

Neuroanatomy questions essay sample

[Health & Medicine](#), [Stress](#)



1. Motor pathways: Briefly describe important differences between the lateral and the medial (motor) systems

ANSWER:

The motor system is the corticospinal tract. The lateral part of the corticospinal tract decussates while the medial part does not. The lateral corticospinal tract controls limb muscles while the medial corticospinal tract controls the axial and trunk muscles. The lateral corticospinal tract carries contralateral fibers from the cerebral cortex to supply the limb muscles while the medial corticospinal tract carries ipsilateral fibers from the cerebral cortex to supply the axial and trunk muscles.

2. What is the main function of the basal ganglia?

ANSWER:

The Basal ganglia integrates information from the frontal, prefrontal and parietal areas of the cerebral cortex. It also blocks the execution of movements that are not suited to the situation.

3. Name some of the most important functions of the vagus nerve?

ANSWER:

Its main functions include Breathing, speech, sweating, keeping the larynx open during breathing, monitoring and regulating the heartbeat.

4. What is the Central Pattern Generator?

ANSWER:

The central pattern generator is a network of neurons that produce rhythmic outputs that have no sensory feedback. It consists of some processes that interact such that there is an alternating increase and decrease in activity. The system also sequentially returns to baseline after completing the action. They are located in the spinal cord, in the lower thoracic and lumbar parts.

5 What are the two parts of the sensory thalamus that have fundamentally different functions?

ANSWER:

The medial and lateral geniculate bodies.

6. What is the insular lobe? Briefly describe where it is located and briefly mention some of its functions

ANSWER:

The insular cortex is located folded within the lateral sulcus between the frontal lobe and the temporal lobe of the cerebrum. They are linked to such functions as emotion, regulation of the body homeostasis, perception, motor function, cognitive and self-awareness.

7 What are the main differences between ventral and dorsal roots of spinal nerves?

ANSWER:

The dorsal roots of the spinal nerves carry afferent sensory axons while the ventral roots carry efferent fibers.

8. Where do the axons that form the corticospinal tract originate?

ANSWER:

They originate in the motor cortex

9. Briefly describe the immune system of the central nervous system?

ANSWER:

The microglia cells are found throughout the brain parenchyma, they mediate the synthesis and release of pro-inflammatory and anti-inflammatory cytokines.

Perivascular macrophages in the brain capillaries also release cytokines and chemokines.

Astocytes are divided into fibrous astocytes and protoplasmic astocytes.

Fibrous astocytes are located in the white matter and protoplasmic astocytes are located in the grey matter. They contribute to the blood brain barrier.

Oligodendrocytes participate in myelination and it secretes some specific inflammatory molecules.

10. Briefly describe the neural bases for micturition

Answer:

Sympathetic innervation is through the hypogastric nerve (T10-L20 and it involuntarily controls the neck of the bladder and intrinsic sphincter.

Parasympathetic innervation is through the pudendal nerves (S2-S4) which exerts involuntary control on the Detrusor muscle of the bladder.

Somatic innervation is through the pudendal nerve (S2-S4), which controls voluntary contraction and relaxation of the external sphincter.

In the storage phase, the filling of the bladder is enabled by contraction of the striated sphincter (Somatic innervation), contraction of smooth muscle sphincter (Sympathetic) and inhibition of detrusor activity (Sympathetic innervation). The emptying phase, however, is enabled by relaxation of the striated sphincter, which is by somatic innervation, relaxation of the smooth muscle sphincter and opening of the bladder neck, which is by sympathetic innervation and the contraction of the Detrusor muscle, which is by parasympathetic innervation.

11.

Which neural circuits are involved in emptying the urinary bladder?

The spinal pathway activates the striated sphincter via the pudendal nerve; there is also inhibition of the detrusor muscle and activation of the smooth muscle sphincter by the sympathetic nervous system. Afferents are from the bladder through increasing pressure, the pelvic floor muscles, the penis, vagina and rectum.

Pontine Micturition Center: increasing bladder pressure in the urinary bladder increases afferent neuronal activity in the bladder; this activates the pontine micturition center in the Pons. This activation causes inhibition of the spinal reflexes and leads to activation of the detrusor muscle and inhibition of the urinary sphincter.

Urethra to bladder reflex: flow of urine through the urethra leads to stimulation of bladder contractions.

12.

Briefly describe the descending pathways for the two main motor systems?

The corticospinal tract conducts neural impulses from the brain to the spinal cord. In the spinal cord, it is made up of the lateral corticospinal tract and the anterior corticospinal tract. It is concerned with voluntary movements that are skilled.

The corticobulbar tract conveys neural impulses from the cerebral cortex to the brainstem. The tract innervates the cranial motor nuclei except the lower facial nuclei.