

Student: _____

1. The fundamental units of the nervous system are nerve cells, called
 - A. axons.
 - B. glial cells.
 - C. neurons.
 - D. neurotransmitters.
2. Which of the following expressions best approximates the number of nerve cells in the nervous system?
 - A. 10 large
 - B. one trillion
 - C. 100 billion
 - D. 100 trillion
3. Which of the following is NOT one of the functions of glial cells?
 - A. They nourish nerve cells.
 - B. They communicate messages within the nervous system.
 - C. They help repair damage that might occur to neurons.
 - D. All of these are functions of glial cells.
4. Perhaps the main reason that neurons can communicate over relatively great distances within the body is the fact that neurons contain
 - A. a long axon.
 - B. a large cell body.
 - C. many dendrites.
 - D. a variety of neurotransmitters.
5. The part of the neuron that usually receives messages from other neurons is called the
 - A. dendrite.
 - B. axon.
 - C. cell body.
 - D. synapse.
6. The branch-like fibers extending in clusters from the neuron's cell body are called
 - A. axons.
 - B. terminal buttons.
 - C. glial fibers.
 - D. dendrites.
7. Compare your forearm, hand, and fingers to a neuron. In such an analogy, the dendrites would be your
 - A. forearm.
 - B. fingers.
 - C. hand.
 - D. knuckles.
8. An axon is a(n)
 - A. neuron's cell body.
 - B. branchlike fiber extending in clusters from a neuron's cell body.
 - C. support cell in the nervous system.
 - D. long, slender structure extending from a neuron's cell body.

9. Compare your forearm, hand, and fingers to a neuron. In such an analogy, the axon would be your
- forearm.
 - fingers.
 - hand.
 - knuckles.
10. Dendrite is to axon as _____ is to _____.
- receiving; sending
 - sending; receiving
 - reuptake; action potential
 - action potential; reuptake
11. Terminal buttons are found at the ends of
- cell bodies.
 - dendrites.
 - axons.
 - glial cells.
12. Which of the following sequences accurately reflects the route followed by nerve impulses when one neuron communicates with another?
- dendrite → axon → cell body
 - dendrite → cell body → axon
 - axon → cell body → dendrite
 - axon → dendrite → cell body
13. Electrical wires are generally protected by a tube of plastic. A similar insulating function is performed in the nervous system by
- myelin sheaths.
 - glial cells.
 - terminal buttons.
 - None of these
14. A myelin sheath is a
- protein membrane that increases the electrical receptivity of dendrites.
 - fatty substance that collects inside axons, slowing the rate of an action potential.
 - fatty insulation wrapped around some axons.
 - protein that converts food into energy within the cell body.
15. Bob has a degenerative disorder that causes myelin to disintegrate. What effect is this going to have on Bob's nerve impulses?
- They will slow down.
 - They will be stopped in the cell body.
 - They will speed up.
 - There will be no effect.
16. Similar to firing a bullet from a gun, a neuron either fires completely or not at all. This is known as the _____ law.
- big-bang
 - fires-or-not
 - all-or-none
 - on-or-off
17. An action potential is
- the likelihood that a neuron will take action when stimulated.
 - an energy impulse released by the dendrites.
 - the firing of a nerve, either toward or away from the cell body.
 - a neural impulse that carries information along the axon of a neuron.

18. Regarding action potentials, which of the following statements is FALSE?
- A. Action potentials move at the same strength or speed through a particular axon.
 - B. Along a given axon, some action potentials are stronger than others.
 - C. Some neurons can fire action potentials at faster rate than other neurons can.
 - D. A strong stimulus leads to a higher rate of firing than a less intense stimulus.
19. As an action potential occurs, the neuron's electrical charge
- A. changes from negative to more negative.
 - B. changes from positive to more positive.
 - C. changes from negative to positive.
 - D. changes from positive to negative.
20. Once an action potential has been fired, the neuron cannot fire again until
- A. the resting state has been restored.
 - B. the rising phase of the action potential has reached its peak.
 - C. the reuptake of neurotransmitters has been completed.
 - D. the direction of the nerve impulse within the axon has reversed.
21. Neural impulses generally travel
- A. electrically between and within each neuron.
 - B. chemically between and within each neuron.
 - C. electrically between neurons and chemically within each neuron.
 - D. chemically between neurons and electrically within each neuron.
22. A synapse is a(n)
- A. chemical.
 - B. signal.
 - C. joint.
 - D. gap.
23. Chemical messengers that are released by axons and stimulates the dendrites of other neurons are called
- A. chemical transmitters.
 - B. synaptic transmitters.
 - C. neurotransmitters.
 - D. neuromessengers.
24. Neurotransmitters are
- A. chemicals that cross the synapse and stimulate other neurons.
 - B. excitatory messages that make it more likely that a neuron will fire.
 - C. inhibitory messages that make it less likely that a neuron will fire.
 - D. All of these
25. Your body has designed a "traffic signal" for neurotransmitters. In this system, a "red light" would represent
- A. an excitatory neurotransmitter.
 - B. an inhibitory neurotransmitter.
 - C. a combination of excitatory and inhibitory neurotransmitters.
 - D. none of these options; once an action potential starts, it never stops.
26. Regarding neurotransmission, which of the following statements is TRUE?
- A. Neurotransmitters always increase the likelihood that a receiving neuron will fire.
 - B. Neurotransmitters may decrease the likelihood that a receiving neuron will fire.
 - C. A given neuron's dendrites receive either only excitatory or only inhibitory messages.
 - D. Both B and C are true.

27. Cocaine causes the neurotransmitter dopamine to remain at the site of the synapse longer than it normally would; cocaine thus inhibits the process termed
- recycling.
 - reabsorption.
 - reuptake.
 - reuse.
28. The neurotransmitter dopamine is involved in
- attention and learning.
 - Parkinson's disease.
 - schizophrenia.
 - All of these
29. Which neurotransmitter is INCORRECTLY described?
- acetylcholine—transmits messages related to skeletal muscles
 - endorphins—diminished production may be related to Alzheimer's disease
 - serotonin—helps regulate sleep and mood
 - Both A and C are incorrectly matched.
30. This neurotransmitter affects sleep, appetite, and aggression, among other things.
- acetylcholine
 - dopamine
 - endorphins
 - serotonin
31. Too little of this neurotransmitter may be related to Parkinson's disease, while too much of this neurotransmitter may be related to schizophrenia.
- acetylcholine
 - dopamine
 - endorphins
 - serotonin
32. If you run a marathon, your body will release this type of neurotransmitter to elevate your mood and reduce your pain.
- acetylcholine
 - dopamine
 - endorphins
 - serotonin
33. The process of reuptake involves
- the release of different neurotransmitter types by message sending neurons.
 - chemical breakdown of neurotransmitters by the receiving cell.
 - the production of fresh neurotransmitters.
 - soaking up of excess neurotransmitters by the terminal button.
34. Which expression most closely approximates the number of neural connections in the brain?
- 10 quadrillion
 - 1,000,000
 - one billion
 - lots and lots
35. In what way does the endocrine system differ from the nervous system?
- The endocrine system sends chemical messages; the nervous system does not.
 - The endocrine system sends electrical messages; the nervous system does not.
 - The endocrine system involves the circulatory system; the nervous system does not.
 - Both A and C

36. At the broadest level, the nervous system is divided into the _____ and the _____ nervous systems.
- A. primary; secondary
 - B. somatic; autonomic
 - C. sympathetic; parasympathetic.
 - D. central; peripheral
37. The brain and the spinal cord constitute the _____ nervous system.
- A. central
 - B. peripheral
 - C. primary
 - D. autonomic
38. Regarding the spinal cord's control of behavior, which of the following is TRUE?
- A. The spinal cord cannot control any behaviors without the help of the brain.
 - B. The spinal cord is not involved in reflexes.
 - C. The spinal cord can control some simple reflexes without the brain's help.
 - D. The spinal cord can sometimes control relatively complex behavior without the brain's help.
39. Sensory is to motor as _____ is to _____.
- A. efferent; afferent
 - B. afferent; efferent
 - C. afferent; interneuron
 - D. interneuron; efferent
40. Imagine a large city in which a downtown business district is linked to outlying suburbs by a system of subway trains. The spinal cord's sensory neurons may be likened to the trains that go to the _____; the spinal cord's motor neurons are analogous to the trains that go to the _____.
- A. downtown business district; downtown business district as well
 - B. outlying suburbs; downtown business district
 - C. outlying suburbs; outlying suburbs as well
 - D. downtown business district; outlying suburbs
41. The peripheral nervous system
- A. is composed of the brain and spinal cord.
 - B. is less important than the central nervous system.
 - C. is contained within the skull and spinal column.
 - D. includes all the parts of the nervous system other than the brain and spinal cord.
42. The two major divisions of the peripheral nervous system are the _____ and _____ divisions.
- A. somatic; autonomic
 - B. sympathetic; parasympathetic
 - C. afferent; efferent
 - D. sensory; motor
43. The _____ division specializes in the control of voluntary movements.
- A. autonomic
 - B. somatic
 - C. sympathetic
 - D. parasympathetic
44. The _____ division specializes in the control of the heart, lungs and other organs that function involuntarily.
- A. autonomic
 - B. somatic
 - C. sympathetic
 - D. parasympathetic

45. Somatic is to autonomic as _____ is to _____.
A. involuntary; voluntary
B. voluntary; involuntary
C. excitation; rest
D. rest; excitation
46. Excitation is to rest as _____ is to _____.
A. autonomic; somatic
B. somatic; autonomic
C. sympathetic; parasympathetic
D. parasympathetic; sympathetic
47. The _____ division acts to prepare the body for action in stressful situations.
A. autonomic
B. somatic
C. sympathetic
D. parasympathetic
48. The _____ division acts to calm the body after an emergency.
A. autonomic
B. somatic
C. sympathetic
D. parasympathetic
49. Which of the following situations is most likely to involve the action of the parasympathetic nervous system?
A. Brooke's finger accidentally grazes the hot iron; she immediately jerks her hand away.
B. After a satisfying evening meal, Callum relaxes in front of the television.
C. Walking toward her car one night in a deserted parking garage, Danica is surprised by a strange man appearing from nowhere.
D. None of these
50. Izzy was startled by the sound of a loud explosion. Her heart is pounding and her breathing is shallow and rapid. Her _____ nervous system is active.
A. parasympathetic
B. sympathetic
C. autosympathetic
D. autonomic
51. Which nervous system arouses the body and prepares it for fight or flight during times of stress?
A. somatic
B. central
C. sympathetic
D. parasympathetic
52. For which of the following domains of thought and behavior have behavioral geneticists identified a genetic component?
A. cognitive abilities
B. personality traits
C. sexual orientation
D. All of these

53. Which of the following sequences accurately reflects the relative sizes of the components of the human genome, ordered from smallest to largest?
- A. DNA → gene → chromosome
 - B. DNA → chromosome → gene
 - C. gene → chromosome → DNA
 - D. gene → DNA → chromosome
54. With respect to the basis of thought and behavior, your text suggests that
- A. much of our behavior has a genetic component.
 - B. certain behaviors may be linked to specific genes.
 - C. Both A and B
 - D. Neither A nor B
55. Which of the following sequences accurately reflects the degree of specialization of fields within biological psychology, ordered from the broadest to the most specific?
- A. evolutionary psychology → genetic counseling → behavioral genetics
 - B. evolutionary psychology → behavioral genetics → genetic counseling
 - C. genetic counseling → behavioral genetics → evolutionary psychology
 - D. genetic counseling → evolutionary psychology → behavioral genetics
56. Dr. Schilling is investigating the potential genetic basis of antisocial personality disorder by examining the relative prevalence of the disorder among either identical or fraternal twins raised either together or in different families. Dr. Schilling is best described as a
- A. behavioral geneticist.
 - B. molecular geneticist.
 - C. genetic counselor.
 - D. genetic therapist.
57. Dr. Gamble injects genes into a patient's bloodstream to cure a particular disease. Dr. Gamble is using
- A. genetic counseling.
 - B. molecular genetics.
 - C. gene therapy.
 - D. medical genetics.
58. Dr. Ewing is advising a young woman about the risks involved in a potential pregnancy based on the woman's age and the hereditary illnesses present in her family and that of her husband. Dr. Ewing is a
- A. genetic counselor.
 - B. genetic therapist.
 - C. behavior therapist.
 - D. behavioral counselor.
59. Which of the following statements best expresses the relationship between the central nervous system and the endocrine system?
- A. They operate entirely independently.
 - B. The endocrine system is part of the central nervous system.
 - C. The endocrine system is linked to the central nervous system.
 - D. The central nervous system is one portion of the endocrine system.
60. The endocrine system is linked to the _____ in the brain via the _____ gland.
- A. hippocampus; adrenal
 - B. hippocampus; pituitary
 - C. hypothalamus; adrenal
 - D. hypothalamus; pituitary

61. How are hormones similar to neurotransmitters?
- A. both are chemical messengers.
 - B. both are carried in the bloodstream.
 - C. their speed and mode of transmission are similar.
 - D. All of these
62. How are hormones different from neurotransmitters?
- A. Hormones are chemical messengers.
 - B. Hormones are carried in the bloodstream.
 - C. Hormones travel in a straight line.
 - D. All of these
63. Which of the following is NOT a brain scanning technique?
- A. electroencephalogram (EEG)
 - B. electromyogram (EMG)
 - C. positron emission tomography (PET)
 - D. All of these are brain scanning techniques.
64. Which brain imaging technique below is CORRECTLY matched with its description?
- A. EEG—records the brain's electrical activity with scalp electrodes
 - B. PET—produces a momentary interruption of the brain's electrical activity
 - C. fMRI—traces biochemical activity in the brain
 - D. None of these are correctly matched.
65. Which brain imaging technique below is INCORRECTLY matched with its diagnostic use?
- A. EEG—facilitates the diagnosis of epilepsy and learning disorders
 - B. PET—may help identify brain tumors
 - C. fMRI—improves diagnosis of strokes, multiple sclerosis, and Alzheimer's disease
 - D. None of these are incorrectly matched.
66. For what purpose are PET scans and MRI used?
- A. observing the process of polarization
 - B. measuring the responsiveness of the autonomic nervous system
 - C. observing images of the brain
 - D. measuring the sensitivity of the skin's pain receptors
67. Zeke is having his brain scanned using one of the oldest imaging techniques. Zeke is being scanned using a(n)
- A. positron emission tomography.
 - B. electroencephalogram.
 - C. functional magnetic resonance imaging.
 - D. polygraph.
68. Which of the following structures is NOT part of the brain's central core?
- A. hippocampus
 - B. cerebellum
 - C. pons
 - D. reticular formation
69. The hindbrain includes each of the following structures EXCEPT the
- A. medulla.
 - B. thalamus.
 - C. pons.
 - D. cerebellum.

70. The pons serves to
- A. regulate arousal.
 - B. relay sensory information to the brain's association areas.
 - C. integrate movement between the left and right halves of the body.
 - D. consolidate memories.
71. Ultimately extending from the medulla into the forebrain, the _____ functions to increase or decrease the brain's arousal in response to external stimulation.
- A. reticular formation
 - B. thalamus
 - C. cerebellum
 - D. limbic system
72. Yves has been drinking. He has difficulty walking a straight line when asked to do so by a police officer. Apparently, Yves's _____ is functioning poorly.
- A. thalamus
 - B. cerebellum
 - C. corpus callosum
 - D. reticular formation
73. The thalamus may be likened to a(n)
- A. amplifier.
 - B. receiver.
 - C. filter.
 - D. relay station.
74. The hypothalamus is located immediately _____ the thalamus.
- A. above
 - B. next to
 - C. below
 - D. behind.
75. The hypothalamus
- A. maintains a steady internal environment for the body.
 - B. regulates survival-directed behavior.
 - C. Both A and B
 - D. Neither A nor B
76. The limbic system contains each of the following structures EXCEPT the
- A. amygdala.
 - B. medulla.
 - C. hippocampus.
 - D. Actually, the limbic system contains all these structures.
77. Which limbic system structure is INCORRECTLY matched with the potential effects of damage to the structure?
- A. amygdala—unusual emotional or aggressive behavior
 - B. hippocampus—difficulties in learning and memory
 - C. Neither A nor B is incorrectly matched.
 - D. Both A and B are incorrectly matched.
78. The amygdala is to emotion as the hippocampus is to
- A. memory.
 - B. movement.
 - C. decision making.
 - D. vision.

79. The "new brain" is the
- A. hindbrain.
 - B. limbic system.
 - C. cerebral cortex.
 - D. Both B and C
80. Which of the following sequences correctly identifies and orders the lobes of the cortex, from anterior to posterior?
- A. frontal → temporal and parietal → posterior
 - B. occipital → temporal and parietal → frontal
 - C. frontal → occipital → temporal and parietal
 - D. frontal → temporal and parietal → occipital
81. Which area is largely responsible for voluntary body movements?
- A. motor area
 - B. sensory area
 - C. association area
 - D. Broca's area
82. In a neurophysiological investigation, a monkey makes an involuntary gesture when a portion of its brain is electrically stimulated. The area of the brain that was most likely stimulated is the
- A. sensory area of the cortex.
 - B. motor area of the cortex.
 - C. association area of the cortex.
 - D. occipital lobe.
83. Which of the following statements best describes the relationship between the amount of motor cortex devoted to the control of a particular movement and the degree of precision required by the movement?
- A. There is no relationship.
 - B. There is only a weak relationship.
 - C. There is a positive correlation.
 - D. There is a negative correlation.
84. Visual cortex is to auditory cortex as the _____ lobe is to the _____ lobe.
- A. temporal; parietal
 - B. parietal; occipital
 - C. occipital; parietal
 - D. occipital; temporal
85. In a rollerblading mishap, Wendy fell down and injured the very back of her head. Which of her senses is most likely impaired?
- A. hearing
 - B. vision
 - C. taste
 - D. touch
86. Which of the following is not an executive function?
- A. recalling information
 - B. setting goals
 - C. controlling impulses
 - D. All of these are executive functions.

87. Much of our understanding of the association areas comes from
- MRI scans.
 - autopsies.
 - evolutionary psychology.
 - individuals who have suffered some type of injury.
88. Violet suffered an accident where she received a blow to the head. Since the accident, Violet has problems with her speech and memory. Which area is most likely to be damaged?
- the motor area
 - the sensory area
 - the association area
 - None of these
89. The process by which the brain reorganizes itself throughout development is termed
- neurogenesis.
 - neuroplasticity.
 - neuroadaptation.
 - neuromutability.
90. Your text suggests that new brain cells may be created even during adulthood. Which of the following statements is the most likely response by the average person to this idea?
- It doesn't surprise me.
 - It surprises me—I didn't think new neurons and synapses could form during adulthood.
 - It depresses me—I thought I could slowly kill my brain through repeated tequila shots.
 - It frightens me.
91. Based on your text's discussion of the effects of specific experience on information processing, which of the following conclusions is probably MOST valid?
- Specific experience has no effect on the way the brain processes information.
 - Specific experience has only a minimal effect on the way the brain processes information.
 - Specific experience has very definite, specific effects on the way the brain processes information.
 - Specific experience has broad, general effects on the way the brain processes information.
92. Which of the following statements is most accurate with respect to the lateralization of language among right-handers?
- It is most likely left-lateralized.
 - It is most likely right-lateralized.
 - The control of language is shared equally between the hemispheres.
 - No generalization can be made: The lateralization of language varies dramatically from one person to another.
93. Trevor is scratching his head, trying desperately to solve a verbal analogy as part of a standardized entrance examination. Meanwhile, Sienna is giving an oral presentation in a political science class. Of the brain's hemispheres, Trevor's _____ hemisphere is most active; Sienna's _____ hemisphere is most active.
- right; right
 - left; left
 - right; left
 - left; right
94. Kate has suffered right hemisphere damage. Which of the following processes is LEAST likely to be affected?
- achieving *fung shui* in her living room by rearranging the couch and the TV
 - balancing her checkbook
 - reading that look on her boyfriend's face
 - thinking that a new song on the radio is really catchy

95. The left and right hemispheres of the brain are connected by a bundle of fibers called the
A. corpus callosum.
B. corpus cerebellum.
C. central sulcus.
D. the information superhighway.
96. Which of the following generalizations is probably most accurate regarding potential gender differences in the lateralization of language?
A. No gender differences in the lateralization of language have been found.
B. Language is more strongly left-lateralized among females than among males.
C. Language is more strongly left-lateralized among males than among females.
D. No generalization may be made because the lateralization of language is too variable from one person to another.
97. Potential gender differences in the lateralization of language: nature or nurture?
A. Nature. It boils down to brain anatomy. The corpus callosum is proportionately larger in females than in males.
B. Nurture. Parents give baby girls more encouragement to talk than they do baby boys, fostering brain development in certain areas.
C. Neither A nor B is right.
D. Either A or B; actually, probably both A and B.
98. Imagine a study of potential cultural differences in the lateralization of language. Three participant groups are tested: native monolingual English speakers, native monolingual Japanese speakers, and native English speakers who acquired Japanese as a second language. Which of the following might be the study's dependent variable?
A. the participant group
B. some measure of brain activity in the left hemisphere
C. some measure of the difference in brain activity between the two hemispheres
D. Either B or C would be an appropriate dependent variable.
99. Roger Sperry's Nobel Prize-winning split-brain investigations
A. offered a way for psychologists to study the operation of each hemisphere.
B. developed a number of ingenious techniques for studying how each hemisphere operates.
C. offered mainly correlational data.
D. Both A and B
100. Mrs. Simon has learned to lessen the pain associated with her migraine headaches by voluntarily relaxing specific muscles and reducing her blood pressure. This example illustrates
A. deep-brain stimulation.
B. biofeedback.
C. split-brain control.
D. None of these
101. Biofeedback procedures have proven successful in treating
A. physical problems.
B. difficulties that are mainly emotional or mood-related.
C. physical ailments with a psychological element.
D. All of these
102. Psychologists that study how the biological structures and functions of the body affect behavior are called _____.
103. The process by which neurons become encased in a myelin sheath is _____.
104. The _____ is an insulating coat of fat and protein wrapped around an axon.

105. A toilet either flushes or it doesn't; a gun either fires or it doesn't. By a similar _____ law, a neuron either transmits an action potential or it does not.

106. Before a neuron fires, it has a negative electrical charge and is said to be in a _____.

107. The _____ moves from one end of the axon to the other like a flame traveling along a fuse.

108. The neurotransmitter _____ is involved in our every move because it transmits messages to our skeletal muscles.

109. The neurotransmitter _____ is involved in attention and learning.

110. After a long run, Aaron sometimes experiences a feeling of euphoria, or a "runner's" high." This feeling reflects the activity of neurotransmitters called _____.

111. _____ messages make it more likely that a receiving neuron will fire.

112. _____ messages prevent or decreases the likelihood that the receiving neuron will fire.

113. _____ neurons in the spinal cord carry sensory messages from receptors to the brain.

114. The somatic nervous system regulates voluntary behavior; in contrast, the _____ nervous system underlies involuntary behavior.

115. Arif's heart rate and respiration are slowing, and his digestion is facilitated. His _____ nervous system has become active.

116. The branch of psychology that seeks to identify how behavior is influenced and produced by our genetic inheritance from our ancestors is called _____.

117. The chemicals that circulate through the blood and regulate the functioning and growth of the body are called _____.

118. The tiny _____ gland is known as the endocrine system's "master gland."

119. The human brain weighs about _____ pounds.

120. A technique called the _____ records the brain's electrical activity through scalp electrodes.

121. Wilma has been experiencing memory difficulties, and her doctor is concerned that Wilma may have a brain tumor. He recommends a(n) _____ to confirm his diagnosis.

122. The _____ is sometimes known as the "old brain."

- 123.Information travels from our sensory receptors to the _____ in the brain, which relays it to higher association areas.

- 124.Extending from the medulla, through the midbrain, into the forebrain is the _____, which serves to regulate general bodily arousal.

- 125.The amygdala and hippocampus are found within the brain's _____ system.

- 126.Epileptics have sometimes had portions of their limbic system removed. Subsequent memory problems may reflect damage to the _____.

- 127.Anterior to the parietal lobe is the frontal lobe; inferior to it is the _____ lobe.

- 128.New neurons are created even during adulthood in a process called _____.

- 129.Vance has learned to voluntarily control the activation of his autonomic nervous system as part of the treatment for an anxiety disorder. This is an example of _____.

- 130.Draw a typical neuron, labeling its major parts accurately. In several sentences, briefly identify the functions of the parts labeled on your diagram.
- 131.Outline in as much detail as you can the sequence of events that occurs at the synapse when a neural message is communicated.
- 132.Identify three neurotransmitters and describe, using specific examples, how they may play a role in your own behavior.

133. Distinguish between the sympathetic and parasympathetic divisions of the autonomic nervous system. For each division, provide an example of a situation in which the division would become active. Describe the effects on several bodily processes of the activity of each division.
134. Compare and contrast the nature and mode of action of neurotransmitters and hormones.
135. Describe some of the contributions that the field of behavioral genetics has made to the treatment of psychological disorders. Discuss some of the sociopolitical controversies you foresee developing as advances in this field continue.
136. List and describe three brain imaging techniques. Review the potential utility of each for the diagnosis of physical and/or psychological disorders.
137. Identify and describe either three "old brain" or three "new brain" structures or areas. Illustrate the function of each area by speculating as to the potential effects of damage to, or deterioration of, the structures or areas you describe.

138. One might imagine that one brain is essentially the same as the next: If you've seen one brain, you've seen them all. Evaluate this comment in light of recent research investigating the effects of gender and culture on brain structure and function.

139. What exactly is biofeedback? Describe the procedure and identify some of the physical and psychological disorders to which it has been successfully applied.

ch02 Key

1. (p. 32) C
2. (p. 33) B
3. (p. 33) B
4. (p. 33) A
5. (p. 33) A
6. (p. 33) D
7. (p. 33) B
8. (p. 33) D
9. (p. 33) A
10. (p. 33) A
11. (p. 33) C
12. (p. 33) B
13. (p. 34) A
14. (p. 34) C
15. (p. 34) A
16. (p. 34) C
17. (p. 34) D
18. (p. 34) B
19. (p. 34) C
20. (p. 34) A
21. (p. 34) D
22. (p. 35) D
23. (p. 35) C
24. (p. 35) D
25. (p. 36) B
26. (p. 36) B
27. (p. 37) C
28. (p. 37) D
29. (p. 36) B
30. (p. 36) D
31. (p. 38) B
32. (p. 38) C
33. (p. 37) D
34. (p. 38) A
35. (p. 39) C
36. (p. 39) D

37. (p. 39) A
38. (p. 39) C
39. (p. 40) B
40. (p. 40) D
41. (p. 40) D
42. (p. 40) A
43. (p. 40) B
44. (p. 40) A
45. (p. 40) B
46. (p. 40) C
47. (p. 40) C
48. (p. 40) D
49. (p. 40) B
50. (p. 40) B
51. (p. 40) C
52. (p. 42) D
53. (p. 42) A
54. (p. 42) C
55. (p. 42) B
56. (p. 42) A
57. (p. 42) C
58. (p. 42) A
59. (p. 43) C
60. (p. 43) D
61. (p. 43) A
62. (p. 43) B
63. (p. 44-45) B
64. (p. 44-45) A
65. (p. 44-45) D
66. (p. 45) C
67. (p. 45) B
68. (p. 45) A
69. (p. 46) B
70. (p. 46) C
71. (p. 46) A
72. (p. 46) B
73. (p. 46) D
74. (p. 46) C

75. (p. 47) C
76. (p. 47) B
77. (p. 47) C
78. (p. 47) A
79. (p. 47) C
80. (p. 47-48) D
81. (p. 48) A
82. (p. 48) B
83. (p. 48) C
84. (p. 48-49) D
85. (p. 49) B
86. (p. 49) A
87. (p. 49-50) D
88. (p. 49) C
89. (p. 50) B
90. (p. 50) B
91. (p. 50-51) C
92. (p. 51) A
93. (p. 50-51) B
94. (p. 51) B
95. (p. 52) A
96. (p. 52) C
97. (p. 52) D
98. (p. 52) D
99. (p. 52) D
100. (p. 54) B
101. (p. 54) D
102. (p. 32) behavioral neuroscientists or biopsychologists
103. (p. 34) myelination
104. (p. 34) myelin sheath
105. (p. 34) all-or-none
106. (p. 34) resting state
107. (p. 34) action potential
108. (p. 37) acetylcholine (ACh)
109. (p. 38) dopamine (DA)
110. (p. 38) endorphins
111. (p. 40) excitatory
112. (p. 40) inhibitory

- 113. (p. 40) Afferent
- 114. (p. 40) autonomic
- 115. (p. 40) parasympathetic
- 116. (p. 41) evolutionary psychology
- 117. (p. 43) hormones
- 118. (p. 43) pituitary
- 119. (p. 43) three
- 120. (p. 44) EEG (electroencephalogram)
- 121. (p. 44-45) PET (positron emission tomography)
- 122. (p. 45) central core
- 123. (p. 46) thalamus
- 124. (p. 46) reticular formation
- 125. (p. 47) limbic
- 126. (p. 47) hippocampus
- 127. (p. 48) temporal
- 128. (p. 50) neurogenesis
- 129. (p. 54) biofeedback

The function of the following structures should be described. Dendrites receive information from other neurons. The axon sends message to another neuron. Myelin insulates one axon from another and speeds neural transmission.

130. (p. 32-33) The drawing should contain: (a) dendrites, which should appear as clusters of branchlike extensions from the cell body; (b) the cell body, which should appear as a roundish structure in the center of the diagram; (c) the axon, which should appear as a long tube extending from the cell body; and (d) myelin, which should appear bracketing portions of the axon. The diagram might also include a terminal button, which should appear as a bulb-like ending to the axon.

131. (p. 34-35) The answer should include the following steps in the sequence: (1) an action potential reaches the end of the axon, or the terminal button; (2) the potential stimulates the release of neurotransmitter molecules from vesicles within the terminal button; (3) the neurotransmitter molecules float passively across the gap between the terminal button of the sending neuron and the dendrites of the receiving neuron; (4) the molecules fit into specialized receptor sites on the dendrites of the receiving neuron, making (5) the receiving neuron either more or less likely to produce its own action potential, depending on the neurotransmitter.

Endorphins—the brain's natural painkiller; may produce euphoric feelings

Serotonin—regulates sleep, mood, eating, depression

Dopamine—involved in movement, attention, learning, and reinforcement

GABA—eating and aggression; affected by alcohol

Glutamate—memory

Acetylcholine—movement of skeletal muscles; memory

132. (p. 36-38) The answer should include three of the following neurotransmitters. At least one of the functions or domains listed for each of the three neurotransmitters should be mentioned, ideally in a personalized example.

Signs of parasympathetic nervous system activity include decreased heart rate, facilitated digestion, constricted pupils, slowed respiration
Signs of sympathetic nervous system activity include increased heart rate, inhibited digestion, dilated pupils, shallow breathing
The parasympathetic nervous system would become active in calm, restful situations such as relaxing after dinner or resting in bed before falling asleep.
The sympathetic nervous system would become active in such "fight or flight" situations as spotting a threatening stranger in a desolate parking garage, being involved in a near-accident on the road, and so on.
The Parasympathetic nervous system- acts to calm the body once a stressful situation or emergency has ended. Allows the body to store energy.
The sympathetic nervous system-acts to prepare the body for action in stressful situations by mobilizing the organism's resources to "fight" or "flee."
133. (p. 40-41) The answer should contain the following information:

134. (p. 43) The answer should indicate that neurotransmitters are like hormones in that they are both chemical messengers. However, neurotransmitters are transmitted very quickly—in milliseconds—while hormones work more slowly, taking minutes to circulate. Moreover, neurotransmitters move through specific neural circuits, whereas hormones travel throughout the body. A neurotransmitter circuit is like a telephone wire, while hormones are transmitted more like radio waves that are received by the cells that are correctly tuned.

Sociopolitical controversies surround the identification early in an individual's development of genes related to such characteristics as criminality, homosexuality, and so on. One must consider how such information would be used. Would it be used to abort fetuses whose genes indicate the potential presence of traits that might be considered undesirable? Who determines which traits might be considered undesirable? Would individual's civil rights be restricted on the basis of genetic screening?

Behavioral geneticists have related genetic factors to such diverse behaviors as family conflict, schizophrenia, sociability, novelty-seeking, and learning disorders.

135. (p. 42) The answer should define behavioral genetics as the study of the effects of heredity on behavior.

Transcranial magnetic stimulation (TMS) imaging—may assist in the treatment of certain psychological disorders, such as depression and schizophrenia

Functional magnetic resonance imaging (fMRI)—has improved the diagnosis of many ailments, including strokes, multiple sclerosis, and Alzheimer's disease

Positron emission tomography (PET)—may help identify the presence of brain tumors

Electroencephalogram (EEG)—facilitates the diagnosis of epilepsy and learning disabilities

136. (p. 43-45) Three of the following techniques should be identified and a description of the diagnostic utility of each technique should also be provided.

Visual area, in the occipital lobe—responsible for visual perception

Auditory area, in the temporal lobe—responsible for the sense of hearing. Specific areas in the auditory cortex respond to specific pitches.

Somatosensory area, in the parietal lobe—associated with the ability to perceive touch and pressure in different parts of the body. The more sensitive a body area is to touch, the more the somatosensory cortex is devoted to it.

Motor area, in the frontal lobe—responsible for voluntary movement; more precise movements are controlled by larger portions of cortex than are gross movements.

The "new brain" is the cerebral cortex. Damage or deterioration to it should lead to impairment of the corresponding sensory or motor functions listed for the given area. Three of the following regions should be identified:

Hypothalamus—maintains homeostasis, or a steady internal state for the body; produces and regulates survival-related behavior, such as eating, self-protection, and sex.

Thalamus—acts as a relay station for information from the senses

Reticular formation—regulates alertness; when awake, it produces arousal to outside stimulation; when asleep, it filters out distracting background stimuli

Cerebellum—controls body balance and coordinates movement

Pons—regulates sleep and coordinates movement between the right and left sides of the body

Medulla—regulates breathing and heart rate

137. (p. 45-49) The "old brain" is the brain's central core. Damage or deterioration should lead to impairment of the functions for each given area listed below. Three of the following structures should be identified:

Vowel sounds are processed in the right hemisphere by speakers of most European languages, such as English and Spanish. By contrast, vowels are processed in the left hemisphere by native speakers of Japanese, perhaps because complex ideas can be expressed using only vowel sounds in Japanese.

Language is more strongly left-lateralized among men than among women. Among women, linguistic abilities are divided more evenly between the hemispheres, which may account for the greater superiority of women on verbal tasks.

138. (p. 52) Gender differences are apparent in brain weight and the lateralization of language. Men's brains weigh more than do those of women, even after accounting for body weight. The corpus callosum, though, is proportionately larger in women than in men.

Biofeedback has been applied successfully to the treatment of such physical ailments as strokes, cerebral palsy, and curvature of the spine. It also has been applied to such emotional problems as anxiety and depression and to such ailments as migraine headaches, ulcers, and high blood pressure. Additional examples that might be cited are mentioned in the text.

139. (p. 54) The answer should include a definition and a general description of biofeedback. Biofeedback is a procedure in which an individual learns to consciously control such internal physiological processes as heart rate and blood pressure. An individual can be connected to electronic monitoring devices that can provide continuous feedback regarding the process in question.

ch02 Summary

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