

Neuroanatomy questions

1) Which of the following statements concerning the white columns of the spinal cord is correct:

- (a) The posterior spinocerebellar tract is situated in the posterior white column.
- (b) The anterior spinothalamic tract is found in the anterior white column.
- (c) The lateral spinothalamic tract is found in the anterior white column.
- (d) The fasciculus gracilis is found in the lateral white column.
- (e) The rubrospinal tract is found in the anterior white column.

2) Which following statements concerning the spinal cord is correct:

- (a) The spinal cord has a cervical enlargement for the brachial plexus.
- (b) The spinal cord possesses spinal nerves that are attached to the cord by anterior and posterior rami.
- (c) In the adult, the spinal cord usually ends inferiorly at the lower border of the fourth lumbar vertebra.
- (d) The ligamentum denticulatum anchors the spinal cord to the pedicles of the vertebra along each side.
- (e) The central canal does not communicate with the fourth ventricle of the brain.

3) Which of the following statements concerning the nucleus of termination of the tracts listed below is correct:

- (a) The posterior white column tracts terminate in the inferior colliculus.
- (b) The spinoreticular tract terminates on the neurons of the hippocampus.
- (c) The spinotectal tract terminates in the inferior colliculus.
- (d) The anterior spinothalamic tract terminates in the ventral posterolateral nucleus of the thalamus.
- (e) The anterior spinocerebellar tract terminates in the dentate nucleus of the cerebellum.

4) One of the following statements relate sensations with the appropriate nervous pathways:

- (a) Two-point tactile discrimination travels in the lateral spinothalamic tract.
- (b) Pain travels in the anterior spinothalamic tract.
- (c) Unconscious muscle joint sense travels in the anterior spinocerebellar tract.
- (d) Pressure travels in the posterior spinothalamic tract.
- (e) Vibration travels in the posterior spinocerebellar tract.

5) Which of the following statements regarding the gating theory of pain is correct:

- (a) Stimulation of small non-pain-conducting fibers in a peripheral nerve may reduce pain sensitivity.
- (b) Massage applied to the skin over a painful joint may reduce pain sensitivity.
- (c) Stimulation of delta A- and C-type fibers in a posterior root of a spinal nerve may decrease pain sensitivity.
- (d) Degeneration of large non-pain-conducting fibers in a peripheral nerve decreases pain sensitivity.
- (e) Inhibition of pain conduction in the spinal cord does not involve connector neurons.

6) Which of the following statements regarding the course taken by the tracts is

Correct:

- (a) The rubrospinal tract crosses the midline of the neuroaxis in the medulla oblongata.
- (b) The tectospinal tract (most of the nerve fibers) crosses the midline in the posterior commissure. (c) The vestibulospinal tract crosses the midline in the midbrain.
- (d) The lateral corticospinal tract has crossed the midline in the medulla oblongata.
- (e) The anterior corticospinal tract crosses the midline in the midbrain.

7) After a hemorrhage into the left internal capsule in a right-handed person, the following sign or symptom might be present:

- (a) Left homonymous hemianopia
- (b) Right astereognosis
- (c) Left hemiplegia
- (d) Normal speech.
- (e) Left-sided positive Babinski response

8) A patient with a traumatic lesion of the left half of the spinal cord at the level of the eighth cervical segment might present with:

- (a) Loss of pain and temperature sensations on the left side below the level of the lesion
- (b) Loss of position sense of the right leg
- (c) Right hemiplegia
- (d) Left positive Babinski sign
- (e) Right-sided lower motor paralysis in the segment of the lesion and muscular atrophy

9) Which of the following regions of white matter would not contain corticospinal fibers?

- (a) Pyramid of medulla oblongata
- (b) Lateral white column of the spinal cord
- (c) Cerebral peduncle of the midbrain
- (d) Anterior limb of the internal capsule
- (e) Corona radiata

Clinical question:

10) A 59-year-old woman was experiencing pain in the back and showed evidence of loss of pain and temperature sensations down the back of her left leg. Three years previously, she underwent a radical mastectomy followed by radiation and chemotherapy for advanced carcinoma of her right breast. On examination, it was found that she was experiencing pain over the lower part of the back, with loss of the skin sensations of pain and temperature down the back of her left leg in the area of the S1-3 dermatomes. No other neurologic deficits were identified. Radiographic examination of the vertebral column showed evidence of metastases in the bodies of the 9th and 10th thoracic vertebrae. An MRI

revealed an extension of one of the metastases into the vertebral canal, with slight indentation of the spinal cord on the right side.

The loss of pain and temperature sensations down the back of the patient's left leg in the area of the S1-3 dermatomes could be explained by the following factual statements except:

- (a) The lateral spinothalamic tracts in the spinal cord conduct the sensations of pain.
- (b) The lateral spinothalamic tracts are laminated, with the sacral segments of the body located most laterally.
- (c) The sacral segments of the tracts are the most exposed to external cord pressure from a metastasizing tumor.
- (d) The loss of temperature sensations in the leg could be explained by pressure of the tumor on the anterior spinothalamic tract.

Answers:

- 1. B
- 2. A
- 3. D
- 4. C
- 5. B
- 6. D
- 7. B
- 8. D
- 9. D
- 10. D

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Good Luck