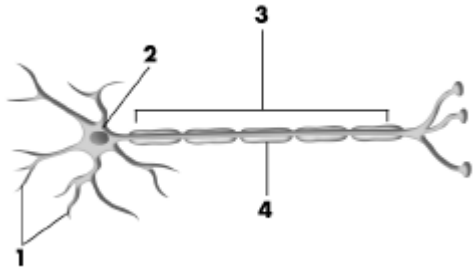
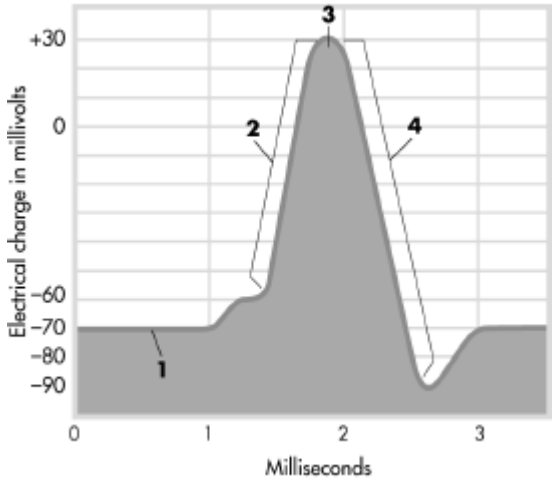
726 **This drawing shows the typical structures found on a neuron. Pick the alternative that correctly labels the structures in the drawing.**



- **1 = dendrites, 2 = cell body, 3 = axon, 4 = myelin sheath** *(True Answer)Correct*
- **1 = axon terminals, 2 = dendrite, 3 = vesicles, 4 = synapse** *Incorrect*
- **1 = synaptic spines, 2 = glial cell, 3 = ion channels, 4 = node of Ranvier** *Incorrect*
- **1 = synaptic vesicles, 2 = ion channel, 3 = pons, 4 = axon** *Incorrect*

---

727 **The graph shows the changing electrical charge of a neuron when it activates. Pick the alternative that correctly labels the different phases depicted in the graph.**

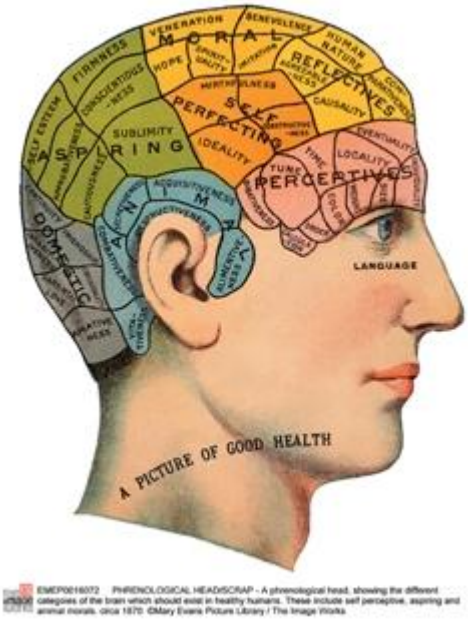


- **1 = action potential, 2 = stimulus threshold, 3 = refractory period, 4 = resting potential** *Incorrect*
- **1 = ions cross membrane, 2 = action potential, 3 = stimulus threshold, 4 = depolarization** *Incorrect*
- **1 = depolarization, 2 = action potential, 3 = stimulus threshold, 4 = repolarization** *Incorrect*
- **1 = resting potential, 2 = ions cross membrane, 3 = action**

potential, 4 = refractory period *(True Answer)Correct*

---

728 **What does this image depict?**

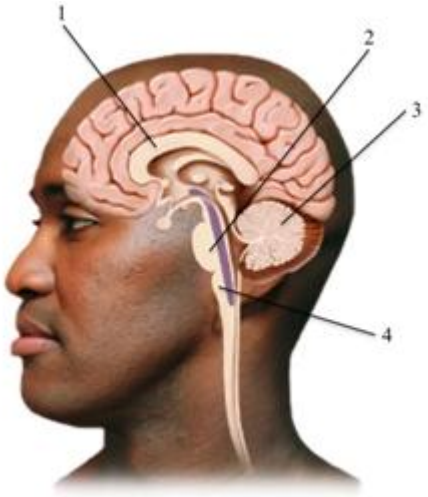


EMEP0016072 PHRENOLOGICAL HEAD/SCRAP - A phrenological head, showing the different categories of the brain which should exist in healthy humans. These include self perceptive, aspiring and animal morals, circa 1870. ©Mary Evans Picture Library / The Image Works

- **a phrenology map indicating the location of different "faculties" or personality characteristics** *(True Answer)Correct*
- **one of Paul Broca's early maps depicting the areas of cognitive functions he identified in brain-damaged patients** *Incorrect*
- **Roger Sperry's "split-brain" map identifying the different abilities of the left cerebral hemisphere** *Incorrect*
- **Canadian neurosurgeon Wilder Penfield's map depicting the cognitive and emotional responses produced by electrical stimulation of the cerebral cortex during brain surgery** *Incorrect*

---

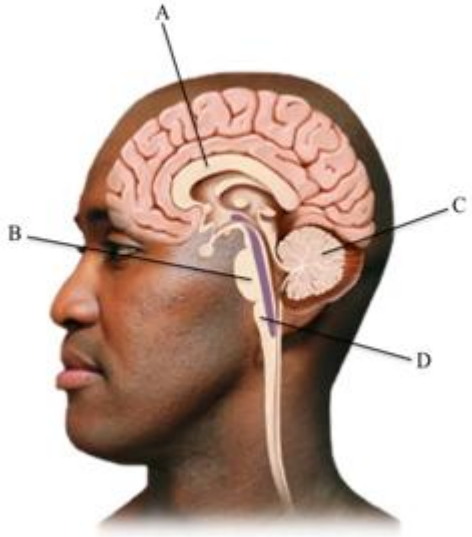
729 **This cross section of the human brain depicts several key structures. Pick the alternative that correctly labels the structures in the drawing.**



- **1 = hypothalamus, 2 = nucleus, 3 = axon, 4 = myelin sheath** *Incorrect*
- **1 = corpus callosum, 2 = pons, 3 = cerebellum, 4 = medulla** *(True Answer)Correct*
- **1 = hippocampus, 2 = reticular formation, 3 = medulla, 4 = spinal cord** *Incorrect*
- **1 = thalamus, 2 = hypothalamus, 3 = pons, 4 = brain stem** *Incorrect*

---

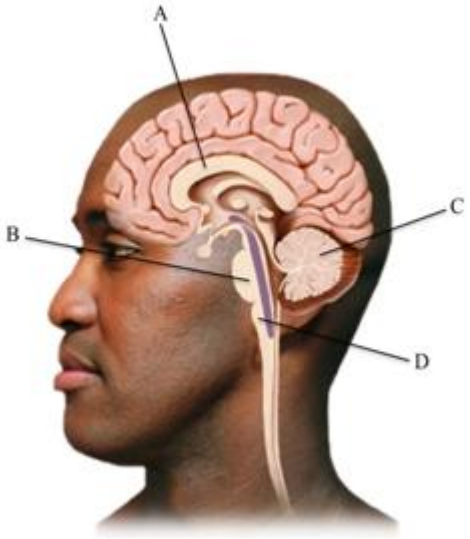
730 **Which letter points to the brain structure that controls vital life functions, such as breathing, heartbeat, and digestion?**



- **corpus callosum** *Incorrect*
- **pons** *Incorrect*
- **cerebellum** *Incorrect*
- **medulla** *(True Answer)Correct*

---

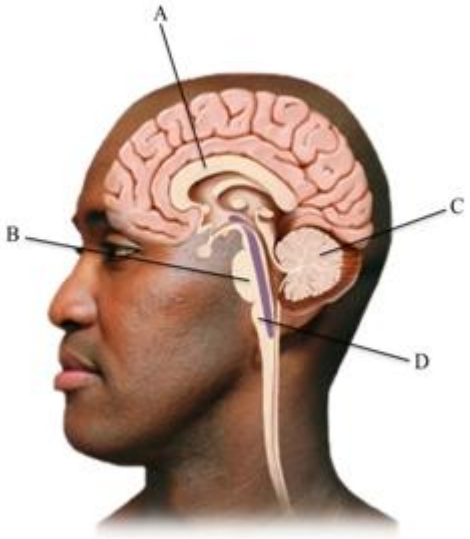
731 **Which letter points to the brain structure that plays a key role in controlling balance, muscle tone, and coordinated movements?**



- **corpus callosum** *Incorrect*
- **pons** *Incorrect*
- **cerebellum** *(True Answer)Correct*
- **medulla** *Incorrect*

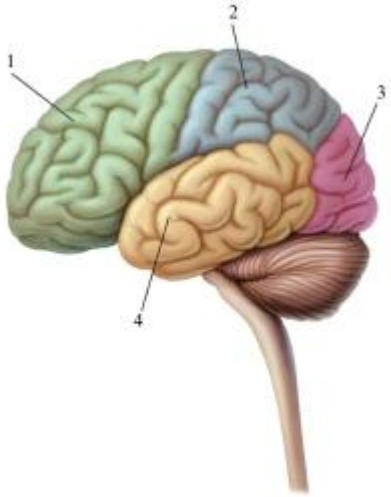
---

732 **Which letter points to the structure connecting the two cerebral hemispheres?**



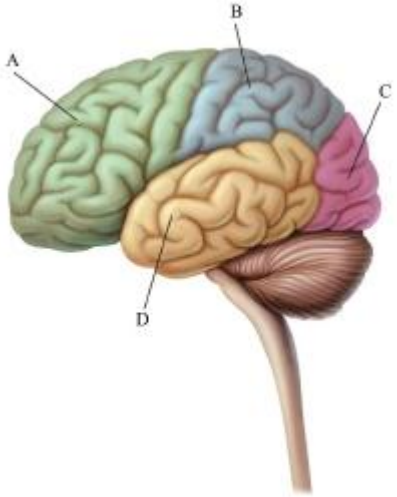
- **corpus callosum** *(True Answer)Correct*
- **pons** *Incorrect*
- **cerebellum** *Incorrect*
- **medulla** *Incorrect*

733 **This image depicts the left hemisphere of the cerebral cortex. Pick the alternative that correctly labels the structures in the drawing.**



- **1 = parietal lobe, 2 = gray matter, 3 = association areas, 4 = white matter** *Incorrect*
- **1 = frontal lobe, 2 = parietal lobe, 3 = occipital lobe, 4 = temporal lobe** *(True Answer)Correct*
- **1 = frontal lobe, 2 = temporal lobe, 3 = parietal lobe, 4 = occipital lobe** *Incorrect*
- **1 = temporal lobe, 2 = midbrain lobe, 3 = occipital lobe, 4 = frontal lobe** *Incorrect*

734 **This image depicts the left hemisphere of the cerebral cortex. Which area contains the primary auditory cortex and processes auditory information?**

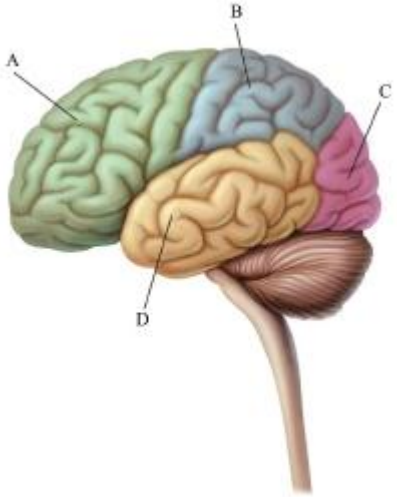


- **frontal lobe** *Incorrect*
- **parietal lobe** *Incorrect*

- **occipital lobe** *Incorrect*
- **temporal lobe** *(True Answer)Correct*

---

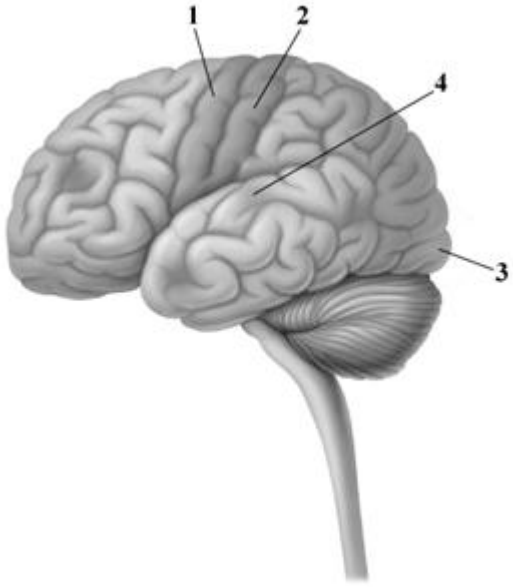
735 **This image depicts the left hemisphere of the cerebral cortex. Which area processes information about body sensations and contains the somatosensory cortex?**



- **frontal lobe** *Incorrect*
- **parietal lobe** *(True Answer)Correct*
- **occipital lobe** *Incorrect*
- **temporal lobe** *Incorrect*

---

736 **This drawing depicts the left hemisphere of the cerebral cortex. Pick the *alternative* that correctly labels the drawing.**



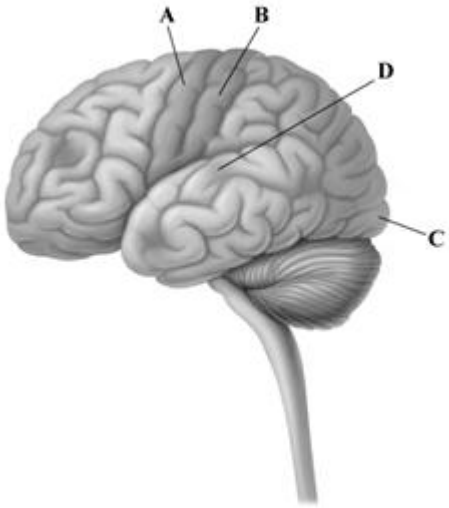
- **1 = parietal lobe, 2 = temporal lobe, 3 = occipital lobe, 4 =**

midbrain *Incorrect*

- **1 = primary motor cortex, 2 = somatosensory cortex, 3 = primary visual cortex, 4 = primary auditory cortex** *(True Answer)Correct*
- **1 = gray matter, 2 = white matter, 3 = cerebellum, 4 = midbrain** *Incorrect*
- **1 = corpus callosum, 2 = lateral fissure, 3 = occipital lobe, 4 = Broca's area** *Incorrect*

---

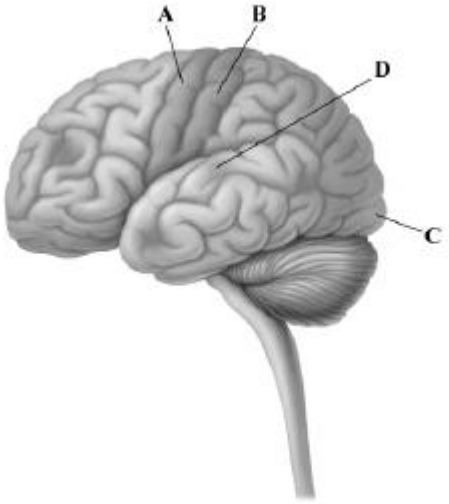
737 **This drawing depicts the left hemisphere of the cerebral cortex. Which letter points to the area where the signals for voluntary muscle movements are initiated?**



- **frontal lobe and primary motor cortex** *(True Answer)Correct*
- **somatosensory cortex** *Incorrect*
- **primary visual cortex** *Incorrect*
- **primary auditory cortex** *Incorrect*

---

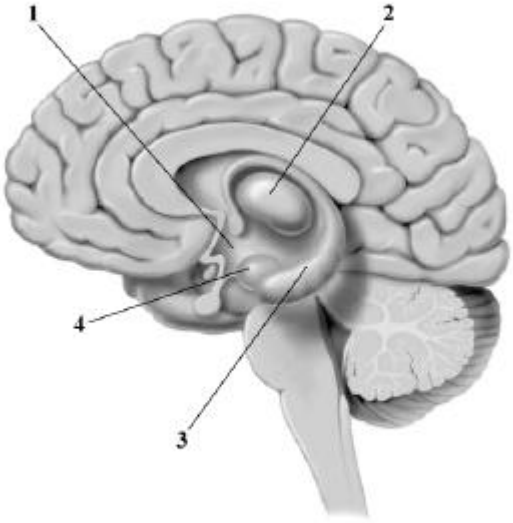
738 **This drawing depicts the left hemisphere of the cerebral cortex. Which letter points to the area where visual information is processed?**



- **primary motor cortex** *Incorrect*
- **somatosensory cortex** *Incorrect*
- **primary visual cortex** *(True Answer)Correct*
- **occipital lobe and primary auditory cortex** *Incorrect*

---

739 **This cross-sectional drawing of the human brain depicts four structures that are key components of the limbic system. Pick the *alternative* that correctly labels the structures in the drawing.**

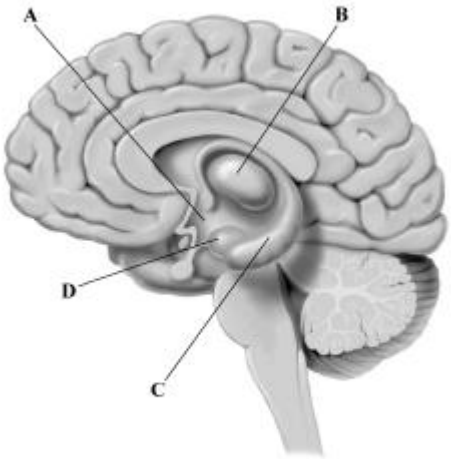


- **1 = hypothalamus, 2 = thalamus, 3 = hippocampus, 4 = amygdala** *(True Answer)Correct*

- **1 = pituitary gland, 2 = corpus callosum, 3 = reticular formation, 4 = hypothalamus** *Incorrect*
- **1 = thalamus, 2 = hypothalamus, 3 = amygdala, 4 = hippocampus** *Incorrect*
- **1 = suprachiasmatic nucleus, 2 = association area, 3 = cerebellum, 4 = hippocampus** *Incorrect*

---

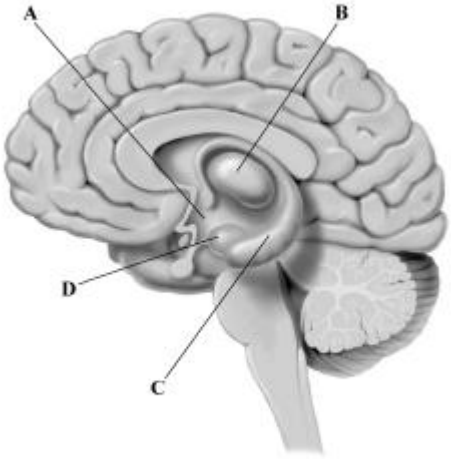
740 **This cross-sectional drawing of the human brain depicts four structures that are key components of the limbic system. Which brain structure plays a critical role in forming new memories?**



- **hypothalamus** *Incorrect*
- **thalamus** *Incorrect*
- **hippocampus** *(True Answer)Correct*
- **amygdala** *Incorrect*

---

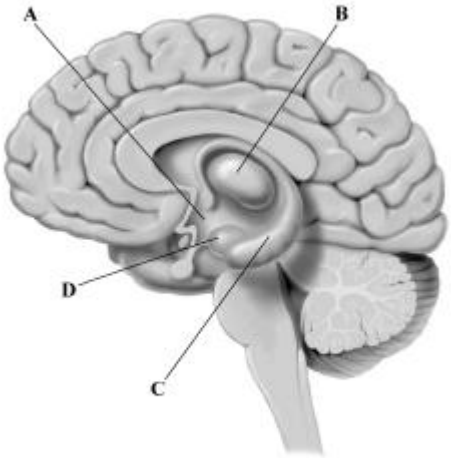
741 **This cross-sectional drawing of the human brain depicts four structures that are key components of the limbic system. Which brain structure processes and integrates information from all the senses, except smell?**



- **hypothalamus** *Incorrect*
- **thalamus** *(True Answer)Correct*
- **hippocampus** *Incorrect*
- **amygdala** *Incorrect*

---

742 **This cross-sectional drawing of the human brain depicts four structures that are key components of the limbic system. Which brain structure regulates survival behaviors, such as eating, drinking, fear, aggression, and sleep–wake cycles?**



- **hypothalamus** *(True Answer)Correct*
- **thalamus** *Incorrect*
- **hippocampus** *Incorrect*
- **amygdala** *Incorrect*

743 **Who is this person and for what is he famous?**

- **German physician and brain anatomist Franz Gall, whose theory of phrenology triggered scientific interest in the possibility of cortical localization** *Incorrect*
- **German psychiatrist and neurologist Karl Wernicke, who studied brain-damaged individuals and identified a brain area on the left temporal lobe of the cerebral cortex that, when damaged, produces meaningless or nonsensical speech and difficulties in verbal or written comprehension** *Incorrect*
- **Pierre Paul Broca, French surgeon and neuroanatomist, who discovered an area on the lower left frontal lobe of the cerebral cortex that, when damaged, produces speech disturbances but no loss of comprehension** *(True Answer)Correct*
- **Neuroscientist Roger Sperry, who studied the specialized abilities of the left and right cerebral hemispheres in split-brain patients** *Incorrect*

744 **Who is this person and for what is he famous?**

- **German psychiatrist and neurologist Karl Wernicke, who identified a brain area on the left temporal lobe of the cerebral cortex that, when damaged, produces meaningless or nonsensical speech and difficulties in verbal or written comprehension** *(True Answer)Correct*
- **Neuroscientist Roger Sperry, who studied the specialized abilities of the left and right cerebral hemispheres in split-brain patients** *Incorrect*
- **Pierre Paul Broca, French surgeon and neuroanatomist, who discovered an area on the lower left frontal lobe of the cerebral cortex that, when damaged, produces speech disturbances but no loss of comprehension** *Incorrect*
- **German physician and brain anatomist Franz Gall, whose theory of phrenology triggered scientific interest in the possibility of cortical localization** *Incorrect*

---

745 **A neuroscientist would be most likely to study which of the following topics?**

- **how conflict affects marital happiness** *Incorrect*
- **which psychological test would best predict job success** *Incorrect*
- **the age at which children understand abstract concepts** *Incorrect*
- **brain development during adolescence** *(True Answer)Correct*

---

746 **The branch of science that is concerned with the study of the nervous system, especially the brain, is called:**

- **interdisciplinary science.** *Incorrect*

- **neuroscience.** *(True Answer)Correct*
- **developmental psychology.** *Incorrect*
- **clinical psychology.** *Incorrect*

---

747 **The branch of psychology that is focused on understanding the internal physical events and processes that correspond with our experiences and behavior is called:**

- **biological psychology.** *(True Answer)Correct*
- **clinical psychology.** *Incorrect*
- **cognitive physiology.** *Incorrect*
- **forensic psychology.** *Incorrect*

---

748 **Neurons are:**

- **found in primates and humans, but not in other animals.** *Incorrect*
- **highly specialized cells that receive and transmit information from one area of the body to another.** *(True Answer)Correct*
- **found only in the spinal cord and bone marrow.** *Incorrect*
- **highly specialized cells that produce myelin.** *Incorrect*

---

749 **There are roughly _____ neurons in the human brain.**

- **500,000** *Incorrect*
- **500 million** *Incorrect*
- **1 billion** *Incorrect*
- **100 billion** *(True Answer)Correct*

---

750 **Which of the following signals muscles to relax or contract?**

- **sensory neurons** *Incorrect*
- **glial cells** *Incorrect*
- **motor neurons** *(True Answer)Correct*
- **interneurons** *Incorrect*

---

751 **Information from specialized cells in the sense organs is conveyed to the brain by:**

- **sensory neurons.** *(True Answer)Correct*
- **glial cells.** *Incorrect*
- **motor neurons.** *Incorrect*

- **hormones.** *Incorrect*

---

752 **The three basic types of neurons are:**

- **glial cells, nodes of Ranvier, and myelin.** *Incorrect*
- **dendritic neurons, axonal neurons, and body neurons.** *Incorrect*
- **excitatory neurons, inhibitory neurons, and interneurons.** *Incorrect*
- **sensory neurons, motor neurons, and interneurons.** *(True Answer)Correct*

---

753 **_____ convey information about the environment from the sense organs to the brain, and _____ communicate information to the muscles and glands.**

- **Interneurons; glial cells** *Incorrect*
- **Excitatory neurons; inhibitory neurons** *Incorrect*
- **Sensory neurons; motor neurons** *(True Answer)Correct*
- **Motor neurons; sensory neurons** *Incorrect*

---

754 **The type of specialized cell whose main function is to communicate between neurons is a(n):**

- **interneuron.** *(True Answer)Correct*
- **glial cell.** *Incorrect*
- **motor neuron.** *Incorrect*
- **sensory neuron.** *Incorrect*

---

755 **Most of the neurons in the human nervous system are:**

- **interneurons.** *(True Answer)Correct*
- **motor neurons.** *Incorrect*
- **sensory neurons.** *Incorrect*
- **glial cells.** *Incorrect*

---

756 **Which of the following statements about the properties of neurons is TRUE?**

- **All neurons are the same size and shape.** *Incorrect*
- **The size and shape of neurons vary a great deal, reflecting their specialized function.** *(True Answer)Correct*
- **Sensory and motor neurons are the same size and shape, and**

interneurons are long and thin. *Incorrect*

- **Motor neurons outnumber interneurons by almost 10 to 1.** *Incorrect*

---

757 **The amount of information that a neuron can receive increases with the number of _____ that the neuron has.**

- **axons** *Incorrect*
- **cell bodies** *Incorrect*
- **glial cells** *Incorrect*
- **dendrites and dendrite branches** *(True Answer)Correct*

---

758 **Which part of the neuron receives messages from other neurons?**

- **the axon** *Incorrect*
- **the nucleus** *Incorrect*
- **the dendrite** *(True Answer)Correct*
- **the sodium ion membrane** *Incorrect*

---

759 **The cell body of a neuron:**

- **provides the energy needed for the neuron to function.** *(True Answer)Correct*
- **manufactures myelin.** *Incorrect*
- **is the long, fluid-filled tube that carries a neuron's message to other body areas.** *Incorrect*
- **receives information directly from other neurons or from sensory receptor cells.** *Incorrect*

---

760 **Which of the following is TRUE about axons?**

- **Neurons that have a myelin sheath do not have an axon.** *Incorrect*
- **Axons often have branches near their tips called axon terminals.** *(True Answer)Correct*
- **Axon terminals receive information from other neurons and from sensory receptor cells.** *Incorrect*
- **Unmyelinated axons fire 20 times faster than do neurons with myelin sheaths.** *Incorrect*

---

761 **Which statement most accurately describes the length of axons?**

- **Most axons are several feet long.** *Incorrect*
- **Most axons are approximately one-tenth of an inch long.** *Incorrect*
- **The length of axons can range from a few thousandths of an inch to 3 or 4 feet.** *(True Answer)Correct*
- **The length of any particular axon changes depending upon whether muscles are stretched or clenched.** *Incorrect*

---

762 **Which of the following statements about glial cells is FALSE?**

- **Glial cells are the glue that holds neurons together, but they play no active role in brain development and function.** *(True Answer)Correct*
- **There are several different kinds of glial cells, each with its own specialized function.** *Incorrect*
- **Glial cells outnumber neurons by about 10 to 1.** *Incorrect*
- **Glial cells provide structural support for neurons throughout the nervous system.** *Incorrect*

---

763 **Most neurons have all of the following parts, EXCEPT:**

- **association areas.** *(True Answer)Correct*
- **a cell body and nucleus.** *Incorrect*
- **dendrites.** *Incorrect*
- **an axon.** *Incorrect*

---

764 **The multiple short fibers that extend from the neuron's cell body and receive information from other neurons or from sensory receptor cells are called:**

- **dendrites.** *(True Answer)Correct*
- **the nodes of Ranvier.** *Incorrect*
- **synaptic vesicles.** *Incorrect*
- **axons.** *Incorrect*

---

765 **A neuron may have thousands of _____, but can have only one _____.**

- **dendrites; axon** *(True Answer)Correct*
- **cell bodies; dendrite** *Incorrect*

- **axons; dendrite** *Incorrect*
- **nodes of Ranvier; synaptic vesicle** *Incorrect*

---

766 **The part of the neuron that carries messages to other cells in the body is the:**

- **dendrite.** *Incorrect*
- **axon.** *(True Answer)Correct*
- **nucleus.** *Incorrect*
- **reticular formation.** *Incorrect*

---

767 **Along with neurons, the human nervous system is made up of _____ cells which greatly outnumber neurons by about 10 to 1.**

- **glial** *(True Answer)Correct*
- **Ranvier** *Incorrect*
- **dendritic** *Incorrect*
- **polarized** *Incorrect*

---

768 **_____ remove waste products from the nervous system, including dead and damaged neurons.**

- **Microglia** *(True Answer)Correct*
- **Astrocytes** *Incorrect*
- **Oligodendrocytes** *Incorrect*
- **Schwann cells** *Incorrect*

---

769 **_____ are the most abundant cells in the human brain.**

- **Microglia** *Incorrect*
- **Astrocytes** *(True Answer)Correct*
- **Oligodendrocytes** *Incorrect*
- **Neurons** *Incorrect*

---

770 **Which of the following is TRUE of glial cells?**

- **They assist neurons by providing nutrition and structural support, and by removing waste products.** *(True Answer)Correct*
- **They are neurons that specifically signal muscles to relax or contract.** *Incorrect*
- **They are neurons that are specialized for conveying information to the brain from receptor cells in the sense organs**

and internal organs. *Incorrect*

- **They are a type of neuron whose primary function is to communicate information from one neuron to the next.** *Incorrect*

---

771 **_____ provide connections between neurons and blood vessels.**

- **Microglia** *Incorrect*
- **Astrocytes** *(True Answer)Correct*
- **Oligodendrocytes** *Incorrect*
- **Schwann cells** *Incorrect*

---

772 **_____ are the most abundant cells in the human brain, provide connections between neurons and blood vessels, and are involved in brain development and the communication of information among neurons.**

- **Microglia** *Incorrect*
- **Astrocytes** *(True Answer)Correct*
- **Oligodendrocytes** *Incorrect*
- **Schwann cells** *Incorrect*

---

773 **The nodes of Ranvier are:**

- **a type of neuron that communicates information from one neuron to another.** *Incorrect*
- **the synaptic vesicles that contain neurotransmitters.** *Incorrect*
- **the ion channels in the membrane of a neuron's axon that open and close during an action potential.** *Incorrect*
- **small gaps in the myelin sheaths that cover some axons.** *(True Answer)Correct*

---

774 **The primary function of the myelin sheath is to:**

- **reduce the speed of neurotransmitters crossing the synaptic gap.** *Incorrect*
- **insulate the axon and increase the speed at which neurons convey their message.** *(True Answer)Correct*
- **provide support and nutrition to the dendrites.** *Incorrect*
- **inhibit the opening and closing of ion channels on the axon's membrane.** *Incorrect*

---

775 **Compared to neurons that do not have myelin, neurons with myelin:**

- **are unable to communicate with other neurons.** *Incorrect*
- **can communicate up to 100 times faster.** *(True Answer)Correct*
- **use much more energy.** *Incorrect*
- **do not have an axon.** *Incorrect*

---

776 **_____ are involved in brain development and the communication of information among neurons.**

- **Microglia** *Incorrect*
- **Astrocytes** *(True Answer)Correct*
- **Oligodendrocytes** *Incorrect*
- **Schwann cells** *Incorrect*

---

777 **Oligodendrocytes and Schwann cells form the _____, which is a fatty covering that is wrapped around the axons of some neurons.**

- **dendrites** *Incorrect*
- **astrocytes** *Incorrect*
- **myelin sheath** *(True Answer)Correct*
- **microglia** *Incorrect*

---

778 **Multiple sclerosis is a disease that involves:**

- **the degeneration of the myelin sheath, slowing or interrupting the transmission of neural messages.** *(True Answer)Correct*
- **an abnormal increase in the thickness of the myelin sheath, blocking the release of neurotransmitters.** *Incorrect*
- **the gradual decline in the ability of neurons to produce neurotransmitters.** *Incorrect*
- **dendrites becoming brittle and breaking.** *Incorrect*

---

779 **As a general rule, communication within a neuron progresses from the:**

- **axon to the dendrites to the cell body.** *Incorrect*
- **dendrites to the cell body to the axon.** *(True Answer)Correct*
- **dendrites to the axon to the axon terminals and then to the cell body.** *Incorrect*

- **cell body to the axon to the nucleus.** *Incorrect*

---

780 **Information is transmitted along the axon:**

- **by glial cells.** *Incorrect*
- **at the speed of light or 186,000 miles per second.** *Incorrect*
- **in the form of a brief electrical impulse.** *(True Answer)Correct*
- **by chemical substances called neurotransmitters.** *Incorrect*

---

781 **The action potential is best defined as:**

- **the amount of serotonin that can cross the axon's membrane.** *Incorrect*
- **the +3- to +7-volt capacity of a typical motor neuron.** *Incorrect*
- **the ability of a motor neuron to either contract or relax a muscle group.** *Incorrect*
- **a brief electrical impulse that transmits information along the axon of a neuron.** *(True Answer)Correct*

---

782 **The analogy used in the book referred to the axon membrane as a "gatekeeper." This means that the membrane:**

- **determines whether an action potential will "pass" through the axon.** *Incorrect*
- **controls the balance of positive and negative ions in the interior and the exterior of the axon.** *(True Answer)Correct*
- **operates in an "all-or-none" fashion, either opening to allow neurotransmitters to pass or not.** *Incorrect*
- **uses the nodes of Ranvier to allow some ions to move out of the axon and neurotransmitters to move into the axon.** *Incorrect*

---

783 **A neuron's resting potential is due to the greater concentration of:**

- **potassium and sodium ions outside of the neuron.** *Incorrect*
- **potassium and sodium ions inside of the neuron.** *Incorrect*
- **potassium ions inside the neuron and the greater concentration of sodium ions outside the neuron.** *(True Answer)Correct*
- **sodium ions inside the neuron and the greater concentration**

of potassium ions outside the neuron. *Incorrect*

---

784 **The stimulus threshold of the neuron refers to the:**

- **minimum level of stimulation required to activate a particular neuron.** *(True Answer)Correct*
- **3-to-1 ratio of positive-to-negative ions required for the neuron to transmit information to the next neuron.** *Incorrect*
- **positive electrical charge on the neuron's interior just prior to neuron activation.** *Incorrect*
- **minimum level of stimulation required to inhibit a neuron from firing.** *Incorrect*

---

785 **When a neuron is in the resting potential state:**

- **it is unable to activate.** *Incorrect*
- **it has a negative electrical charge of about 7 volts.** *Incorrect*
- **the fluid within the axon has a larger concentration of potassium ions than the fluid surrounding the axon.** *(True Answer)Correct*
- **the ion channels are open.** *Incorrect*

---

786 **The electrical charge of a neuron when it is in the resting potential state is about:**

- **+30 millivolts.** *Incorrect*
- **–70 millivolts.** *(True Answer)Correct*
- **+2 volts.** *Incorrect*
- **–10 volts.** *Incorrect*

---

787 **When a neuron is polarized:**

- **the exterior fluid surrounding the neuron is more negatively charged than the interior of the neuron.** *Incorrect*
- **an action potential will travel down the dendrites causing the release of neurotransmitters.** *Incorrect*
- **the electrical charge across the neuron's membrane is balanced with the same charge outside as inside.** *Incorrect*
- **the interior of the neuron is more negatively charged than the exterior fluid surrounding the neuron.** *(True Answer)Correct*

---

788 **Which of the following is TRUE regarding action potentials?**

- **Partial action potentials result in fewer neurotransmitter molecules being released than whole action potentials.** *Incorrect*
- **Action potentials operate under the "all-or-none law," which means that action potentials either move all sodium ions across the membrane or none of the sodium ions across the membrane.** *Incorrect*
- **Once an action potential is started, it is self-sustaining and continues to the end of the axon.** *(True Answer)Correct*
- **Action potentials regenerate themselves during their refractory periods when the axon membrane is depolarized.** *Incorrect*

---

789 **The all-or-none law refers to the fact that:**

- **the myelin sheath either completely covers an axon or it does not.** *Incorrect*
- **the resting potential occurs only when the neuron is completely depolarized.** *Incorrect*
- **either the neuron is sufficiently stimulated and an action potential occurs or it is not sufficiently stimulated and the action potential does not occur.** *(True Answer)Correct*
- **a neurotransmitter is completely reabsorbed by the presynaptic neuron or it is dissolved in the synaptic gap.** *Incorrect*

---

790 **What occurs during the refractory period?**

- **The neuron depolarizes.** *Incorrect*
- **Neurotransmitters are released by the dendrites.** *Incorrect*
- **The charge of the neuron's interior increases to about +60 millivolts.** *Incorrect*
- **The neuron reestablishes the negative-inside/positive-outside condition.** *(True Answer)Correct*

---

791 **An action potential occurs when:**

- **sodium ions enter the axon's interior, causing a brief positive electrical impulse.** *(True Answer)Correct*

- **potassium ions are electrically transformed into sodium ions.** *Incorrect*
- **polarized dendrites stimulate adjoining nodes of Ranvier.** *Incorrect*
- **potassium ions enter the dendrites and sodium ions exit the axon, causing depolarization and a brief negative electrical charge.** *Incorrect*

---

792 **The action potential is produced by the:**

- **movement of neurotransmitters across the ion channels.** *Incorrect*
- **opening and closing of the nodes in the myelin sheath.** *Incorrect*
- **reuptake of the neurotransmitters into the vesicles.** *Incorrect*
- **movement of ions across the membrane of the axon.** *(True Answer)Correct*

---

793 **Which of the following represents the sequence of ion movements that causes an action potential?**

- **Sodium ions move into the axon and then potassium ions move out of the axon.** *(True Answer)Correct*
- **Sodium ions move out of the axon and then potassium ions move into the dendrite.** *Incorrect*
- **Potassium ions move out of the dendrite and then sodium ions move into the axon.** *Incorrect*
- **Sodium ions move out of the axon and then potassium ions move into the axon.** *Incorrect*

---

794 **What is the result of sodium ions moving across the axon's membrane during an action potential?**

- **The inside of the axon changes to a negative electrical charge.** *Incorrect*
- **The outside of the axon changes to a positive electrical charge.** *Incorrect*
- **The inside of the axon changes to a positive electrical charge.** *(True Answer)Correct*
- **The nodes of Ranvier close.** *Incorrect*

---

795 **What keeps an action potential continuing down an axon?**

- **At each successive segment of the axon, the action potential is regenerated by depolarization and the movement of ions across the axon's membrane.** *(True Answer)Correct*
- **Neurotransmitters are constantly being released to generate the action potential at each successive segment of the axon.** *Incorrect*
- **Action potentials are conducted down the axon just as electricity is conducted through a wire.** *Incorrect*
- **Ion channels open and close at the nodes of Ranvier, allowing neurotransmitters to enter into the axon and regenerate an action potential at each node.** *Incorrect*

---

796 **Which two factors affect the speed at which the action potential is conducted along a neuron's axon?**

- **the diameter of the axon and whether the axon is wrapped with a myelin sheath** *(True Answer)Correct*
- **the number of dendrites and the size of the cell body** *Incorrect*
- **the type and number of axons projecting from the neuron** *Incorrect*
- **the size of the positive electrical charge just before an action potential occurs and the number of adjacent neurons** *Incorrect*

---

797 **The fastest neurons in the human body communicate their messages at:**

- **the speed of light, or 186,000 miles per second.** *Incorrect*
- **speeds up to 270 miles per hour.** *(True Answer)Correct*
- **the speed of sound, or about 770 miles per hour.** *Incorrect*
- **only about 10 miles per hour.** *Incorrect*

---

798 **In myelinated axons, where are the sodium ion channels concentrated?**

- **at each of the nodes of Ranvier** *(True Answer)Correct*
- **near the site of neurotransmitter release** *Incorrect*
- **along the dendrites** *Incorrect*
- **wherever myelin is covering the axon** *Incorrect*

---

799 **How are action potentials different in a myelinated axon and an unmyelinated axon?**

- **Action potentials are slower in myelinated axons because the myelin sheath interferes with the transfer of ions across the**

membrane. *Incorrect*

- **Action potentials "jump" from node to node in myelinated axons rather than progressing down the entire length of the axon.** *(True Answer)Correct*
- **Action potentials have greater electrical charges in myelinated axons.** *Incorrect*
- **Action potentials in myelinated axons operate according to the "all-or-none law" but action potentials in unmyelinated axons do not.** *Incorrect*

---

800 **The presynaptic neuron and the postsynaptic neuron are separated by a tiny, fluid-filled space called the:**

- **myelin sheath.** *Incorrect*
- **synaptic gap.** *(True Answer)Correct*
- **the node of Ranvier.** *Incorrect*
- **ion channel.** *Incorrect*

---

801 **Communication between two neurons occurs at the:**

- **nucleus.** *Incorrect*
- **node of Ranvier.** *Incorrect*
- **ion channel.** *Incorrect*
- **synapse.** *(True Answer)Correct*

---

802 **Presynaptic neuron is to postsynaptic neuron as:**

- **synapse is to neurotransmitters.** *Incorrect*
- **receptors are to neurotransmitters.** *Incorrect*
- **electrical communication is to chemical communication.** *Incorrect*
- **message-sending neuron is to message-receiving neuron.** *(True Answer)Correct*

---

803 **The most common form of communication between neurons is:**

- **chemical.** *(True Answer)Correct*
- **electrical.** *Incorrect*
- **magnetic.** *Incorrect*
- **hormonal.** *Incorrect*

---

804 **Which of the following best defines a neurotransmitter?**

- **a chemical messenger that crosses the synaptic gap between neurons** *(True Answer)Correct*
- **an electrical impulse that crosses the synaptic gap between neurons** *Incorrect*
- **a chemical communicator manufactured by glial cells** *Incorrect*
- **a microscopic channel through which sodium and potassium ions pass** *Incorrect*

---

805 **Synaptic vesicles contain:**

- **hormones.** *Incorrect*
- **ions.** *Incorrect*
- **neurotransmitters.** *(True Answer)Correct*
- **receptors.** *Incorrect*

---

806 **In synaptic transmission, the action potential stimulates the release of:**

- **potassium ions by the glial cells.** *Incorrect*
- **neurotransmitters by the synaptic vesicles.** *(True Answer)Correct*
- **myelin by the glial cells.** *Incorrect*
- **sodium ions by the dendrites.** *Incorrect*

---

807 **What happens to the neurotransmitters that fail to attach to a receptor site?**

- **In a process called reuptake, they are reabsorbed by the sending neuron and recycled.** *(True Answer)Correct*
- **They bind with potassium ions.** *Incorrect*
- **They are destroyed by glial cells.** *Incorrect*
- **In a process called depolarization, they are neutralized by negative ions.** *Incorrect*

---

808 **Which of the following statements is FALSE?**

- **A given neuron can have thousands of synapses with other neurons.** *Incorrect*
- **Some neurons can manufacture three or more different types**

of neurotransmitters. *Incorrect*

- **Synaptic vesicles are released into the synaptic gap, then "dock" with the adjoining neurons.** *(True Answer)Correct*
- **It only takes a few millionths of a second for neurotransmitters to cross the synaptic gap.** *Incorrect*

---

809 **Like a key in a lock, the shape of the _____ must fit the _____ to affect the postsynaptic neuron.**

- **dendrite; axon terminal** *Incorrect*
- **cell body; axon terminal** *Incorrect*
- **neurotransmitter; receptor site** *(True Answer)Correct*
- **synaptic vesicle; receptor site** *Incorrect*

---

810 **When neurotransmitters communicate an excitatory message to the postsynaptic neuron:**

- **the postsynaptic neuron is more likely to generate an action potential.** *(True Answer)Correct*
- **the presynaptic neuron is more likely to generate an action potential.** *Incorrect*
- **the action potential is canceled out.** *Incorrect*
- **reuptake is inhibited.** *Incorrect*

---

811 **When a neurotransmitter communicates an inhibitory message to a postsynaptic neuron, the:**

- **postsynaptic neuron is more likely to have an action potential.** *Incorrect*
- **postsynaptic neuron is less likely to have an action potential.** *(True Answer)Correct*
- **presynaptic neuron is more likely to have an action potential.** *Incorrect*
- **presynaptic neuron is less likely to have an action potential.** *Incorrect*

---

812 **If a postsynaptic neuron receives an excitatory and an inhibitory message at the same time, what happens?**

- **An action potential will occur in the postsynaptic neuron because of the excitatory message.** *Incorrect*
- **An action potential will occur in the postsynaptic neuron because of the inhibitory message.** *Incorrect*
- **The excitatory and the inhibitory messages cancel each other**

out. *(True Answer)Correct*

- **Reuptake is less likely to occur because the excitatory and inhibitory messages cancel the reuptake mechanism.** *Incorrect*

---

813 **On average, each neuron in the brain communicates directly with _____ other neurons.**

- **100** *Incorrect*
- **100 billion** *Incorrect*
- **100 trillion** *Incorrect*
- **1,000** *(True Answer)Correct*

---

814 **Neurotransmitters:**

- **are chemical messengers that are secreted into the bloodstream primarily by endocrine glands.** *Incorrect*
- **are present in extremely small quantities in the brain.** *(True Answer)Correct*
- **are constantly changing their basic molecular shape as the human brain adapts to new experiences.** *Incorrect*
- **compete with sodium and potassium ions for the receptor sites on the surrounding neurons.** *Incorrect*

---

815 **A particular neurotransmitter:**

- **always communicates either an excitatory or inhibitory effect.** *Incorrect*
- **can have different effects, depending upon the receptor site to which it attaches.** *(True Answer)Correct*
- **can be located in the central nervous system or the peripheral nervous system but not both.** *Incorrect*
- **can attach to any available receptor site on adjacent neurons.** *Incorrect*

---

816 **The neurotransmitter called acetylcholine:**

- **is found in all sensory neurons.** *Incorrect*
- **is involved in muscle contractions and memory.** *(True Answer)Correct*
- **can cause hallucinations when present in abnormally excessive amounts.** *Incorrect*

- **is chemically identical to heroin.** *Incorrect*

---

817 **Acetylcholine is:**

- **found in sensory neurons but not motor neurons.** *Incorrect*
- **involved in movement and memory.** *(True Answer)Correct*
- **manufactured by glial cells.** *Incorrect*
- **dramatically decreased in the brains of people with Parkinson's disease.** *Incorrect*

---

818 **All motor neurons manufacture:**

- **acetylcholine.** *(True Answer)Correct*
- **dopamine.** *Incorrect*
- **serotonin.** *Incorrect*
- **L-dopa.** *Incorrect*

---

819 **Which of the following neurotransmitters is implicated in Alzheimer's disease?**

- **serotonin** *Incorrect*
- **dopamine** *Incorrect*
- **acetylcholine** *(True Answer)Correct*
- **GABA** *Incorrect*

---

820 **Rachel had injections of Botox in an attempt to eliminate facial wrinkles. Botox contains minute amounts of botulin, an extremely lethal substance produced by bacteria, and works by blocking the release of a specific neurotransmitter from motor neurons, causing muscle paralysis. This neurotransmitter, found in all motor neurons, is called:**

- **dopamine.** *Incorrect*
- **serotonin.** *Incorrect*
- **acetylcholine.** *(True Answer)Correct*
- **GABA.** *Incorrect*

---

821 **Too little dopamine in the brain is associated with symptoms of:**

- **schizophrenia.** *Incorrect*
- **Parkinson's disease.** *(True Answer)Correct*
- **anxiety.** *Incorrect*
- **Alzheimer's disease.** *Incorrect*

822 **Evidence suggests that the addictiveness of some drugs, including cocaine and nicotine, is related to increases in the activity of which of the following neurotransmitters?**

- **dopamine** *(True Answer)Correct*
- **serotonin** *Incorrect*
- **acetylcholine** *Incorrect*
- **GABA** *Incorrect*

---

823 **Parkinson's disease is caused by the degeneration of neurons that produce:**

- **GABA.** *Incorrect*
- **norepinephrine.** *Incorrect*
- **dopamine.** *(True Answer)Correct*
- **acetylcholine.** *Incorrect*

---

824 **_____ is to Alzheimer's disease as _____ is to Parkinson's disease.**

- **Dopamine; serotonin** *Incorrect*
- **Acetylcholine; dopamine** *(True Answer)Correct*
- **Serotonin; norepinephrine** *Incorrect*
- **Norepinephrine; serotonin** *Incorrect*

---

825 **The drug called L-dopa:**

- **is used to treat people suffering from schizophrenia.** *Incorrect*
- **blocks pain signals.** *Incorrect*
- **is found in all sensory neurons.** *Incorrect*
- **converts to dopamine in the brain.** *(True Answer)Correct*

---

826 **Over the course of several months and for no apparent reason, Jennifer became progressively more despondent, withdrawn, and listless. Her doctor accurately diagnosed the problem as major depression and started Jennifer on an antidepressant drug called Prozac. Three weeks later, Jennifer was much improved. Like some other antidepressant drugs, Prozac works by _____ the availability of _____ in the brain.**

- **increasing; serotonin** *(True Answer)Correct*
- **decreasing; dopamine** *Incorrect*
- **increasing; endorphins** *Incorrect*

- **decreasing; acetylcholine** *Incorrect*

---

827 **Former heavyweight boxer Muhammad Ali suffers from symptoms that are very similar to Parkinson's disease. He sometimes experiences muscle tremors and has difficulty initiating movements or speech. To help reduce these symptoms, Ali takes a drug called:**

- **naloxone.** *Incorrect*
- **atropine.** *Incorrect*
- **L-dopa.** *(True Answer)Correct*
- **morphine.** *Incorrect*

---

828 **Like other people afflicted with _____, actor Michael J. Fox takes a medication that increases _____ levels to help control symptoms of the disease.**

- **Alzheimer's disease; GABA** *Incorrect*
- **depression; serotonin** *Incorrect*
- **obsessive-compulsive disorder; GABA** *Incorrect*
- **Parkinson's disease; dopamine** *(True Answer)Correct*

---

829 **Antianxiety medications such as Valium and Xanax work by _____ in the brain.**

- **increasing dopamine activity** *Incorrect*
- **increasing GABA activity** *(True Answer)Correct*
- **decreasing norepinephrine activity** *Incorrect*
- **decreasing endorphin activity** *Incorrect*

---

830 **Which of the following drugs is chemically similar to the endorphins?**

- **curare** *Incorrect*
- **morphine** *(True Answer)Correct*
- **L-dopa** *Incorrect*
- **botox** *Incorrect*

---

831 **The term *endorphin* is actually a combination of the words _____ and _____.**

- **endogenous; morphine** *(True Answer)Correct*
- **endogenous; pheromone** *Incorrect*
- **endocrine; norepinephrine** *Incorrect*
- **endocrine; dopamine** *Incorrect*

---

832 **Which of the following is one of the phenomena mentioned in the text that is associated with increased endorphin levels?**

- **addiction to nicotine** *Incorrect*
- **muscle spasms during aerobic exercise** *Incorrect*
- **the pain-relieving effects of acupuncture** *(True Answer)Correct*
- **the relaxation produced by drinking alcohol** *Incorrect*

---

833 **After surgery, physicians may prescribe a medication to relieve pain. Such a medication would most likely mimic the effects of _____.**

- **dopamine** *Incorrect*
- **endorphins** *(True Answer)Correct*
- **serotonin** *Incorrect*
- **GABA** *Incorrect*

---

834 **During a rest stop while hiking, Phil was bitten by a black widow spider. Shortly after being bitten, he started having breathing difficulties, then experienced muscle spasms. The symptoms he experienced occurred because the black widow spider's venom:**

- **blocked acetylcholine receptor sites on motor neurons.** *Incorrect*
- **blocked the release of serotonin from sending neurons.** *Incorrect*
- **shut down the functioning of the substantia nigra in Phil's brain.** *Incorrect*
- **caused acetylcholine to be continuously released by the motor neurons.** *(True Answer)Correct*

---

835 **Which of the following is NOT one of the ways discussed in the text that drugs can interfere with synaptic transmission?**

- **by blocking a receptor site and preventing the neurotransmitter from acting** *Incorrect*
- **by mimicking a particular neurotransmitter and producing the same effect** *Incorrect*
- **by increasing the length of time a neurotransmitter remains in the synaptic gap, strengthening its effects** *Incorrect*
- **by bonding with the neurotransmitter and changing its molecular weight and shape** *(True Answer)Correct*

---

836 **The involvement of the brain's opioid system in "runner's high" suggests one possible explanation for why:**

- **endurance athletes enter a meditative state during long training sessions.** *Incorrect*
- **sedentary people find it so difficult to begin an exercise routine.** *Incorrect*
- **some people can become addicted to excessive exercise.** *(True Answer)Correct*
- **athletes perform better when cheered on by a crowd.** *Incorrect*

---

837 **Miguel jogs about five miles a day. At roughly the three-mile point, Miguel usually experiences a rush of positive feelings due to _____ levels of _____.**

- **decreased; norepinephrine** *Incorrect*
- **increased; serotonin** *Incorrect*
- **increased; endorphins** *(True Answer)Correct*
- **decreased; GABA** *Incorrect*

---

838 **The rush of euphoria that many people experience after sustained exercise, especially running or cycling, is called:**

- **neurogenesis.** *Incorrect*
- **the "synaptic rush."** *Incorrect*
- **the "split-brain" high.** *Incorrect*
- **the "runner's high."** *(True Answer)Correct*

---

839 **Randy exercises more than most people and continues to train even when he has a cold or an injury. His friends joke that Randy seems addicted to exercise. According to Focus on Neuroscience, Randy's compulsive exercising:**

- **may be due to the involvement of his brain's opioid system and the production of endorphins.** *(True Answer)Correct*
- **is an indicator of decreased levels of dopamine and increased risk of Parkinson's disease.** *Incorrect*
- **may be due to the involvement of his limbic system and the production of acetylcholine.** *Incorrect*
- **is an indicator of the overproduction of dopamine and an increased risk of schizophrenia.** *Incorrect*

---

840 **Researchers using PET scans to study the opioid system in long-distance runners are likely to find increased brain levels of _____ following a long run.**

- **acetylcholine** *Incorrect*
- **endorphins** *(True Answer)Correct*
- **GABA** *Incorrect*
- **cerebrospinal fluid** *Incorrect*

---

841 **How does cocaine achieve its effects?**

- **It mimics dopamine.** *Incorrect*
- **It interferes with the reuptake of dopamine.** *(True Answer)Correct*
- **It mimics serotonin.** *Incorrect*
- **It blocks the reuptake of endorphins.** *Incorrect*

---

842 **Which of the following drugs mimics the neurotransmitter acetylcholine?**

- **Prozac** *Incorrect*
- **L-dopa** *Incorrect*
- **nicotine** *(True Answer)Correct*
- **morphine** *Incorrect*

---

843 **A(n) _____ is a drug or other chemical that binds to a receptor site and triggers a response in the cell.**

- **antagonist** *Incorrect*
- **endorphin** *Incorrect*
- **agonist** *(True Answer)Correct*
- **opiate** *Incorrect*

---

844 **An agonist is a drug or other chemical that:**

- **blocks a receptor site and inhibits or prevents a response in the receiving cell.** *Incorrect*
- **binds to a receptor site and triggers a response in the cell.** *(True Answer)Correct*
- **is released in response to stress or trauma and reduces the perception of pain.** *Incorrect*
- **blocks the reuptake of serotonin, increasing its effect.** *Incorrect*

---

845 **Nicotine binds to acetylcholine receptor sites, stimulating skeletal muscles and causing the heart to beat more rapidly. Thus, nicotine is a(n):**

- **endorphin.** *Incorrect*
- **SSRI.** *Incorrect*
- **agonist.** *(True Answer)Correct*
- **antagonist.** *Incorrect*

---

846 **Prozac and cocaine are very different drugs, but they achieve their effects through the same mechanism of action. What is that mechanism?**

- **Both drugs block GABA.** *Incorrect*
- **Both drugs mimic GABA.** *Incorrect*
- **Both drugs interfere with the reuptake of certain neurotransmitters.** *(True Answer)Correct*
- **Both drugs occupy the receptor sites for opiates.** *Incorrect*

---

847 **Some native peoples of South America use the drug curare to poison the tips of their hunting arrows. When an animal is struck by the arrow, it goes limp and quickly suffocates. Why?**

- **Serotonin floods into the synaptic gap.** *Incorrect*
- **Dopamine reuptake is blocked.** *Incorrect*
- **Acetylcholine receptor sites are blocked.** *(True Answer)Correct*
- **Endorphin receptor sites are destroyed.** *Incorrect*

---

848 **A(n) _____ is a drug or other chemical that blocks a receptor site and inhibits or prevents a response in the receiving cell.**

- **antagonist** *(True Answer)Correct*
- **endorphin** *Incorrect*
- **agonist** *Incorrect*
- **opiate** *Incorrect*

---

849 **An antagonist is a drug or other chemical that:**

- **blocks a receptor site and inhibits or prevents a response in the receiving cell.** *(True Answer)Correct*
- **binds to a receptor site and triggers a response in the cell.** *Incorrect*
- **is released in response to stress or trauma and reduces the perception of pain.** *Incorrect*
- **blocks the reuptake of serotonin, increasing its effect.** *Incorrect*

---

850 **The drug *curare* blocks acetylcholine receptor sites, causing virtually instantaneous paralysis. Thus, curare is a(n):**

- **endorphin.** *Incorrect*
- **SSRI.** *Incorrect*
- **agonist.** *Incorrect*
- **antagonist.** *(True Answer)Correct*

---

851 **The drug *naloxone* acts as a(n) _____ at opioid receptor sites and eliminates the effects of both endorphins and opiates.**

- **endorphin** *Incorrect*
- **SSRI** *Incorrect*
- **agonist** *Incorrect*
- **antagonist** *(True Answer)Correct*

---

852 **Because it is an opioid _____, *naloxone* prevents or reverses the effects of opioid drugs and can be used to treat an overdose of heroin or similar drugs.**

- **endorphin** *Incorrect*
- **SSRI** *Incorrect*
- **agonist** *Incorrect*
- **antagonist** *(True Answer)Correct*

---

853 **The two main divisions of the nervous system are the _____ and the _____.**

- **peripheral nervous system; central nervous system** *(True Answer)Correct*
- **central nervous system; autonomic nervous system** *Incorrect*
- **brain; spinal cord** *Incorrect*
- **autonomic nervous system; somatic nervous system** *Incorrect*

---

854 **Nerves are made up of:**

- **bundles of axons.** *(True Answer)Correct*
- **dendritic fibers.** *Incorrect*
- **bundles of cell bodies.** *Incorrect*
- **glial cells.** *Incorrect*

---

855 **In combination, the brain and spinal cord make up the:**

- **peripheral nervous system.** *Incorrect*
- **autonomic nervous system.** *Incorrect*
- **central nervous system.** *(True Answer)Correct*
- **somatic nervous system.** *Incorrect*

---

856 **What is a function of cerebrospinal fluid?**

- **It protects the central nervous system from being jarred.** *(True Answer)Correct*
- **It promotes the release of hormones in the brain.** *Incorrect*
- **It can function as a neurotransmitter in times of severe stress.** *Incorrect*
- **It is the communication link between the central nervous system and the peripheral nervous system.** *Incorrect*

---

857 **There are four hollow cavities in the brain, called _____, which are filled with cerebrospinal fluid and whose surfaces are lined with _____, specialized cells that produce neurons in the developing brain.**

- **neural pathways; neurogenetic cells** *Incorrect*
- **ventricles; neural stem cells** *(True Answer)Correct*
- **synaptic vesicles; myelin** *Incorrect*
- **axon terminals; GABA** *Incorrect*

---

858 **Which of the following statements is FALSE?**

- **The central nervous system is protected by bone.** *Incorrect*
- **The brain is suspended in cerebrospinal fluid to help protect it.** *Incorrect*
- **The peripheral nervous system consists of the brain and spinal cord.** *(True Answer)Correct*
- **The spinal cord handles both incoming and outgoing messages.** *Incorrect*

---

859 **_____ are to the central nervous system as _____ are to the peripheral nervous system.**

- **Axons; dendrites** *Incorrect*
- **Neurons; nerves** *(True Answer)Correct*
- **Myelin sheaths; neurotransmitters** *Incorrect*
- **Neurotransmitters; hormones** *Incorrect*

---

860 **Professor Romero discovered that the overhead projector in her classroom had a short in the wiring system. When she touched the metal edge of the projector, she got an electric shock and instantly jerked her hand back. This instantaneous reaction is an example of:**

- **aphasia.** *Incorrect*
- **hemispheric specialization.** *Incorrect*
- **the brain's structural plasticity.** *Incorrect*
- **a spinal reflex.** *(True Answer)Correct*

---

861 **Thomas was distracted as he was cooking, and he inadvertently touched a very hot dish. Instantaneously, he jerked his hand back, a reflexive action that was processed:**

- **in his spinal cord.** *(True Answer)Correct*
- **simultaneously in his spinal cord and brain.** *Incorrect*
- **first in his brain, then a moment later in his spinal cord.** *Incorrect*
- **with no involvement of the central nervous system.** *Incorrect*

---

862 **In the _____, information is communicated along nerves.**

- **central nervous system** *Incorrect*
- **peripheral nervous system** *(True Answer)Correct*
- **limbic system** *Incorrect*
- **endocrine system** *Incorrect*

---

863 **The peripheral nervous system is made up of:**

- **the brain.** *Incorrect*
- **the brain and the spinal cord.** *Incorrect*
- **all the nerves lying outside the central nervous system.** *(True Answer)Correct*
- **motor neurons.** *Incorrect*

---

864 **The two main subdivisions of the peripheral nervous system are the _____ nervous system and the _____ nervous system.**

- **sympathetic; parasympathetic** *Incorrect*
- **somatic; autonomic** *(True Answer)Correct*
- **autonomic; sympathetic** *Incorrect*
- **parasympathetic; somatic** *Incorrect*

---

865 **As you are taking a test, you inadvertently drop your pencil, reach down, pick it up, and put it back on the desk. This voluntary action involved motor signals that were communicated out to your muscles via the _____ nervous system.**

- **autonomic** *Incorrect*
- **sympathetic** *Incorrect*
- **parasympathetic** *Incorrect*
- **somatic** *(True Answer)Correct*

---

866 **As you are walking on a beach, you pick up an odd-looking seashell that has a very rough texture. As you rub your fingers over the shell, the sensory messages are communicated via the _____ nervous system to the central nervous system.**

- **somatic** *(True Answer)Correct*
- **autonomic** *Incorrect*
- **sympathetic** *Incorrect*
- **parasympathetic** *Incorrect*

---

867 **While taking this test, you have probably paid little attention to ongoing body functions, such as breathing, heartbeat, and digestion. Such involuntary bodily functions are governed by the:**

- **somatic nervous system.** *Incorrect*
- **cerebrospinal fluid.** *Incorrect*
- **spinal reflexes.** *Incorrect*
- **autonomic nervous system.** *(True Answer)Correct*

---

868 **The autonomic nervous system is composed of two different branches called the _____ and _____ nervous systems.**

- **somatic; endocrine** *Incorrect*
- **sympathetic; parasympathetic** *(True Answer)Correct*
- **endocrine; sympathetic** *Incorrect*
- **involuntary; voluntary** *Incorrect*

---

869 **Paul was awakened by a thumping noise in the middle of the night. Frightened, he jumped out of bed to investigate. Hearing a muffled meow, Paul realized that his cat was shut in the closet and was pushing against the door. Breathing a sigh of relief, Paul let the cat out of the closet and went back to bed. Which subdivision of the nervous system helped calm down and restore Paul's body functioning back to normal?**

- **parasympathetic** *(True Answer)Correct*

- **endocrine** *Incorrect*
- **sympathetic** *Incorrect*
- **somatic** *Incorrect*

---

870 **The heightened physical arousal that characterizes the fight-or-flight response involves the _____ branch of the nervous system.**

- **spinal** *Incorrect*
- **somatic** *Incorrect*
- **sympathetic** *(True Answer)Correct*
- **parasympathetic** *Incorrect*

---

871 **In general, the sympathetic nervous system _____, while the parasympathetic nervous system _____.**

- **arouses and mobilizes; maintains and conserves** *(True Answer)Correct*
- **transmits sensory information; transmits motor information** *Incorrect*
- **maintains and conserves; arouses and mobilizes** *Incorrect*
- **transmits motor information; transmits sensory information** *Incorrect*

---

872 **Maria heard a strange banging noise just outside her bedroom window in the middle of the night. She froze in fear, and her heart began to pound. Maria's heightened physical arousal involved the activation of which subdivision of the nervous system?**

- **endocrine** *Incorrect*
- **parasympathetic** *Incorrect*
- **sympathetic** *(True Answer)Correct*
- **reticular** *Incorrect*

---

873 **The endocrine system involves communication by chemical messengers called _____, which circulate through the _____.**

- **hormones; bloodstream** *(True Answer)Correct*
- **neurotransmitters; spinal cord** *Incorrect*
- **hormones; cerebrospinal fluid** *Incorrect*
- **endorphins; nervous system** *Incorrect*

---

874 **Which of the following help regulate blood pressure, metabolism, and reproduction?**

- **myelin** *Incorrect*

- **endorphins** *Incorrect*
- **glial cells** *Incorrect*
- **hormones** *(True Answer)Correct*

---

875 **How does communication in the endocrine system differ from communication in the nervous system?**

- **Communication in the nervous system is slower than communication in the endocrine system.** *Incorrect*
- **Communication in the endocrine system is slower than communication in the nervous system.** *(True Answer)Correct*
- **Endocrine system cells can receive messages but cannot transmit messages.** *Incorrect*
- **While both inhibitory and excitatory messages can be transmitted by cells in the nervous system, endocrine system cells can only transmit excitatory messages.** *Incorrect*

---

876 **Which gland directly regulates the production of hormones in other endocrine glands?**

- **the adrenal gland** *Incorrect*
- **the thyroid gland** *Incorrect*
- **the pituitary gland** *(True Answer)Correct*
- **the pancreas** *Incorrect*

---

877 **Prolactin and oxytocin are _____ produced by the _____.**

- **neurotransmitters; synaptic vesicles** *Incorrect*
- **hormones; pituitary gland** *(True Answer)Correct*
- **neurotransmitters; adrenal glands** *Incorrect*
- **hormones; adrenal glands** *Incorrect*

---

878 **Which gland produces melatonin, a hormone that helps to regulate our sleep–wake cycle?**

- **the pineal gland** *(True Answer)Correct*
- **the pituitary gland** *Incorrect*
- **the pancreas** *Incorrect*
- **the thyroid gland** *Incorrect*

---

879 **The _____ is involved in regulating sleep–wake cycles, and the _____ is involved in regulating blood sugar levels and hunger.**

- **thyroid gland; pituitary gland** *Incorrect*

- **pineal gland; pancreas** *(True Answer)Correct*
- **adrenal gland; pineal gland** *Incorrect*
- **pancreas; thyroid gland** *Incorrect*

---

880 **Growth hormone, prolactin, oxytocin, and the gonadotropins are all secreted by:**

- **the pineal gland.** *Incorrect*
- **the adrenal medulla.** *Incorrect*
- **the pituitary gland.** *(True Answer)Correct*
- **the hypothalamus.** *Incorrect*

---

881 **The adrenal glands produce hormones that are involved in:**

- **reproduction.** *Incorrect*
- **stress.** *(True Answer)Correct*
- **metabolism.** *Incorrect*
- **sleep.** *Incorrect*

---

882 **Another word for *epinephrine* is:**

- **adrenaline.** *(True Answer)Correct*
- **progesterone.** *Incorrect*
- **glutamate.** *Incorrect*
- **testosterone.** *Incorrect*

---

883 **The physical arousal that accompanies the fight-or-flight response involves the activation of which of the following endocrine glands?**

- **the testes in males and the ovaries in females** *Incorrect*
- **the pineal gland** *Incorrect*
- **the thyroid gland** *Incorrect*
- **the adrenal medulla** *(True Answer)Correct*

---

884 **The main link between the nervous system and the endocrine system is the:**

- **adrenal cortex.** *Incorrect*
- **hypothalamus.** *(True Answer)Correct*
- **pineal gland.** *Incorrect*
- **pancreas.** *Incorrect*

---

885 **In males, the gonads are the _____, which secrete _____.**

- **ovaries; androgens, including testosterone** *Incorrect*
- **testes; androgens, including testosterone** *(True Answer)Correct*
- **ovaries; estrogen and progesterone** *Incorrect*
- **testes; estrogen and progesterone** *Incorrect*

---

886 **In females, the gonads are the _____, which secrete _____.**

- **ovaries; testosterone** *Incorrect*
- **testes; testosterone** *Incorrect*
- **ovaries; estrogen and progesterone** *(True Answer)Correct*
- **testes; estrogen and progesterone** *Incorrect*

---

887 **As you're eating lunch with a friend, you reach for your glass of water with your right hand, lift it to your lips, take a sip, and then set it down. This simple task involved:**

- **only the primary motor cortex in the brain.** *Incorrect*
- **neuroplasticity.** *Incorrect*
- **multiple brain structures and regions communicating via neural pathways.** *(True Answer)Correct*
- **just the right hemisphere of the brain.** *Incorrect*

---

888 **Many brain functions involve the activation of _____ that link different brain regions.**

- **hormones** *Incorrect*
- **reflexes** *Incorrect*
- **neural pathways** *(True Answer)Correct*
- **nerves** *Incorrect*

---

889 **Although your text talks about brain centers and structures that are involved in different aspects of behavior, the best way to think of the brain is as a(n):**

- **integrated system.** *(True Answer)Correct*
- **neural network.** *Incorrect*
- **computer memory device.** *Incorrect*
- **neural pathway.** *Incorrect*

---

890 **The brain's ability to change function and structure is referred to as:**

- **synaptic transmission.** *Incorrect*
- **neurogenesis.** *Incorrect*
- **neuroplasticity.** *(True Answer)Correct*
- **cortical localization.** *Incorrect*

---

891 **Neuroplasticity, or simply plasticity, refers to the brain's ability to:**

- **generate new neurons.** *Incorrect*
- **change function and structure.** *(True Answer)Correct*
- **change structure but not function.** *Incorrect*
- **change function but not structure.** *Incorrect*

---

892 ***Phrenology*** **refers to:**

- **the study of brain/endocrine system interactions.** *Incorrect*
- **a pseudoscience that related personality characteristics to bumps on the skull.** *(True Answer)Correct*
- **the historical method of drilling holes in the skull as a treatment for brain disease and mental illness.** *Incorrect*
- **the scientific study of "phrens" or "phrenetics."** *Incorrect*

---

893 **Phrenology was founded by:**

- **Pierre Paul Broca.** *Incorrect*
- **Roger Sperry.** *Incorrect*
- **Karl Wernicke.** *Incorrect*
- **Franz Gall.** *(True Answer)Correct*

---

894 **The popularity of phrenology triggered scientific interest in which of the following?**

- **the idea that the brain's left hemisphere might be specialized for language functions** *Incorrect*
- **the development of medications to treat severe mental disorders** *Incorrect*
- **cutting the corpus callosum to reduce epileptic seizures** *Incorrect*
- **the idea that specific psychological and mental functions are located in specific brain areas** *(True Answer)Correct*

---

895 **What is a psycograph?**

- **a device worn on the head that measures the bumps on a person's skull** *(True Answer)Correct*
- **an instrument that is used to ensure the precise placement of electrodes in the brain** *Incorrect*
- **a device used to ensure precision when surgeons sever the corpus callosum during the split-brain operation** *Incorrect*
- **a sophisticated imaging instrument that helps identify the cortical localization of certain cognitive and perceptual abilities** *Incorrect*

---

896 **Although disproved, phrenology was valuable in:**

- **generating interest in the idea of cortical localization.** *(True Answer)Correct*
- **stressing the role of nutrition in endocrine and brain disorders.** *Incorrect*
- **emphasizing the importance of hormones in human behavior.** *Incorrect*
- **inspiring modern methods of treating brain disease and mental disorders.** *Incorrect*

---

897 **Functional plasticity:**

- **can produce aphasia or paralysis.** *Incorrect*
- **has been demonstrated in research with primates but not with humans.** *Incorrect*
- **refers to the brain's ability to shift functions from damaged to undamaged areas of the brain.** *(True Answer)Correct*
- **can only occur in children prior to about the age of seven.** *Incorrect*

---

898 **Jake received a severe brain injury in a motorcycle accident and was partially paralyzed on the left side of his body. After several months of intensive physical therapy, he gradually regained the use of his left leg and arm. This example best illustrates the principle of:**

- **aphasia.** *Incorrect*
- **cortical localization.** *Incorrect*
- **functional plasticity.** *(True Answer)Correct*

- **neurogenesis.** *Incorrect*

---

899 **The brain's ability to physically change in response to environmental stimulation is called:**

- **aphasia.** *Incorrect*
- **neurogenesis.** *Incorrect*
- **structural plasticity.** *(True Answer)Correct*
- **functional plasticity.** *Incorrect*

---

900 **The brain's ability to shift functions from damaged to undamaged areas is called:**

- **aphasia.** *Incorrect*
- **neurogenesis.** *Incorrect*
- **structural plasticity.** *Incorrect*
- **functional plasticity.** *(True Answer)Correct*

---

901 **Juliana began taking violin lessons as a young child. As a teenager, she participated in a research study in which MRI scans of teenagers who had played the violin for several years were compared to MRI scans of other teenagers who had never played a musical instrument. The MRI scans of the teenage violinists showed that brain regions devoted to control of the fine muscles of the hands and fingers were larger in the teenage musicians than in the nonmusicians. This example illustrates the important phenomenon of:**

- **functional plasticity.** *Incorrect*
- **structural plasticity.** *(True Answer)Correct*
- **lateralization of function.** *Incorrect*
- **myelin regrowth.** *Incorrect*

---

902 **The notion of structural plasticity:**

- **has been demonstrated in animal studies but there is no evidence for structural plasticity in humans.** *Incorrect*
- **is the idea that learning, active practice, or environmental stimulation can cause physical changes in the brain's structure.** *(True Answer)Correct*
- **led to the idea of surgically cutting the corpus callosum as a possible treatment for severe cases of epilepsy.** *Incorrect*
- **is the idea that the brain has the ability to shift functions from damaged to undamaged brain areas.** *Incorrect*

---

903 **Which of the following best defines *neurogenesis*?**

- **the development of new neurons** *(True Answer)Correct*
- **the first neuron to generate an action potential** *Incorrect*
- **the influence of neurons on the formation of new genes** *Incorrect*
- **the influence of genes on the firing rate of neurons** *Incorrect*

---

904 **The _____ has an ambitious goal: to map the millions of miles of neural connections among the 100 billion neurons in the human brain.**

- **Human Connectome Project** *(True Answer)Correct*
- **Human Genome Project** *Incorrect*
- **Homo sapiens Neural Map Project** *Incorrect*
- **Neural Networking Model** *Incorrect*

---

905 **The Human Connectome Project has an ambitious goal to:**

- **sequence the human genome.** *Incorrect*
- **map the millions of miles of neural connections among the 100 billion neurons in the human brain.** *(True Answer)Correct*
- **determine how each human is genetically related.** *Incorrect*
- **connect human research to animal research.** *Incorrect*

---

906 **Launched in 2009 by the National Institutes of Health, the _____ aims to combine brain-imaging data from hundreds of participants into a three-dimensional map of the brain's information highways.**

- **Human Connectome Project** *(True Answer)Correct*
- **Human Genome Project** *Incorrect*
- **Homo sapiens Neural Map Project** *Incorrect*
- **Neural Networking Model** *Incorrect*

---

907 **Launched in 2009 by the National Institutes of Health, the Human Connectome project aims to:**

- **sequence the human genome.** *Incorrect*
- **determine how each human is genetically related.** *Incorrect*
- **connect human research to animal research.** *Incorrect*
- **form a three-dimensional map of the brain's information highways.** *(True Answer)Correct*

---

908 **A new brain-scanning technique called _____ allows neuroscientists to produce three-dimensional images of the neural pathways that connect one part of the brain to another.**

- **functional magnetic resonance imaging** *Incorrect*
- **positron emission tomography** *Incorrect*
- **diffusion spectrum imaging** *(True Answer)Correct*
- **X-ray computerized tomography** *Incorrect*

---

909 **A new brain-scanning technique called *diffusion spectrum imaging* allows neuroscientists to:**

- **produce three-dimensional images of the neural pathways that connect one part of the brain to another.** *(True Answer)Correct*
- **use electromagnetic techniques to examine blood flow in the brain.** *Incorrect*
- **trace the metabolism of radioactive glucose in the brain.** *Incorrect*
- **examine the structure of the brain using combined X-rays.** *Incorrect*

---

910 **Diffusion spectrum imaging can produce three-dimensional images of the neural pathways that connect one part of the brain to another. These neural pathways are sometimes called:**

- **diffusions.** *Incorrect*
- **tracts.** *(True Answer)Correct*
- **spectrums.** *Incorrect*
- **voxels.** *Incorrect*

---

911 **Diffusion spectrum imaging tracks the:**

- **changes in blood flow due to neural activity.** *Incorrect*
- **electrical activity of neurons produced by postsynaptic potentials.** *Incorrect*
- **magnetic fields produced by action potentials of neurons.** *Incorrect*
- **movement of water molecules in brain tissue along the axons.** *(True Answer)Correct*

---

912 **Diffusion spectrum imaging can produce three-dimensional images of the neural pathways that connect one part of the brain to another. These neural pathways, sometimes called tracts, are made up of:**

- **cell bodies of neurons.** *Incorrect*
- **astrocytes.** *Incorrect*
- **dendrites of neurons.** *Incorrect*
- **myelinated axons.** *(True Answer)Correct*

---

913 **In studies with primates, specifically adult macaque monkeys, psychologist Elizabeth Gould and her colleagues found evidence:**

- **of limited neurogenesis in brain stem structures but not in more sophisticated brain regions.** *Incorrect*
- **for structural plasticity but not functional plasticity.** *Incorrect*
- **that new neurons develop and migrate to multiple brain regions.** *(True Answer)Correct*
- **for functional plasticity but not structural plasticity.** *Incorrect*

---

914 **Stress, exercise, and environmental complexity have been shown to affect the rate of _____ in the brains of monkeys, rodents, and birds.**

- **neurogenesis** *(True Answer)Correct*
- **cortical localization** *Incorrect*
- **lateralization** *Incorrect*
- **neuroplasticity** *Incorrect*

---

915 **German researchers conducted a study investigating what happens to the brain when we learn a new, challenging skill. Participants learned to juggle and then had brain scans taken using MRI. What changes did the MRI scans reveal?**

- **a 3 to 4 percent increase in gray matter in two brain regions involved in perceiving, remembering, and anticipating complex motions** *(True Answer)Correct*
- **a 3 to 4 percent increase in white matter in a brain region involved in kinesthetic sense** *Incorrect*
- **a 3 to 4 percent decrease in white matter in two brain regions involved in perceiving, remembering, and anticipating complex motions** *Incorrect*
- **There were no brain changes identifiable in the scans.** *Incorrect*

---

916 **At 70 years old, Alice decided to take up juggling. According to research described in a Focus on Neuroscience feature, what kind of brain changes might result from Alice's new hobby?**

- **increased complexity in the corpus callosum** *Incorrect*
- **gray matter increases in brain regions involved in perceiving and anticipating complex visual motions** *(True Answer)Correct*
- **damage to the cerebellum** *Incorrect*
- **No changes would result; plasticity has not been demonstrated in the aging brain.** *Incorrect*

---

917 **A Focus on Neuroscience section in the text described a research study involving participants who learned how to juggle. What was the purpose of the study?**

- **to test the effects of enriched environments on balance and motor skills** *Incorrect*
- **to compare the motor skills of jugglers versus nonjugglers** *Incorrect*
- **to determine whether learning a new skill caused structural changes in the brain** *(True Answer)Correct*
- **to determine whether juggling involves primarily the left or the right cerebral hemisphere** *Incorrect*

---

918 **One of the Focus on Neuroscience sections in the text described a study in which German neuroscientists studied people who learned to juggle. One of the findings of the study was that:**

- **specific brain regions increased in size by 3 to 4 percent in the nonjugglers but did not change in the jugglers.** *Incorrect*
- **specific brain regions increased in size by 3 to 4 percent in the jugglers but did not change in the nonjugglers.** *(True Answer)Correct*
- **gray matter in two regions in the brains of novice jugglers decreased by 3 to 4 percent after seven days of daily practice.** *Incorrect*
- **gray matter in two regions in the brains of seniors who learned to juggle decreased by 3 to 4 percent after seven days of daily practice.** *Incorrect*

---

919 **A Focus on Neuroscience section in the text described a research study involving participants who learned how to juggle. What was the main conclusion of the research?**

- **that learning and practicing a new skill had distinct physical effects on specific brain structures** *(True Answer)Correct*
- **that jugglers, as compared to nonjugglers, were more likely to show evidence of neurogenesis in the corpus callosum** *Incorrect*

- **that learning how to juggle helped the participants become more creative by enhancing their right-brain abilities** *Incorrect*
- **that jugglers, as compared to nonjugglers, had higher levels of endorphins** *Incorrect*

---

920 **Which of the following is TRUE regarding the development and growth of new neurons in the human brain?**

- **Animals such as primates, birds, and rodents do not experience neurogenesis.** *Incorrect*
- **Glial cells of human brains continue to reproduce and grow in number through adulthood but neurons do not.** *Incorrect*
- **The human brain has the capacity to generate new neurons throughout the lifespan.** *(True Answer)Correct*
- **There is no evidence that the human brain continues to develop new neurons after birth.** *Incorrect*

---

921 **In what area of the adult primate brain have researchers found evidence of growth of new neurons?**

- **the pons** *Incorrect*
- **the hippocampus** *(True Answer)Correct*
- **the medulla** *Incorrect*
- **the thalamus** *Incorrect*

---

922 **The brainstem is made up of the _____ and the _____.**

- **forebrain; midbrain** *Incorrect*
- **cerebellum; medulla** *Incorrect*
- **reticular formation; the pons** *Incorrect*
- **midbrain; hindbrain** *(True Answer)Correct*

---

923 **The right side of the brain controls movements on the left side of the body, such as the ability to kick your left leg. Where do the outgoing motor messages cross over?**

- **at the forebrain level** *Incorrect*
- **at the midbrain level** *Incorrect*
- **in the spinal cord** *Incorrect*
- **at the hindbrain level** *(True Answer)Correct*

---

924 **Which of the following is NOT a hindbrain structure?**

- **hypothalamus** *(True Answer)Correct*

- **pons** *Incorrect*
- **medulla** *Incorrect*
- **cerebellum** *Incorrect*

---

925 **The chapter prologue described the story of a young university professor named Asha, who suffered a stroke. Because Asha experienced some damage to the motor areas on the left side of her brain, she experienced:**

- **muscle weakness on the left and right sides of her body.** *Incorrect*
- **muscle weakness only on the right side of her body.** *(True Answer)Correct*
- **no muscle impairment.** *Incorrect*
- **muscle weakness only on the left side of her body.** *Incorrect*

---

926 **As you are listening to a lecture, workers are repairing a wall just outside your classroom. Throughout the class, you find yourself coughing and sneezing because of the dust and fumes in the air. Which brain structure controls such vital reflexes as sneezing, coughing, and swallowing?**

- **the corpus callosum** *Incorrect*
- **the cerebellum** *Incorrect*
- **the medulla** *(True Answer)Correct*
- **the thalamus** *Incorrect*

---

927 **As you take this test, you do not have to focus on taking your next breath or making your heart beat. This is because the _____ is involved in the control of vital life functions, such as breathing, heart rate, and digestion.**

- **medulla** *(True Answer)Correct*
- **pons** *Incorrect*
- **thalamus** *Incorrect*
- **parietal lobe** *Incorrect*

---

928 **Which structure helps relay information from higher brain regions to the cerebellum and helps coordinate and integrate movements on each side of the body?**

- **the substantia nigra** *Incorrect*
- **the corpus callosum** *Incorrect*
- **the amygdala** *Incorrect*
- **the pons** *(True Answer)Correct*

---

929 **When President John F. Kennedy was hit by a sniper's bullet in the back of his head, he died almost instantly because the bullet destroyed the part of his brain called the _____, which controls breathing, heartbeat, and other vital body functions.**

- **hippocampus** *Incorrect*
- **medulla** *(True Answer)Correct*
- **amygdala** *Incorrect*
- **thalamus** *Incorrect*

---

930 **The _____ is a network of neurons at the base of the brain that projects signals up to higher brain regions and down to the spinal cord, and regulates attention and sleep.**

- **cerebellum** *Incorrect*
- **hypothalamus** *Incorrect*
- **reticular formation** *(True Answer)Correct*
- **substantia nigra** *Incorrect*

---

931 **Your pencil starts to roll off the desk and in a smooth, coordinated fashion you grab it just before it rolls off the edge. Your ability to perform this action involved which of the following brain areas?**

- **the cerebellum** *(True Answer)Correct*
- **the hippocampus** *Incorrect*
- **the amygdala** *Incorrect*
- **Broca's area** *Incorrect*

---

932 **After too many drinks at a party, your friend awkwardly stumbles into a table, almost knocking it over. Your friend's coordination for simple actions, such as walking between two tables, is reduced because the alcohol has affected his:**

- **medulla.** *Incorrect*
- **cerebellum.** *(True Answer)Correct*
- **thalamus.** *Incorrect*
- **somatosensory cortex.** *Incorrect*

---

933 **As you are walking in a crowded hallway, someone calls your name. Almost instantly, you sense that the person is on your left. Your brain's ability to detect the direction of a sound is initially processed in the:**

- **medulla.** *Incorrect*
- **frontal lobe.** *Incorrect*
- **midbrain region.** *(True Answer)Correct*
- **occipital lobe.** *Incorrect*

934 **As you play a *Star Trek* video game, you track all of the Romulan warships as they fly across the screen, attacking your ship, the *U.S.S. Enterprise*. In visually tracking the movements on the screen, the _____ plays an important role.**

- **hypothalamus** *Incorrect*
- **hindbrain** *Incorrect*
- **midbrain** *(True Answer)Correct*
- **pons** *Incorrect*

---

935 **The substantia nigra is:**

- **located in the midbrain.** *(True Answer)Correct*
- **the brain location that has shown the greatest degree of neurogenesis in studies with rats and primates.** *Incorrect*
- **the primary communication link between the two hemispheres of the cerebral cortex.** *Incorrect*
- **the point at which motor signals cross over from one side of the brain to the opposite side of the body.** *Incorrect*

---

936 **The substantia nigra:**

- **contains dopamine-producing neurons and is involved in motor control.** *(True Answer)Correct*
- **is the region that has shown the greatest degree of neurogenesis in humans.** *Incorrect*
- **is the primary communication link between the left and right cerebral hemispheres.** *Incorrect*
- **does not fully develop until late adolescence.** *Incorrect*

---

937 **Parkinson's disease often involves the degeneration of neurons that produce _____, which are located in a brain area called the _____.**

- **serotonin; somatosensory cortex** *Incorrect*
- **dopamine; substantia nigra** *(True Answer)Correct*
- **acetylcholine; thalamus** *Incorrect*
- **norepinephrine; pons** *Incorrect*

---

938 **Which of the following statements is FALSE?**

- **The term *substantia nigra* means "dark substance."** *Incorrect*

- **The substantia nigra contains almost all of the serotonin-producing neurons in the brain.** *(True Answer)Correct*
- **The symptoms of Parkinson's disease are often associated with the degeneration of dopamine-producing neurons in the substantia nigra.** *Incorrect*
- **The substantia nigra is located in the midbrain.** *Incorrect*

---

939 **Which of the following represents the largest region of the brain?**

- **the forebrain** *(True Answer)Correct*
- **the hindbrain** *Incorrect*
- **the cerebellum** *Incorrect*
- **the midbrain** *Incorrect*

---

940 **Comparing the structure of the human brain to that of other animals reveals that:**

- **human brain organization bears little or no resemblance to that of lower animals, such as birds and fish.** *Incorrect*
- **all animals have a cerebellum, but only humans and other primates have a cortex.** *Incorrect*
- **the human cortex is much more complex than that of lower animals, which makes up for the absence of a cerebellum in the human brain.** *Incorrect*
- **the basic structure of the human brain is similar to that of many other animals, but a higher proportion of the human brain is devoted to the cortex.** *(True Answer)Correct*

---

941 **The primary communication link between the left and right cerebral hemispheres is called:**

- **the hypothalamus.** *Incorrect*
- **the hippocampus.** *Incorrect*
- **Broca's area.** *Incorrect*
- **the corpus callosum.** *(True Answer)Correct*

---

942 **The phrase *white matter* in the brain refers to:**

- **myelinated axons.** *(True Answer)Correct*
- **the large spaces on the interior of the brain called ventricles.** *Incorrect*
- **unmyelinated axons, glial cells, and cell bodies.** *Incorrect*
- **neurons that manufacture endorphins.** *Incorrect*

943 **White matter is to gray matter as _____ is(are) to _____.**

- **cell bodies and glial cells; myelinated axons** *Incorrect*
- **myelinated axons; cell bodies and glial cells** *(True Answer)Correct*
- **dendrites; glial cells and axons** *Incorrect*
- **midbrain; hindbrain** *Incorrect*

944 **Which best describes the surface of the cerebral cortex?**

- **smooth, pinkish tissue, well-endowed with blood vessels** *Incorrect*
- **a rounded, semicircular mass of white matter** *Incorrect*
- **darkly pigmented tissue bisected by a single deep fissure** *Incorrect*
- **numerous folds, wrinkles, bulges, ridges, and valleys** *(True Answer)Correct*

945 **During the middle of a test, your instructor announces that there's a typographical error on one of the questions. As you listen, the auditory information is being processed in your:**

- **occipital lobe.** *Incorrect*
- **frontal lobe.** *Incorrect*
- **temporal lobe.** *(True Answer)Correct*
- **parietal lobe.** *Incorrect*

946 **Each cerebral hemisphere can be roughly divided into four lobes. Which lobe processes auditory information?**

- **the frontal lobe** *Incorrect*
- **the parietal lobe** *Incorrect*
- **the temporal lobe** *(True Answer)Correct*
- **the occipital lobe** *Incorrect*

947 **The occipital lobe is to _____ as the temporal lobe is to _____.**

- **vision; somatosensory processing** *Incorrect*
- **audition; vision** *Incorrect*
- **somatosensory processing; audition** *Incorrect*
- **vision; audition** *(True Answer)Correct*

948 **Standing at an arrival gate, you scan the faces of the passengers as they walk off the plane, looking for your friend. This visual information is being processed in your:**

- **occipital lobe.** *(True Answer)Correct*
- **parietal lobe.** *Incorrect*
- **frontal lobe.** *Incorrect*
- **temporal lobe.** *Incorrect*

---

949 **As you wait in line at the airport, the guy behind you is standing so close that his briefcase is pushing against your leg. The sensation of the briefcase touching and pushing against you is being processed in your:**

- **frontal lobe.** *Incorrect*
- **occipital lobe.** *Incorrect*
- **temporal lobe.** *Incorrect*
- **parietal lobe.** *(True Answer)Correct*

---

950 **A gymnast knows where his arms and legs are as he does his tumbling routine because information from his muscles and joints is relayed to his:**

- **temporal lobe.** *Incorrect*
- **frontal lobe.** *Incorrect*
- **occipital lobe.** *Incorrect*
- **parietal lobe.** *(True Answer)Correct*

---

951 **Which of the following statements is FALSE?**

- **Sensory and motor information are processed and integrated in association areas on the cerebral cortex.** *Incorrect*
- **Body sensations such as touch, temperature, and pressure are processed in the somatosensory cortex.** *Incorrect*
- **The temporal lobe contains the primary auditory cortex, which processes auditory information.** *Incorrect*
- **Each part of the body has the same degree of representation on the primary motor cortex.** *(True Answer)Correct*

---

952 **Your nephew's eyes suddenly light up and he reaches out, executes a double-jump of your checker pieces, then smiles at you triumphantly. The brain signals for these voluntary actions originated in the _____ of your nephew's brain.**

- **somatosensory cortex** *Incorrect*
- **primary motor cortex** *(True Answer)Correct*

- **temporal lobe** *Incorrect*
- **hippocampus** *Incorrect*

---

953 **The signals for voluntary muscle movements originate in a band of tissue called the _____, which is located on the _____ lobe.**

- **primary motor cortex; parietal** *Incorrect*
- **somatosensory cortex; parietal** *Incorrect*
- **primary motor cortex; frontal** *(True Answer)Correct*
- **association area; occipital** *Incorrect*

---

954 **Which of the following body areas has (have) the greatest degree of representation on the primary motor cortex and the somatosensory cortex?**

- **the knee** *Incorrect*
- **the face** *(True Answer)Correct*
- **the arm** *Incorrect*
- **the feet** *Incorrect*

---

955 **How is each part of the body represented on the somatosensory cortex?**

- **in proportion to each body part's potential for movement** *Incorrect*
- **in proportion to the degree of neurogenesis that has occurred in each segment of the region** *Incorrect*
- **in proportion to the size of each body part** *Incorrect*
- **in proportion to each body part's sensitivity to somatic sensations** *(True Answer)Correct*

---

956 **Which parts of the body have the greatest representation on the primary motor cortex?**

- **hands and facial muscles** *(True Answer)Correct*
- **legs and arms muscles** *Incorrect*
- **head and neck muscles** *Incorrect*
- **chest and back muscles** *Incorrect*

---

957 **A large bulk of the cerebral cortex is not devoted to any particular sensory or motor function. Rather, these areas, known as _____, are generally thought to be involved in processing and integrating sensory and motor information.**

- **secondary cortex areas** *Incorrect*
- **association areas** *(True Answer)Correct*

- **the limbic system** *Incorrect*
- **Broca's and Wernicke's areas** *Incorrect*

---

958 **Which of the following brain structures is NOT a key component of the limbic system?**

- **the reticular formation** *(True Answer)Correct*
- **the amygdala** *Incorrect*
- **the hippocampus** *Incorrect*
- **the hypothalamus** *Incorrect*

---

959 **The hippocampus plays a key role in:**

- **regulating sleep and wakefulness.** *Incorrect*
- **survival behaviors, including eating and drinking.** *Incorrect*
- **forming new memories.** *(True Answer)Correct*
- **emotional responses, including fear, anger, and disgust.** *Incorrect*

---

960 **The limbic system refers to the:**

- **hypothalamus, pituitary gland, and adrenal glands.** *Incorrect*
- **hippocampus, thalamus, amygdala, and hypothalamus.** *(True Answer)Correct*
- **thalamus, cerebellum, pons, medulla, and hypothalamus.** *Incorrect*
- **parietal, occipital, frontal, and temporal lobes.** *Incorrect*

---

961 **After an automobile accident, Randy experienced a series of severe seizures. After the seizures stopped, Randy's ability to form new memories was greatly impaired. Which brain structure was most likely damaged by the severe seizures?**

- **the hypothalamus** *Incorrect*
- **the hippocampus** *(True Answer)Correct*
- **the somatosensory cortex** *Incorrect*
- **the thalamus** *Incorrect*

---

962 **According to your text, there is good evidence to show that neurogenesis takes place in which region(s) of the adult human brain?**

- **the amygdala** *Incorrect*

- **the thalamus and the hypothalamus** *Incorrect*
- **throughout the limbic system** *Incorrect*
- **the hippocampus** *(True Answer)Correct*

---

963 **Almost all of the sensory and motor information going to and from the cerebral cortex is processed through the:**

- **thalamus.** *(True Answer)Correct*
- **hypothalamus.** *Incorrect*
- **hippocampus.** *Incorrect*
- **pituitary gland.** *Incorrect*

---

964 **Recent evidence suggests that _____ is more than just a sensory relay station and plays a key role in regulating levels of awareness.**

- **the pituitary gland** *Incorrect*
- **the thalamus** *(True Answer)Correct*
- **Broca's area** *Incorrect*
- **the primary motor cortex** *Incorrect*

---

965 **You've been studying biology in the library for the last couple of hours when you realize that you're getting really hungry and thirsty. Which brain structure played a key role in triggering feelings of hunger and thirst?**

- **the pituitary gland** *Incorrect*
- **the corpus callosum** *Incorrect*
- **the hypothalamus** *(True Answer)Correct*
- **the hippocampus** *Incorrect*

---

966 **Which brain structure regulates the sympathetic and parasympathetic branches of the autonomic nervous system?**

- **the amygdala** *Incorrect*
- **the hippocampus** *Incorrect*
- **the thalamus** *Incorrect*
- **the hypothalamus** *(True Answer)Correct*

---

967 **Daily rhythms of sleep and wakefulness are regulated by the _____, which is found in the _____.**

- **suprachiasmatic nucleus (SCN); hypothalamus** *(True Answer)Correct*
- **reticular formation; frontal lobe** *Incorrect*
- **hippocampus; hypothalamus** *Incorrect*

- **cerebellum; midbrain** *Incorrect*

---

968 **The hypothalamus exerts control over the endocrine system by directly triggering activity in the:**

- **amygdala.** *Incorrect*
- **thyroid.** *Incorrect*
- **pituitary gland.** *(True Answer)Correct*
- **hippocampus.** *Incorrect*

---

969 **Which two limbic system structures are especially associated with forming new memories?**

- **the hypothalamus and the substantia nigra** *Incorrect*
- **the thalamus and the hypothalamus** *Incorrect*
- **the hippocampus and amygdala** *(True Answer)Correct*
- **the thalamus and cerebellum** *Incorrect*

---

970 **Which brain structure exerts considerable influence over the secretion of hormones throughout the body?**

- **the hypothalamus** *(True Answer)Correct*
- **the amygdala** *Incorrect*
- **the hippocampus** *Incorrect*
- **the thalamus** *Incorrect*

---

971 **In humans, electrical stimulation of the amygdala produces:**

- **an almost instantaneous onset of sleep.** *Incorrect*
- **awkward, clumsy behavior.** *Incorrect*
- **grooming or mating behavior.** *Incorrect*
- **feelings of fear.** *(True Answer)Correct*

---

972 **Of the following brain structures, which is associated with the emotional responses of fear, disgust, and anger?**

- **the hypothalamus** *Incorrect*
- **the amygdala** *(True Answer)Correct*
- **the thalamus** *Incorrect*
- **Broca's area** *Incorrect*

---

973 **Cortical localization refers to the idea that:**

- **specific areas of the cerebral cortex are associated with**

specific behaviors or psychological processes. *(True Answer)Correct*

- **specific behaviors or psychological processes can shift from damaged brain areas to undamaged areas.** *Incorrect*
- **brain organization is fundamentally different for left-handed versus right-handed people.** *Incorrect*
- **specific psychological or cognitive functions are processed primarily in one side of the brain.** *Incorrect*

---

974 **According to the Critical Thinking box, "'His' and 'Her' Brains?" which of the following is FALSE?**

- **Men's brains tend to be larger than women's brains.** *Incorrect*
- **In general, men's brains are more symmetrical than women's brains.** *(True Answer)Correct*
- **Women have a higher proportion of gray matter to white matter in their brains than men.** *Incorrect*
- **Women display greater cortical complexity than men.** *Incorrect*

---

975 **According to the Critical Thinking box in the text, "'His' and 'Her' Brains?":**

- **neuroscientists have found no structural differences between male and female brains.** *Incorrect*
- **physiological gender differences are innate, biological, permanent, and hard-wired in the brain.** *Incorrect*
- **not all structural differences found in male and female brains lead to differences in measurable behavior or abilities.** *(True Answer)Correct*
- **research findings on differences in male and female brains conclusively support the belief that men and women think and reason differently.** *Incorrect*

---

976 **Researchers have found that the female hippocampus tends to be larger than the male hippocampus. Based on evidence presented in the Critical Thinking box in the text, "'His' and 'Her' Brains?" you would be justified in asserting which of the following?**

- **Females are much better at memory and learning tasks than males.** *Incorrect*
- **Because their hippocampus is smaller, males will tend to draw on multiple regions within both hemispheres when solving**

complex arithmetic problems and spatial tasks compared to females. *Incorrect*

- **When tested on memory tasks, there are no differences between males and females.** *(True Answer)Correct*
- **Because of the differences in the size of the hippocampus, females will be much more emotional than men.** *Incorrect*

---

977 **According to the Critical Thinking box in the text, "'His' and 'Her' Brains," which of the following is TRUE?**

- **Men's brains tend to be larger than women's brains.** *Incorrect*
- **Women and men have different proportions of gray to white matter in their brains.** *Incorrect*
- **In general, the male brain is more asymmetrical and functions are more lateralized than in the female brain.** *Incorrect*
- **All of the answers are true.** *(True Answer)Correct*

---

978 **A German neurologist named _____ identified an area on the left temporal lobe that, when damaged, disrupted the ability to understand written or spoken language.**

- **Paul Broca** *Incorrect*
- **Karl Wernicke** *(True Answer)Correct*
- **Roger Sperry** *Incorrect*
- **Franz Gall** *Incorrect*

---

979 **The idea that specific psychological or cognitive functions are processed primarily on one side of the brain is called:**

- **cortical localization.** *Incorrect*
- **lateralization of function.** *(True Answer)Correct*
- **functional plasticity.** *Incorrect*
- **structural plasticity.** *Incorrect*

---

980 **When brain damage causes the loss of the ability to speak, write, or understand spoken or written language, it is a condition called:**

- **aphasia.** *(True Answer)Correct*
- **Parkinson's disease** *Incorrect*
- **epilepsy.** *Incorrect*
- **Alzheimer's disease.** *Incorrect*

---

981 **The discoveries of Pierre Paul Broca and Karl Wernicke:**

- **provided compelling evidence that language and speech functions are lateralized on the right hemisphere.** *Incorrect*
- **discredited the idea of cortical localization.** *Incorrect*
- **provided compelling evidence that language and speech functions are lateralized on the left hemisphere.** *(True Answer)Correct*
- **were later discredited by the work of psychologist Roger Sperry and his colleagues.** *Incorrect*

---

982 **Broca's area is located on the _____, whereas Wernicke's area is located on the _____.**

- **right frontal lobe; left frontal lobe** *Incorrect*
- **left temporal lobe; right temporal lobe** *Incorrect*
- **left frontal lobe; left temporal lobe** *(True Answer)Correct*
- **right temporal lobe; right frontal lobe** *Incorrect*

---

983 **Damage to Wernicke's area in the brain:**

- **produces disruptions in the sense of balance as well as numbness in the arms and legs.** *Incorrect*
- **produces difficulty speaking but does not disrupt the ability to comprehend verbal or written words.** *Incorrect*
- **disrupts or destroys the ability to form new memories.** *Incorrect*
- **produces difficulty in comprehending written or spoken communication.** *(True Answer)Correct*

---

984 **Following her stroke, Fernando's grandmother could understand what she read or what was being said to her. However, she had great difficulty speaking. Based on these observations, Fernando suspected that his grandmother's stroke had produced damage in:**

- **Wernicke's area.** *Incorrect*
- **Broca's area.** *(True Answer)Correct*
- **the corpus callosum.** *Incorrect*
- **the hippocampus.** *Incorrect*

---

985 **The chapter prologue described a young university professor named Asha who suffered a stroke. Following her stroke,**

Asha's ability to speak was not impaired, but she was unable to read and often had difficulty understanding what was said to her. Asha showed many of the symptoms that characterize:

- **right-hemisphere damage.** *Incorrect*
- **Broca's aphasia.** *Incorrect*
- **Parkinson's disease.** *Incorrect*
- **Wernicke's aphasia.** *(True Answer)Correct*

---

986 **Why was the split-brain operation first performed?**

- **to study the specialized abilities of the left and right hemispheres** *Incorrect*
- **to help control recurring epileptic seizures** *(True Answer)Correct*
- **to identify the location of motor centers in the brain** *Incorrect*
- **to treat people suffering from severe forms of aphasia** *Incorrect*

---

987 **What was the logic behind the first split-brain operations that were tried experimentally with humans?**

- **By removing the precise brain location where epileptic seizures originated, the seizures should stop.** *Incorrect*
- **By selectively removing portions of the left hemisphere, language functions should shift to the right hemisphere.** *Incorrect*
- **By cutting the corpus callosum, seizure activity should be contained in just one hemisphere of the brain.** *(True Answer)Correct*
- **By cutting the corpus callosum, the brain would be forced to use the left and right hemispheres for different functions.** *Incorrect*

---

988 **Phrenology helped introduce the idea of brain _____, while the split-brain research demonstrated the principle of brain _____.**

- **localization; lateralization** *(True Answer)Correct*
- **lateralization; localization** *Incorrect*
- **specialization; plasticity** *Incorrect*
- **plasticity; specialization** *Incorrect*

---

989 **Psychologist Roger Sperry is best known for his:**

- **discovery of neurogenesis in the brains of rats.** *Incorrect*
- **case studies of stroke patients with language difficulties.** *Incorrect*
- **studies of rats that were raised in "impoverished" versus "enriched" environments.** *Incorrect*
- **studies of split-brain patients.** *(True Answer)Correct*

---

990 **Tracy is a split-brain patient seated in front of a screen. As she focuses on the middle of the screen, the image of a fork is briefly flashed on the RIGHT side of the screen. Tracy will:**

- **be able to verbally name the object.** *(True Answer)Correct*
- **be able to use her left hand to reach under the screen and pick up the correct object.** *Incorrect*
- **verbally deny that any image appeared on the screen.** *Incorrect*
- **probably have an epileptic seizure.** *Incorrect*

---

991 **In reading these test questions, you are primarily using your _____ to understand what you are reading.**

- **left hemisphere** *(True Answer)Correct*
- **right hemisphere** *Incorrect*
- **amygdala** *Incorrect*
- **medulla** *Incorrect*

---

992 **Based on research with split-brain patients, we know that the _____ hemisphere is specialized for _____.**

- **left; emotional and nonverbal aspects of communication** *Incorrect*
- **right; visual perception tasks** *(True Answer)Correct*
- **right; language abilities** *Incorrect*
- **left; artistic and musical appreciation** *Incorrect*

---

993 **You were reading a novel on a lazy Sunday afternoon when your six-year-old niece asked if you would help her sort through and find the right Lego pieces to make an airplane just like the one in the Lego design booklet. Reading the novel most likely involved your _____ hemisphere, while matching the Lego design most likely involved your _____ hemisphere.**

- **right; left** *Incorrect*

- **left; right** *(True Answer)Correct*
- **right; right** *Incorrect*
- **left; left** *Incorrect*

---

994 **You can thank your _____ for your ability to appreciate music.**

- **hippocampus** *Incorrect*
- **right hemisphere** *(True Answer)Correct*
- **prefrontal association cortex** *Incorrect*
- **left hemisphere** *Incorrect*

---

995 **Recognizing a person but blocking on his or her name is a common experience. For most people, facial recognition is a _____ hemisphere task, while being able to name the person is a _____ hemisphere verbal memory task.**

- **left; left** *Incorrect*
- **right; right** *Incorrect*
- **right; left** *(True Answer)Correct*
- **left; right** *Incorrect*

---

996 **The chapter Prologue described the story of a young university professor named Asha who suffered a stroke. Even though some of Asha's language abilities were disrupted by the stroke, she was still able to appreciate music because her _____ was not damaged.**

- **corpus callosum** *Incorrect*
- **left hemisphere** *Incorrect*
- **right hemisphere** *(True Answer)Correct*
- **amygdala** *Incorrect*

---

997 **According to Science Versus Pseudoscience in the text, the statement that most people only use about 10% of their brain:**

- **has been proven by modern brain research.** *Incorrect*
- **is true of people who have not finished high school, but does not apply to most college students.** *Incorrect*
- **has been disproved; the real figure is that most people only use about 25% of their brain.** *Incorrect*
- **is just a myth.** *(True Answer)Correct*

---

998 **In the college cafeteria, your friend Larry, who is an art major, loudly proclaims that because he is an artist he is right-brained and it's no wonder he's having trouble with his college algebra**

class. Because you have read this chapter, you are able to tell him that:

- **with special training, he should be able to better educate his left brain, so that he will at least pass algebra even if he'll never be very good at it.** *Incorrect*
- **he should drop algebra and take geometry, which takes a more right-brain approach to mathematics.** *Incorrect*
- **his problems with algebra cannot be blamed on either his right or left hemispheres; it is a myth that people are either "right-brained" or "left-brained."** *(True Answer)Correct*
- **given the right degree of environmental stimulation, he should be able to increase his left-hemisphere abilities, but doing so will undoubtedly lessen his artistic creativity.** *Incorrect*

---

999 **About 70 percent of left-handed people:**

- **are left-hemisphere dominant for language.** *(True Answer)Correct*
- **are right-hemisphere dominant for language.** *Incorrect*
- **are bilateral, using both hemispheres for language functions.** *Incorrect*
- **are sometimes left-hemisphere dominant, sometimes right-hemisphere dominant, depending upon the nature of the speech or language task.** *Incorrect*

1000 **Which one of the following statements is TRUE?**

- **Despite the fact that some people write with their left hand, all humans show left-hemisphere dominance for language functions.** *Incorrect*
- **The vast majority of people are strongly right-handed, using their right hands for virtually all tasks requiring dexterity.** *(True Answer)Correct*
- **The fact that it is very easy to teach infants and young children to be left-handed strongly suggests that handedness is determined by environmental conditions, not genetics.** *Incorrect*
- **The percentage of the population that is strongly left-handed is approximately 15 to 20 percent.** *Incorrect*

1001 **Most left-handed people process language in:**

- **their left cerebral hemisphere.** *(True Answer)Correct*
- **the right cerebral hemisphere.** *Incorrect*
- **both cerebral hemispheres.** *Incorrect*
- **the corpus callosum.** *Incorrect*

1002 **Which of the following results have NOT been reported in rats that have been raised in an enriched environment as compared to rats raised in an impoverished environment?**

- **increased number of synapses and synaptic connections** *Incorrect*
- **thicker myelin sheaths and an increased number of axons** *(True Answer)Correct*
- **increased length of dendrites and more dendritic branches** *Incorrect*
- **increase in the number of glial cells** *Incorrect*

1003 **According to the Enhancing Well-Being with Psychology feature in Chapter 2, living in an enriched environment has been shown to:**

- **enhance neurogenesis, increasing the number and survival rate of new neurons.** *(True Answer)Correct*
- **increase the rate at which axons and dendritic spines are pruned in the cerebellum and midbrain regions.** *Incorrect*
- **increase the rate at which unused neurons are pruned.** *Incorrect*
- **increase the speed of neurotransmission.** *Incorrect*

1004 **Research has shown that neurogenesis in adult rats can be enhanced by:**

- **taking drugs that increase the production of dopamine.** *Incorrect*
- **living in an enriched environment.** *(True Answer)Correct*
- **constant exposure to bright lights.** *Incorrect*
- **taking drugs that increase the production of endorphins.** *Incorrect*

1005 **Compared with young rats that have been raised in an "impoverished" environment, young rats that have been raised in an "enriched" environment have:**

- **more dendritic branches and more synaptic connections in**

the cerebral cortex. *(True Answer)Correct*

- **a much stronger tendency to favor their left paws.** *Incorrect*
- **an enlarged medulla and reticular formation.** *Incorrect*
- **about half as many glial cells but almost double the number of neurons in their brain.** *Incorrect*

1006 **Based on studies with rats, it is clear that the exposure to environmental enrichment:**

- **has no detectable effect on the brain.** *Incorrect*
- **can have an impact on brain development during early life but not in later life.** *Incorrect*
- **enhances right-hemisphere abilities but not left-hemisphere abilities.** *Incorrect*
- **produces significant brain changes regardless of the age of the rats.** *(True Answer)Correct*

1007 **According to the Enhancing Well-Being with Psychology feature in Chapter 2, in general, the greater the level of aerobic fitness:**

- **the greater the increase of blood flow to the hippocampus.** *(True Answer)Correct*
- **the worse people's memories became.** *Incorrect*
- **the lower the level of endorphins in the brain.** *Incorrect*
- **the greater the likelihood of developing aphasia.** *Incorrect*

1008 **The implication of Pereira's study on exercise and neurogenesis, discussed in the Enhancing Well-Being with Psychology feature in Chapter 2, was that:**

- **experience has little or no effect on brain functions or structures.** *Incorrect*
- **exercising regularly retarded the release of endorphins in the brain.** *Incorrect*
- **neurogenesis was directly correlated with addiction to exercise.** *Incorrect*
- **exercise promotes the growth of new neurons in the human brain just as it does in other mammals.** *(True Answer)Correct*

1009 **According to the Enhancing Well-Being with Psychology feature in Chapter 2, which of the following is TRUE?**

- **A mentally stimulating, intellectually challenging environment is associated with enhanced cognitive**

functioning. *Incorrect*

- **Better-educated people have more synaptic connections than those who are less educated.** *Incorrect*
- **Compared with young rats that have been raised in an "impoverished" environment, young rats that have been raised in an "enriched" environment have more dendritic branches and more synaptic connections in the cerebral cortex.** *Incorrect*
- **All of the answers are true.** *(True Answer)Correct*

1010 **A *neuroscientist* might examine how damage to the hippocampus affects the ability to form new memories.**

- **True** *(True Answer)*
- **False**

1011 **The human brain contains approximately 100 billion neurons and about ten times as many glial cells.**

- **True** *(True Answer)*
- **False**

1012 **Interneurons communicate information from one neuron to the next.**

- **True** *(True Answer)*
- **False**

1013 **Sensory neurons communicate information to muscles to help muscles better respond to environmental events.**

- **True**
- **False** *(True Answer)*

1014 **The neuron's genetic material (DNA) is found in the nucleus of the neuron's cell body.**

- **True** *(True Answer)*
- **False**

1015 **Dendrites receive information from other neurons.**

- **True** *(True Answer)*
- **False**

1016 **Neurons outnumber glial cells by about 10 to 1.**

- **True**
- **False** *(True Answer)*

1017 **Glial cells provide structural support and nutrition for neurons and remove waste products.**

- **True** *(True Answer)*
- **False**

1018 **Along with neurons, the human nervous system is made up of *glial cells*, which greatly outnumber neurons by about 10 to 1.**

- **True** *(True Answer)*
- **False**

1019 ***Astrocytes* are the most abundant cells in the human brain.**

- **True** *(True Answer)*
- **False**

1020 ***Microglia* are involved in brain development and the communication of information among neurons.**

- **True**
- **False** *(True Answer)*

1021 ***Astrocytes* are the most abundant cells in the human brain, provide connections between neurons and blood vessels, and are involved in brain development and the communication of information among neurons.**

- **True** *(True Answer)*
- **False**

1022 ***Oligodendrocytes* and *Schwann cells* form the myelin sheath, a fatty covering that is wrapped around the axons of some neurons.**

- **True** *(True Answer)*
- **False**

1023 **Schwann cells remove waste products from the nervous system, including dead and damaged neurons.**

- **True**

- **False** *(True Answer)*

1024 **_Oligodendrocytes_ provide connections between neurons and blood vessels.**

- **True**
- **False** *(True Answer)*

1025 **The myelin sheath is a white, fatty covering that surrounds the axons of neurons.**

- **True** *(True Answer)*
- **False**

1026 **When the doctors tried to determine what was causing Jorge's speech disturbances, muscle weakness, and loss of coordination, they finally diagnosed the problem as multiple sclerosis. Because he had carefully studied Chapter 2 in his psychology text, Jorge knew that multiple sclerosis is caused by excessive levels of the neurotransmitter called dopamine.**

- **True**
- **False** *(True Answer)*

1027 **The myelin sheath covering an axon insulates that axon from other axons and increases its communication speed.**

- **True** *(True Answer)*
- **False**

1028 **The action potential is the brief electrical impulse that is transmitted along the axon.**

- **True** *(True Answer)*
- **False**

1029 **When a neuron is in the resting state, it is polarized so that the axon's interior is more positively charged than the exterior fluid surrounding the axon.**

- **True**
- **False** *(True Answer)*

1030 **An action potential is produced by the movement of ions across the axon membrane.**

- **True** *(True Answer)*
- **False**

1031 **The all-or-none law refers to a neuron's ability to either release all or none of its neurotransmitter when an action potential occurs in its axon.**

- **True**
- **False** *(True Answer)*

1032 **When a neuron depolarizes and begins an action potential, sodium ions move into the axon and then potassium ions move out of the axon.**

- **True** *(True Answer)*
- **False**

1033 **During the refractory period, the neuron is unable to fire.**

- **True** *(True Answer)*
- **False**

1034 **About 12 to 15 seconds elapse during the entire sequence of a neuron's activating, generating an action potential, and then reestablishing the ability to fire again.**

- **True**
- **False** *(True Answer)*

1035 **The action potential is slower in myelinated neurons, because it has to travel the entire length of the axon rather than being able to jump from one node of Ranvier to the next.**

- **True**
- **False** *(True Answer)*

1036 **Transmission of information between two neurons occurs one of two ways: electrically or chemically.**

- **True** *(True Answer)*
- **False**

1037 **The synaptic vesicles are tiny pouches that hold the special chemical messengers manufactured by the neuron, which are called neurotransmitters.**

- **True** *(True Answer)*
- **False**

1038 **Synaptic vesicles contain neurotransmitters.**

- **True** *(True Answer)*

- **False**

1039 **During the process of reuptake, glial cells absorb unused neurotransmitters and then transfer the neurotransmitters to the appropriate neuron.**

- **True**
- **False** *(True Answer)*

1040 **Each neuron produces only one type of neurotransmitter.**

- **True**
- **False** *(True Answer)*

1041 **The receiving, or postsynaptic, neuron can have many differently shaped receptor sites on its dendrites, allowing it to receive more than one type of neurotransmitter.**

- **True** *(True Answer)*
- **False**

1042 **An excitatory message communicated to a postsynaptic neuron increases the likelihood that the postsynaptic neuron will generate an action potential.**

- **True** *(True Answer)*
- **False**

1043 **The neurotransmitter called acetylcholine plays a key role in sleep, moods, and emotional states, including the symptoms of depression.**

- **True**
- **False** *(True Answer)*

1044 **Acetylcholine is found in all motor neurons.**

- **True** *(True Answer)*
- **False**

1045 **Diminished brain levels of dopamine can produce symptoms of Parkinson's disease, while excess brain levels of dopamine can produce symptoms of schizophrenia.**

- **True** *(True Answer)*
- **False**

1046 **Dopamine is the neurotransmitter that has been found to be most depleted in Alzheimer's patients.**

- **True**
- **False** *(True Answer)*

1047 **Antianxiety medications such as Valium work by decreasing GABA activity, which inhibits action potentials and slows brain activity.**

- **True**
- **False** *(True Answer)*

1048 **Researchers have found that endorphins have pain-reducing effects.**

- **True** *(True Answer)*
- **False**

1049 **Acupuncture seems to reduce pain by reducing the availability of serotonin and dopamine in the brain.**

- **True**
- **False** *(True Answer)*

1050 **One of the key ways that drugs affect synaptic transmission is by changing an excitatory neurotransmitter to an inhibitory neurotransmitter, and vice versa.**

- **True**
- **False** *(True Answer)*

1051 **The involvement of the brain's opioid system in “runner's high” suggests one possible explanation for why endurance athletes enter a meditative state during long training sessions.**

- **True**
- **False** *(True Answer)*

1052 **“Runner's high” is the rush of euphoria that many people experience after sustained aerobic exercise.**

- **True** *(True Answer)*
- **False**

1053 **Research has shown that the greater the subjective feelings of euphoria experienced by runners, the higher the brain level of endorphin activity.**

- **True** *(True Answer)*

- **False**

1054 **It has now been demonstrated conclusively, using PET scans of runners' brains, that endorphins circulating in the blood do not affect the brain and thus do not cause the "runner's high."**

- **True**
- **False** *(True Answer)*

1055 **Prozac and many other antidepressant medications increase the availability of serotonin in certain brain areas.**

- **True** *(True Answer)*
- **False**

1056 **An *agonist* is a drug or other chemical that binds to a receptor site and triggers a response in the cell.**

- **True** *(True Answer)*
- **False**

1057 **An *agonist* is a drug or other chemical that blocks a receptor site and inhibits or prevents a response in the receiving cell.**

- **True**
- **False** *(True Answer)*

1058 **Nicotine binds to acetylcholine receptor sites, stimulating skeletal muscles and causing the heart to beat more rapidly. Thus, nicotine is an *agonist.***

- **True** *(True Answer)*
- **False**

1059 **Psychoactive drugs can alter brain functioning by blocking neurotransmitter receptor sites on postsynaptic neurons.**

- **True** *(True Answer)*
- **False**

1060 **One way in which drugs can prolong the effects of a neurotransmitter is through blocking the reuptake of the neurotransmitter by the sending neuron.**

- **True** *(True Answer)*
- **False**

1061 **Because the drug naloxone is chemically similar to endorphins and opiates, it prolongs and intensifies their effects.**

- **True**
- **False** *(True Answer)*

1062 **An *antagonist* is a drug or other chemical that blocks a receptor site and inhibits or prevents a response in the receiving cell.**

- **True** *(True Answer)*
- **False**

1063 **An *antagonist* is a drug or other chemical that binds to a receptor site and triggers a response in the cell.**

- **True**
- **False** *(True Answer)*

1064 **The drug *curare* blocks acetylcholine receptor sites, causing virtually instantaneous paralysis. Thus, curare is an *agonist*.**

- **True**
- **False** *(True Answer)*

1065 **The drug naloxone acts as an *antagonist* at opioid receptor sites and can eliminate the effects of both endorphins and opiates.**

- **True** *(True Answer)*
- **False**

1066 **In the central nervous system, communication occurs along nerves.**

- **True**
- **False** *(True Answer)*

1067 **Throughout the entire body, the human nervous system contains an estimated 1 trillion neurons.**

- **True** *(True Answer)*
- **False**

1068 **The central nervous system and the peripheral nervous system act independently of each other.**

- **True**
- **False** *(True Answer)*

1069 **There are four hollow cavities in the brain, called ventricles, which are filled with cerebrospinal fluid and whose inner**

surfaces are lined with neural stem cells.

- **True** *(True Answer)*
- **False**

1070 **Some simple forms of behavior, called spinal reflexes, occur without any involvement of the brain.**

- **True** *(True Answer)*
- **False**

1071 **The autonomic nervous system regulates spinal reflexes.**

- **True**
- **False** *(True Answer)*

1072 **The two subdivisions of the peripheral nervous system are the somatic nervous system and the autonomic nervous system.**

- **True** *(True Answer)*
- **False**

1073 **The somatic nervous system regulates involuntary functions, including heartbeat, blood pressure, breathing, and digestion.**

- **True**
- **False** *(True Answer)*

1074 **As your body's emergency system, the sympathetic nervous system rapidly triggers the fight-or-flight response when a threat or danger is perceived.**

- **True** *(True Answer)*
- **False**

1075 **The sympathetic nervous system conserves and maintains your body's energy resources, whereas the parasympathetic nervous system activates your body and prepares the body for action.**

- **True**
- **False** *(True Answer)*

1076 **The fight-or-flight response is triggered by the activation of the sympathetic nervous system.**

- **True** *(True Answer)*

- **False**

1077 **Compared with the sympathetic nervous system, the parasympathetic nervous system produces its effects much more rapidly.**

- **True**
- **False** *(True Answer)*

1078 **Hormones can influence the nervous system by promoting or inhibiting the generation of nerve impulses.**

- **True** *(True Answer)*
- **False**

1079 **Pituitary hormones regulate the production of other hormones by many of the glands in the endocrine system.**

- **True** *(True Answer)*
- **False**

1080 **The hypothalamus is largely controlled by the pituitary gland.**

- **True**
- **False** *(True Answer)*

1081 **The adrenal medulla, which secretes epinephrine and norepinephrine, plays a key role in helping to activate the body during the fight-or-flight response.**

- **True** *(True Answer)*
- **False**

1082 **The adrenal cortex plays a key role in the fight-or-flight response through its production of epinephrine and norepinephrine.**

- **True** *(True Answer)*
- **False**

1083 **Melatonin is a hormone secreted by the thyroid gland, and it plays an important role in the letdown of milk in nursing mothers.**

- **True**
- **False** *(True Answer)*

1084 **In males, the gonads are the testes, which produce hormones called androgens, the most important of which is testosterone.**

- **True** *(True Answer)*
- **False**

1085 **Gonads are found only in males.**

- **True**
- **False** *(True Answer)*

1086 **The brain's ability to change function and structure is referred to as neuroplasticity.**

- **True** *(True Answer)*
- **False**

1087 **The brain's ability to change function and structure is called cortical localization.**

- **True**
- **False** *(True Answer)*

1088 **Franz Gall, a German physician and anatomist, invented the psychograph machine in the early 1900s to improve the accuracy of phrenology measurements.**

- **True**
- **False** *(True Answer)*

1089 **Although the basic premise of phrenology was disproved, phrenology helped trigger scientific interest in the idea of cortical localization.**

- **True** *(True Answer)*
- **False**

1090 **The psychograph machine provides detailed images of the brain's structures.**

- **True**
- **False** *(True Answer)*

1091 **The notion that different psychological and mental functions are located or localized in different areas of the brain is called localization of function or cortical localization.**

- **True** *(True Answer)*
- **False**

1092 **Phrenology, which was a popular pseudoscience in the 1800s, has since been refuted by modern brain research, including research with brain-imaging techniques.**

- **True** *(True Answer)*
- **False**

1093 **Franz Gall was the founder of phrenology, which was a popular pseudoscience in the 1800s.**

- **True** *(True Answer)*
- **False**

1094 **Although Franz Gall and the phrenologists were wrong about the significance of bumps on the skull, they were correct about the idea that different psychological functions are localized in different brain areas.**

- **True** *(True Answer)*
- **False**

1095 **The term *functional plasticity* refers to the brain's capacity to shift functions from one area to another.**

- **True** *(True Answer)*
- **False**

1096 **Functional plasticity refers to the notion that different brain functions are located or localized in different areas of the brain.**

- **True**
- **False** *(True Answer)*

1097 **Current research shows that structural plasticity is limited to regions in the hindbrain and midbrain; there is no evidence supporting structural plasticity in forebrain structures, including the cerebral cortex.**

- **True**
- **False** *(True Answer)*

1098 **Humans and nonhuman primates are born with all the brain neurons they will ever have, and there is no evidence that new neurons grow and develop after birth.**

- **True**
- **False** *(True Answer)*

1099 **Research with primates has shown that some regions of the brain have the capacity to develop new neurons throughout the lifespan.**

- **True** *(True Answer)*
- **False**

1100 **Contemporary neuroscientists have found newly generated neurons in the hippocampus of the adult human brain.**

- **True** *(True Answer)*
- **False**

1101 **The Human Connectome Project's goal is to map the millions of miles of neural connections among the 100 billion neurons in the human brain.**

- **True** *(True Answer)*
- **False**

1102 **The Human Connectome Project's goal is to sequence the human genome.**

- **True**
- **False** *(True Answer)*

1103 **Launched in 2009 by the National Institutes of Health, the Neural Mapping Project aims to combine brain-imaging data from hundreds of participants into a three-dimensional map of the brain's information highways.**

- **True**
- **False** *(True Answer)*

1104 **Launched in 2009 by the National Institutes of Health, the Human Connectome project aims to sequence the human genome.**

- **True**
- **False** *(True Answer)*

1105 **A new brain-scanning technique called *diffusion spectrum imaging* allows neuroscientists to produce three-dimensional images of the neural pathways that connect one part of the brain to another.**

- **True** *(True Answer)*
- **False**

1106 **Diffusion spectrum imaging can produce three-dimensional images of the neural pathways that connect one part of the brain to another.**

- **True** *(True Answer)*
- **False**

1107 **Diffusion spectrum imaging tracks the movement of water molecules in brain tissue along the axons.**

- **True** *(True Answer)*
- **False**

1108 **Diffusion spectrum imaging can produce three-dimensional images of the neural pathways that connect one part of the brain to another. These pathways, sometimes called tracts, are made up of cell bodies of neurons.**

- **True**
- **False** *(True Answer)*

1109 **German neuroscientists used expert, professional jugglers as participants in a study to determine whether the jugglers' superior manual dexterity and sense of balance were the cause or the result of structural brain differences.**

- **True**
- **False** *(True Answer)*

1110 **According to one research study that involved participants who learned how to juggle, learning a new motor skill produces physical changes in specific brain structures related to the skill.**

- **True** *(True Answer)*
- **False**

1111 **According to one research study investigating the effects of learning a new skill on the brain's physical structure, novice jugglers showed evidence of brain changes within just seven days after learning to juggle.**

- **True** *(True Answer)*
- **False**

1112 **In combination, the structures of the hindbrain and the midbrain are referred to as the brainstem.**

- **True** *(True Answer)*
- **False**

1113 **Because the human brain is characterized by contralateral organization, the left side of the brain controls movement on the right side of the body, and vice versa.**

- **True** *(True Answer)*
- **False**

1114 **The cerebellum plays a critical role in the control of vital life functions, such as breathing, heart rate, swallowing, and coughing.**

- **True**
- **False** *(True Answer)*

1115 **The medulla, the pons, and the cerebellum make up the midbrain.**

- **True**
- **False** *(True Answer)*

1116 **The pons controls a number of vital reflexes, including swallowing, coughing, and sneezing.**

- **True**
- **False** *(True Answer)*

1117 **A midbrain area called the substantia nigra contains a large concentration of dopamine-producing neurons and is involved in motor control.**

- **True** *(True Answer)*
- **False**

1118 **The forebrain represents about 50 percent of the brain, and the midbrain and hindbrain represent the other 50 percent.**

- **True**
- **False** *(True Answer)*

1119 **The corpus callosum is an important midbrain structure that contains many dopamine-producing neurons.**

- **True**
- **False** *(True Answer)*

1120 **The brains of fish, birds, amphibians, and humans share many common brain structures, although they differ in their degree of complexity.**

- **True** *(True Answer)*

- **False**

1121 **The structural organization of the human brain is unique and different from all other animal species, including primates.**

- **True**
- **False** *(True Answer)*

1122 **The temporal lobe contains the primary auditory cortex, which receives auditory information.**

- **True** *(True Answer)*
- **False**

1123 **The parietal lobe is involved in planning, initiating, and executing voluntary movements.**

- **True**
- **False** *(True Answer)*

1124 **The hands and the face have the greatest degree of representation on both the somatosensory cortex and the primary motor cortex.**

- **True** *(True Answer)*
- **False**

1125 **Each hemisphere of the cerebral cortex can be divided into the occipital, frontal, parietal, and temporal lobes.**

- **True** *(True Answer)*
- **False**

1126 **The signals for voluntary muscle movements originate in the somatosensory cortex on the frontal lobe.**

- **True**
- **False** *(True Answer)*

1127 **Much of the cerebral cortex consists of three large association areas that process and integrate sensory and motor information.**

- **True** *(True Answer)*
- **False**

1128 **The brain structure called the hippocampus represents the main link between the endocrine system and nervous system.**

- **True**
- **False** *(True Answer)*

1129 **The forebrain structure called the hippocampus plays a critical role in the ability to form new memories.**

- **True** *(True Answer)*
- **False**

1130 **A key function of the hypothalamus is to process and distribute sensory and motor information going to and from the cerebral cortex.**

- **True**
- **False** *(True Answer)*

1131 **Key structures of the limbic system include the amygdala, hippocampus, thalamus, and hypothalamus.**

- **True** *(True Answer)*
- **False**

1132 **The amygdala is an almond-shaped structure at the base of the brain that is attached to and controls the pituitary gland.**

- **True**
- **False** *(True Answer)*

1133 **The amygdala is involved in a variety of emotional responses, including fear, anger, and disgust.**

- **True** *(True Answer)*
- **False**

1134 **According to the Critical Thinking box "'His' and 'Her' Brains?," men's brains tend to be larger than women's brains and are more asymmetrical with functions being more lateralized.**

- **True** *(True Answer)*
- **False**

1135 **Researchers found that the female hippocampus tends to be larger than the male hippocampus and, according to the Critical Thinking box "'His' and 'Her' Brains?," they concluded that this difference accounted for female superiority on memory tests.**

- **True**

- **False** *(True Answer)*

1136 **According to the Critical Thinking box "'His' and 'Her' Brains?," there are no functional or structural differences between male and female brains.**

- **True**
- **False** *(True Answer)*

1137 **According to the Critical Thinking box "'His' and 'Her' Brains?," not all structural differences found in male and female brains lead to differences in measurable behavior or abilities.**

- **True** *(True Answer)*
- **False**

1138 **Two important language regions in the brain, Broca's area and Wernicke's area, are named after the European scientists who discovered their functions in the mid-1800s.**

- **True** *(True Answer)*
- **False**

1139 **Speech and language are examples of the principle of lateralization of function.**

- **True** *(True Answer)*
- **False**

1140 **For the vast majority of people, Broca's area is located on the right frontal lobe and Wernicke's area is located on the right temporal lobe.**

- **True**
- **False** *(True Answer)*

1141 **Although people with Wernicke's aphasia can speak easily, they often have trouble understanding written or spoken communication.**

- **True** *(True Answer)*
- **False**

1142 **People with Broca's aphasia find it difficult or impossible to produce speech.**

- **True** *(True Answer)*
- **False**

1143 **Pierre Broca and Karl Wernicke helped demonstrate that speech and language functions are lateralized.**

- **True** *(True Answer)*
- **False**

1144 **Humans are the only species that display a preference for handedness.**

- **True**
- **False** *(True Answer)*

1145 **The famous French surgeon, Pierre Paul Broca, developed the split-brain operation as a cure for epilepsy and aphasia.**

- **True**
- **False** *(True Answer)*

1146 **Roger Sperry's split-brain research in the twentieth century illustrated the independent functions of the two hemispheres.**

- **True** *(True Answer)*
- **False**

1147 **A split-brain patient will not be able to verbally identify a picture that is flashed to the left visual field (and therefore processed in the right hemisphere) but will be able to pick up the pictured object with his or her left hand.**

- **True** *(True Answer)*
- **False**

1148 **Studies with split-brain patients have demonstrated that the corpus callosum serves no particular purpose in the brain.**

- **True**
- **False** *(True Answer)*

1149 **For most people, the left hemisphere is superior at language tasks and the right hemisphere is superior at visual perception tasks.**

- **True** *(True Answer)*
- **False**

1150 **Most complex tasks will primarily involve either your left cerebral hemisphere or your right cerebral hemisphere, but not both simultaneously.**

- **True**

- **False** *(True Answer)*

1151 **In the normal intact brain, the left and right cerebral hemispheres function in an integrated fashion.**

- **True** *(True Answer)*
- **False**

1152 **The brain is active almost all the time, and we use virtually every part of it.**

- **True** *(True Answer)*
- **False**

1153 **There is now strong evidence that it is possible to "educate" one side of your brain in isolation from the other side, so with proper training you can become more "right-brained" or more "left-brained."**

- **True**
- **False** *(True Answer)*

1154 **Approximately 70 percent of left-handed people process language in their right hemisphere.**

- **True**
- **False** *(True Answer)*

1155 **People who are logical, analytical, or detail–oriented, are "left-brained" individuals and rely primarily on the capacities of their left hemisphere to solve complex tasks.**

- **True**
- **False** *(True Answer)*

1156 **Most people use only 10 percent of their brain, but special training and enriched environments can help us utilize more of our brain's capacity.**

- **True**
- **False** *(True Answer)*

1157 **Because virtually all left-handed people are right-brain dominant, they are generally more creative and artistic than right-handed people, who are left-brain dominant.**

- **True**
- **False** *(True Answer)*

1158 **Studies with rats have confirmed that exposure to “enriched” environments produces structural changes in the brains of young rats but not in the brains of fully mature or older rats.**

- **True**
- **False** *(True Answer)*

1159 **A mentally stimulating, intellectually challenging environment is associated with enhanced cognitive functioning.**

- **True** *(True Answer)*
- **False**

1160 **Research has shown that living in an enriched environment can affect the brain, but only in very young mammals.**

- **True**
- **False** *(True Answer)*

1161 **In general, the greater the level of aerobic fitness, the greater the increase of blood flow to the hippocampus and the birth of new neurons.**

- **True** *(True Answer)*
- **False**

1162 **The implication of Pereira's study on exercise and neurogenesis was that exercise promotes the growth of new neurons in the human brain just as it does in other mammals.**

- **True** *(True Answer)*
- **False**

1163 **Experience has little or no effect on brain functioning or structures.**

- **True**
- **False** *(True Answer)*

1164 **Better-educated people have more synaptic connections and less severe symptoms of Alzheimer's disease than those who are less educated.**

- **True** *(True Answer)*
- **False**

1165 **Messages from other neurons and sensory receptors are typically:**

- **collected by the synaptic vesicles.** *Incorrect*

- **relayed by glial cells to the correct node of Ranvier.** *Incorrect*
- **received by the dendrites.** *(True Answer)Correct*
- **received by the axon terminals.** *Incorrect*

1166 **The resting potential is:**

- **the length of time that a neuron is incapable of activating after an action potential.** *Incorrect*
- **the term used to describe how the sympathetic nervous system reduces arousal and conserves energy.** *Incorrect*
- **a state in which a neuron has a negative electrical charge of about –70 millivolts.** *(True Answer)Correct*
- **is a state in which a neuron has a positive electrical charge of +70 millivolts.** *Incorrect*

1167 **During the action potential:**

- **the electrical charge of the neuron changes from positive to negative.** *Incorrect*
- **sodium ions rush into the interior of the axon.** *(True Answer)Correct*
- **sodium ions rush out of the interior of the axon.** *Incorrect*
- **potassium ions flow into the interior of the axon.** *Incorrect*

1168 **Reuptake occurs:**

- **when the brain shifts functions from damaged areas to undamaged areas.** *Incorrect*
- **when sodium ion and potassium ion channels open.** *Incorrect*
- **at the small gaps in the axon called the nodes of Ranvier.** *Incorrect*
- **when neurotransmitter molecules are reabsorbed by the presynaptic neuron.** *(True Answer)Correct*

1169 **Reduced brain levels of the neurotransmitter called _____ are involved in the progressive memory loss that characterizes Alzheimer's disease.**

- **GABA** *Incorrect*
- **serotonin** *Incorrect*

- **dopamine** *Incorrect*
- **acetylcholine** *(True Answer)Correct*

1170 **The terms *autonomic* and *somatic* refer to the two main subdivisions of the:**

- **sympathetic nervous system.** *Incorrect*
- **central nervous system.** *Incorrect*
- **peripheral nervous system.** *(True Answer)Correct*
- **parasympathetic nervous system.** *Incorrect*

1171 **The _____ functions as the main link between the nervous system and the endocrine system.**

- **adrenal medulla** *Incorrect*
- **adrenal cortex** *Incorrect*
- **amygdala** *Incorrect*
- **hypothalamus** *(True Answer)Correct*

1172 **Epinephrine and norepinephrine are manufactured by the _____ in the _____.**

- **adrenal glands; endocrine system** *(True Answer)Correct*
- **pineal gland; endocrine system** *Incorrect*
- **thyroid gland; limbic system** *Incorrect*
- **pituitary gland; limbic system** *Incorrect*

1173 **Structural plasticity:**

- **refers to the brain's ability to shift functions from damaged to undamaged brain areas.** *Incorrect*
- **occurs when neurotransmitters in the synaptic gap are blocked from being reabsorbed by the presynaptic neuron.** *Incorrect*
- **refers to a phenomenon in which brain structures change in response to learning, active practice, or environmental influences.** *(True Answer)Correct*
- **refers to the brain's ability to develop new neurons.** *Incorrect*

1174 **The _____ lobe is involved in a person's ability to plan, initiate, and carry out voluntary movements and actions.**

- **frontal** *(True Answer)Correct*

- **occipital** *Incorrect*
- **parietal** *Incorrect*
- **temporal** *Incorrect*

1175 **According to the Critical Thinking box "'His' and 'Her' Brains?," which of the following is FALSE?**

- **Men's brains tend to be much smaller than women's brains.** *(True Answer)Correct*
- **Women and men have different proportions of gray to white matter in their brains.** *Incorrect*
- **In general, the male brain is more asymmetrical and functions are more lateralized than in the female brain.** *Incorrect*
- **Men's brains tend to be larger than women's brains.** *Incorrect*

1176 **Petro is unable to articulate ideas or understand spoken or written language because of brain damage. Petro suffers from:**

- **Parkinson's disease.** *Incorrect*
- **Alzheimer's' disease.** *Incorrect*
- **the aftereffects of the split-brain operation.** *Incorrect*
- **aphasia.** *(True Answer)Correct*

1177 **Psychologist Roger Sperry is best known for:**

- **his efforts to debunk the pseudoscientific claims of phrenology.** *Incorrect*
- **the discovery of neurogenesis in the adult human brain.** *Incorrect*
- **his studies of split-brain patients.** *(True Answer)Correct*
- **identifying the specific brain areas involved in different forms of aphasia.** *Incorrect*

1178 **Tom is a split-brain patient seated in front of a screen. As he focuses on the middle of the screen, the image of an apple is briefly flashed on the LEFT side of the screen. Tom will:**

- **be able to verbally name the object.** *Incorrect*
- **be able to use his right hand to reach under the screen and pick up the correct object.** *Incorrect*
- **verbally deny that any image appeared on the screen.** *(True Answer)Correct*

- **probably have an epileptic seizure.** *Incorrect*

1179 **Karen is right-handed. A biopsychologist administers a PET scan of Karen's brain while Karen listens to one of her favorite pieces of music, Beethoven's *Third Symphony*. Which area of Karen's brain is likely to show the greatest activity on the PET scan?**

- **Broca's area** *Incorrect*
- **Wernicke's area** *Incorrect*
- **the cerebellum** *Incorrect*
- **the right hemisphere** *(True Answer)Correct*

1180 **The three types of neurons are:**

- **excitatory, inhibitory, and myelinated.** *Incorrect*
- **sensory, motor, and interneurons.** *(True Answer)Correct*
- **interneurons, glial cells, and motor cells.** *Incorrect*
- **glial cells, myelinated cells, and unmyelinated cells.** *Incorrect*

1181 **In general, neural messages are received by the _____ and transmitted by the _____.**

- **cell body; dendrites** *Incorrect*
- **axons; nucleus** *Incorrect*
- **dendrites; axon** *(True Answer)Correct*
- **axon; dendrites** *Incorrect*

1182 **When neurotransmitters communicate an inhibitory message to the postsynaptic neuron:**

- **reuptake is inhibited.** *Incorrect*
- **the presynaptic neuron is less likely to activate.** *Incorrect*
- **the action potential is canceled out.** *Incorrect*
- **the postsynaptic neuron is less likely to activate.** *(True Answer)Correct*

1183 **The venom of the black widow spider bite causes _____ to be released continuously by motor neurons, causing severe muscle spasms.**

- **acetylcholine** *(True Answer)Correct*
- **dopamine** *Incorrect*
- **GABA** *Incorrect*

- **serotonin** *Incorrect*

1184 **_____ are to the peripheral nervous system as _____ are to the central nervous system.**

- **Nerves; neurons** *(True Answer)Correct*
- **Interneurons; glial cells** *Incorrect*
- **Neurons; nerves** *Incorrect*
- **Electrical impulses; chemical messengers** *Incorrect*

1185 **Janeen and Marty were strolling down a wooded path in a city park when a man holding a knife suddenly jumped out of the shrubbery. Rather than fight, Janeen and Marty decided to flee and took off running in the opposite direction. This quick reaction reflects the fight-or-flight response, which is triggered by the _____ nervous system, which stimulates the_____ to produce _____.**

- **somatic; adrenal medulla; dopamine and serotonin** *Incorrect*
- **parasympathetic; adrenal cortex; melatonin and androgen** *Incorrect*
- **sympathetic; adrenal medulla; epinephrine and norepinephrine** *(True Answer)Correct*
- **central; hypothalamus; GABA and dopamine** *Incorrect*

1186 **Although _____ has been shown to be a pseudoscience, it helped introduce the idea that functions were _____ in the brain.**

- **phrenology; lateralized** *Incorrect*
- **neuroscience; plastic or flexible** *Incorrect*
- **the split-brain procedure; lateralized** *Incorrect*
- **phrenology; localized** *(True Answer)Correct*

1187 **The development of new neurons in the brain is called:**

- **neurogenesis.** *(True Answer)Correct*
- **structural plasticity.** *Incorrect*
- **neuroplasticity.** *Incorrect*
- **functional plasticity.** *Incorrect*

1188 **The brainstem is made up of several structures, which include the:**

- **thalamus, hypothalamus, hippocampus, and**

amygdala. *Incorrect*

- **medulla, pons, cerebellum, reticular formation, and midbrain, including the substantia nigra.** *(True Answer)Correct*
- **temporal lobe, parietal lobe, the occipital lobe, and frontal lobe.** *Incorrect*
- **corpus callosum, cerebral cortex, and the structures that make up the limbic system.** *Incorrect*

1189 **Samuel suffered damage to his temporal lobes during an operation to remove tumors from his brain. He is likely to have problems with his:**

- **vision.** *Incorrect*
- **ability to smell and taste.** *Incorrect*
- **hearing.** *(True Answer)Correct*
- **ability to process somatosensory information.** *Incorrect*

1190 **Processing somatosensory information is to _____ lobe as seeing is to _____ lobe.**

- **parietal; temporal** *Incorrect*
- **frontal; parietal** *Incorrect*
- **temporal; occipital** *Incorrect*
- **parietal; occipital** *(True Answer)Correct*

1191 **Which of the following is part of the limbic system and is involved in emotional responses and memories with a strong emotional component?**

- **the amygdala** *(True Answer)Correct*
- **the thalamus** *Incorrect*
- **the hypothalamus** *Incorrect*
- **the medulla** *Incorrect*

1192 **Broca is to _____ as Wernicke is to _____.**

- **expressive aphasia; receptive aphasia** *(True Answer)Correct*
- **left cerebral hemisphere; right cerebral hemisphere** *Incorrect*
- **structural plasticity; functional plasticity** *Incorrect*
- **receptive aphasia; expressive aphasia** *Incorrect*

1193 **Most left-handed people:**

- **are right-hemisphere dominant for language, the opposite pattern as right-handed people.** *Incorrect*
- **are left-hemisphere dominant for language, like most right-handed people.** *(True Answer)Correct*
- **are bilateral, using both hemispheres equally for virtually all tasks, including speech and language tasks.** *Incorrect*
- **are right-hemisphere dominant for language in their childhood but become increasingly more left-hemisphere dominant by early adulthood.** *Incorrect*

1194 **Modern neuroscience research has shown that learning a new motor skill, such as juggling, and living in an enriched environment:**

- **can make people more right-hemisphere dominant, and thus more creative.** *Incorrect*
- **can help shift functions from damaged to undamaged brain regions, a phenomenon called functional plasticity.** *Incorrect*
- **will reliably decrease average levels of GABA and acetylcholine.** *Incorrect*
- **can affect brain structures, such as the number and shape of neuronal dendrites and axon terminals, and the number of glial cells.** *(True Answer)Correct*

1195 **How do the fields of biological psychology and neuroscience contribute to basic psychological knowledge?**

-

1196 **How do sensory neurons, motor neurons, and interneurons differ?**

-

1197 **What are the three basic components of a neuron, and what function does each component perform?**

-

1198 **What are glial cells, and what is their role in the nervous system?**

-

1199 **Describe the functions of the microglia, astrocytes, oligodendrocytes, and Schwann cells.**

-

1200 **What does it mean to say that a neuron is polarized?**

-

1201 **What is the refractory period, and what takes place during that period?**

-

1202 **Describe the sequence of events that occurs when one neuron communicates with another neuron.**

-

1203 **Describe the sequence of events that occurs when a neuron “fires” or activates.**

-

1204 **What different types of messages can be communicated by neurotransmitters?**

-

1205 **Pick two neurotransmitters and describe the roles they play in behavior.**

-

1206 **What are endorphins, and what are their functions?**

-

1207 **Identify and explain several ways in which drugs can affect brain activity by interfering with synaptic transmission.**

-

1208 **Explain what is meant by “runner's high” and discuss the role that endorphins play.**

-

1209 **Define and give an example of an agonist drug.**

-

1210 **Compare and contrast the effects of agonist and antagonist drugs.**

-

1211 **Define and give an example of an antagonist drug.**

-

1212 **How does the central nervous system differ from the peripheral nervous system?**

-

1213 **What is a spinal reflex, and why is it important?**

-

1214 **Briefly describe the functions of the different subdivisions of the peripheral nervous system.**

-

1215 **What are the functions of the sympathetic nervous system and the parasympathetic nervous system?**

-

1216 **How does information transmission in the endocrine system differ from that in the nervous system?**

-

1217 **How is the endocrine system involved in the regulation of behavior?**

-

1218 **State what neural pathways are and explain why they are important.**

-

1219 **Describe phrenology, and explain the contribution it has made to the understanding of the brain.**

-

1220 **Explain the difference between structural plasticity and functional plasticity, and give an example of each.**

-

1221 **What evidence supports the idea that the brain can develop new neurons in adulthood?**

-

1222 **Describe the goals of the Human Connectome Project, the diffusion spectrum imaging technique, and the challenges faced by the Project.**

-

1223 **A team of German neuroscientists conducted a research study that involved people learning how to juggle. Describe the study, including the experimental and control groups, and discuss the implications of the study's findings.**

-

1224 **Complete an illustration (similar to Figure 2.14 in your textbook) of the human brain, name and label its major regions, and briefly describe the functions of each structure.**

-

1225 **Distinguish between the ideas of cortical localization and lateralization of function, and give an example of each.**

-

1226 **What are the key structures of the hindbrain, and what roles do they play?**

-

1227 **What are the key structures of the midbrain, and what roles do they play?**

-

1228 **Identify the four lobes of each cerebral hemisphere and the function associated with each lobe.**

-

1229 **What is the somatosensory cortex, and how is it organized?**

-

1230 **What is the primary motor cortex, and how is it organized?**

-

1231 **What are the key structures of the limbic system?**

-

1232 **What is the hypothalamus, and what roles does it play?**

-

1233 **Describe the differences in male and female brains and discuss what conclusions can be drawn from research on gender differences and the brain.**

-

1234 **What is meant by the phrase *lateralization of function*?**

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1235 **What contributions did Pierre Paul Broca and Karl Wernicke make to the understanding of the brain?**

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1236 **What is the corpus callosum, and what is its function?**

-

1237 **Who was Roger Sperry, and what contributions did he make to the understanding of the brain?**

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1238 **Assume that you have asked a split-brain patient to close his eyes, and then you placed a paper clip in his right hand. Most likely, how would the split-brain patient respond, and why?**

-

1239 **Describe the procedure used for testing split-brain patients and explain what the findings of this research demonstrate about the different functions of the left and right hemisphere.**

-

1240 **Briefly summarize the specialized abilities of the left and right cerebral hemispheres.**

-

1241 **Critically evaluate the following claim: "Most people use only 10 percent of their brain."**

-

1242 **List two myths about left- and right-handedness and discuss what research findings have shown about handedness.**

-

1243 **Critically evaluate the claim that some people are "right-brained" and others "left-brained" and discuss the idea that you can train your right brain to be more creative and intuitive.**

-

1244 **Compare the effects on rats of being raised in an enriched versus an impoverished environment.**

-

1245 **What evidence supports the notion that the human brain seems to benefit from a stimulating environment?**

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1246 **How can you apply the findings from the brain enrichment studies to yourself?**

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