

NEUR0010

Week 3 – Old Exam Questions

2005-1

38. Which of the following planes of section changes orientation as you make a complete series of sections through the *human* nervous system?

- a) coronal
- b) sagittal
- c) transverse
- d) horizontal

39. You are on a microscopic submarine sailing through the ventricular system trying to get from the third to the fourth ventricle when the space around you suddenly narrows and the submarine gets stuck. When you radio for help, you should tell your rescuers you are wedged in:

- e) the spinal canal
- f) between the thalamus and the hypothalamus
- g) between the tectum and the tegmentum
- h) the rhombencephalon

40. Four thousand years ago the Incas drilled holes in peoples heads to cure illness or to "get the devils out". Starting at the surface of the skull and drilling inward towards the brain, in what order do you encounter the following structures?

- i) Dura mater--Pia Mater--Subdural Space--Arachnoid Membrane--Subarachnoid Space
- j) Pia Mater--Arachnoid Membrane--Subarachnoid Space--Dura Mater--Subdural Space
- k) Dura Mater--Subdural Space--Arachnoid Membrane--Subarachnoid Space--Pia Mater
- l) Pia Mater--Dura Mater--Subdural Space--Arachnoid Membrane--Subarachnoid Space

41. You got invited to a really hip and happening party at some place called "the third ventricle." And the party was great and all, but now you need a ride home, so you call your friend Peter. Which of the following are accurate directions to the third ventricle?

- m) Go to the thalamus and then turn medial.
- n) Go to the cerebral aqueduct and then turn lateral.
- o) Go to the central sulcus and then turn anterior.
- p) Go to the fourth ventricle (where, apparently, an even cooler party took place...) and then turn dorsal.
- q) Go over substantia nigra falls in a barrel and turn up missing.

42. A mutation in the gene *roofless* creates an embryo without the tectum in the mesencephalon. If this embryo survived, which structure would it be missing.

- r) Pons
- s) Substantia nigra
- t) Inferior Colliculi
- u) Third ventricle

43. If the caudal part of the neural tube fails to develop correctly it can lead to a condition known as

- v) Anencephaly
- w) Spina bifida
- x) Hydrocephalus
- y) subdural hematoma

2007-1

37. The blocking of the flow of cerebrospinal fluid can lead to a condition known as

- a) spina bifida
- b) anencephaly
- c) hydrocephalus
- d) damnifyeknow

38. The whole nervous system develops from

- a) ectoderm
- b) mesoderm
- c) endoderm
- d) plasmoderm

39. What is so special about the human brain compared to other animals?

- a) It is the biggest in the world.
- b) The cortex has the most gyri and sulci.
- c) The ratio of brain size to body size is biggest in humans.
- d) The human brain is the only one that has temporal lobes.

40. Cerebrospinal fluid can normally be found in all of the following areas EXCEPT

- a) in the ventricles of the brain
- b) in the subarachnoid space
- c) surrounding the spinal cord
- d) in the subdural space

41. The sensory neurons that innervate the skin develop from the

- a) neural tube
- b) neural crest
- c) mesoderm
- d) endoderm

42. The basal ganglia are _____ to the thalamus

- a) lateral
- b) medial
- c) ventral
- d) posterior

43. The death of dopaminergic (dopamine producing) neurons in a particular area of the brain will lead to the symptoms seen in Parkinson's disease. The cell bodies of these dopaminergic neurons are located in the _____ of the _____

- a) caudate; telencephalon
- b) folia; cerebellum
- c) tectum; midbrain
- d) substantia nigra; tegmentum

2007-3

16) The hypothalamus is _____ to the medulla and _____ to the thalamus.

- a) Dorsal; Posterior
- b) Lateral; Caudal
- c) Caudal; Lateral
- d) Rostral; Ventral

17) Cerebrospinal fluid

- a) Is normally found in the subdural space.
- b) Can cause hydrocephalus if the ventricular system gets blocked.
- c) Is found inside the ventricles of the brain and in the subarachnoid space of the spinal cord.
- d) More than one of the above.

18) The hippocampus develops from the

- a) Forebrain
- b) Midbrain
- c) Hindbrain
- d) Rhombencephalon

19) The most ventral structure in the medulla is the

- a) Inferior olive
- b) Medullary pyramids
- c) 4th ventricle
- d) dorsal column

20) If the neural folds fail to fuse properly into a complete neural tube this can cause

- a) Damage to the mesoderm
- b) Failure of the peripheral nervous system to develop
- c) Spina bifida
- d) A subdural hematoma

21) Primary sensory neurons in the somatic sensory system have cell bodies in the

- a) Ventral horn
- b) Dorsal horn
- c) Basal ganglia
- d) Dorsal root ganglia

2008-3

19. The dopamine neurons that die in a person with Parkinson's disease are located in the

- a) telencephalon
- b) rostral rhombencephalon
- c) diencephalon
- d) tegmentum

20. The hippocampus develops from the

- a) telencephalon
- b) rostral rhombencephalon
- c) diencephalon
- d) tegmentum

21. Cerebrospinal fluid flows through the

- a) subdural space
- b) cerebral aqueduct
- c) medial lemniscus
- d) More than one of the above

22. The thalamus is _____ to the hypothalamus. (Remember to select the **best** answer.)

- a) medial
- b) dorsal
- c) lateral
- d) ventral

2009-1

36. A genetic mutation early in fetal development results in all of the cells originating from Joe's prosencephalon to glow bright orange. As an adult, which of the following structures in Joe's brain would be glowing orange?

- a) the midbrain
- b) the cerebellum
- c) structures rostral to the midbrain
- d) structures caudal to the midbrain
- e) the medulla

37. A tiny little horse named Peter is swimming around in your 3rd ventricle (preparing to slide down your cerebral aqueduct into your 4th ventricle..."Wahooo!"). As he sits there he notes that the brain area surrounding the 3rd ventricle is

- a) cerebral cortex
- b) thalamus
- c) corpus callosum
- d) basal ganglia
- e) glowing orange!...Your name must be Joe! (Just kidding...not an answer.)

38. Damage to the neural crest cells would most likely cause

- a) spina bifida
- b) problems with the peripheral nervous system
- c) problems with the cerebral cortex
- d) hydrocephalus

39. In the ventral horn of the spinal cord you are most likely to find

- a) motor neurons
- b) sensory neurons
- c) bundles of axons travelling up or down the spinal cord
- d) cerebrospinal fluid
- e) a tiny little horse named Peter...he really get around!

40. Cerebrospinal fluid can be found

- a) in the subarachnoid space
- b) in the ventricles
- c) surrounding the outside of the brain and the spinal cord
- d) All of the above.

41. The cells of the superior and inferior colliculi (tectum) are derived from the

- a) mesoderm
- b) prosencephalon
- c) mesencephalon
- d) rhombencephalon
- e) endoderm

42. All of the following have been demonstrated to increase neurogenesis in adult brain EXCEPT:

- a) stress
- b) exercise
- c) damage due to stroke
- d) tasks involving learning

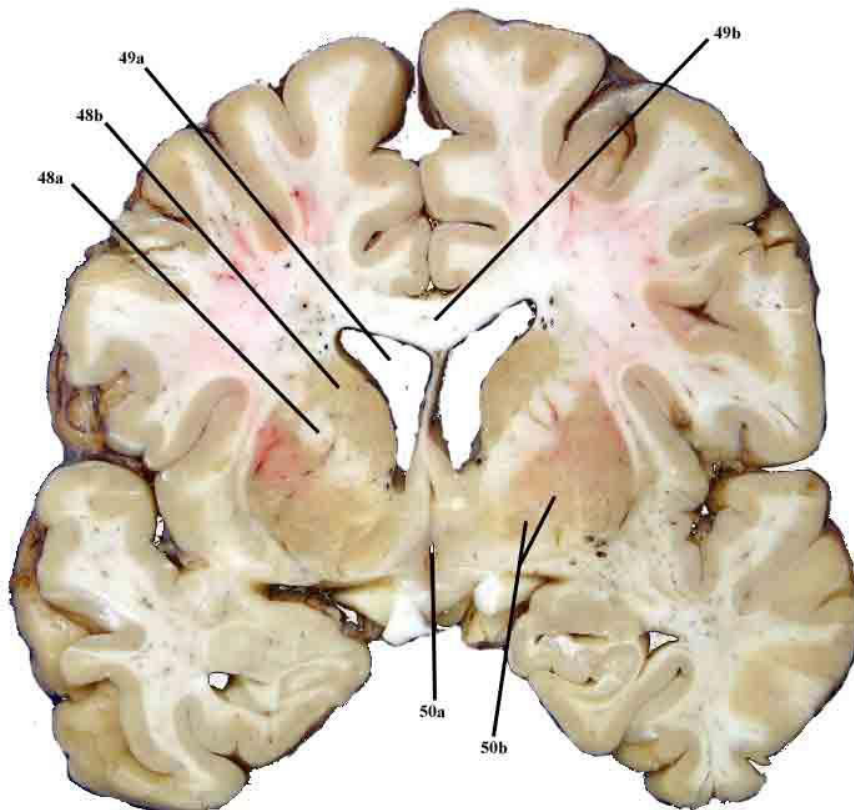
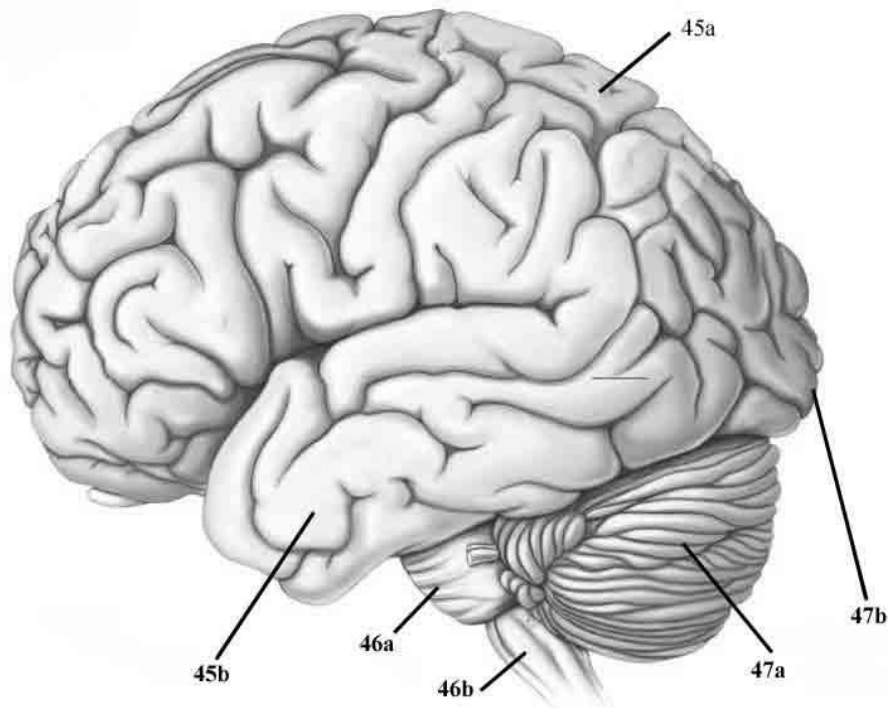
43. Loss of darkly pigmented cells in the tegmentum of the midbrain is associated with which disease?

- a) Alzheimer's
- b) Parkinson's
- c) Rabies
- d) herpes

44. Alzheimer's disease will cause

- a) an enlargement of the ventricles
- b) wider sulci
- c) loss of gray matter and white matter
- d) More than one of the above
- e) All of the above (a,b &c)

45-50 For the structures indicated, write the correct name on the corresponding line of the answer sheet.



2010-1

36. You want to make a thin section of the brain that includes the lateral ventricles, the third ventricle and the occipital lobe of the cerebral cortex. Which is the only plane of section listed below that would allow for this?

- a) sagittal
- b) coronal
- c) horizontal
- d) vertical

37. Where are ventral and anterior orientated in the same direction in the nervous system?

- a) spinal cord
- b) forebrain
- c) thalamus
- d) third ventricle
- e) bizzarrocortex

38. All of the following statements are true EXCEPT?

- a) The midbrain is rostral to the medulla.
- b) The thalamus is dorsal to the hypothalamus.
- c) The right eye is contralateral to the left ear.
- d) The putamen is medial to the globus pallidus.

39. According to the latest research on neurogenesis ("birth" of new neurons) in humans

- a) Neurogenesis ends in the first few years after birth.
- b) Damage to the adult brain may cause an increase in neurogenesis.
- c) In the adult brain, neurogenesis is found in the hippocampus.
- d) More than one of the above.

40. All of the neurons with cell bodies in the dorsal root ganglion develop from

- a) endoderm
- b) neural crest
- c) mesoderm
- d) rhombic lips

41. Your roommate, the wannabe “foodie”, decides to create a novel sauce for his chicken fingers one Friday afternoon at the V-Dub by combining soy sauce, 5-Hour Energy drink, Neuro 1 “NeuroEnergetic Matrix” and some glowing orange liquid he synthesized during his Organic Chemistry Lab. While the taste is palatable, the reaction in his nervous system is severe, as this concoction kills all neurons that develop from the ***diencephalon***. If you were to slice and observe his brain where would you look for dead neurons?

- a) midbrain
- b) basal ganglia
- c) hypothalamus
- d) cerebral cortex
- e) cerebellum

42. You, Dave Canterbury and Cody Lundin are miniaturized and injected into a human brain. While Dave tries to kill something for dinner and Cody tries to find edible plants you decide to figure out where you are in the brain. Given the following clues where are you? ***You are floating in cerebrospinal fluid in a spider web-like area with large blood vessels passing through.***

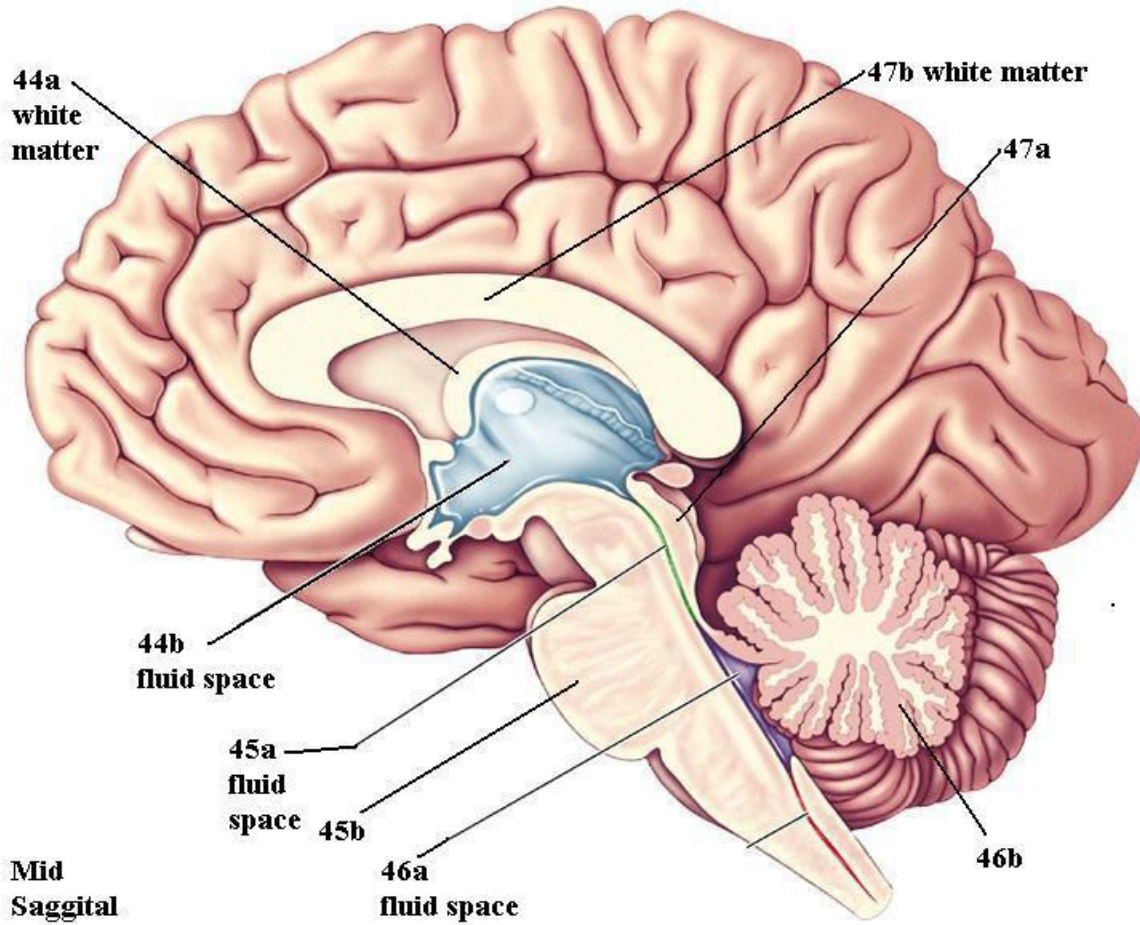
- a) 4th ventricle
- b) cerebral aqueduct
- c) subarachnoid space
- d) subdural space

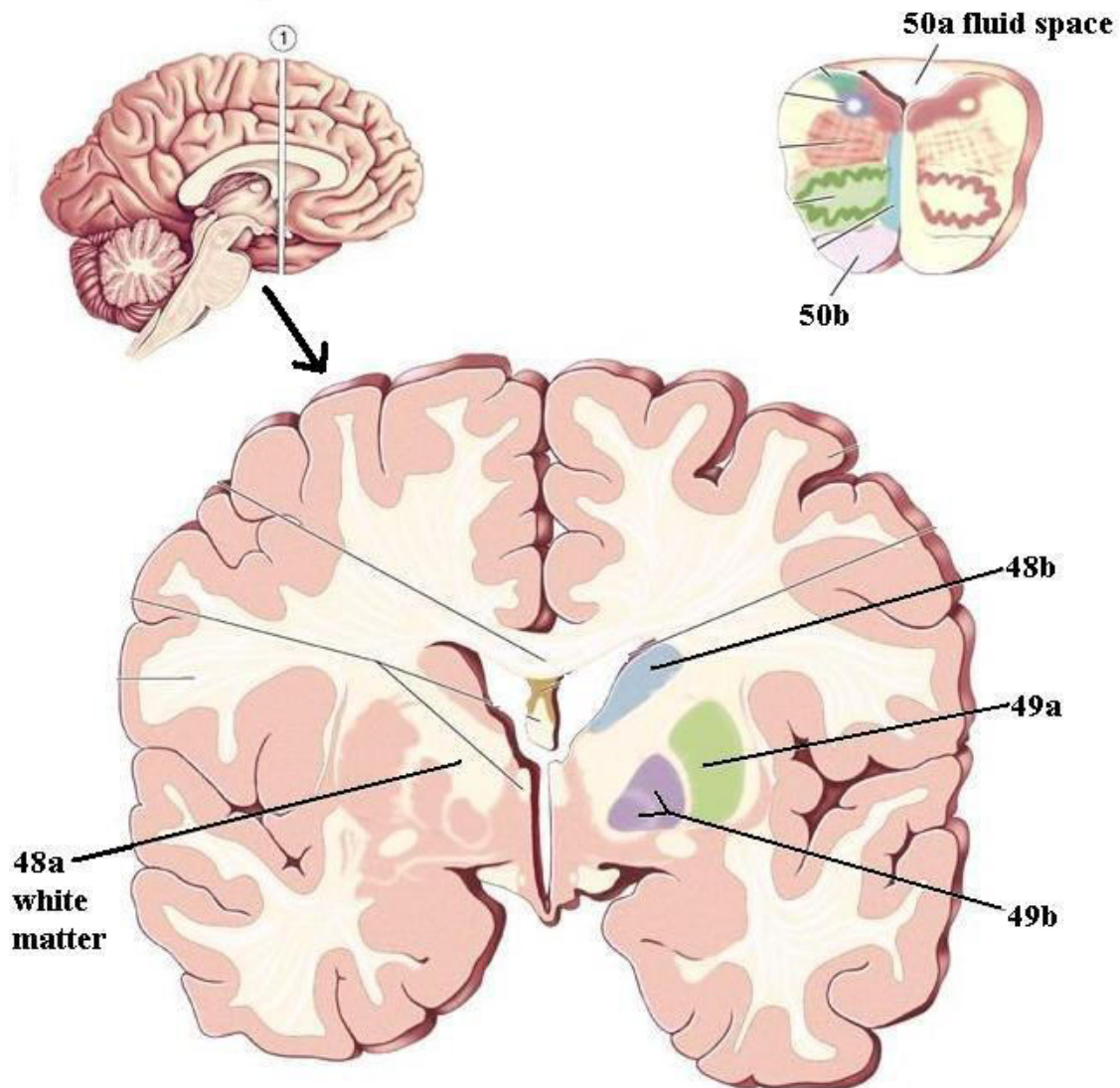
43. Which of the following diseases would cause an increase in the size of ventricles and sulci in the brain?

- a) Alzheimer’s Disease
- b) Parkinson’s Disease
- c) spina bifida
- d) meningitis

Fill In The Blank (44-50)

Identify the structures indicated and write your answers on the answer sheet on the appropriate line. Try to be as specific as possible. White matter and fluid spaces are listed as such. All other structures are gray matter, cell bodies, nuclei, etc.





16. Cells in the neural tube of a developing embryo can eventually develop into all of the following types of cells EXCEPT

- a) cortical pyramidal cells
- b) GABAergic neurons in the substantia nigra
- c) neurons with axons that are in the spinothalamic pathway
- d) oligodendrocytes
- e) nociceptors

17. Cells in the rhombencephalon (hindbrain) can eventually develop into all of the following types of cells EXCEPT.

- a) neurons in the ventral tegmental area
- b) Purkinje cells in the cerebellum
- c) neurons in the medulla
- d) neurons in the nuclei of the pons (pontine nuclei)

18. Which of the structures below is the most rostral?

- a) spinal cord
- b) medulla
- c) tectum
- d) thalamus

19. Greatly enlarged ventricles along with very wide sulci and diminished gyri is characteristic of

- a) meningitis
- b) Parkinson's disease
- c) Alzheimer's disease
- d) subdural hematoma

20. All of the following statements about neurogenesis are true EXCEPT

- a) Neurogenesis in the adult has only been directly demonstrated in animals (i.e. not demonstrated in adult humans).
- b) Rate of neurogenesis is increased after damage to the adult brain
- c) Rate of neurogenesis in an adult can be decreased by stress and age.
- d) Physical exercise stimulates neurogenesis in adult brain.

21. A tiny little horse named Peter is camped out in the upper portion of your lateral ventricle. He has heard of another horse called the hippocampus and would like to meet this seahorse to become friends. What directions would you give Peter to take him from the lateral ventricle to the hippocampus?

- a) Travel through the lateral ventricle to its rostral end and then go 1 mm ventral
- b) Travel through the lateral ventricle to its rostral end and then go 1 mm dorsal.
- c) Travel back through the lateral ventricle as it sweeps into the temporal lobe and then go 1 mm medial.
- d) Travel back through the lateral ventricle as it sweeps into the temporal lobe and then go 1 mm lateral.
- e) Pass through the seven levels of the Candy Cane forest, through the sea of swirly twirly gum drops, and then walk through the Lincoln Tunnel.

2011-1

34. One day in neuro 1 an armed madman storms the stage and threatens to spray us all with a chemical that will turn our brains to mush. In a horrible but ironic twist of fate, a large metal blade falls edge first from the ceiling onto his head. The intruder's brain could be sectioned in all the following planes

EXCEPT:

- a) coronal
- b) horizontal
- c) sagittal
- d) transverse

35. In the human spinal cord, which anatomical reference is equivalent to anterior?

- a) dorsal
- b) caudal
- c) rostral
- d) ventral

36. The dorsal root of the spinal cord consists of:

- a) sensory signals coming into the spinal cord
- b) motor signals from the spinal cord to muscles
- c) both sensory signals and motor signals
- d) the portions of the spinal cord beneath the dorsal branches and the dorsal trunk

37. Blood vessels travel through the largest open space in the meninges, which is between:

- a) arachnoid and dura
- b) arachnoid and pia
- c) dura and pia
- d) pia and cortex

38. All the following are part of the forebrain EXCEPT:

- a) basal ganglia
- b) cerebellum
- c) cerebral cortex
- d) thalamus

39. The central nervous system develops from the:

- a) neural crest and neural plate
- b) neural crest and neural tube
- c) neural plate and neural tube
- d) endoderm

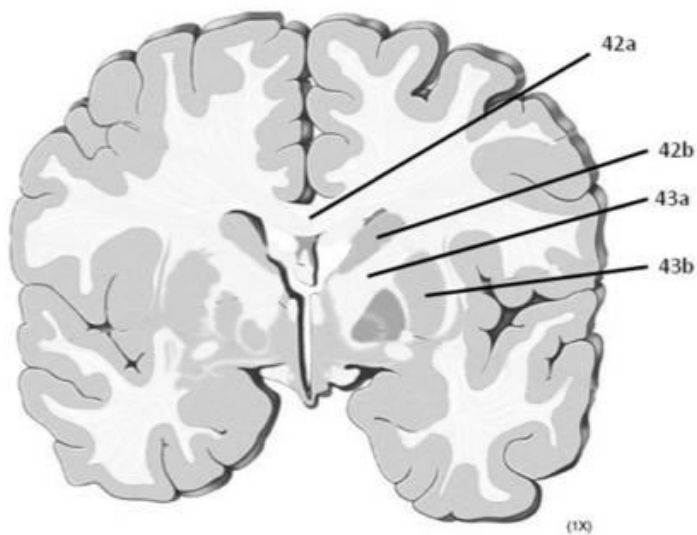
40. One of the few brain areas where new neuron formation has been found in the adult human brain is:

- a) thalamus
- b) hypothalamus
- c) hippocampus
- d) caudate nucleus

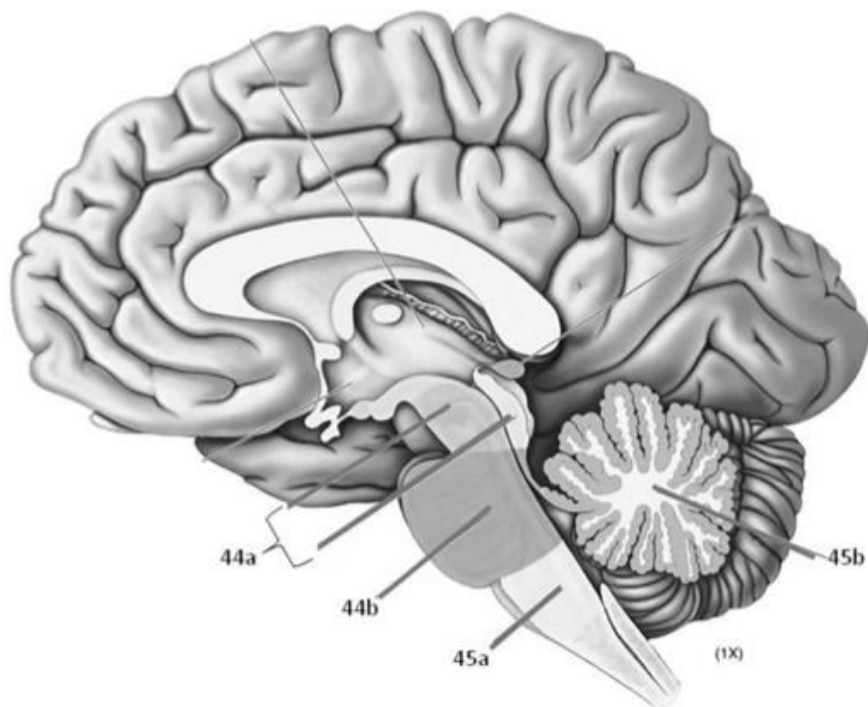
41. The superior colliculus is part of the:

- a) diencephalon
- b) hindbrain
- c) midbrain
- d) telencephalon

42-43. On the answer sheet, clearly write the name of the structures pointed to in this coronal section of the human forebrain.



44-45. On the answer sheet, clearly write the name of the structures pointed to in this sagittal section of the human brain.



46. If a tiny fish is swimming in your lateral ventricle and it pokes the lateral wall, its nose will be nearest to the:

- a) thalamus
- b) substantia nigra
- c) caudate nucleus
- d) globus pallidus

47. On the island of flatopia lives a rare breed of humans that have the same amount of cerebral cortex as us but it is flat and totally unfolded. The cortex is the same thickness as ours. The surface area of the flat cerebral cortex is easy to measure and the same as ours; it is about:

- a) 1 mm^2
- b) 1 cm^2
- c) 1 m^2
- d) 1 km^2

48. The following factors all promote neurogenesis EXCEPT:

- a) death of existing neurons
- b) learning
- c) physical exercise
- d) stress

49. Which portion of the spinal cord has the highest concentration of neurons that drive muscles in the body?

- a) dorsal horn
- b) intermediate zone
- c) ventral horn
- d) spinal canal

50. The substantia nigra is less prominent and less black with which disease:

- a) Alzheimer's disease
- b) Parkinson's disease
- c) multiple sclerosis
- d) rabies

2011-3

15. Coco the cannibal chef serves King Cortexia a delicacy of human brain slices. If Coco does not want to have his own head cut off he must use proper technique. The brain must sit on a table in the position it would have in a person standing upright. It is critical to cut the brain by slicing parallel to the table-top upon which the brain sits. In other words, the slices are:

- a) coronal
- b) horizontal
- c) sagittal
- d) transverse

16. To really top off the meal and please King Cortexia, Coco serves hypothalamus-on-a-stick for dessert. The hypothalamus is part of the:

- a) diencephalon
- b) mesencephalon
- c) rhombencephalon
- d) telencephalon

17. The layer of the meninges closest to cerebral cortex is:

- a) arachnoid
- b) dura mater
- c) pia mater

18. During development, the neural plate gives rise to:

- a) CNS
- b) PNS
- c) CNS and PNS

2012-1

36. You want to make a thin section of a brain that includes the left cerebellum and the left hippocampus but **not** the right hippocampus or cerebellum. Which plane of section do you use?

- a) coronal
- b) horizontal
- c) sagittal
- d) transverse

37. A tiny little horse named Peter is galloping through your left pyramidal tract in your ventral medulla. In order for him to reach the gray matter in your spinal cord that receives sensory information from your feet he would have to travel
- caudal then dorsal
 - caudal then ventral
 - rostral then dorsal
 - rostral then ventral
38. You want to make every neuron in the central and peripheral nervous system glow green by inserting a gene for green fluorescent protein (GFP) into cells in a developing embryo. In order to get all cells in the nervous system to express GFP you should insert this gene into all cells in the
- neural tube
 - neural crest
 - neural ectoderm
 - neural crestectotuboderm
39. You want the cells of the cerebellum, but not the tectum, to glow red by inserting the gene for red fluorescent protein (RFP) into cells in a developing embryo. In order to get all cells in the cerebellum, but not the tectum, to express RFP you should insert this gene into all cells in the
- prosencephalon
 - mesencephalon
 - rhombencephalon
 - cook-in-calphalon
40. After an extreme bout of ethanol poisoning (thanks a lot Mr. Jagermeister) you decide that you are going to make up for the neurons you killed on Friday night by doing something to promote neurogenesis in your brain. Which of the following would most likely increase neurogenesis in your brain?
- putting yourself in a life threatening situation for one year where you are majorly stressed out.
 - physical exercise
 - drinking more ethanol
 - getting old
41. Your roommate comes back from CHEM0360 lab with a drink that was specially prepared for you. After drinking it, you are told that the organic compound in the drink will destroy black pigmented cells in the tegmentum of your midbrain. You will most likely develop symptoms that are very similar to those seen in
- Alzheimer's disease
 - Spinabifida
 - Anencephaly
 - Parkinson's disease
42. A complication that is found in hydrocephalus, meningitis and subdural hematoma is
- increased pressure inside the skull damaging brain tissue
 - white blood cells in the cerebrospinal fluid
 - blockage of the flow of cerebrospinal fluid
 - blood pooling inside the skull after a blood vessel is damaged

For the questions 43-50 please write the name of the structure on the corresponding answer sheet line. Fluid filled spaces are indicated as well as lobes. All other indicators are pointing at structures. Please be as specific as possible when answering (e.g. no credit for putting "brain" as a response).

