

Name \_\_\_\_\_ KEY \_\_\_\_\_

**Nsci 2001: Human Neuroanatomy  
2019 Examination 1**

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***On your scantron answer sheet, please enter your name (last name, space, first name), internet ID (X.500 name) and student number. Please do it now!!!***

**Lecture 2 overview**

1. Neurons can receive synapses on all parts of the cell except ...
  - A. the axon.
  - B. the dendrites.
  - C. the soma.
  - D. None of the above are correct as neurons can receive synapses on any of the above.
  
2. Which of the following is NOT one of the major lobes of the cerebral cortex?
  - A. pons
  - B. frontal
  - C. occipital
  - D. parietal
  - E. temporal
  
3. Bundles of axons in the peripheral nervous system (PNS) are called ...
  - A. ganglia.
  - B. nuclei.
  - C. nerves.
  - D. commissures.
  - E. tracts.
  
4. The central sulcus divides ...
  - A. the spinal cord from the medulla.
  - B. the thalamus from the hypothalamus.
  - C. the cerebral cortex from the cerebellum.
  - D. the cerebral cortex from the diencephalon.
  - E. the frontal lobe from the parietal lobe.
  
5. Which of the following statements regarding the hypothalamus is NOT true?
  - A. The hypothalamus is part of the diencephalon.
  - B. The hypothalamus is visible on the ventral surface of the intact human brain.
  - C. Part of the third ventricle is within the hypothalamus.
  - D. The hypothalamus is caudal to the pons.
  - E. None of the above are correct as all the statements are true.

**Lecture 3 development**

6. The DNA in a dividing cell is replicated during what phase of the cell division cycle?
  - A. G1 phase
  - B. G2 phase
  - C. G3 phase
  - D. M phase
  - E. S phase

7. The cells along the midline of the embryonic neural plate will contribute mainly to development of ...
- A. ventral regions of the brain and spinal cord.
  - B. dorsal regions of the brain and spinal cord.
  - C. lateral regions of the brain and spinal cord.
  - D. peripheral nervous system and some other non-neural structures.
8. Which of the following normally develops from cells of the neural crest?
- A. retina
  - B. cerebellum
  - C. dorsal horn of the spinal cord
  - D. sensory neurons of the dorsal root ganglia
  - E. More than one of the above are correct.
9. Cells in the alar plate of the early developing spinal cord will develop into what structure in the adult nervous system?
- A. white matter
  - B. dorsal horn
  - C. ventral horn
  - D. central canal
  - E. floor plate
10. Spina bifida is ...
- A. due to a blockage in the brain ventricles.
  - B. due to an embryonic midline closure defect that can involve the spinal cord, vertebrae and/or skin.
  - C. is an infection of the spinal cord that can be lethal if not treated.
  - D. is a hole in the skull through which the spinal cord passes.
  - E. is the junction between the medulla and the spinal cord.

#### Lecture 4 ventricles, CSF & meninges

11. What is the function of the choroid plexus?
- A. produces cerebrospinal fluid (CSF)
  - B. collects cerebrospinal fluid (CSF) from the brain
  - C. collects venous blood from the brain
  - D. blocks transfer of harmful chemicals from the blood into the brain
  - E. makes blood
12. Cerebrospinal fluid (CSF) drains from the 4<sup>th</sup> ventricle immediately into ...
- A. the subarachnoid space.
  - B. the 5<sup>th</sup> ventricle.
  - C. the dural venous sinuses.
  - D. the falx cerebri.
  - E. the cerebral aqueduct.
13. What structure connects the third and fourth ventricles?
- A. central canal
  - B. subarachnoid space
  - C. cerebral aqueduct
  - D. falx cerebri
  - E. dural sinus

14. What is a lumbar puncture?
- A. a clinical procedure to sample cerebrospinal fluid (CSF)
  - B. a clinical procedure to treat hydrocephalous
  - C. a common cause of stroke
  - D. a common injury to the spine
  - E. the route by which blood returns from the spinal cord to the heart
15. What layer of the meninges is in contact with the skull?
- A. arachnoid
  - B. pia
  - C. dura
  - D. cerebral spinal
  - E. subarachnoid

### Lecture 5 blood supply

16. Oxygen ( $O_2$ ) is carried in the serum component of blood. True or false?
- A. true
  - B. false
17. Which of the following has the lowest level of oxygen ( $O_2$ ) and the highest level of carbon dioxide ( $CO_2$ ) in its blood?
- A. aorta
  - B. pulmonary artery
  - C. vertebral artery
  - D. carotid artery
  - E. None of the above are correct as all are similar in their  $O_2/CO_2$  levels.
18. Which of the following provides the major source of blood to the occipital lobe of the cerebral cortex?
- A. internal cerebral artery
  - B. dorsal cerebral artery
  - C. anterior cerebral artery
  - D. middle cerebral artery
  - E. posterior cerebral artery
19. Which of the following is NOT a major contributor to the blood-brain barrier?
- A. endothelial cells of the capillaries that are linked together by tight junctions
  - B. end-feet of astrocytes that surround capillaries
  - C. end-feet of dendrites of neurons that surround capillaries
  - D. The blood-brain barrier is an outdated idea that is no longer viewed as real.
20. A blocked artery can result in ...
- A. an aneurysm.
  - B. an arteriovenous malformation.
  - C. a stroke.
  - D. acid reflux.
  - E. hydrocephalous.

**Lecture 6 cells**

21. The cell membrane is ...

- A. hydrophilic and allows the free movement of water into and out of the cell.
- B. formed by two layers of water molecules held in place by outer and inner layers of lipids.
- C. covers the soma and largest parts of the dendrites in neurons, but not the axon or smallest dendrites.
- D. where most proteins are synthesized in the cell.
- E. None of the above is correct.

22. The synthesis of mRNA is called ...

- A. transcription.
- B. translation.
- C. polymerization.
- D. isomerization.
- E. degradation.

23. Which of the following is NOT a function of the cytoskeleton in a cell?

- A. maintenance of cell shape
- B. transport of molecules and organelles inside the cell
- C. cell movement
- D. None of the above are correct as all are functions of the cytoskeleton.

24. Neurons have a large amount of what cell organelle that early microscopists called Nissl substance?

- A. mitochondria
- B. nuclei
- C. myelin
- D. rough endoplasmic reticulum (rER)
- E. golgi apparatus

25. Which of the following is a type of glial cell NOT usually found in the CNS?

- A. oligodendrocytes
- B. schwann cells
- C. microglia
- D. astrocytes
- E. ependymal cells

**Lecture 7 electrical properties**

26. The sodium-potassium pump in neurons ...

- A. is important for maintaining the resting membrane potential.
- B. is activated by depolarization of the cell to generate and propagate an action potential.
- C. pumps sodium ions ( $\text{Na}^+$ ) into the cell and potassium ions ( $\text{K}^+$ ) out of the cell.
- D. is activated by excitatory synapses.
- E. generates energy in the form of ATP for the neuron.

27. Depolarization of a neuron means ...

- A. its charge becomes more positive.
- B. its charge becomes more negative.
- C. the neuron has been inhibited.
- D. the neuron has 'forgotten' something previously learned.
- E. More than one of the above are correct.

28. Myelin causes action potentials to ...
- A. be slower.
  - B. be faster.
  - C. be more depolarized.
  - D. be more hyperpolarized.
  - E. terminate.
29. An action potential 'hopping' between the Nodes of Ranvier is known as ...
- A. hyper conduction.
  - B. axonal conduction.
  - C. saltatory conduction.
  - D. super conduction.
  - E. ultraconduction.
30. Multiple Sclerosis (MS) is a disease which destroys ...
- A. axons.
  - B. voltage-gated sodium channels.
  - C. voltage-gated calcium channels.
  - D. myelin.
  - E. the lipid bilayer.

### Lecture 8 synaptic communication

31. When an action potential depolarizes an axon terminal, what change will be initiated in the terminal?
- A. voltage-gated calcium channels will open
  - B. voltage-gated potassium channels will close
  - C. non-selective cation channels will open
  - D. SNARE proteins will be deactivated
  - E. neurotransmitter receptors will be released into the synaptic cleft
32. SNARE proteins in a synaptic terminal are activated by ...
- A. an outflow of sodium ions ( $\text{Na}^+$ ) from the terminal.
  - B. an outflow of calcium ions ( $\text{Ca}^{++}$ ) from the terminal.
  - C. an inflow of calcium ions ( $\text{Ca}^{++}$ ) into the terminal.
  - D. an inflow of potassium ions ( $\text{K}^+$ ) into the terminal.
  - E. neurotransmitter binding its receptor at the terminal.
33. Vesicle membrane that has fused with the cell membrane is taken back up into the cytoplasm via what process?
- A. exocytosis
  - B. metamorphosis
  - C. symbiosis
  - D. endocytosis
  - E. phagocytosis
34. What is the effect of tetanus toxin on certain neurons?
- A. degrades neurotransmitter receptors
  - B. degrades synaptic vesicles so neurotransmitter is released inside the neuron
  - C. increases neurotransmitter release into the synaptic cleft
  - D. prevents neurotransmitter release into the synaptic cleft

35. What occurs when glutamate binds to an NMDA receptor on a neuron?
- A. A channel opens in the receptor and allows passage of glutamate into the neuron.
  - B. A channel opens in the receptor and allows passage of calcium and potassium into the neuron.
  - C. An intracellular cascade is triggered that results in opening of voltage-gated sodium channels.
  - D. It depends on the membrane potential of the neuron when glutamate binds to the receptor.

### Lecture 9 spinal cord

36. Which of the following structures is NOT normally found in an intervertebral foramen?
- A. spinal cord
  - B. sensory ganglion
  - C. ventral root
  - D. dorsal root
37. What level of the spinal cord has the least amount of grey matter?
- A. lumbar
  - B. sacral
  - C. thoracic
  - D. cervical
38. Where do most axons in the spinocerebellar tract synapse?
- A. dorsal horn of the spinal cord
  - B. ventral horn of the spinal cord
  - C. thalamus
  - D. cerebellum
  - E. muscles
39. What is the lower end of the spinal cord called?
- A. conus medullaris
  - B. lumbar terminal
  - C. foramen magnum
  - D. spinal root
  - E. cauda equina
40. The stretch reflex is initiated by ...
- A. stretching muscle spindles.
  - B. stretching motor axons.
  - C. muscle paralysis.
  - D. injury to a tendon .
  - E. More than one of the above are correct.

*The End!*

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