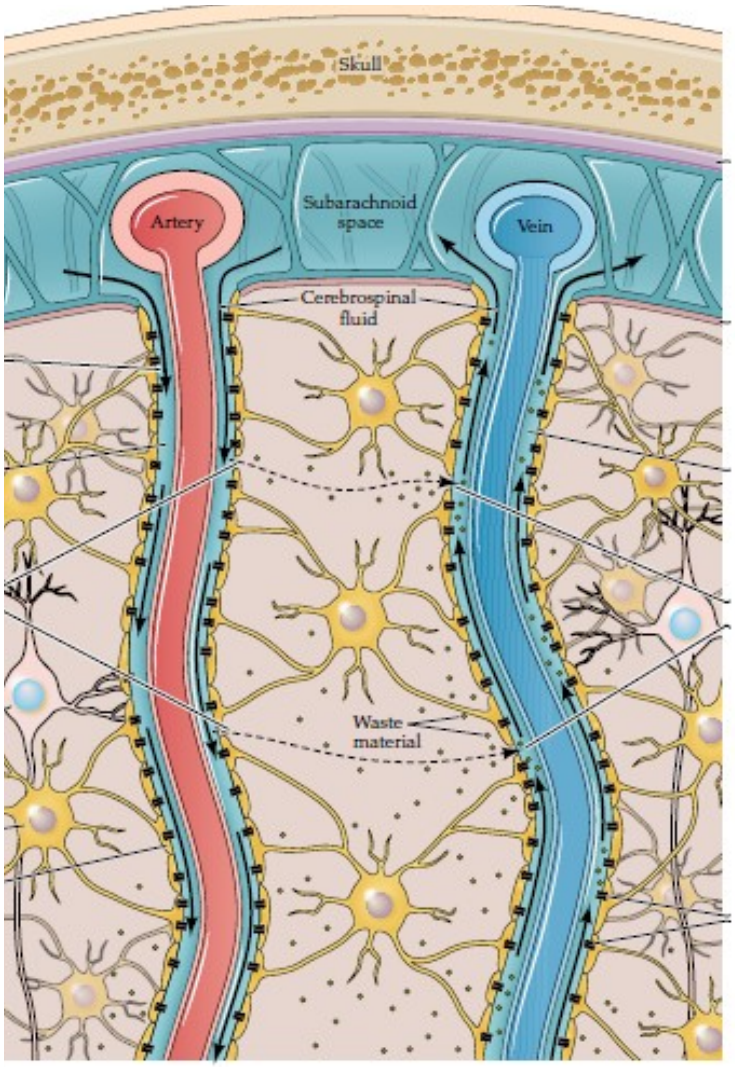
57. Purkinje cells are located in the
a. cerebral cortex.
b. cerebellum.
c. cervical spinal cord.
d. basal ganglia.
Answer: b
Textbook Reference: 2.3 The Brain Shows Regional Specialization of Functions
Learning Objective: 2.3.3 Name the major divisions of the brainstem and midbrain, and identify key functions performed by each.
Bloom's Level: 1. Remembering

58. The ventricular system contains
a. the circle of Willis.
b. blood.
c. cerebrospinal fluid.
d. the meninges.
Answer: c

Textbook Reference: 2.4 Specialized Support Systems Protect and Nourish the Brain
Learning Objective: 2.4.1 Name and describe the meninges and components of the ventricular system and explain their clinical significance.
Bloom's Level: 1. Remembering

59. The specialized vascular tissue that produces the cerebrospinal fluid is called the
a. circle of Willis.
b. dura mater.
c. corpus callosum.
d. choroid plexus.
Answer: d
Textbook Reference: 2.4 Specialized Support Systems Protect and Nourish the Brain
Learning Objective: 2.4.2 Briefly describe the production and circulation of cerebrospinal fluid.
Bloom's Level: 1. Remembering

60. Refer to the figure.



After M. Nedergaard and S. A. Goldman, 2016. *Sci Am* 314:44-49.

The dashed arrows in this figure represent what key process?
a. The vascular circulation of blood that maintains blood pressure
b. The glymphatic flow that provides protection from harmful substances in the brain
c. The regeneration of the choroid plexus.
d. The opening and closing of the aquaporins to waste material.
Answer: b
Textbook Reference: 2.4 Specialized Support Systems Protect and Nourish the Brain
Learning Objective: 2.4.2 Briefly describe the production and circulation of cerebrospinal fluid.
Bloom's Level: 3. Applying

61. A person suffers a stroke that affects the base of the anterior cerebral artery. This will likely result in reduced blood flow to the
a. medial frontal and parietal lobes.
b. occipital lobe.
c. lateral temporal lobe.

d. lateral frontal and parietal lobes.
Answer: a
Textbook Reference: 2.4 Specialized Support Systems Protect and Nourish the Brain
Learning Objective: 2.4.3 Give an overview of the vascular supply of the brain, and note the signs and symptoms of stroke.
Bloom's Level: 4. Analyzing

62. Which arteries provide blood to the brain?
a. Basilar artery and carotid artery only
b. Carotid artery and vertebral artery only
c. Basilar artery, carotid artery, and vertebral artery
d. Carotid artery, choroid plexus, and vertebral artery
Answer: c
Textbook Reference: 2.4 Specialized Support Systems Protect and Nourish the Brain
Learning Objective: 2.4.3 Give an overview of the vascular supply of the brain, and note the signs and symptoms of stroke.
Bloom's Level: 3. Applying

63. The anterior and middle cerebral arteries branch from the
a. superior vena cava.
b. internal carotid artery.
c. basilar artery.
d. vertebral artery.
Answer: b
Textbook Reference: 2.4 Specialized Support Systems Protect and Nourish the Brain
Learning Objective: 2.4.3 Give an overview of the vascular supply of the brain, and note the signs and symptoms of stroke.
Bloom's Level: 2. Understanding

64. Which statement about the blood–brain barrier is true?
a. It is a part of the immune system that involves the release of antibodies to protect the brain from infectious agents.
b. It is a property of the closely packed endothelial cells of the walls of brain capillaries that prevents large molecules from entering the brain.
c. It is a property of the blood vessels of the brain that promotes the diffusion of nutrients into the tissue of the brain.
d. It is a property of neurons that prevents them from accidentally releasing their neurotransmitters into the blood circulation.
Answer: b
Textbook Reference: 2.4 Specialized Support Systems Protect and Nourish the Brain
Learning Objective: 2.4.3 Give an overview of the vascular supply of the brain, and note the signs and symptoms of stroke.
Bloom's Level: 2. Understanding

65. The basilar artery of the brain is formed by the fusion of the _____ arteries.
a. carotid

b. vertebral
c. subclavian
d. femoral
Answer: b
Textbook Reference: 2.4 Specialized Support Systems Protect and Nourish the Brain
Learning Objective: 2.4.3 Give an overview of the vascular supply of the brain, and note the signs and symptoms of stroke.
Bloom's Level: 2. Understanding

66. _____ makes use of radio waves and magnetic fields to form images of the living brain.
a. CAT
b. MRI
c. PET
d. Angiography
Answer: radio; magnetic
Textbook Reference: Brain-Imaging Techniques Reveal the Structure and Function of the Living Human Brain
Learning Objective: 2.5.1 Identify and briefly describe the basis of anatomical imaging technologies like X-ray, CT, and MRI.
Bloom's Level: 1. Remembering

67. Refer to the photo.

From R. F. Lee et al., 2012. *Magn Reson Med* 68: 1087–1096

The procedure depicted here is most likely
a. transcranial magnetic stimulation.
b. DTI tractography.
c. dyadic functional MRI.
d. angiography.
Answer: c
Textbook Reference: Brain-Imaging Techniques Reveal the Structure and Function of the Living Human Brain

Learning Objective: 2.5.2 Describe and compare functional-imaging technologies, including PET, fMRI, and MEG, and explain how each is useful for research.
Bloom's Level: 2. Understanding

68. The physiological activity of the brain can be visualized using
a. PET.
b. CT.
c. DTI.
d. electron microscopy.
Answer: a
Textbook Reference: 2.5 Brain-Imaging Techniques Reveal the Structure and Function of the Living Human Brain
Learning Objective: 2.5.2 Describe and compare functional-imaging technologies, including PET, fMRI, and MEG, and explain how each is useful for research.
Bloom's Level: 2. Understanding

69. Which imaging technique is *not* used for studies of the structural details of the brain?
a. CT scan
b. fMRI scan
c. MRI scan
d. Angiography
Answer: b
Textbook Reference: 2.5 Brain-Imaging Techniques Reveal the Structure and Function of the Living Human Brain
Learning Objective: 2.5.2 Describe and compare functional-imaging technologies, including PET, fMRI, and MEG, and explain how each is useful for research.
Bloom's Level: 3. Applying

70. Which imaging technology could provide a physician with a very high-resolution image of the thalamus?
a. MRI
b. CT
c. PET
d. DTI
Answer: a
Textbook Reference: 2.5 Brain-Imaging Techniques Reveal the Structure and Function of the Living Human Brain
Learning Objective: 2.5.2 Describe and compare functional-imaging technologies, including PET, fMRI, and MEG, and explain how each is useful for research.
Bloom's Level: 3. Applying

71. Which technique does *not* provide information about the activity level of brain regions?
a. PET
b. fMRI
c. CT

d. Autoradiography
Answer: c
Textbook Reference: 2.5 Brain-Imaging Techniques Reveal the Structure and Function of the Living Human Brain
Learning Objective: 2.5.2 Describe and compare functional-imaging technologies, including PET, fMRI, and MEG, and explain how each is useful for research.
Bloom's Level: 2. Understanding

72. Which statement about conventional fMRI is true?
a. Subjects must fast before testing.
b. Subjects must lie completely motionless.
c. It involves the use of X-rays.
d. Subjects must perform specific cognitive tasks.
Answer: b
Textbook Reference: 2.5 Brain-Imaging Techniques Reveal the Structure and Function of the Living Human Brain
Learning Objective: 2.5.2 Describe and compare functional-imaging technologies, including PET, fMRI, and MEG, and explain how each is useful for research.
Bloom's Level: 3. Applying

73. A dyadic fMRI could be used to
a. test a person's response to two voices coming through headphones.
b. sequentially examine the brain responses of identical twins.
c. simultaneously examine how two people respond to the same stimulus.
d. stimulate movement of two people simultaneously.
Answer: c
Textbook Reference: 2.5 Brain-Imaging Techniques Reveal the Structure and Function of the Living Human Brain
Learning Objective: 2.5.2 Describe and compare functional-imaging technologies, including PET, fMRI, and MEG, and explain how each is useful for research.
Bloom's Level: 3. Applying

74. What have we learned about the functional organization of the brain from fMRI studies?
a. Local regions of the brain are used for multiple functions across multiple domains, like cognition, language, sensation, emotion, and action planning.
b. Multiple behaviors can be associated with a single specific region in the brain.
c. Multiple cognitive processes can be associated with a single specific region in the brain.
d. During many behaviors and cognitive processes, all the neurons in a local region of the brain will be active at once, as represented by the color scale in an fMRI image.
Answer: a
Textbook Reference: 2.5 Brain-Imaging Techniques Reveal the Structure and Function of the Living Human Brain
Learning Objective: 2.5.3 Discuss important caveats and potential pitfalls in interpreting the results of imaging studies.

Bloom's Level: 2. Understanding

Fill in the Blank

75. Substances are conveyed from the cell body of the neuron to the distant reaches of the axon through the process of _____.
Answer: axonal transport
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.2 Name and describe the general functions of the four main parts of a neuron.
Bloom's Level: 2. Understanding

76. Although nerve cells typically have only one axon, an axon may divide into numerous axon _____.
Answer: collaterals
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.3 Classify neurons according to both structure and function.
Bloom's Level: 1. Remembering

77. The dorsal root consists of _____ projections from the body to the spinal cord.
Answer: sensory
Textbook Reference: 2.2 The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.2.1 Describe the composition of nerves, and distinguish between somatic and autonomic nerves.
Bloom's Level: 2. Understanding

78. Almost all incoming sensory information passes through the _____, which sends the information on to the overlying cortex.
Answer: thalamus
Textbook Reference: 2.2 The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.2.4 Provide an inventory of the main anatomical structures that make up the two cerebral hemispheres.
Bloom's Level: 2. Understanding

79. The hypothalamus is located _____ to the thalamus.
Answer: ventral
Textbook Reference: The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.2.4 Provide an inventory of the main anatomical structures that make up the two cerebral hemispheres.
Bloom's Level: 2. Understanding

80. The _____ sulcus divides the frontal lobe from the parietal lobe.
Answer: central

Textbook Reference: 2.2 The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.2.4 Provide an inventory of the main anatomical structures that make up the two cerebral hemispheres.
Bloom's Level: 2. Understanding

81. The most prominent type of neuron of the cerebral cortex—the pyramidal neuron—features an apical dendrite that extends toward the outer surface of the cortex, and _____ dendrites that spread out horizontally from the cell body.
Answer: basilar
Textbook Reference: 2.3 The Brain Shows Regional Specialization of Functions
Learning Objective: 2.3.1 Describe the cellular structure and organization of the cortex.
Bloom's Level: 2. Understanding

82. Located within the basal ganglia are the globus pallidus, caudate nucleus, and _____.
Answer: putamen
Textbook Reference: 2.3 The Brain Shows Regional Specialization of Functions
Learning Objective: 2.3.2 Identify the major components of the basal ganglia and the limbic system, and state some of the behavioral functions of each.
Bloom's Level: 1. Remembering

83. The fornix and _____ are two components of the limbic system that form arcs under the surface of the cerebral hemispheres.
Answer: hippocampus
Textbook Reference: 2.3 The Brain Shows Regional Specialization of Functions
Learning Objective: 2.3.2 Identify the major components of the basal ganglia and the limbic system, and state some of the behavioral functions of each.
Bloom's Level: 2. Understanding

84. Within the midbrain, the _____ receive auditory (sound) information.
Answer: inferior colliculi
Textbook Reference: 2.3 The Brain Shows Regional Specialization of Functions
Learning Objective: 2.3.3 Name the major divisions of the brainstem and midbrain, and identify key functions performed by each.
Bloom's Level: 1. Remembering

85. In _____ fMRI, the brains of two interacting individuals are simultaneously imaged.
Answer: dyadic
Textbook Reference: 2.5 Brain-Imaging Techniques Reveal the Structure and Function of the Living Human Brain
Learning Objective: 2.5.2 Describe and compare functional-imaging technologies, including PET, fMRI, and MEG, and explain how each is useful for research.
Bloom's Level: 1. Remembering

Essay/Discussion

Prepare a comprehensive discussion for each of the following topics:

86. Summarize the neuron doctrine and the process of discovery that led up to it.
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.1 Give a brief historical account of the study of cellular neuroanatomy.
Bloom's Level: 2. Understanding

87. What is axonal transport, and how is it important to the functioning of neurons? Describe the key components of the neuron that are involved in axonal transport, and the speeds at which they operate.
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.2 Name and describe the general functions of the four main parts of a neuron.
Bloom's Level: 3. Applying

88. Give an account of the ways in which neurons may be categorized. What are the various categories, and what are some examples for each category?
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.2 Name and describe the general functions of the four main parts of a neuron.
Bloom's Level: 3. Applying

89. Describe the typical synapse. What is the sequence of events at the synapse that is triggered by electrical activity in the axon?
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.4 Outline the key components of a synapse and the major steps in neurotransmission.
Bloom's Level: 2. Understanding

90. What are glial cells? Name four types of glial cells, and describe three important functions that glial cells perform.
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.5 Describe the four principal types of glial cells and their functions.
Bloom's Level: 2. Understanding

91. Name the 12 pairs of cranial nerves, and briefly mention the functions performed by each.
Textbook Reference: 2.2 The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.2.2 Give a general description of the naming conventions and functions of the cranial and spinal nerves.
Bloom's Level: 2. Understanding

92. What are the divisions of the peripheral nervous system? Briefly describe the kind of information conveyed by each division and subdivisions of the autonomic nervous system.
Textbook Reference: 2.2 The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.2.3 Name and describe the key structures, innervation patterns, and general functions of the sympathetic, parasympathetic, and enteric divisions of the autonomic nervous system.
Bloom's Level: 2. Understanding

93. How does embryonic development provide a scheme for subdividing the human brain?
Textbook Reference: 2.2 The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.2.6 Summarize the sequence of events in the development of the fetal nervous system.
Bloom's Level: 2. Understanding

94. Summarize the ways in which one brain region may be distinguished from another. In your answer, take several perspectives, including those of gross anatomy, cellular anatomy, and functional anatomy.
Textbook Reference: 2.3 The Brain Shows Regional Specialization of Functions
Learning Objective: 2.3.3 Name the major divisions of the brainstem and midbrain, and identify key functions performed by each.
Bloom's Level: 3. Applying

95. Describe the arterial supply of the human brain, including both the arteries that enter the cranium and the major intracranial arteries that arise from them.
Textbook Reference: 2.4 Specialized Support Systems Protect and Nourish the Brain
Learning Objective: 2.4.3 Give an overview of the vascular supply of the brain, and note the signs and symptoms of stroke.
Bloom's Level: 2. Understanding

96. Describe four methods used to visualize the brain at a cellular level. When relevant, list the molecules involved for a given visualization technique.
Textbook Reference: 2.5 Brain-Imaging Techniques Reveal the Structure and Function of the Living Human Brain
Learning Objective: 22.5.1 Identify and briefly describe the basis of anatomical imaging technologies like X-ray, CT, and MRI.
Bloom's Level: 2. Understanding

97. Compare and contrast at least four different human brain imaging technologies through discussion of their technical bases and the types of information each provides.
Textbook Reference: 2.5 Brain-Imaging Techniques Reveal the Structure and Function of the Living Human Brain

Learning Objective: 2.5.2 Describe and compare functional-imaging technologies, including PET, fMRI, and MEG, and explain how each is useful for research.
Bloom's Level: 3. Applying

98. Describe how fMRI has been modified such that simultaneous brain activation during social interactions can be visualized. How has this technique contributed to our understanding of the cognitive processing that takes place in interactions between individuals?
Textbook Reference: 2.5 Brain-Imaging Techniques Reveal the Structure and Function of the Living Human Brain
Learning Objective: 2.5.3 Discuss important caveats and potential pitfalls in interpreting the results of imaging studies.
Bloom's Level: 3. Applying

Paragraph Development

99. Write a coherent and informative paragraph incorporating each of the following terms or concepts: dendrite; dendritic spines; cell body; axon; axon hillock.
Textbook Reference: Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.2 Name and describe the general functions of the four main parts of a neuron.
Bloom's Level: 3. Applying

100. Write a coherent and informative paragraph incorporating each of the following terms or concepts: axon; Schwann cells; oligodendrocytes; nodes of Ranvier; medical problems.
Textbook Reference: Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.5 Describe the four principal types of glial cells and their functions.
Bloom's Level: 3. Applying

101. Write a coherent and informative paragraph incorporating each of the following terms or concepts: cerebral cortex; lobes; layers; columns; corpus callosum.
Textbook Reference: The Nervous System Consists of Central and Peripheral
Learning Objective: 2.3.1 Describe the cellular structure and organization of the cortex.
Bloom's Levels: 3. Applying

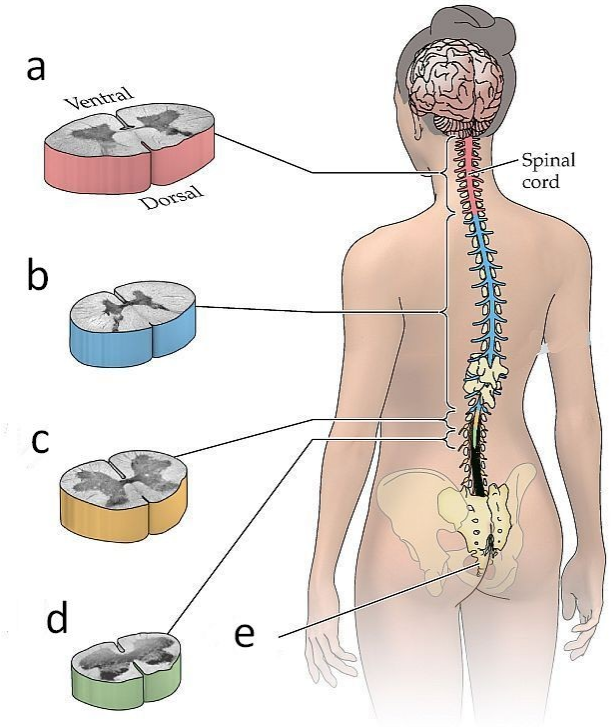
102. Write a coherent and informative paragraph incorporating each of the following terms or concepts: precentral gyrus; basal ganglia; cerebellum; motoneurons; ventral roots.
Textbook Reference: The Nervous System Consists of Central and Peripheral
Learning Objective: 2.3.2 Identify the major components of the basal ganglia and the limbic system, and state some of the behavioral functions of each.
Bloom's Levels: 3. Applying

103. Write a coherent and informative paragraph incorporating each of the following terms or concepts: PET scan; MRI scan; CT scan; MEG scan; fMRI; optical imaging; angiography.
Textbook Reference: Brain-Imaging Techniques Reveal the Structure and Function of the Living Human Brain
Learning Objective: 2.5.1 Identify and briefly describe the basis of anatomical imaging technologies like X-ray, CT, and MRI; 2.5.2 Describe and compare functional-imaging technologies, including PET, fMRI, and MEG, and explain how each is useful for research.
Bloom's Level: 3. Applying

Matching

104. Match each of the following lettered items with an item from the numbered list below.
_____ a. Golgi stain
_____ b. In situ hybridization
_____ c. Nissl stain
_____ d. Immunohistochemistry
_____ e. Cranial nerves
_____ f. Thalamus
_____ g. Medulla
_____ h. Limbic system
_____ i. Hypothalamus
_____ j. Cerebellum
1. Labels intracellular proteins
2. Labels cell bodies
3. Labels entire neuron, including cell processes
4. Labels neurons with active gene of interest
5. Sensory information
6. Cardiac control
7. Motor coordination
8. Hunger control
9. Emotion
10. Sensory/motor systems of head
Answer: a. 3; b. 4; c. 2; d. 1; e. 10; f. 5; g. 6; h. 9; i. 8; j. 7
Textbook Reference: 2.3 The Brain Shows Regional Specialization of Functions
Learning Objective: 2.3.2 Identify the major components of the basal ganglia and the limbic system, and state some of the behavioral functions of each.
Bloom's Level: 3. Applying

105. Refer to the figure.



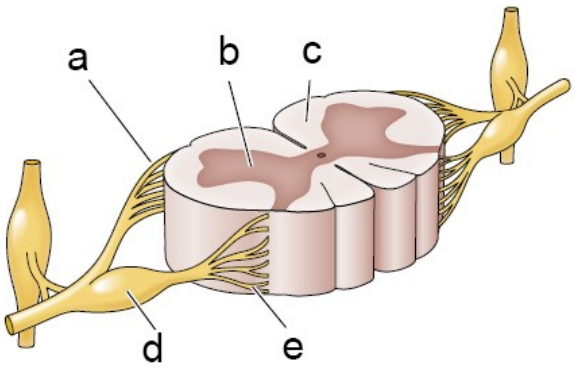
Match each of the letters to proper term for the segment of the spinal cord to which it is pointing.

_____ a.
_____ b.
_____ c.
_____ d.
_____ e.

1. Lumbar
2. Cervical
3. Coccygeal
4. Sacral
5. Thoracic

Answer: a. 2; b. 5; c. 1; d. 4; e. 3
Textbook Reference: The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.2.2 Give a general description of the naming conventions and functions of the cranial and spinal nerves.
Bloom's Level: 1. Remembering

106. Refer to the figure.



Match each letter label (a-e) on the spinal cord section to the anatomical label (1–5).
_____ a.
_____ b.
_____ c.
_____ d.
_____ e.
1. Dorsal roots (sensory)
2. Dorsal root ganglion
3. Ventral roots (motor)
4. Gray matter
5. White matter
Answer: a. 3; b. 4; c. 5; d. 2; e. 1
Textbook Reference: The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.2.5 Explain the difference between gray matter and white matter, with examples.
Bloom's Level: 3. Applying

CHAPTER QUIZ QUESTIONS

Multiple Choice

1. A key finding of the Spanish neuroscientist Santiago Ramón Cajal was that neurons
a. depend on one another for their metabolic needs.
b. are continuous with one another through a system of tubes.
c. are contiguous with one another.
d. along with glial cells form functional units.
Answer: c
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.1 Give a brief historical account of the study of cellular neuroanatomy.
Bloom's Level: 2. Understanding

2. Which neuroanatomical method provides an outline of entire neurons, including all of the cell's processes (axons and dendrites)?

a. Nissl stain
b. Radioactive glucose stain
c. Golgi stain
d. Axonal degeneration procedure
Answer: c
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.1 Give a brief historical account of the study of cellular neuroanatomy.
Bloom's Level: 2. Understanding

3. The most common type of neuron in vertebrates is the _____ neuron.
a. unipolar
b. multipolar
c. bipolar
d. semipolar
Answer: b
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.3 Classify neurons according to both structure and function.
Bloom's Level: 1. Remembering

4. Which of the following is *not* a type of glial cell?
a. Astrocyte
b. Oligodendrocyte
c. Schwann cell
d. Stellate cell
Answer: d
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.5 Describe the four principal types of glial cells and their functions.
Bloom's Level: 2. Understanding

5. Which statement about glia is *false*?
a. They regulate the chemical content of the extracellular space surrounding neurons.
b. Some types of glia are responsible for myelinating axons.
c. There are fewer glia than neurons in the CNS.
d. They are important for providing structural support for neurons.
Answer: c
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.5 Describe the four principal types of glial cells and their functions.
Bloom's Level: 4. Analyzing

6. Which type of cell is responsible for myelination within the central nervous system?
a. Schwann cells
b. Astrocytes
c. Microglial cells

d. Oligodendrocytes
Answer: d
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.5 Describe the four principal types of glial cells and their functions.
Bloom's Level: 1. Remembering

7. The ventral roots of the spinal cord carry
a. motor information to muscles.
b. sensory information from muscles and skin.
c. both motor and sensory information.
d. pain information.
Answer: a
Textbook Reference: 2.2 The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.2.2 Give a general description of the naming conventions and functions of the cranial and spinal nerves.
Bloom's Level: 2. Understanding

8. The two cerebral hemispheres are connected by
a. the meninges.
b. tendons.
c. the corpus callosum.
d. the reticular formation.
Answer: c
Textbook Reference: 2.2 The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.2.4 Provide an inventory of the main anatomical structures that make up the two cerebral hemispheres.
Bloom's Level: 1. Remembering

9. The temporal lobe is separated from the frontal and parietal lobes by the
a. central sulcus.
b. Sylvian fissure.
c. precentral fissure.
d. lateral sulcus.
Answer: b
Textbook Reference: 2.2 The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.2.4 Provide an inventory of the main anatomical structures that make up the two cerebral hemispheres.
Bloom's Level: 1. Remembering

10. The basal ganglia are particularly implicated in
a. emotion.
b. learning and memory.

c. motor control.
d. sympathetic nervous system control.
Answer: c
Textbook Reference: 2.3 The Brain Shows Regional Specialization of Functions
Learning Objective: 2.3.2 Identify the major components of the basal ganglia and the limbic system, and state some of the behavioral functions of each.
Bloom's Level: 2. Understanding

11. Which structure is *not* part of the limbic system?
a. Hippocampus
b. Fornix
c. Putamen
d. Mammillary body
Answer: c
Textbook Reference: 2.3 The Brain Shows Regional Specialization of Functions
Learning Objective: 2.3.2 Identify the major components of the basal ganglia and the limbic system, and state some of the behavioral functions of each.
Bloom's Level: 2. Understanding

12. Which structure(s) is(are) specialized for motor control?
a. Caudate nucleus
b. Hippocampus
c. Septal nuclei
d. All of the above
Answer: a
Textbook Reference: 2.3 The Brain Shows Regional Specialization of Functions
Learning Objective: 2.3.2 Identify the major components of the basal ganglia and the limbic system, and state some of the behavioral functions of each.
Bloom's Level: 2. Understanding

13. The superior colliculus is located within the
a. hindbrain.
b. midbrain.
c. telencephalon.
d. diencephalon.
Answer: b
Textbook Reference: 2.3 The Brain Shows Regional Specialization of Functions
Learning Objective: 2.3.3 Name the major divisions of the brainstem and midbrain, and identify key functions performed by each.
Bloom's Level: 1. Remembering

14. The brain and spinal cord are wrapped in protective membranes known collectively as the
a. dura mater.
b. pia mater.
c. myelin.

d. meninges.
Answer: d
Textbook Reference: 2.4 Specialized Support Systems Protect and Nourish the Brain
Learning Objective: 2.4.1 Name and describe the meninges and components of the ventricular system and explain their clinical significance.
Bloom's Level: 1. Remembering

15. Which technique could be used to influence behavior?
a. CT
b. TMS
c. dfMRI
d. MEG
Answer: b
Textbook Reference: 2.5 Brain-Imaging Techniques Reveal the Structure and Function of the Living Human Brain
Learning Objective: 2.5.2 Describe and compare functional-imaging technologies, including PET, fMRI, and MEG, and explain how each is useful for research.
Bloom's Level: 2. Understanding

Essay

16. Summarize the historical and current understanding of the basic cellular structure of the neuron.
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.1 Give a brief historical account of the study of cellular neuroanatomy.
Bloom's Level: 3. Applying

17. Detail the components of a synapse, and describe the sequence of events at a synapse when information is transmitted.
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.4 Outline the key components of a synapse and the major steps in neurotransmission.
Bloom's Level: 3. Applying

18. Discuss the forms and functions of glial cells.
Textbook Reference: 2.1 Specialized Cells Make Up the Nervous System
Learning Objective: 2.1.5 Describe the four principal types of glial cells and their functions.
Bloom's Level: 2. Understanding

19. Identify the components and general layout of the peripheral nervous system. Include the three divisions and subdivisions of the autonomic nervous system.
Textbook Reference: 2.2 The Nervous System Consists of Central and Peripheral Divisions

Learning Objective: 2.2.1 Describe the composition of nerves, and distinguish between somatic and autonomic nerves; 2.2.3 Name and describe the key structures, innervation patterns, and general functions of the sympathetic, parasympathetic, and enteric divisions of the autonomic nervous system.
Bloom's Level: 2. Understanding

20. Describe anatomical conventions regarding directions and planes.
Textbook Reference: 2.2 The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.2.4 Provide an inventory of the main anatomical structures that make up the two cerebral hemispheres.
Bloom's Level: 3. Applying

21. Identify the components and general layout of the central nervous system.
Textbook Reference: 2.2 The Nervous System Consists of Central and Peripheral Divisions
Learning Objective: 2.2.6 Summarize the sequence of events in the development of the fetal nervous system.
Bloom's Level: 2. Understanding

22. Discuss the cellular structure of the cerebral cortex and the functional correlates of this structure.
Textbook Reference: 2.3 The Brain Shows Regional Specialization of Functions
Learning Objective: 2.3.1 Describe the cellular structure and organization of the cortex.
Bloom's Level: 3. Applying

23. Describe the components and general function of the basal ganglia, limbic system, and reticular formation.
Textbook Reference: 2.3 The Brain Shows Regional Specialization of Functions
Learning Objective: 2.3.2 Identify the major components of the basal ganglia and the limbic system, and state some of the behavioral functions of each.
Bloom's Level: 3. Applying

24. Describe the anatomy of the membranes, fluids, and blood supply that provide support and protection for the brain.
Textbook Reference: 2.4 Specialized Support Systems Protect and Nourish the Brain
Learning Objective: 2.4.1 Name and describe the meninges and components of the ventricular system and explain their clinical significance; 2.4.3 Give an overview of the vascular supply of the brain, and note the signs and symptoms of stroke.
Bloom's Level: 3. Applying

25. Review some of the techniques that allow us to study the structure and function of the living brain, including techniques that can be used to study social neuroscience.
Textbook Reference: 2.5 Brain-Imaging Techniques Reveal the Structure and Function of the Living Human Brain

Learning Objective: 2.5.1 Identify and briefly describe the basis of anatomical imaging technologies like X-ray, CT, and MRI; 2.5.2 Describe and compare functional-imaging technologies, including PET, fMRI, and MEG, and explain how each is useful for research.
Bloom's Level: 3. Applying