

Chapter 14 Study Guide
The Brain & Cranial Nerves
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Please Note: I know that there are a lot of questions in this study guide, however The first group of questions review the lab objectives. These questions will be covered on the lab exam. The other questions cover lecture objectives. These questions will be covered on the lecture exam.

In neuroscience, in order to understand the function of the brain, you must first understand its structure. The brain's overall function is a consequence of the brain's many interconnect structures. No organ is more complex than the human brain. So make sure you bring your study guide questions to class!

1. How are the meninges arranged in the brain?
2. What is a brain ventricle? How many ventricles are in the brain?
3. What is cerebrospinal fluid? Locations?
4. Is the brain floating in CSF? Explain.
5. What are cranial sinuses? How are they formed? Where are they located? What is an arachnoid villus? Significance?
6. How does the CSF “flow” through the brain and spinal cord? (see video)
7. What is the relationship between the ventricles and the cranial sinuses?
8. How do “special ependymal cells” help to produce some of the CSF? What is the location of these structures? What are these structures called?
9. What principle describes the movement of fluid across the wall of the arachnoid villus?
10. What is the blood brain barrier? Significance? What glial cell forms the BBB?
11. Why do we need a BBB?
12. Is there a blood-CSF barrier?
13. Is there a cerebral spinal fluid-brain barrier? Significance
14. What are circumventricular organs? Function? Locations? Significance?

15. What is the potential problem associated with the circumventricular organs? What are the three division of the brain?
16. What are the three division of the brain?
17. What four structures make up the brain-stem? What two structures are not part of the brainstem?
18. What are the three division of the diencephalon? Largest of the three?
19. What is the definition of rostral and caudal?
20. What is the definition of these terms: sulcus, gyrus, and fissure?
21. What is the significance of the central sulcus?
22. What is the significance of the longitudinal fissure?
23. What is the significance of the pre-central gyrus? Nickname?
24. What is the significance of the post-central gyrus? Nickname?
25. What part of a neuron makes up the brain's white matter? Grey matter?
26. In general, how is the white and grey matter arranged in the brain? How is this different in the spinal cord?
27. What functions are associated with the medulla oblongata? What term is used to describe the location of these structures? Are they white or grey?
28. The pons is a relay station for nerve tracts in the CNS called penduncles. Three different penduncles connect the pons with the cerebellum. What is the role of these nerve tracks? (Hint: Think about the movement of the action potentials)
29. What is the main function of the cerebellum? Examples
30. There are many important nuclei in the midbrain. One nuclei is the substantia nigra. What molecule does this nuclei produce? Where will this molecule be used? What disease is caused by the substantia nigra if it does not produce this molecule?
31. Where is the reticular formation located? What types of functions are associated with the reticular formation?
32. What are the three main structures of the diencephalon? What is the nickname for the largest member of this group?

33. What type of action potentials pass through the thalamus?
34. What sensation does not pass through the thalamus? Significance?
35. What division of the brain is the control center (i.e. the boss) of the autonomic nervous system and endocrine system? What do these systems control? Significance?
36. Where is the basal nuclei located? What is the general function of the basal nuclei?
37. How does the basal nuclei regulate motor signals to the thalamus? Significance
38. Where is the limbic system located? (i.e. also called the limbic lobe)
39. What is the limbic systems “nickname”? (What is an alternative “nickname”?)
40. What functions were acquired with the evolution of the limbic lobe? (hint: two important functions)
41. What are the names and locations of the cerebrum’s lobes? What types of functions are assigned with each lobe? (Note: you only need to know the ones we discuss in class)
42. When we study the brain's structures, we define primary and association areas and their functions. What is the significance of this in motor and sensory function? Explain this answer using the example given in class about coins in your pocket or facial recognition.
43. The white matter of the cerebrum form tracts. These tracks may carry action potentials up and down the CNS, or between hemispheres, or between gyrus within the same hemisphere. What names describe these tracts within the cerebrum?
44. Where is the hippocampus located? The hippocampus is part of what system? What is the significance of the hippocampus in learning?
45. Where is the amygdala located? The amygdala is part of what system? What is the significance of the amygdala in learning?
46. What is the function of the prefrontal cortex?
47. What is the function of the orbitalfrontal cortex? Location?
48. What other area of the brain communicates directly with the prefrontal cortex?
49. What is the function of the orbitalfrontal cortex? What other areas of the brain communicate with the orbitalfrontal cortex?

50. How may you explain a bad test score if you receive bad news just before you start the exam?
51. What is the advantage to have the cerebrum yield control of the body to the limbic lobe? Significance in evolution?
52. What is the function of the hypothalamus? Nickname?
53. Think about the evolution of the brain. What three brain formations occurred? Do we still see these three brain formations? Explain.
54. What is cognition?
55. What are memories? How many different types of memories do we have?
56. What is the significance of these terms: consolidation, retrieval, reconsolidation?
57. What is the difference between perceptual memory, short term memory, and long term memory?
58. What is the difference between declarative (explicit) memory and procedural (implicit) memory?
59. What types of memories do these phrases describe: knowing what VS knowing how)?
60. What brain structures are required to form new declarative memory? To form new procedural memories?
61. What is the relationship between the areas where declarative memories are formed and the memories stored? Newly stored VS long term storage?
62. Are the memories of the cerebrum conscious or subconscious? Limbic memories?
63. What are somatosensory (somesthetic) sensations? How are these sensations routed to the primary somatosensory cortex? Number of neurons and route?
64. Where is the primary somatosensory cortex located? Where is the somatosensory association area located? What is the functional relationship between these two areas? (Hint: Think about putting your hand in your pocket and feeling different coins.)
65. What is motor control?
66. What structure in the brain compares the intent and performance in motor control?

67. Where is the primary motor cortex located? What is the function of the primary motor cortex?
68. What is the primary motor gyrus located? Where is the motor association area located? How do these areas interact? (Hint: Think about tying your shoes or typing in your computer password)
69. How many neurons are there between the primary motor cortex and a skeletal muscle? What are these neurons called? Their locations?
70. How many neurons are there between a skeletal muscle and the somatosensory gyrus? What are these neurons called? Their locations?
71. What are the nerve motor pathways for skeletal muscles in the head and neck? For skeletal muscles below the head and neck? Explain. What is the relationship between upper and lower motor neurons?
72. What is the relationship between the thalamus and the somatosensory cortex? Do all sensations pass through the thalamus? (Hint: think about freshly baked chocolate chip cookies)
73. Where is Broca's area located? Function? What is its spatial relationship to the motor strip's "homunculus model"?
74. Where is Wernicke's area located? Function? Relationship to other brain structures?
75. Which cerebral hemisphere dominates in language function? What does the non-dominant Wernicke area contribute to language?
76. What is the significance of Cerebral Lateralization? Think in terms of our language VS painting a picture or playing music.
77. What are cranial nerves? Where do they originate? How do they reach their target tissue?
78. Are cranial nerves sensory or motor? Explain
79. What is the function of these cranial nerves: I, II, VIII, X.
80. What is the difference between the precentral gyrus and postcentral gyrus?
81. Where are the control centers for heart and respiratory regulation located?
82. What is the startle reflex? What brain structures are associated with the sound and sight startle reflex?

83. Where is the reticular formation located? Functions
84. What happens if the tract between the reticular formation and the cerebrum is broken? What is this condition called?
85. Where is the pineal gland located? What does the pineal gland produce? Target tissue for the pineal gland's secretions? Function?