Name:_____ Class:_____ Date:_____

Chapter 3 - The Biological Bases of Behaviour

1. Which cells in the nervous system do most of the work of receiving, integrating, and transmitting information?
   a. neurons
   b. glial cells
   c. axons
   d. dendrites

   ANSWER: a

2. Which of the following is the most accurate description of the structure and function of all neurons in your central nervous system?
   a. All neurons contain a cell body and an axon, and may have other structures.
   b. All neurons receive information via one or more dendrites and send information via one or more axons.
   c. All neurons synapse onto another neuron in order to transmit an electrical signal.
   d. All neurons receive and send information.

   ANSWER: d

3. Which of the following is NOT one of the main functions of neurons?
   a. integrating information
   b. generating information
   c. transmitting information
   d. receiving information

   ANSWER: b

4. What are three basic components of most neurons?
   a. vesicles, terminal buttons, synapses
   b. myelin, nodes, axon terminals
   c. cell body, axon, dendrites
   d. hindbrain, midbrain, forebrain

   ANSWER: c

5. Which neuronal structures are analogous to branches on a tree?
   a. dendrites
   b. axons
   c. nuclei
   d. cell bodies

   ANSWER: a

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6. On a typical neuron, which structure receives neurochemical information, and which structure sends neurochemical information to other neurons?
   a. Dendrites receive; axons send.
   b. Axons send; synapses receive.
   c. Dendrites receive; synapses send.
   d. Axons receive; dendrites send.

   ANSWER: a

7. In computers, the keyboard is the component of the computer that receives information. What would the keyboard be equivalent to, in comparing a computer to a neuron?
   a. axon
   b. soma
   c. dendrite
   d. terminal button

   ANSWER: c

8. Emma has a disorder that includes degeneration of myelin sheaths in her nervous system. Which of the following disorders does Emma most likely have?
   a. Alzheimer's disease
   b. multiple sclerosis
   c. Broca's aphasia
   d. Parkinson's disease

   ANSWER: b

9. Which of the following is associated with the fastest neural impulses?
   a. unmyelinated dendrites
   b. myelinated axons
   c. shorter axons
   d. multiple dendrites

   ANSWER: b

10. When you want to print something from a computer, a cable carries this signal from the computer to the printer. In comparing a computer and printer to two neurons, what is the neuronal equivalent to the cable?
    a. synapse
    b. soma
    c. terminal button
    d. axon

    ANSWER: d

11. When you are printing something from your computer, your cable must be securely connected to the printer or else the signal won't get through. If you compared a computer and printer to two neurons, what is the neuronal equivalent of the connection between the cable and the printer?
    a. synapse
    b. soma
    c. terminal button
    d. axon

    ANSWER: a

12. Which part of the neuron secretes neurotransmitters?
    a. neuromodulators
    b. dendrites
    c. myelin sheaths
    d. terminal buttons

    ANSWER: d

13. Which of the following is the correct sequence of structures through which information flows in a neuron?
    a. dendrites to axon to soma
    b. axon to glia to dendrites
    c. glia to dendrites to axon
    d. dendrites to soma to axon

    ANSWER: d

14. What are the cells that provide structural support and insulation for neurons?
    a. synapses
    b. sheaths
    c. glia
    d. soma

    ANSWER: c

15. What is the primary role of glial cells?
    a. They form the primary components of the spinal cord.
    b. They provide support for neurons.
    c. They release neurotransmitters.
    d. They release neuromodulators.

    ANSWER: b

16. What would happen if you were to lose all of your glial cells?
    a. There would be no change in functioning, because neurons are the cells that are important for transmission of information within the nervous system.
    b. One hemisphere could not send information to the other hemisphere.
    c. Your neurons would no longer have a normal chemical environment, and there would be problems with efficient neurotransmission.
    d. You would no longer be able to send neurotransmitters from one cell to another.

    ANSWER: c

17. Which of the following is a characteristic of both sodium and potassium ions?
    a. They carry a negative charge.
    b. They are concentrated inside the neuron's cell body.
    c. They carry a positive charge.
    d. They are capable of changing their potentials.

    ANSWER: c

18. What do we call the tiny electrical charge that exists when a neuron is neither receiving nor sending information?
    a. resting potential
    b. action potential
    c. post-synaptic potential
    d. inhibitory potential

    ANSWER: a

19. When a neuron is neither receiving nor sending, what is the approximate voltage of the electrical charge that exists between the inside and the outside of a neuron?
    a. –700 millivolts
    b. –70 millivolts
    c. +70 millivolts
    d. +700 millivolts

    ANSWER: b

20. Bradley is deeply relaxed and many of his muscles are not moving at all. What does this suggest about many of Bradley's motor neurons?
    a. They have a voltage of +70 millivolts.
    b. They have a voltage of –70 millivolts.
    c. They are in a relative refractory period.
    d. They are in an absolute refractory period.

    ANSWER: b

21. When the sodium channels of a neuron open, allowing sodium ions to flow inside, which of the following is most likely to happen next?
    a. a resting potential
    b. an action potential
    c. a refractory period
    d. reuptake

    ANSWER: d

22. What is an action potential?
    a. an electrical signal that travels along the axon of a neuron
    b. the small gap that exists between adjacent neurons
    c. the tiny electrical charge that exists when a neuron is neither receiving nor sending information
    d. the release of neurotransmitters

    ANSWER: a

23. Tracey became dehydrated during a recent illness, and the levels of sodium in her body were significantly reduced. What would we expect to occur if enough sodium was lost?
    a. Her nervous system would become highly activated, and action potentials would be generated continuously.
    b. More neurotransmitters would be produced in her terminal buttons.
    c. Fewer action potentials would occur in her nervous system.
    d. Glial cells would start to degenerate and die.

    ANSWER: c

24. A neuron just sent a neural impulse. It will be one to two milliseconds before another neural impulse can be generated. What do we call this brief time increment, when another neural impulse cannot occur?
    a. resting potential
    b. absolute refractory period
    c. postsynaptic discharge
    d. all-or-none period

    ANSWER: b

25. What is the term for the minimum length of time between action potentials?
    a. relative threshold period
    b. transduction interval
    c. absolute refractory period
    d. synaptic interval

    ANSWER: c

26. Which of the following is known about action potentials?
    a. They travel more slowly if the incoming stimulation is less intense.
    b. They are stronger when the incoming stimulation is more intense.
    c. They are generated in an all-or-none fashion.
    d. They are seldom strong enough to reach the terminal buttons.

    ANSWER: c

27. What is the typical speed of an action potential?
    a. at least 600 kilometres/hour
    b. up to 300 kilometres/hour
    c. approximately the speed of light (300,000 kilometres/second)
    d. approximately the speed of sound (1236 kilometres/hour)

    ANSWER: b

28. Sara is holding Scott's hand during a scary movie. Suddenly she squeezes his hand very hard. When she does this, what will the nerves in Scott's hand do?
    a. release more GABA
    b. send larger action potentials to his central nervous system
    c. enter an absolute refractory period
    d. start to fire at a faster rate

    ANSWER: d

29. Fiona puts her hands into a bucket of lukewarm water; Luke puts his hands into a bucket of ice-cold water. What should we predict about each of their action potentials?
    a. Only Fiona will experience enough stimulation to trigger an action potential.
    b. Luke will have inhibitory action potentials.
    c. Their action potentials will differ in rate, due to differences in the intensity of the stimuli.
    d. Their action potentials will differ in size, due to differences in the intensity of the stimuli.

    ANSWER: c

30. Peggy smells a very strong odour; Harry smells an odour that is barely detectable. Based on what is known about neural transmission, what should we predict about each of their action potentials?
    a. They will be the same size but at different rates.
    b. Peggy's will be excitatory, and Harry's will be inhibitory.
    c. They will be weaker in Harry's system because the stimulus is less intense.
    d. They will be distinguished by the amount of inhibition they exert on synapses.

    ANSWER: a

31. What do we call the space between a terminal button and a dendrite?
    a. the transmission gap
    b. the midsynaptic potential range
    c. the synaptic cleft
    d. the neuromodulator

    ANSWER: c

32. Where are neurotransmitters stored?
    a. in the dendrites
    b. in the mitochondria
    c. in the axon
    d. in the synaptic vesicles

    ANSWER: d

33. What do synaptic vesicles do?
    a. They fuse with the postsynaptic cell.
    b. They store neurotransmitters.
    c. They block receptors.
    d. They manufacture myelin.

    ANSWER: b

34. What happens when a neurotransmitter is released from a presynaptic neuron, but it does not fit into a suitable receptor channel on the postsynaptic neuron?
    a. The firing potential of the postsynaptic neuron will not be affected.
    b. An inhibitory postsynaptic potential will be generated.
    c. A graded potential will be generated.
    d. The presynaptic neuron will be inhibited.

    ANSWER: a

35. What is a good analogy for the way in which a neurotransmitter binds to receptor sites?
    a. the lowering of a drawbridge
    b. a key fitting in a lock
    c. the pulling of a gun trigger
    d. the opening and closing of a window

    ANSWER: b

36. What type of electric potential increases the likelihood that the postsynaptic neuron will fire?
    a. all-or-none potential
    b. excitatory postsynaptic potential
    c. inhibitory postsynaptic potential
    d. a resting potential

    ANSWER: b

37. The voltage at a receptor site has just changed from –70 millivolts to –75 millivolts. What caused the change?
    a. excitatory postsynaptic potential
    b. influx of potassium ions
    c. influx of sodium ions
    d. inhibitory postsynaptic potential

    ANSWER: d

38. The voltage at a receptor site has just changed from –70 millivolts to –67 millivolts. What will this lead to?
    a. an absolute refractory period
    b. increased likelihood of an action potential
    c. decreased likelihood of an action potential
    d. a relative refractory period

    ANSWER: b

39. What do we call the process of absorption of neurotransmitters into the presynaptic neuron?
    a. reuptake
    b. neurotransmission
    c. graded potential
    d. inhibition

    ANSWER: a

40. Which of the following is the correct sequence of steps through which neurotransmitters progress during synaptic transmission?
    a. binding, synthesis, release, inactivation, reuptake
    b. synthesis, release, binding, inactivation, reuptake
    c. synthesis, binding, release, reuptake, inactivation
    d. release, synthesis, binding, reuptake, inactivation

    ANSWER: b

41. If a brain has several synapses that are not particularly active, those synapses may be eliminated. What is this process called?
    a. synaptic pruning
    b. inhibition
    c. natural selection
    d. long-term potentiation

    ANSWER: a

42. At what age do humans tend to have the largest number of synapses?
    a. at birth
    b. at 1 year
    c. at puberty
    d. after physical growth has ended in early adulthood

    ANSWER: b

43. According to the Hebbian Learning Rule, if an axon of Cell A is near enough to repeatedly stimulate Cell B (causing it to fire often), then what will happen to Cell B?
    a. Cell B will eventually stop responding to Cell A.
    b. Cell B will merge with Cell A.
    c. Cell B will be pruned because it is redundant with Cell A.
    d. Cell B will become more likely to fire in response to signals from Cell A.

    ANSWER: d

44. Which of the following neurotransmitters is primarily involved in the activation of motor neurons controlling skeletal muscles?
    a. GABA
    b. acetylcholine
    c. serotonin
    d. norepinephrine

    ANSWER: b

45. Jeremy is sitting quietly when the voluntary muscles in his left leg begin to twitch. Which neurotransmitter is likely being released?
    a. serotonin
    b. norepinephrine
    c. acetylcholine
    d. GABA

    ANSWER: c

46. When your text states that nicotine functions as an acetylcholine agonist, what does that mean?
    a. It interacts with acetylcholine to produce a novel effect.
    b. It occupies acetylcholine receptor sites, thus blocking the action of the neurotransmitter.
    c. It stimulates some acetylcholine synapses.
    d. It inhibits some acetylcholine release.

    ANSWER: c

47. What does an agonist do?
    a. It extends the absolute refractory period of neural transmission.
    b. It blocks the action of neurotransmitters.
    c. It mimics the action of a neurotransmitter.
    d. It prevents reuptake of neurotransmitters.

    ANSWER: c

48. Curare blocks the action of acetylcholine by occupying its receptor sites. In this context, what is curare?
    a. a neurotransmitter
    b. an agonist
    c. a neuromodulator
    d. an antagonist

    ANSWER: d

49. Dr. Jacoby has just discovered a new drug named Z2W that is an antagonist to acetylcholine. What are some likely side effects of this new drug?
    a. hallucinations and disrupted sleep patterns
    b. general stimulation within the body and an increase in heart rate
    c. sleepiness and loss of interest in activities
    d. motor and memory problems

    ANSWER: d

50. Dr. Ferracane has just discovered a new drug named GL8 that produces side effects such as paralysis and memory loss. Based on this information, how might this drug act on the nervous system?
    a. as an agonist for GABA
    b. as an antagonist for GABA
    c. as an antagonist for acetylcholine
    d. as an agonist for acetylcholine

    ANSWER: c

51. What seems to be a primary cause of Parkinson's disease?
    a. degeneration of neurons that use dopamine as a neurotransmitter
    b. degeneration of myelin sheaths
    c. antagonistic effects on acetylcholine receptors
    d. damage to glial cells

    ANSWER: a

52. Garrett has a chronic disease that is slowly destroying the cells that produce serotonin in his brain. Which of the following will likely happen to Garrett as his disease progresses?
    a. His memory will gradually worsen.
    b. He will start to show signs of Parkinson's disease.
    c. His sleep and mood will be disrupted.
    d. He will begin to experience symptoms of schizophrenia.

    ANSWER: c

53. Which of the following disorders is associated with reduced activity at norepinephrine and serotonin receptors?
    a. depression
    b. schizophrenia
    c. Parkinson's disease
    d. multiple sclerosis

    ANSWER: a

54. Julia is currently in the midst of a major depression. Which of the following patterns of neurotransmitter activity is most likely to be associated with her symptoms?
    a. reduced levels of GABA
    b. increased activity at serotonin synapses
    c. increased levels of dopamine
    d. reduced activity at norepinephrine synapses

    ANSWER: d

55. Stuart abuses a drug that is a dopamine agonist. Which of the following is Stuart most likely to experience when he is high?
    a. deep relaxation
    b. hallucinations
    c. temporary paralysis
    d. excessive anxiety

    ANSWER: b

56. Caitlin has taken a drug that has reduced the levels of GABA in her nervous system. What side effect is Caitlin likely to experience?
    a. motor tics and other involuntary motor movements
    b. increased levels of anxiety
    c. depression
    d. hallucinations

    ANSWER: b

57. Dr. Athorp has just discovered a new drug named P3X that is an agonist for GABA. What effects will this drug likely have?
    a. hallucinations and disrupted sleep patterns
    b. general stimulation within the body and an increase in heart rate
    c. a reduction in pain and a sense of euphoria
    d. anxiety reduction and general relaxation

    ANSWER: d

58. Which of the following neurotransmitters always has inhibitory effects?
    a. GABA
    b. glutamate
    c. acetylcholine
    d. norepinephrine

    ANSWER: a

59. Which of the following neurotransmitters has effects on learning and memory, and on long-term potentiation?
    a. GABA
    b. glutamate
    c. acetylcholine
    d. norepinephrine

    ANSWER: b

60. Opiate drugs bind onto the same receptor sites as the body's own endorphins. What effect, then, do opiate drugs have?
    a. They increase anxiety and agitation.
    b. They inhibit visual sensations.
    c. They produce insomnia.
    d. They relieve pain.

    ANSWER: d

61. Which of the following neurotransmitters is most similar to the drug heroin?
    a. acetylcholine
    b. dopamine
    c. endorphins
    d. serotonin

    ANSWER: c

62. If you were making a new drug to treat pain, which type of neurotransmitter would you attempt to mimic?
    a. dopamine
    b. monoamines
    c. acetylcholine
    d. endorphins

    ANSWER: d

Chapter 3 - The Biological Bases of Behaviour

63. What are the two most basic divisions of the nervous system?
    a. somatic nervous system and autonomic nervous system
    b. brain and spinal cord
    c. sympathetic division and parasympathetic division
    d. central nervous system and peripheral nervous system

    ANSWER: d

64. In which part of the nervous system are the nerves in your hands and feet found?
    a. peripheral
    b. vascular
    c. parasympathetic
    d. skeletal

    ANSWER: a

65. Which major division of the nervous system is comprised of the somatic nervous system and the autonomic nervous system?
    a. skeletal
    b. central
    c. afferent
    d. peripheral

    ANSWER: d

66. What system allows you both to notice a buzzing near your ear and to swat the mosquito away?
    a. autonomic nervous system
    b. somatic nervous system
    c. limbic system
    d. endocrine system

    ANSWER: b

67. What is the distinction between afferent and efferent nerves?
    a. Afferent nerves take information to the central nervous system, while efferent nerves take information out from the central nervous system.
    b. Afferent nerves are motor neurons, while efferent nerves are sensory neurons.
    c. Afferent nerves are in the peripheral nervous system, while efferent nerves are in the central nervous system.
    d. Afferent nerves take information to the muscles, while efferent nerves take information to the central nervous system.

    ANSWER: a

68. Which division of the nervous system is necessary if you need to intentionally stand up or scratch your nose?
    a. autonomic
    b. parasympathetic
    c. sympathetic
    d. somatic

    ANSWER: d

69. Through which type of nerves does the brain send messages to the skeletal muscles in the legs when you are walking?
    a. central
    b. afferent
    c. efferent
    d. sensory

    ANSWER: c

70. Which part of the nervous system controls digestion and the flow of blood?
    a. somatic
    b. motor
    c. autonomic
    d. central

    ANSWER: c

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71. Which part of the nervous system diverts energy and resources in your body so that you can deal with emergency situations?
    a. central
    b. sympathetic
    c. parasympathetic
    d. somatic

    ANSWER: b

72. During what type of situations is the sympathetic nervous system in primary control?
    a. stress
    b. sexual
    c. calm
    d. fatigue

    ANSWER: a

73. Zayed was walking down a dark street when he heard a car backfire. His heart started to race, and he began to perspire in response to this sudden, startling noise. Which division of the nervous system is responsible for his reactions?
    a. sympathetic nervous system
    b. parasympathetic nervous system
    c. central nervous system
    d. somatic nervous system

    ANSWER: a

74. Karlette took some new medication for her hay fever. The medication made her heart race, and she became agitated and jittery. Which division of the nervous system has been activated by the medication?
    a. peripheral
    b. parasympathetic
    c. somatic
    d. sympathetic

    ANSWER: d

75. Which division of your nervous system handles conservation of body resources, including blood pressure reduction and the promotion of digestion?
    a. central
    b. somatic
    c. parasympathetic
    d. sympathetic

    ANSWER: c

76. Which division of the nervous system is most likely to be in control of bodily processes during periods of rest and recovery for the body?
    a. parasympathetic
    b. somatic
    c. peripheral
    d. sympathetic

    ANSWER: a

77. Robyn has just eaten a full meal and is now relaxing. Which specific division of her nervous system is in primary control at this time?
    a. sympathetic nervous system
    b. parasympathetic nervous system
    c. somatic nervous system
    d. peripheral nervous system

    ANSWER: b

78. Brenda was startled when a large shadow unexpectedly passed across her living room window. When she realized that it was just a cloud passing in front of the full moon, her racing heart began to slow, and her blood pressure started to return to normal. What division of the nervous system controlled the reactions as Brenda began to relax?
    a. somatic nervous system
    b. peripheral nervous system
    c. sympathetic nervous system
    d. parasympathetic nervous system

    ANSWER: d

79. Johann took some medication for his flu symptoms. Later, Johann began to feel a little faint because the medication caused his heart to beat more slowly and his blood pressure to fall. What system was likely activated by the medication?
    a. parasympathetic nervous system
    b. sympathetic nervous system
    c. somatic nervous system
    d. central nervous system

    ANSWER: a

80. What does the central nervous system consist of?
    a. the sympathetic and parasympathetic nervous systems
    b. the somatic and autonomic nervous systems
    c. the body's sensory and motor neurons
    d. the brain and the spinal cord

    ANSWER: d

81. What are the protective membranes that protect the brain and spinal cord?
    a. meninges
    b. myelin sheaths
    c. ventricles
    d. glia

    ANSWER: a

82. Which of the following protects the brain as a whole by providing an internal cushion?
    a. meninges
    b. ventricles filled with CSF
    c. myelin sheaths
    d. synaptic vesicles

    ANSWER: b

83. Which of the following is the most accurate representation of the relationship between the brain and spinal cord?
    a. The spinal cord communicates with the brain, but is separated by the meninges.
    b. The spinal cord receives commands from the brain through nerves and cerebrospinal fluid.
    c. The spinal cord and brain contribute independently to the central nervous system.
    d. The spinal cord is an extension of the brain.

    ANSWER: d

84. If brain damage is suspected, which of the following methods is most likely to be used to assess the damage?
    a. electroencephalograph (EEG)
    b. transcranial magnetic stimulation (TMS)
    c. electrocardiograph (ECG)
    d. electrical stimulation of the brain (ESB)

    ANSWER: a

85. To confirm a diagnosis of epilepsy, a neurologist needs to record the overall electrical activity in Hillary's brain. What would be the best way for the neurologist to obtain this information?
    a. magnetic resonance imaging (MRI)
    b. an electroencephalograph (EEG)
    c. transcranial magnetic stimulation (TMS)
    d. computerized tomography (CT) scan

    ANSWER: b

86. Standing outside a football stadium and judging the excitement of the game by the crowd's screams is analogous to "eavesdropping" on the brain using which of the following?
    a. electrical stimulation
    b. MRI scanning
    c. CT scanning
    d. an electroencephalograph

    ANSWER: d

87. Paul is wide awake and studying for an upcoming exam. While he is studying, his brain activity is being recorded using an electroencephalograph (EEG). Which type of waves is likely to dominate Paul's EEG readings?
    a. high-voltage, high-frequency brain waves
    b. low-voltage, high-frequency brain waves
    c. high-voltage, low-frequency brain waves
    d. low-voltage, low-frequency brain waves

    ANSWER: b

88. Imagine that you are looking at a printout from an electroencephalograph and you see a change from fairly short waves that are close together to waves that are tall and farther apart. What could you infer has happened to the person whose waves have been recorded?
    a. She fell asleep.
    b. She is having a seizure.
    c. She is studying.
    d. She is experiencing anxiety.

    ANSWER: a

89. Dr. Smith destroys a small piece of tissue in the forebrain of a rat in order to determine whether that area is important for maze-learning. What is this technique called?
    a. case study method
    b. tomography
    c. transcranial stimulation
    d. lesioning

    ANSWER: d

90. Which of the following research techniques is least likely to be used to study the human brain?
    a. electrical brain stimulation
    b. transcranial magnetic stimulation
    c. lesioning
    d. positron emission tomography

    ANSWER: c

91. Electrical stimulation of its lateral hypothalamus causes an animal to overeat and become obese. Therefore, what could we expect to be produced by lesioning the lateral hypothalamus?
    a. no effect on eating or body weight
    b. overeating and obesity
    c. undereating and weight loss
    d. alternating periods of overeating and undereating

    ANSWER: c

92. Taylor has to have brain surgery to remove a tumour from her temporal lobe. During the surgery, the surgeon plans to map out specific brain function in the areas adjacent to the tumour. What method is the surgeon is most likely to use to map the brain?
    a. electrical stimulation of the brain (ESB)
    b. positron emission tomography (PET) scanning
    c. stereotaxic lesioning
    d. computerized tomography (CT) scanning

    ANSWER: a

93. Which technique results in effects that are similar to that of lesioning?
    a. stereotaxic plotting (STP)
    b. transcranial magnetic stimulation (TMS)
    c. electrical stimulation of the brain (ESB)
    d. magnetic resonance imaging (MRI)

    ANSWER: b

94. Sigourney's doctors think she might have a tumour, and they would like to use a technique that will provide them with an accurate image of her brain structure. What technique are they most likely to use?
    a. electrical stimulation of the brain (ESB)
    b. positron emission tomography (PET) scan
    c. computerized tomography (CT) scan
    d. electroencephalograph (EEG) recording

    ANSWER: c

95. For which of the following techniques would the patient be required to consume radioactive chemicals?
    a. magnetic resonance imaging
    b. positron emission tomography
    c. electroencephalography
    d. computerized tomography

    ANSWER: b

96. Which of the following techniques is likely to be most useful for identifying the activity of a specific neurotransmitter in the brain?
    a. computerized tomography
    b. positron emission tomography
    c. electrographic tomography
    d. magnetic resonance imaging

    ANSWER: b

97. Ricardo just came back from seeing a neurologist. Ricardo tells you that he will be having a test in which images of his brain will be recorded after he drinks a radioactive sugar solution. What test will his neurologist be using?
    a. a computerized tomography (CT) scan
    b. a magnetic resonance imaging (MRI) scan
    c. a positron emission tomography (PET) scan
    d. transcranial magnetic stimulation (TMS)

    ANSWER: c

98. Milo's doctors believe he might have some specific brain damage, but before they make their final diagnosis, they want to study very high-resolution, three-dimensional images of Milo's brain structures. Which technique are the doctors most likely to use in this case?
    a. an electroencephalograph (EEG) recording
    b. a computerized tomography (CT) scan
    c. a positron emission tomography (PET) scan
    d. a magnetic resonance imaging (MRI) scan

    ANSWER: d

99. What is the key advantage to using fMRI rather than an MRI?
    a. the ability to assess brain activity
    b. reduced discomfort for patients
    c. better spatial resolution
    d. reduced costs

    ANSWER: a

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100. In the Featured Study that examined brain regions associated with memory, why would the researchers have used fMRI technology for their study?
    a. It would have allowed them to look at precise locations of activity during different types of cognitive tasks.
    b. It would have allowed them to have the best spatial resolution, compared to other types of imaging.
    c. It would have allowed participants to move freely during the tasks.
    d. It is the only type of imaging that has good temporal resolution for assessing changes in brain function.

    ANSWER: a

101. Based on evidence from the Featured Study on the neuroscience of time travel, which of the following brain areas would you expect to be active when you are imagining what you will do tomorrow, but not particularly active when you are remembering what you did yesterday?
    a. temporal cortex
    b. parietal regions
    c. medial left prefrontal cortex
    d. right hippocampus

    ANSWER: d

102. Which brain area would you stimulate if you wanted to alter alertness or wakefulness?
    a. pons
    b. cerebellum
    c. medulla
    d. thalamus

    ANSWER: a

103. Which brain structure controls unconscious but essential functions such as breathing and circulation?
    a. corpus callosum
    b. pons
    c. medulla
    d. cerebellum

    ANSWER: c

104. Ian has been in a coma since he was in a serious car accident. He is still on life support because he is unable to breathe on his own. Which area of Ian's brain is likely damaged?
    a. medulla
    b. hypothalamus
    c. pons
    d. cerebellum

    ANSWER: a

105. A victim who is shot in the head died instantly because the bullet entered a portion of the hindbrain that regulates breathing. Which portion would that be?
    a. cerebellum
    b. pons
    c. medulla
    d. thalamus

    ANSWER: c

106. Which of the following is a hindbrain structure involved with sleep and arousal?
    a. pons
    b. cerebellum
    c. thalamus
    d. hypothalamus

    ANSWER: a

107. What is the primary function of the cerebellum?
    a. coordinating body movement
    b. storing semantic memory
    c. processing visual information
    d. controlling blood pressure

    ANSWER: a

108. What is the most likely consequence of damage to the cerebellum?
    a. eating irregularities
    b. impairment of short-term memory
    c. difficulties in judging distance
    d. problems with coordination of movement

    ANSWER: d

109. The drunk-driving suspect was unable to walk a straight line with her eyes closed because activity in one of her brain structures was depressed by alcohol. Given this symptom, which brain structure is impaired?
    a. corpus callosum
    b. hypothalamus
    c. medulla
    d. cerebellum

    ANSWER: d

110. Wanda fell down some stairs and hit her head. Prior to her accident she was an excellent flute player, but she now has difficulty coordinating the finger movements required in complex musical pieces. Which of the following brain areas was likely damaged in the fall?
    a. reticular formation
    b. cerebellum
    c. amygdala
    d. temporal lobe

    ANSWER: b

111. Gaspar was a world-class diver until he hit his head on the diving board during one of his dives. He now has difficulty coordinating the movements required for various tucks and rotations. Which of the following areas of Gaspar's brain is likely damaged?
    a. temporal lobes
    b. medulla
    c. cerebellum
    d. pons

    ANSWER: c

112. In which of the following areas of the brain is the dopamine system involved in Parkinson's disease located?
    a. forebrain
    b. midbrain
    c. brainstem
    d. hindbrain

    ANSWER: b

113. Dr. Bashir has implanted electrodes in the brain of a rabbit. When currents of different frequencies are passed through the electrodes, the rabbit will fall into a deep sleep or suddenly awaken. Based on this information, where are the electrodes most likely implanted?
    a. cerebellum
    b. hippocampus
    c. medulla
    d. reticular formation

    ANSWER: d

114. Erin suffered a brain injury, and her neurologist has told her that there is damage to her reticular formation. Which of the following symptoms is Erin most likely to experience?
    a. difficulty with language perception
    b. disruption of her sleep and wake cycles
    c. inability to initiate movement
    d. inability to accurately locate objects in space

    ANSWER: b

115. Which brain structure appears to play an active role in integrating sensory information?
    a. hypothalamus
    b. cerebrum
    c. limbic system
    d. thalamus

    ANSWER: d

116. Uma just caught sight of a red hummingbird. The neural impulses from her eye will eventually travel to her primary visual cortex, but which brain area must they first pass through?
    a. thalamus
    b. occipital lobe
    c. hypothalamus
    d. hippocampus

    ANSWER: a

117. What is the function of the hypothalamus?
    a. inhibit emotional reactions like anger and fear
    b. regulate sensory integration
    c. integrate sensory information with motor impulses
    d. regulate basic biological needs

    ANSWER: d

118. Juan is in a state of high arousal. His heart is beating quickly, and he is perspiring. Which brain area is largely responsible for controlling these automatic survival responses?
    a. reticular formation
    b. thalamus
    c. hippocampus
    d. hypothalamus

    ANSWER: d

119. If you destroy one particular area of its brain, a rat will lose all interest in food and may well starve to death. Which area is it?
    a. thalamus
    b. cerebellum
    c. medulla
    d. hypothalamus

    ANSWER: d

120. If a person has a brain tumour that results in a disruption of his or her eating behaviour, which of the following areas is the most likely location of the tumour?
    a. thalamus
    b. hypothalamus
    c. brainstem
    d. cerebellum

    ANSWER: b

Chapter 3 - The Biological Bases of Behaviour

121. By altering brain structures, an evil scientist has created supervillains who have specialized powers or abilities. One of these supervillains seldom feels hungry or thirsty and can go for days without feeling the need to eat or drink. Which brain area has likely been altered?
    a. thalamus
    b. hypothalamus
    c. cerebellum
    d. medulla

    ANSWER: b

122. Which of the following brain structures is most closely associated with the regulation of emotion?
    a. cerebellum
    b. reticular formation
    c. brainstem
    d. limbic system

    ANSWER: d

123. Aretha had severe epilepsy, and surgeons removed portions of her hippocampus to control the severity of her seizures. What ability is likely to be affected by Aretha's surgery?
    a. controlling her urges to eat and drink
    b. forming new memories
    c. expressing emotions appropriately
    d. interpreting sensory information accurately

    ANSWER: b

124. By altering brain structures, an evil scientist has created supervillains who have specialized powers or abilities. One of these supervillains has a fantastic memory and is able to form new memories incredibly well. In this case, which brain structure was likely altered?
    a. pons
    b. hippocampus
    c. hypothalamus
    d. amygdala

    ANSWER: b

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125. Madeleine has learned to fear thunder and lightning storms. Which area of her brain was likely very active when Madeleine's fear was first acquired?
    a. left temporal lobe
    b. amygdala
    c. Wernicke's area
    d. cerebellum

    ANSWER: b

126. By altering brain structures, an evil scientist has created supervillains who have specialized powers or abilities. One of these supervillains is absolutely fearless and willing to undertake extremely dangerous missions. In this case, what brain structure was most likely altered?
    a. amygdala
    b. occipital lobes
    c. cerebellum
    d. medulla

    ANSWER: a

127. Where do "pleasure centres" in the brain appear to be most heavily concentrated?
    a. brainstem
    b. corpus callosum
    c. endocrine system
    d. limbic system

    ANSWER: d

128. Research has identified a "pleasure centre" in rat brains, and researchers have determined that rats will press a lever thousands of times in order to have a tiny electrode stimulate this area of the brain. What brain area is it?
    a. hypothalamus
    b. corpus callosum
    c. frontal lobe
    d. brainstem

    ANSWER: a

129. If you connect an electrode to a device that will deliver stimulation directly to the brain, where should you insert the electrode in order to cause a sensation of pleasure?
    a. posterior hippocampus
    b. cerebral cortex
    c. medial forebrain bundle
    d. amygdala

    ANSWER: c

130. What is the largest and most complex part of the human brain?
    a. cerebellum
    b. brainstem
    c. limbic system
    d. cerebrum

    ANSWER: d

131. Which brain structure is responsible for the human ability to engage in higher mental activity such as thinking and philosophizing?
    a. limbic system
    b. corpus callosum
    c. cerebellum
    d. cerebrum

    ANSWER: d

132. Which structure connects the two cerebral hemispheres?
    a. pineal gland
    b. pons
    c. corpus callosum
    d. thalamus

    ANSWER: c

133. Vivian has been experiencing unexplained flashes of light and colour, even when her eyes are closed. She recently saw a neurologist who located a small brain tumour. Where is Vivian's tumour likely to be located?
    a. right frontal lobe
    b. temporal lobe
    c. occipital lobe
    d. left parietal lobe

    ANSWER: c

134. When Taryk slipped on the stairs and hit his head, he saw "stars" for several minutes. The "stars" were most likely a result of activity in which area of the brain?
    a. parietal cortex
    b. occipital lobes
    c. temporal lobes
    d. prefrontal cortex

    ANSWER: b

135. Which lobe of the brain is primarily responsible for processing bodily sensations, like tickling?
    a. frontal
    b. temporal
    c. parietal
    d. occipital

    ANSWER: c

136. Which lobe of the brain, when electrically stimulated, causes people to report physical sensations as if they had been touched?
    a. parietal
    b. temporal
    c. occipital
    d. frontal

    ANSWER: a

137. Padraigh woke up one day, unable to reach properly for objects, even though he could both see them and feel them. His doctor determined that Padraigh had a stroke and that the damage was confined to one portion of his brain. Which part is most likely damaged?
    a. temporal lobe
    b. frontal lobe
    c. parietal lobe
    d. occipital lobe

    ANSWER: c

138. With which of the following can you expect to have problems if you have damaged your temporal lobe?
    a. hearing
    b. sight
    c. touch
    d. taste

    ANSWER: a

139. Sharif suffered a stroke recently, and now he finds he constantly hears a buzzing sound in his ear. Where is the damage located?
    a. right frontal lobe
    b. occipital lobes
    c. left parietal lobe
    d. temporal lobe

    ANSWER: d

140. Which of the following is strongly correlated with the amount of motor cortex devoted to each body area?
    a. size of the body area
    b. location of the body area
    c. size of the muscles in the body area
    d. diversity of movements of the body area

    ANSWER: d

141. If a monkey's mirror neurons fire when the monkey picks up a grape, when will those same neurons also fire?
    a. When the monkey tastes grapes or even grape juice
    b. When the monkey smells a grape
    c. When the monkey sees a grape
    d. When the monkey sees another monkey pick up a grape

    ANSWER: d

142. If a monkey's mirror neuron fires when he sees another monkey reaching for a stick, in what other situation should that same neuron fire?
    a. when the monkey gets hit with a stick
    b. when the monkey drops the stick
    c. when the monkey also reaches for a stick
    d. when the monkey thinks about a stick

    ANSWER: a

143. Stefan has suffered brain damage, and as a result, he shows deficits in attention, planning, and getting organized. Which area was likely damaged?
    a. medial forebrain bundle
    b. primary sensory cortex
    c. prefrontal cortex
    d. limbic system

    ANSWER: c

144. Some theorists believe that the brain contains a sort of "executive control system," which is responsible for monitoring, directing, and organizing thought processes. In which area of the brain would you find this system?
    a. prefrontal cortex
    b. medial forebrain bundle
    c. limbic system
    d. thalamus

    ANSWER: a

145. In primary motor cortex, which of the following has the largest area of representation?
    a. legs
    b. eyes
    c. arms
    d. lips

    ANSWER: d

146. If one group of animals is raised in a stimulating environment and another group of animals is raised in a boring environment, which of the following should be enhanced in the brains of animals raised in the stimulating environment?
    a. specificity
    b. dendritic branching
    c. demylenization
    d. distance between neurons

    ANSWER: b

Chapter 3 - The Biological Bases of Behaviour

147. Which of the following is characteristic of stem cells?
    a. They fire in response to an action or to seeing that same action.
    b. They are critical for the perception of pain and other bodily sensations.
    c. They are able to resist the effects of plasticity.
    d. They can be induced to become a specialized cell anywhere in the body.

    ANSWER: d

148. What will be difficult for you if you experience damage to Broca's area?
    a. controlling your arms and legs
    b. being creative
    c. hearing
    d. speaking

    ANSWER: d

149. What is the area of the frontal lobe that plays an important role in the production of speech?
    a. Sperry's area
    b. Broca's area
    c. Wernicke's area
    d. Hebb's area

    ANSWER: b

150. Zeke has no problem understanding what other people say to him, but he has difficulty producing spoken language. If Zeke's problem stems from damage to the cerebral cortex, where do you expect the damage to be?
    a. right parietal lobe
    b. left parietal lobe
    c. right frontal lobe
    d. left frontal lobe

    ANSWER: d

151. If you have difficulty understanding the meaning of speech as a consequence of brain damage, where is the damage most likely to be located?
    a. Broca's area
    b. corpus callosum
    c. pituitary gland
    d. Wernicke's area

    ANSWER: d

152. Monique is not able to understand spoken language. If Monique's problem stems from damage to the cerebral cortex, where is the damage most likely to be?
    a. left temporal lobe
    b. right temporal lobe
    c. left frontal lobe
    d. right frontal lobe

    ANSWER: a

153. What has traditionally been the main reason for the characterization of the left hemisphere as the "dominant" hemisphere?
    a. evidence that the left hemisphere usually processes complex information
    b. evidence that the left hemisphere usually processes language
    c. the fact that the majority of people are right-handed
    d. evidence that patients use only their left hemisphere for processing information after split-brain surgery

    ANSWER: b

154. What is the main function of Wernicke's area?
    a. speech comprehension
    b. speech production
    c. sensory integration
    d. motor integration

    ANSWER: a

155. If you knew that a surgeon was about to do a surgery to disconnect the cerebral hemispheres, which of the following patients is she most likely to operate on?
    a. a patient in a coma
    b. a patient with epilepsy
    c. a patient with schizophrenia
    d. a patient with antisocial personality disorder

    ANSWER: b

156. Which of the following would be MOST likely to be impaired as a result of damage to the right hemisphere?
    a. language comprehension
    b. sensations from the right side of the body
    c. vision from the left eye
    d. control of the left leg

    ANSWER: d

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157. If you present a sound in the right ear, where will that sound be processed first?
    a. right temporal lobe
    b. left temporal lobe
    c. right parietal lobe
    d. left parietal lobe

    ANSWER: b

158. Because the speech centre is generally located in the left hemisphere of the brain, what would a split-brain patient be unable to describe or name?
    a. an object seen in the left visual field
    b. an object felt with the right hand
    c. an object seen in the right visual field
    d. an object presented directly in front of him or her

    ANSWER: a

159. If you sent the word "banana" to the left hemisphere and the word "cucumber" to the right hemisphere in a patient with a severed corpus callosum, which of the following would the patient be able to name verbally?
    a. both items
    b. neither item
    c. only the banana
    d. only the cucumber

    ANSWER: c

160. Imagine that a picture of a spoon is briefly flashed in the left visual field of an individual with a severed corpus callosum. At the same time, a picture of a cup is briefly flashed in the right visual field. What would this individual likely say based on Roger Sperry's work with split-brain patients?
    a. "I saw a spoon resting in a cup."
    b. "I saw a cup."
    c. "I saw a spoon."
    d. "I didn't see anything."

    ANSWER: b

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161. Imagine that a picture of a blue circle is briefly flashed in the left visual field of an individual with a severed corpus callosum. At the same time, a picture of a red square is briefly flashed in the right visual field. What would this individual likely say based on Roger Sperry's work with split-brain patients?
    a. "I saw a blue circle."
    b. "I didn't see anything."
    c. "I saw a red square."
    d. "I saw a blue circle around a red square."

    ANSWER: c

162. If a right-handed subject whose corpus callosum has been cut were asked to reproduce a drawing, what could we predict?
    a. best performance by the left hand
    b. best performance by the right hand
    c. equal performance by the two hands
    d. an inability to draw with either hand

    ANSWER: a

163. On average, which of the following tasks is performed most quickly by the right hemisphere?
    a. reading and naming items verbally
    b. hearing and listening
    c. processing visual information from the right visual field
    d. locating and recognizing objects or people

    ANSWER: d

164. Chase is using a single earphone to listen in on a conversation. Based on the research that investigated hemispheric specialization in intact brains, what could we suggest in order for Chase to recognize the words he hears most quickly?
    a. put the earphone in his right ear
    b. hum lightly to cancel out the background noise
    c. close his eyes while he listens to the conversation
    d. watch the conversation, in addition to listening

    ANSWER: a

165. What is the left hemisphere's specialty in both split-brain people and neurologically intact people?
    a. spatial perception
    b. motor initiation
    c. visual recognition
    d. verbal processing

    ANSWER: d

166. Which of the following is NOT primarily controlled by the left hemisphere of the brain?
    a. visual-spatial abilities
    b. the right side of the body
    c. producing language
    d. understanding language

    ANSWER: a

167. Which of the following is LEAST associated with left hemisphere functioning?
    a. reading
    b. speaking
    c. writing words
    d. musical recognition

    ANSWER: d

168. Nadine had a stroke that was confined to the right side of her brain. What sort of task will be most difficult for Nadine, based on hemispheric lateralization studies?
    a. mathematics and logical reasoning skills
    b. fine motor coordination, such as for handwriting
    c. spatial skills, such as fitting together puzzle pieces
    d. language and communication skills

    ANSWER: c

169. Which of the following parts of the brain is most likely to play a major role in the work of artists, architects, and engineers, who must rely heavily on visual-spatial skills?
    a. corpus callosum
    b. left hemisphere
    c. right hemisphere
    d. cerebellum

    ANSWER: c

170. Which of the following is associated with brains that have low levels of lateral specialization?
    a. reduced likelihood of mental disorder
    b. low IQ scores
    c. poor hand-eye coordination
    d. creativity

    ANSWER: b

171. What is the function of the pituitary gland?
    a. It controls the hypothalamus.
    b. It is the master gland of the endocrine system.
    c. It releases testosterone and estrogen in order to affect the gonads.
    d. It integrates information about the status of all organs.

    ANSWER: b

172. What does the endocrine system do?
    a. It connects the two cerebral hemispheres of the brain.
    b. It secretes hormones.
    c. It manufactures myelin.
    d. It forms the basis of reflexive behaviours.

    ANSWER: b

173. What is a hormone?
    a. an enzyme produced by the hypothalamus
    b. a chemical stored in the synapse
    c. a neurotransmitter that acts on organs
    d. a chemical secreted into the blood by a gland

    ANSWER: d

174. Which system is malfunctioning for individuals who have hormonal imbalances?
    a. reticular
    b. endocrine
    c. dopaminergic
    d. limbic

    ANSWER: b

175. How are hormones transported throughout the body?
    a. within the lymph nodes
    b. by the nervous system
    c. through cerebrospinal fluid
    d. by the bloodstream

    ANSWER: d

176. Hormones tend to be released in a pulsatile pattern. What does this mean?
    a. They are released at an unpredictable rate.
    b. They are released on demand.
    c. They are released in a steady, invariant rhythm.
    d. They are released in brief bursts at various times.

    ANSWER: d

177. Which brain region controls the endocrine system?
    a. cerebellum
    b. hypothalamus
    c. thalamus
    d. medulla

    ANSWER: b

178. What is the so-called "master gland" of the endocrine system?
    a. gonad
    b. pituitary
    c. adrenal
    d. hypothalamus

    ANSWER: b

179. Which of the following does NOT belong with the other three?
    a. gonad
    b. adrenal
    c. pituitary
    d. thalamus

    ANSWER: d

180. Which of the following hormones is associated with bonding and trust?
    a. gonadotropin
    b. oxytocin
    c. estrogen
    d. insulin

    ANSWER: b

181. Which gland secretes hormones associated with the development of secondary sex characteristics?
    a. pineal
    b. pancreas
    c. thyroid
    d. gonad

    ANSWER: d

182. Some individuals reach puberty before others. Which glands would be important to examine if you wished to explore the role of the endocrine system in producing these differences?
    a. parathyroid
    b. pancreas
    c. thyroid
    d. gonads

    ANSWER: d

183. What do we call the interdisciplinary field that studies the influence of inherited traits on complex behaviour?
    a. cross-cultural anthropology
    b. behavioural genetics
    c. physiological psychology
    d. ethology

    ANSWER: b

184. Which of the following is true of genes but not chromosomes?
    a. They contain gonadotropins.
    b. They contain DNA.
    c. They are found in zygotes.
    d. There are thousands of them in each sperm or egg.

    ANSWER: d

185. What is the genetic complement of all cells in the human body, except sex cells?
    a. 23 chromosomes
    b. 46 chromosomes
    c. 23 recessive genes and 23 dominant genes
    d. 46 pairs of chromosomes

    ANSWER: b

186. How many chromosomes does a zygote contain?
    a. 1 pair
    b. 2 pairs
    c. 23 pairs
    d. 46 pairs

    ANSWER: c

187. How many possible combinations of chromosomes are possible when you combine one person's sperm with another person's egg?
    a. 529, or 23^2
    b. 2,116, or 46^2
    c. 8 million, or 2^{23}
    d. 70 trillion, or 2^{46}

    ANSWER: b

188. What do we call a pairing of genes with one dominant and one recessive gene?
    a. homozygous
    b. phenotypic
    c. heterozygous
    d. polygenic

    ANSWER: c

189. What do we call the member of a gene pair that is more influential in terms of expressing a trait?
    a. phenotypic
    b. expressive
    c. recessive
    d. dominant

    ANSWER: d

190. Assume that developing a sixth toe is a recessive trait that is controlled by a single pair of genes. If a child has six toes, but both the child's parents have normal feet, what can you conclude?
    a. The child is heterozygous for the trait in question.
    b. Both parents are heterozygous for the trait in question.
    c. Both parents are homozygous for the trait in question.
    d. The child is adopted.

    ANSWER: b

191. What is the term for the specific pattern of genes that an individual inherits at conception?
    a. phenotype
    b. zygote
    c. polygenic inheritance
    d. genotype

    ANSWER: d

192. What is a person's genotype?
    a. their biological or chromosomal sex
    b. the maternal contribution to their genetic makeup
    c. their genetic makeup
    d. their observable characteristics and traits

    ANSWER: c

193. Which of the following is determined at conception and is essentially fixed forever?
    a. phenotype
    b. somatotype
    c. genotype
    d. zygote

    ANSWER: c

194. Shane and Blane are monozygotic twins. However, people seldom get the two brothers mixed up because Blane is almost two inches shorter than Shane. What can you conclude based on this evidence?
    a. Because the brothers display different phenotypes, they must also have different underlying genotypes.
    b. Even though both brothers share the same genotype, they display different phenotypes.
    c. Even though both brothers display the same phenotype, they have different genotypes.
    d. Blane is heterozygous for the "tallness" trait, and Shane is homozygous for the "tallness" trait.

    ANSWER: b

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195. If a trait is described as polygenic, what does that mean?
    a. It is controlled by a single gene.
    b. It is controlled by a single chromosome.
    c. It is controlled by more than one pair of genes.
    d. It is controlled by genes on all 46 chromosomes.

    ANSWER: c

196. Skin colour is determined by three to five gene pairs. Based on this information, what type of trait is skin colour?
    a. a monogenic trait
    b. a polygenic trait
    c. a homozygous trait
    d. a heterozygous trait

    ANSWER: b

197. Why are all human studies about the interaction of genes and environment correlational?
    a. to assess the effects of modern child-rearing methods
    b. to demonstrate the empirical nature of psychological research
    c. to meet ethical standards in research
    d. to disentangle the effects of genetics and experience on behavioural traits

    ANSWER: c

198. Which two individuals would we expect to have the GREATEST degree of phenotypic similarity?
    a. mother and daughter
    b. monozygotic twins
    c. dizygotic twins
    d. father and son

    ANSWER: b

199. Four sisters were all raised in the same household by parents who are very creative and artistic. Anna and Betty are the biological children of their parents, while Cassie and Deanna were adopted as infants into the family. Like their parents, Anna and Betty are artistically inclined and enjoy working on creative projects. Cassie and Deanna are not particularly interested in artistic endeavours even though they've received a lot of exposure to art and a lot of encouragement for creative work. Which of the following conclusions would be reasonable if this pattern occurred in a variety of similar families?
    a. Environmental factors have more influence than genetic factors in artistic interest.
    b. Both genetic and environmental factors contribute equally to artistic interest.
    c. Genetic factors have more influence than environmental factors in artistic interest.
    d. Neither genetic nor environmental factors contribute to artistic interest.

    ANSWER: c

200. Which of the following supports the hypothesis that intelligence is influenced by environmental factors?
    a. Twins reared apart have similar intelligence scores.
    b. Monozygotic twins are more similar than dizygotic twins on intelligence measures.
    c. Identical twins do not have identical intelligence scores.
    d. The correlations between dizygotic twins' intelligence scores are around 0.60.

    ANSWER: c

201. Londra and Sondra are identical twins who have been raised together in the same home. Londra has developed a psychological disorder, but Sondra does not appear to have the same disorder. What does this suggest about the disorder if this pattern holds for other identical twins?
    a. Genetic factors have more influence than environmental factors in this disorder.
    b. Both genetic and environmental factors contribute equally to this disorder.
    c. Neither genetic nor environmental factors contribute to this disorder.
    d. Environmental factors have more influence than genetic factors in this disorder.

    ANSWER: d

202. Phong and Phan are identical twins who have been raised apart in separate adoptive homes. However, both brothers have developed the same psychological disorder. What does this evidence suggest?
    a. Genetic factors have more influence than environmental factors in this disorder.
    b. Environmental factors have more influence than genetic factors in this disorder.
    c. Neither genetic nor environmental factors contribute to this disorder.
    d. Both genetic and environmental factors contribute equally to this disorder.

    ANSWER: a

203. Mary and Celine are identical twins who have been raised apart in separate adoptive homes. Mary has developed a psychological disorder, but Celine does not appear to have the same disorder. What does this evidence suggest?
    a. Environmental factors have more influence than genetic factors in this disorder.
    b. Both genetic and environmental factors contribute equally to this disorder.
    c. Genetic factors do not influence this disorder.
    d. Genetic factors have more influence than environmental factors in this disorder.

    ANSWER: a

204. What can we conclude about the heritability of intelligence, based on adoption studies?
    a. Genotype determines intelligence.
    b. Adoption studies do not provide enough evidence to assess the relative contributions of genes and experience on intelligence.
    c. Family environment is the strongest influence on intelligence.
    d. Both genes and environment contribute to intelligence.

    ANSWER: d

205. Which of the following comparison groups has a significant similarity with adopted children, based on research on adopted children and intelligence?
    a. their biological parents
    b. both sets of parents
    c. their adoptive parents
    d. neither set of parents

    ANSWER: b

206. Donavon was adopted at birth by Mr. and Mrs. Erndt. Although neither of his biological parents had much musical ability, Donavon has become an excellent pianist, just like Mr. Erndt. What would this evidence suggest if this pattern held up across multiple adoption studies?
    a. Genetic factors have more influence than environmental factors in musical talent.
    b. Environmental factors have more influence than genetic factors in musical talent.
    c. Neither genetic nor environmental factors contribute to musical talent.
    d. Both genetic and environmental factors contribute equally to musical talent.

    ANSWER: b

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207. If you are working on the Human Genome Project, which of the following types of traits are you most likely to be able to map?
    a. behavioural traits, like aggression
    b. physical traits that are highly polygenic
    c. dichotomous traits that are either present or absent
    d. polygenic traits with high worldwide variance

    ANSWER: c

208. What do we know about the heritability of schizophrenia?
    a. Schizophrenia is primarily social in origin, rather than biological.
    b. Schizophrenia is inherited through the male line, which is why we don't see heritability from mothers to children.
    c. Schizophrenia is essentially a personality variant, which is highly heritable.
    d. Schizophrenia likely results from an inherited vulnerability that interacts with experience.

    ANSWER: d

209. Dean is conducting a study in which he exposes rats to different amounts of noise to cause different amounts of stress. He then evaluates whether the offspring of those rats have different reactions to stress. What sort of study is Dean conducting?
    a. epigenetic study
    b. behaviour genetic study
    c. genetic mapping study
    d. polygenic study

    ANSWER: a

210. Which of the following statements about Charles Darwin and the theory of evolution is NOT accurate?
    a. He suggested that variations in hereditary traits might affect organisms' ability to obtain resources.
    b. He identified natural selection as the mechanism that orchestrates the process of evolution.
    c. He was the first person to describe the process of evolution.
    d. He noted that some of the characteristics of organisms are passed down from one generation to the next.

    ANSWER: c

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211. Imagine that you and Charles Darwin are looking at a newborn litter of kittens, and the kittens are all a bit different from one another. As you observe the kittens, you ask Mr. Darwin which of the kittens will be most "fit" in terms of natural selection. What would Mr. Darwin be most likely to say in response to your question?
    a. "The one who has the most kittens of its own."
    b. "Because they are related and carry the same genes, they all have equal fitness."
    c. "The one that is the strongest and the most aggressive."
    d. "The one that requires the smallest amount of resources."

    ANSWER: a

212. If our planet were a place where each individual has the opportunity to acquire all necessary resources, and each individual produces exactly one offspring in his or her lifetime, what impact would this have on the process of evolution by natural selection?
    a. It would not occur, because there would be no opportunity for some traits to be passed on more often than other traits.
    b. It would not change, because there would still be some individuals who were better than others.
    c. It would not occur because there would be no differences between individuals.
    d. It would have no impact on natural selection, but it would lead to an increase in mutations.

    ANSWER: a

213. Which of the following is the key factor in evolutionary change, according to Darwin's theory of evolution?
    a. interaction of heredity and the environment
    b. genetic transmission of learned behaviour
    c. relative success of aggressive predators
    d. variations in reproductive success

    ANSWER: d

214. What do we call the process by which genes that lead to a survival or reproductive advantage become more frequent in the next generation?
    a. natural selection
    b. polygenic transmission
    c. epigenetics
    d. genetic dominance

    ANSWER: a

215. Which of the following aspects of evolution is mainly based on chance alone?
    a. natural selection
    b. adaptations
    c. gene flow
    d. genetic drift

    ANSWER: d

216. If an individual is born with a genetic mutation, what will happen to that mutation in an evolutionary sense?
    a. The individual will die, so the mutation cannot be passed on to subsequent generations.
    b. If the mutation is beneficial, then it will be selected for and become more common.
    c. It is an isolated genetic anomaly, so it cannot be spread to others in the population.
    d. Mutations are part of the phenotype, not the genotype, so they won't affect fitness.

    ANSWER: b

217. What occurs when gene frequencies in a population shift because some individuals leave the population and others enter it?
    a. genetic drift
    b. mutation
    c. natural selection
    d. gene flow

    ANSWER: d

218. Which of the following is most likely to contribute to the emergence of new species?
    a. minimal gene flow between populations
    b. genetic drift within a single generation
    c. increases in gene flow between populations
    d. multiple mutations within a population

    ANSWER: a

219. What do we call an inherited characteristic that solves a survival problem?
    a. dominant gene
    b. genetic mutation
    c. adaptation
    d. fitness

    ANSWER: c

220. Humans' taste preferences for fatty substances would have conferred a survival advantage for our ancestors, but in our modern environment, where we have an overabundance of food, that preference can end up causing obesity and illness. What would an evolutionary psychologist say about this trend?
    a. It tends to occur when recessive genes mutate into dominant traits.
    b. It is an example of an adaptation that has become a liability.
    c. It is a consequence of genetic drift across several generations.
    d. It represents the paradox of inclusive fitness.

    ANSWER: b

221. Why is it more difficult to study the evolution of behaviour compared to studying the evolution of physical traits?
    a. Behaviours may occur infrequently and may not last very long.
    b. Natural selection generally does not operate on behaviours.
    c. Behaviours are more susceptible to genetic drift.
    d. Behaviours tend to evolve more slowly.

    ANSWER: a

222. What makes a behaviour adaptive, according to evolutionary theory?
    a. It decreases the amount of genetic drift in the population.
    b. It increases the likelihood of favourable mutations.
    c. It aids the survival or reproduction of an organism and its offspring.
    d. It increases the probability of natural selection.

    ANSWER: c

223. Which of the following statements most accurately reflects the roles of heredity and environment in shaping our behaviour?
    a. Heredity plays an indirect role by influencing the physiology that interacts with the environment.
    b. Heredity affects most physical behaviour, and environment affects most psychological behaviour.
    c. Genes exert their influence on behaviour with little impact from environmental factors.
    d. Genetic factors have surprisingly little influence on behaviour.

    ANSWER: a

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224. In your text, we saw that schizophrenia may be a function of abnormalities in neurotransmitter activity, structural defects in the brain, and genetic vulnerability. Which of the following unifying themes of your text do these findings support?
    a. Behaviour is determined by multiple causes.
    b. Psychology is empirical.
    c. Psychology evolves in a sociohistorical context.
    d. Behaviour is shaped by our cultural heritage.

    ANSWER: a

225. Much of what we know about left brain/right brain differences would not be known without systematic research and analysis. The current interest in the right brain/left brain phenomenon highlights the importance of approaching topics such as this from which point of view?
    a. conjectural
    b. empirical
    c. anecdotal
    d. subjective

    ANSWER: b

226. Kim is good at reading maps and enjoys listening to music. What would some researchers suggest about Kim, according to the Personal Application, Evaluating the Concept of "Two Minds in One"?
    a. She is "left-brained."
    b. She is "mid-brained."
    c. She is "hemispheric."
    d. She is "right-brained."

    ANSWER: d

227. In the Personal Application, Evaluating the Concept of "Two Minds in One," what was the conclusion regarding left-brain and right-brain thinking?
    a. Right-brain people benefit most from learning to do more left-brain activities.
    b. There is strong evidence to support modification of school curriculum to support both types of thinking.
    c. Career choice is strongly correlated with which side of the brain is most dominant.
    d. The link between hemispheric lateralization and ability is speculative and unsupported.

    ANSWER: d

228. Which of the following features do all of the studies highlighting the possible importance of early experience in animals have in common?
    a. The researchers used very small samples.
    b. They used species that cannot be logically compared to humans.
    c. They used relatively crude measures of brain growth.
    d. They used extreme conditions to make their comparisons.

    ANSWER: d

229. Dr. Sandra Witelson found that Einstein's brain was similar in terms of size and weight to most other brains, but that it had certain exceptionalities, including a wider parietal region and a distinct sylvian fissure. Which of the following is a reasonable statement about Einstein's brain given what we know about the role of environment for brain plasticity?
    a. Einstein was born with brain anomalies that led to his mathematical genius, and those anomalies were clearly visible in the autopsy. His experience would not change the actual structure of the brain.
    b. It must be due to the effects of practice that Einstein was so mathematically brilliant, given that he had brain damage in an area that is particularly important for mathematical reasoning.
    c. Einstein may have been born with a predisposition toward mathematical genius, or his brain may have been changed as a result of so much practice, but his genius is likely to have been the result of some combination of genetics and experience.
    d. There is no relationship between the structure of the brain and intelligence, because learning changes the function of the brain rather than the structure.

    ANSWER: c

230. Which of the following is a valid hypothesis, considering both the Hebbian Learning Rule and evidence that there is a decline in the number of synapses in the human brain after about age 1?
    a. Because we use only 10 percent of our brain at any given time, the decline in synapses after age 1 has no impact on functioning.
    b. We create new connections in infancy, and unless all the necessary connections are made before we are a year old, we will have difficulty learning for the rest of our lives because we start losing brain cells so early.
    c. Although the number of synapses decreases throughout the life span, the number of neurons does not decrease, and having a large number of neurons is more important than having a large number of synapses.
    d. Although creating new connections between neurons is important, it is also important to get rid of unnecessary or outdated connections in order to enhance the efficiency of processing within our brains.

    ANSWER: d

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231. Drug 8K43 is a stimulant drug that acts by blocking the reuptake of dopamine in the nervous system. This means that dopamine stays in the synapse longer and continues to stimulate the postsynaptic neuron. Based on this information, what can we infer about the effects of dopamine on the postsynaptic neuron?
    a. It produces excitatory postsynaptic potentials.
    b. It blocks the receptor channels in the postsynaptic neuron.
    c. It cancels out excitatory potentials generated by other neurons.
    d. It reduces inhibitory postsynaptic potentials.

    ANSWER: a

232. Which of the following does NOT belong with the others?
    a. stereotaxic instrument
    b. computerized tomography scan
    c. electroencephalograph
    d. reticular activating system

    ANSWER: d

233. Which of the following does NOT belong with the others?
    a. hemispheric lateralization
    b. positron emission tomography
    c. magnetic resonance imaging
    d. electroencephalography

    ANSWER: a

    Trevor

    Trevor is going for a run. He starts thinking about all the things that he needs to do throughout his day, and he decides that after he showers he will study for his midterm for a little while before he goes to work for the evening. As Trevor rounds the corner near home, he sees something move near his feet and then feels a sharp pain in his right leg. At this point, Trevor's heart rate increases substantially, as he spins away from the dog that just bit him. As the dog's owner apologizes and puts the dog back on its leash, Trevor's heart rate slows down and he then makes his way home.

234. As Trevor's heart rate is coming back down after the dog bite, he is feeling less fear. Which division of the nervous system is responsible for the physiological changes associated with calming back down?
    a. peripheral
    b. sympathetic
    c. somatic
    d. parasympathetic

    ANSWER: d

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235. As Trevor is running, what area of his brain is sending signals to his muscles so that they will move?
    a. motor cortex in the parietal lobes
    b. somatosensory cortex in the parietal lobes
    c. motor cortex in the frontal lobes
    d. somatosensory cortex in the frontal lobes

    ANSWER: c

236. When Trevor feels the pain in his right leg, what area of the brain responds to this sensation?
    a. left parietal lobe
    b. right temporal lobe
    c. left frontal lobe
    d. right prefrontal cortex

    ANSWER: a

237. As Trevor plans out his day, which area of his brain is processing these higher-level thoughts?
    a. limbic system
    b. prefrontal cortex
    c. medial temporal lobes
    d. Wernicke's area

    ANSWER: b

238. What would an evolutionary psychologist say about Trevor's physiological responses to the frightening experience of being bitten?
    a. Fight or flight responses are adaptations that evolved through natural selection.
    b. The increase in heart rate is caused by an overactive hypothalamus.
    c. Such responses put Trevor at risk for developing an anxiety disorder.
    d. Fight or flight responses are a maladaptive consequence of exposure to danger.

    ANSWER: a

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239. Choose a specific neurotransmitter or class of neurotransmitters and discuss its impact on behaviour.

ANSWER: Acetylcholine: The only neurotransmitter between motor neurons and voluntary muscles, therefore mediates all voluntary movement. Also contributes to attention, arousal, and memory. Alzheimer's disease is associated with an insufficient supply of this neurotransmitter.

Monoamines (dopamine, serotonin, norepinephrine): Dopamine—mediates voluntary movement. A deficiency is associated with Parkinson's disease; overactivity is associated with schizophrenia. Serotonin—regulates sleeping and waking. Norepinephrine—also regulates arousal. A deficiency is associated with depression.

GABA: Has inhibitory effects only. Too little GABA is associated with anxiety

Endorphins: Resemble opiate drugs in structure and effects contribute to pain relief and perhaps to some pleasurable emotions.

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· Glutamate: Amino acid with both excitatory and inhibitory effects. Implicated in learning and memory.

240. Compare and contrast the nervous system and the endocrine system.

ANSWER: Both are internal communication systems; both use chemical messengers. The nervous system utilizes neurotransmitters, which travel short distances at high speeds from neuron to neuron; the endocrine system uses hormones, which are slow acting and travel long distances through the blood stream. Some chemicals can be both a neurotransmitter and a hormone (like norepinephrine, for example).

241. Compare and contrast lesioning and electrical stimulation of the brain.

ANSWER: Both are methods of studying brain function; both involve the introduction of electric current into a specific brain structure via an implanted electrode. Lesioning uses a fairly strong electric current to destroy brain tissue, thus eliminating the relevant behaviour or function from the subject's repertoire. Since lesioning produces permanent brain damage, it is employed with animal subjects only. Electrical stimulation of the brain introduces a weak current to artificially stimulate a brain structure and produce a behavioural response. It does not permanently damage the brain and so, under certain medical circumstances, may be used with humans; however, the technique is more frequently applied to animals.

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242. Assume that trait X is primarily an inherited characteristic. Imagine that trait X is investigated using family studies, twin studies, and adoption studies. Briefly describe each of these three methods and indicate what information each would be expected to yield regarding trait X.

ANSWER:

- Family studies: There should be more phenotypic similarity on trait X among relatives who share a greater percentage of genes. For example, there should be more similarity on trait X between identical twins than among siblings, who in turn should exhibit more similarity than cousins.
- Twin studies: Identical twins should exhibit more similarity on trait X than fraternal twins.
- Adoption studies: Children adopted in early infancy should more closely resemble their biological parents on trait X than they do their adoptive parents.

243. Imagine the following scenario: Administrators at the local high school have been impressed by recent media reports of cerebral hemispheric specialization, and are considering curricular reform to achieve a better balance between "left-brained" and "right-brained" activities. You have been hired to advise them on this issue. What would your recommendation be, and why?

ANSWER: Although there is some evidence that the cerebral hemispheres are specialized to a degree, there is no basis for saying that people have two independent streams of consciousness or that each hemisphere has its own cognitive style. There is little basis for labelling some people as "left-brained" and others as "right-brained," or for relating these differences to distinctive task preferences, personalities, or vocations. All information reaches both hemispheres, since they communicate via the corpus callosum. Thus, cerebral specialization is not a sound basis for educational reform.