

Name _____KEY_____

Lab Section _____

**Nsci 2100: Human Neuroanatomy
Examination 1**

On this page, write your name and lab section.

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

Lecture 2 overview

1. Which of the following statements regarding axons in the human nervous system is NOT true?
 - A. Some types of neurons do not have an axon.
 - B. Most types of neurons have only one axon, but it can branch.
 - C. Some types of neurons can have two or more axons.
 - D. All of the above statements are true.

2. Neurons can receive synapses on all parts of the cell except ...
 - A. the axon.
 - B. the dendrites.
 - C. the soma.
 - D. Neurons can have synapses on all of the above.

3. Retina is part of the ...
 - A. central nervous system (CNS).
 - B. peripheral nervous system (PNS).
 - C. autonomic nervous system.
 - D. motor system.
 - E. None of the above is correct.

4. A sagittal section of the brain...
 - A. divides the top from the bottom of the brain.
 - B. divides the front from the back of the brain.
 - C. divides the left side from the right side of the brain.
 - D. divides the spinal cord from the brain.

Lecture 3 development

5. 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.

6. At the end of gastrulation, the human embryo has how many cell layers?
- A. one
 - B. two
 - C. three
 - D. four
 - E. five
7. In the gastrula stage embryo, the nervous system will develop from the same cell group as the ...
- A. skin.
 - B. muscles of the trunk & limbs.
 - C. bones of the trunk & limbs.
 - D. intestines.
 - E. heart.
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. During what phase of the cell division cycle is the DNA replicated?
- A. G1
 - B. G2
 - C. G3
 - D. M
 - E. S

Lecture 4 ventricles, CSF & meninges

10. What ventricle is in the diencephalon?
- A. 2nd ventricle
 - B. 3rd ventricle
 - C. 4th ventricle
 - D. thalamic ventricle
 - E. cerebral aqueduct
11. The ventricular system in the brain is normally continuous with the ...
- A. cranial veins.
 - B. cranial arteries.
 - C. subarachnoid space.
 - D. epidural space.
 - E. paranasal sinuses.
12. With the head in an upright position, such as when you are sitting in a chair, the occipital lobe of the cerebral cortex is supported by the ...
- A. base (lowest part) of the skull.
 - B. falx cerebri.
 - C. tentorium cerebelli.
 - D. foramen magnum.

13. In the clinic, a good place to obtain a sample of cerebrospinal fluid (CSF) from a patient would be ...
- A. a lateral ventricle.
 - B. the subarachnoid space in the skull.
 - C. the central canal in the lumbar spinal cord.
 - D. the spinal (vertebral) canal in the lower lumbar spine.
 - E. a dural venous sinus.

Lecture 5 blood supply

14. 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. dendrites of neurons that surround capillaries
 - D. The blood-brain barrier is an outdated idea that is no longer viewed as real.
15. What vessel will normally have blood with a high level of carbon dioxide (CO₂) and a low level of oxygen (O₂)?
- A. pulmonary artery
 - B. carotid artery
 - C. aorta
 - D. vertebral artery
 - E. None of the above are correct.
16. Blood that will supply more posterior regions of the brain enters the cranium via what artery?
- A. internal jugular
 - B. internal carotid
 - C. external carotid
 - D. basilar
 - E. vertebral
17. Which of the following is NOT a significant risk factor for a stroke?
- A. smoking
 - B. diabetes
 - C. high levels of cholesterol in the blood
 - D. high blood pressure
 - E. All of the above are risk factors for stroke.

Lecture 6 cells

18. 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.
19. Males have one chromosome that females do not have. True or false?
- A. true
 - B. false

20. Certain viruses, such as the rabies virus, can be transported from the skin to the soma of a neuron by what process?
- A. transcription
 - B. translation
 - C. blood circulation
 - D. Golgi apparatus
 - E. axonal transport
21. Nissl substance, which is a prominent feature of most neurons, is largely composed of what cell organelle?
- A. nucleus
 - B. nucleolus
 - C. mitochondria
 - D. Golgi apparatus
 - E. rough endoplasmic reticulum

Lecture 7 electrical properties

22. Myelin ...
- A. reduces the voltage required to reach threshold for generating an action potential.
 - B. protects axons from trauma.
 - C. is formed by microglia in the CNS.
 - D. increases the speed of conduction of action potentials along axons.
 - E. None of the above is correct.
23. When sodium chloride (NaCl) is dissolved in water ...
- A. the sodium atom 'lends' the chloride atom an electron giving the chloride atom a positive charge.
 - B. the sodium atom 'lends' the chloride atom an electron giving the chloride atom a negative charge.
 - C. the chloride atom 'lends' the sodium atom an electron giving the sodium atom a positive charge.
 - D. the chloride atom 'lends' the sodium atom a proton giving the sodium atom a positive charge.
 - E. the sodium atom 'lends' the chloride atom a proton giving the chloride atom a negative charge.
24. 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 (Na^+) into the cell and potassium ions (K^+) out of the cell.
 - D. is activated by excitatory synapses.
 - E. generates energy in the form of ATP for the neuron.
25. Immediately following an action potential, the voltage-gated sodium (Na^+) channels in the axon are blocked and do not allow sodium to pass. True or false?
- A. true
 - B. false

26. Multiple sclerosis (MS) is due to ...
- A. abnormal function of a certain ion channel in the brain, usually as the result of a genetic mutation.
 - B. blockage of voltage-gated sodium (Na^+) channels in some CNS neurons.
 - C. demyelination of certain CNS axons.
 - D. the blockage of arteries in the brain.
 - E. abnormal mitochondria in certain neurons in the brain.

Lecture 8 synaptic communication

27. Exocytosis is a process required for ...
- A. entry of sodium (Na^+) into the axon during an action potential.
 - B. entry of calcium (Ca^{++}) into the presynaptic terminal in response to the arrival of an action potential.
 - C. the release of neurotransmitter into the synaptic cleft.
 - D. the entry of neurotransmitter into the postsynaptic neuron.
 - E. transcription in the nucleus.
28. Long-term potentiation (LTP) describes a condition following a burst of synaptic activity after which an action potential in a presynaptic cell elicits more depolarization of the postsynaptic cell than before the burst of activity. True or false?
- A. true
 - B. false
29. SNARE proteins in a synaptic terminal are activated by ...
- A. an outflow of sodium ions (Na^+) from the terminal.
 - B. an outflow of calcium ions (Ca^{++}) from the terminal.
 - C. an inflow of calcium ions (Ca^{++}) into the terminal.
 - D. an inflow of potassium ions (K^+) into the terminal.
 - E. an inflow of neurotransmitter into the terminal.
30. Dopamine receptors are metabotropic. You would expect the action of dopaminergic synapses on a postsynaptic neuron to be ...
- A. rapid and of long duration.
 - B. slow and of long duration.
 - C. rapid and of short duration.
 - D. slow and of short duration.

Lecture 9 spinal cord

31. 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
32. At what level of the spine are the vertebrae normally connected to ribs?
- A. lumbar
 - B. sacral
 - C. thoracic
 - D. cervical
 - E. More than one level can have ribs.

33. What level of the spinal cord has the least amount of grey matter?

- A. lumbar
- B. sacral
- C. thoracic
- D. cervical

Everyone received credit for #34.

34. When the patellar tendon is tapped with a rubber hammer, the quadriceps muscle contracts causing the leg to kick forward. Which of the following statements regarding this reflex are NOT true?

- A. The reflex is initiated because receptors in the tendon are activated.
- B. Muscle spindle sensory neurons synapse directly on motor neurons that synapse in the quadriceps muscle.
- C. Muscle spindle sensory neurons synapse directly on inhibitory interneurons in the spinal cord.
- D. Contraction of the quadriceps muscle is due to a monosynaptic reflex.
- E. Contraction of the antagonistic muscle to the quadriceps is inhibited during this reflex.

35. Where do most axons in the spinocerebellar tract synapse?

- A. dorsal horn of the spinal cord
- B. ventral horn of the spinal cord
- C. ventral posterior lateral nucleus of the thalamus
- D. cerebellum
- E. muscles

Laboratory 1 & 2

36. Which of the following structures is not part of the diencephalon?

- A. superior colliculus
- B. pineal body
- C. thalamus
- D. hypothalamus

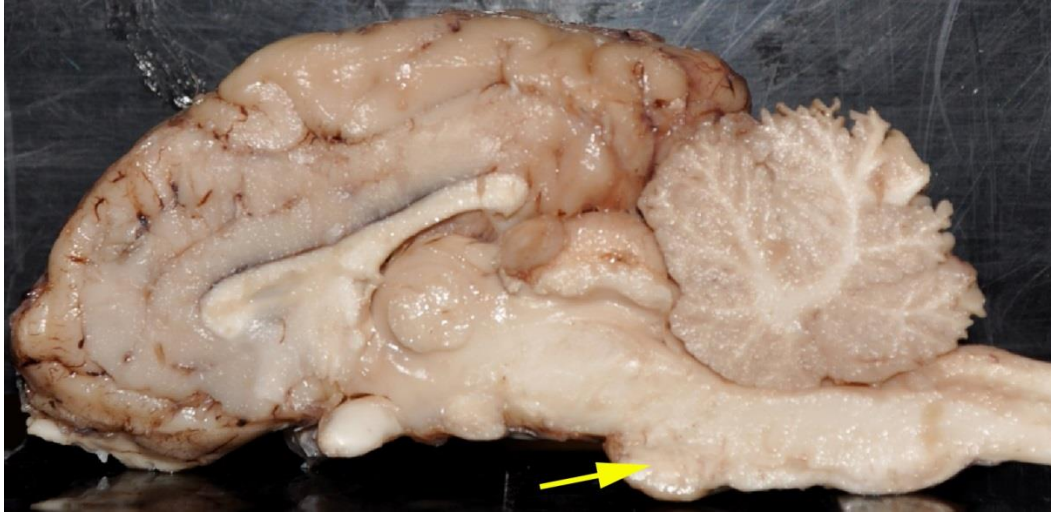
37. Which of the following list of brain structures is in the correct rostral-to-caudal order?

- A. spinal cord, medulla, cerebellar vermis, thalamus, frontal lobe
- B. spinal cord, cerebellar vermis, medulla, thalamus, frontal lobe
- C. frontal lobe, thalamus, cerebellar vermis, medulla, spinal cord
- D. frontal lobe, medulla, thalamus, cerebellar vermis, spinal cord
- E. thalamus, frontal lobe, cerebellar vermis, medulla, spinal cord

38. What is the name of the meningeal membrane that is closest to the skull?

- A. pia mater
- B. arachnoid
- C. subarachnoid space
- D. dura mater
- E. arachnoid villi

39. What structure is indicated by the yellow arrow in the photograph of a sheep brain below?
- A. medulla
 - B. cerebellar vermis
 - C. cerebral aqueduct
 - D. inferior colliculus
 - E. pons



40. Which of the following structures cannot be seen in a ventral view of the human brain?
- A. thalamus
 - B. pons
 - C. optic chiasm
 - D. olfactory tract
 - E. trigeminal nerve

The End!

Please turn in this exam and your scantron in the box at the back of the room.

Double check that your name is on both.