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Brain: Basic Anatomy, Locations & Functions

Study Guide — Brain Anatomy

High-school/pre-med-level questions on major brain regions, lobes, structures and their basic functions.

30 items — Study Guide with Answers

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1 **Which part of the central nervous system is primarily responsible for higher functions such as thinking, memory, and conscious perception?**

A Spinal cord

B Cerebellum

C **Cerebrum (cerebral hemispheres)** ✓

D Medulla oblongata

E Hypothalamus

▶ **Explanation:** The cerebrum is the largest part of the brain and is responsible for conscious thought, memory, voluntary movement and sensory perception.

2 **Which of the following is NOT part of the brainstem?**

A Midbrain

B Pons

C Medulla oblongata

D **Cerebellum** ✓

E All of the above are brainstem structures

▶ **Explanation:** The brainstem consists of midbrain, pons and medulla; the cerebellum is attached to the brainstem but is not part of it.

3 **Which lobe of the cerebral cortex is primarily associated with vision?**

A Frontal lobe

B Parietal lobe

C Temporal lobe

D **Occipital lobe** ✓

E Insular cortex

▶ **Explanation:** The primary visual cortex is located in the occipital lobes at the back of the brain.

4 **The primary motor cortex, which controls voluntary movements of skeletal muscles, is located in the:**

A Postcentral gyrus of the parietal lobe

B **Precentral gyrus of the frontal lobe** ✓

C Temporal lobe

D Occipital lobe

E Cerebellar cortex

▶ **Explanation:** The precentral gyrus in the frontal lobe contains the primary motor cortex, sending signals to skeletal muscles.

5 **The primary somatosensory cortex (for touch, pressure, pain, temperature from the body) is located in the:**

A Precentral gyrus of the frontal lobe

B **Postcentral gyrus of the parietal lobe** ✓

C Temporal lobe

D Occipital lobe

E Insula

▶ **Explanation:** The postcentral gyrus of the parietal lobe receives sensory information from receptors in the skin and body.

6 **Which lobe of the brain is MOST associated with planning, decision-making, personality, and voluntary movement?**

A **Frontal lobe** ✓
B Parietal lobe
C Temporal lobe
D Occipital lobe
E Cerebellum

▶ **Explanation:** The frontal lobes are involved in higher cognitive functions, personality, and voluntary motor control.

7 **Which lobe is primarily involved in processing auditory information and is also important for memory and understanding language?**

A Frontal lobe
B Parietal lobe
C **Temporal lobe** ✓
D Occipital lobe
E Cerebellum

▶ **Explanation:** The temporal lobes process sound and play a major role in memory and language (e.g. Wernicke's area in the dominant hemisphere).

8 **The cerebellum is located:**

A In the frontal lobe behind the forehead

B **Under the occipital lobes, behind the brainstem** ✓

C Between the two cerebral hemispheres, forming the corpus callosum

D Inside the lateral ventricles

E At the very top of the brain above the cortex

▶ **Explanation:** The cerebellum is a 'little brain' at the back of the skull, beneath the occipital lobes and behind the brainstem.

9 **The main function of the cerebellum is to:**

A Generate conscious thoughts and emotions

B **Coordinate movement, balance and posture** ✓

C Control basic breathing and heart rate

D Produce hormones like insulin

E Interpret visual information

▶ **Explanation:** The cerebellum fine-tunes movements, maintains balance and posture, and contributes to motor learning.

10 **Damage to the cerebellum is most likely to cause:**

A Complete paralysis of one side of the body

B Loss of consciousness

C **Poor coordination and balance, with clumsy movements** ✓

D Total blindness

E Loss of the sense of smell only

▶ **Explanation:** Cerebellar lesions cause ataxia (uncoordinated movement), tremor, and balance problems rather than paralysis.

11 **The medulla oblongata is crucial for life because it contains centers that control:**

A Complex thinking and memory

B **Basic reflexes for breathing and heart rate** ✓

C Fine motor control of fingers

D Color vision

E Conscious pain perception only

▶ **Explanation:** The medulla contains vital autonomic centers for respiration, cardiovascular control and some basic reflexes.

12 **Which structure acts as a major relay station for sensory information going to the cerebral cortex (often called the 'gateway to the cortex')?**

A Hypothalamus

B **Thalamus** ✓

C Cerebellum

D Pons

E Amygdala

▶ **Explanation:** Most sensory pathways synapse in the thalamus before reaching specific areas of the cortex.

13 **The hypothalamus is BEST known for its role in:**

A Coordinating voluntary muscles

B **Maintaining homeostasis (temperature, hunger, thirst) and controlling the pituitary gland** ✓

C Storing long-term memories

D Fine-tuning balance and posture

E Processing visual information

▶ **Explanation:** The hypothalamus links the nervous and endocrine systems, regulating body temperature, appetite, thirst, circadian rhythms and pituitary hormone release.

14 **The pituitary gland is directly connected to which brain structure?**

A Thalamus

B **Hypothalamus** ✓

C Pons

D Cerebellum

E Medulla oblongata

▶ **Explanation:** The pituitary (hypophysis) hangs below the hypothalamus and is controlled by hypothalamic hormones and nerve signals.

15 **The structure that connects the left and right cerebral hemispheres and allows communication between them is the:**

A Brainstem

B **Corpus callosum** ✓

C Thalamus

D Hypothalamus

E Pineal gland

▶ **Explanation:** The corpus callosum is a large bundle of myelinated fibres connecting the two hemispheres.

16 **Gray matter in the brain consists mainly of:**

A Myelinated axons only

B **Neuron cell bodies, dendrites and synapses** ✓

C Cerebrospinal fluid

D Pure connective tissue

E Only blood vessels

▶ **Explanation:** Gray matter is rich in neuron cell bodies and synapses; white matter is mostly myelinated axons.

17 **Which statement about the arrangement of gray and white matter in the CEREBRUM is CORRECT?**

A Gray matter is only in the center; white matter is only at the surface

B **Gray matter forms a thin outer cortex and some deeper nuclei; white matter lies beneath the cortex** ✓

C Both gray and white matter are randomly mixed

D White matter is only found in the spinal cord

E There is no white matter in the cerebrum

▶ **Explanation:** The cerebral cortex is gray matter; beneath it is white matter, and there are also gray nuclei deep inside (basal nuclei).

18 **The limbic system is mainly involved in:**

A Fine motor control of hand muscles

B Vision and eye movements

C **Emotions, motivation, and aspects of memory** ✓

D Controlling breathing and heart rate

E Hearing and balance only

▶ **Explanation:** The limbic system includes structures such as the hippocampus and amygdala, important for emotion and memory.

19 **Which brain structure is particularly important for forming new long-term declarative memories (facts and events)?**

A **Hippocampus** ✓

B Medulla oblongata

C Pons

D Cerebellum

E Pituitary gland

▶ **Explanation:** The hippocampus, part of the limbic system, is crucial for converting short-term memories into long-term explicit memories.

20 **The amygdala is most strongly associated with:**

A Regulating heart rate and blood pressure

B Fine-tuning voluntary movements

C **Processing fear and other emotional responses** ✓

D Controlling endocrine glands directly

E Producing cerebrospinal fluid

▶ **Explanation:** The amygdala is involved in emotional processing, especially fear and threat detection.

21 **In most right-handed people, language production (speaking) is primarily controlled by Broca's area, which is located in the:**

A Right frontal lobe

B **Left frontal lobe** ✓

C Left occipital lobe

D Right temporal lobe

E Cerebellum

▶ **Explanation:** Broca's area is typically in the dominant (usually left) frontal lobe and is essential for speech production.

22 **Wernicke's area, important for understanding spoken and written language, is usually found in the:**

A Occipital lobe

B Right parietal lobe

C **Dominant temporal/parietal region (usually left)** ✓

D Cerebellum

E Medulla oblongata

▶ **Explanation:** Wernicke's area is in the dominant hemisphere (usually left), at the junction of temporal and parietal lobes, and is crucial for language comprehension.

23 **Which side of the brain primarily controls movements on the RIGHT side of the body?**

A Right cerebral hemisphere

B **Left cerebral hemisphere** ✓

C Cerebellum only

D Brainstem only

E Spinal cord only

▶ **Explanation:** Motor pathways cross (decussate) so that the left hemisphere typically controls the right side of the body and vice versa.

24 **Cerebrospinal fluid (CSF) is produced mainly by the:**

A Cerebral cortex

B **Choroid plexuses in the ventricles** ✓

C Pituitary gland

D Cerebellar cortex

E Spinal cord gray matter

▶ **Explanation:** CSF is secreted by specialized capillary networks (choroid plexuses) in the brain's ventricles.

25 **Which of the following is NOT a function of cerebrospinal fluid (CSF)?**

A Providing buoyancy and cushioning for the brain

B Helping remove metabolic waste products

C Transporting some nutrients and chemical signals

D **Directly generating nerve impulses in neurons** ✓

E Providing a stable chemical environment

▶ **Explanation:** CSF protects and supports the brain and aids in chemical stability and waste removal, but it does not itself generate action potentials.

26 **The blood–brain barrier primarily serves to:**

A Allow all substances free access to brain tissue

B **Protect the brain by limiting passage of many substances from blood to brain** ✓

C Generate cerebrospinal fluid

D Produce myelin for axons

E Allow proteins and cells to easily enter the brain

▶ **Explanation:** The blood–brain barrier consists of tight junctions between endothelial cells and helps maintain a stable environment for neurons.

27 **Which brain region acts as a bridge between the spinal cord and higher brain centers and also plays a role in sleep and breathing?**

A **Pons** ✓
B Cerebellum
C Occipital lobe
D Hippocampus
E Pituitary gland

▶ **Explanation:** The pons is part of the brainstem connecting different parts of the brain and helps regulate breathing and sleep.

28 **Which structure is part of the midbrain and is involved in reflex movements of the eyes and head in response to visual and auditory stimuli?**

A Cerebellar hemispheres
B **Superior and inferior colliculi (tectum)** ✓
C Thalamus
D Hypothalamus
E Basal nuclei

▶ **Explanation:** The superior colliculi coordinate visual reflexes; the inferior colliculi coordinate auditory reflexes.

29 **Basal nuclei (basal ganglia) are groups of gray matter deep within the cerebral hemispheres that are mainly involved in:**

A Producing CSF

B **Coordinating and smoothing motor activity and initiating appropriate movements** ✓

C Regulating breathing and heart rate

D Processing visual information

E Secreting hormones into the blood

▶ **Explanation:** Basal nuclei help regulate motor programs; their dysfunction is linked to movement disorders such as Parkinson's disease.

30 **Which of the following pairings of brain region and MAIN function is MOST accurate?**

A Occipital lobe – hearing

B Temporal lobe – primary control of balance

C Medulla – conscious decision-making

D **Cerebellum – coordination and fine-tuning of movements** ✓

E Frontal lobe – primary visual processing

▶ **Explanation:** The cerebellum is key for coordination; the other pairings swap functions that belong to different regions.