

Chapter 13: Brain and Cranial Nerves

I. Brainstem

A. Medulla Oblongata

1. The medulla is the most _____ part of the brainstem and is continuous _____
2. The medulla oblongata contains:
 - a. _____ & _____ tracts
 - b. _____
 - c. _____
 - d. Part _____
3. In terms of the medulla, what are nuclei? _____
4. List the reflexes that medullary nuclei are involved in:

| | |
|----------|----------|
| a. _____ | b. _____ |
| c. _____ | d. _____ |
| e. _____ | f. _____ |
| g. _____ | h. _____ |
5. Structurally the pyramids are _____
6. Functionally the pyramids are descending tracts involved in _____
7. Define decussate _____
8. Structurally the olives are two _____, _____
9. Functionally the olives are nuclei involved in:
 - a. _____
 - b. _____
 - c. _____

B. Pons

1. The pons is located just _____
2. The pons contains:
 - a. _____ & _____ tracts
 - b. Several _____
3. The anterior pontine nuclei relay information _____

4. The pons also contains important centers for:

- a. _____
- b. _____

C. Midbrain (Mesencephalon)

1. This is the _____ of the brainstem.
2. The midbrain is located just _____
3. Define tectum _____
4. The four mounds on the dorsal surface of the midbrain are collectively called _____
5. Each mound is called a _____
 - a. The two superior mounds are called _____
 - b. The two inferior mounds are called _____
6. The inferior colliculi are involved in _____
7. The superior colliculi are involved in _____
8. Define tegmentum _____
9. The tegmentum largely consists of _____ like the
 - a. _____ &
 - b. _____
10. Functionally the red nuclei _____
11. Where are the cerebral peduncles? _____
12. The cerebral peduncles consist primarily of _____
13. The substantia nigra is a nuclear mass between _____ & _____
14. The substantia nigra is involved in _____ & _____

D. Reticular Formation

1. Describe the reticular formation _____
2. The reticular formation receives axons from _____ & _____

II. Cerebellum

A. Structure

1. The cerebellum is attached to the brainstem _____
2. Specify which part of the brainstem each of the peduncles connect to:
 - a. Superior peduncle connects cerebellum to _____
 - b. Middle peduncle connects cerebellum to _____
 - c. Inferior peduncle connects cerebellum to _____
3. The ridges of the cerebellar cortex are called _____
4. What is the arbor vitae? _____

B. Function

1. The flocculonodular lobe helps control:
 - a. _____
 - b. _____
2. Vermis & medial portion of the lateral hemispheres are involved in control of:
 - a. _____
 - b. _____
 - c. _____
3. The major portion of the lateral hemispheres works with the frontal lobe of the cerebral cortex in _____, _____, & _____ complex movements

III. Diencephalon

A. Thalamus

1. Structurally composed of a cluster of _____ shaped like a _____
 - a. Two large _____
 - b. Connected by a small stalk called _____
 - c. The space between the two lateral portions (where the string of the yo-yo would be) is the _____
2. Most sensory input of the body goes to the thalamus where _____ synapse with _____ which _____
3. Axons carrying auditory information synapse in the _____

4. Axons carrying visual information synapse in the _____
5. Axons for most other sensory information synapse in the _____
6. Specify which nuclei are associated with each of the following functions:
 - a. Motor functions:
 1. _____
 2. _____
 - b. Mood modification:
 1. _____
 2. _____
 - c. Regulating emotions:
 1. _____
 - d. Sensory integration:
 1. _____
 2. _____

B. Subthalamus

1. A small area immediately _____
2. The subthalamus contains _____
& _____
3. Functionally the subthalamic nuclei are involved in _____

C. Epithalamus

1. A small area _____ & _____ to the thalamus
2. The habenular nuclei are:
 - a. Influenced by _____
 - b. Involved in _____
3. The pineal body is:
 - a. Shaped _____
 - b. Appears to _____
 - c. May also influence _____

D. Hypothalamus

1. Is the most _____ & contains _____

2. The most conspicuous nuclei of the hypothalamus:
 - a. Appear as bulges on the ventral surface called _____
 - b. Functionally they are involved in:
 1. _____ &
 2. _____
3. What is the infundibulum? _____
 - a. What does it connect to? _____
4. The hypothalamus regulates the _____
5. Sensory neurons that terminate in the hypothalamus provide input from:
 - a. _____
 - b. _____
 - c. _____
 - d. _____
 - e. _____
6. Efferent fibers extend into the brainstem and spinal cord to synapse with _____
7. Efferent fibers extend through the infundibulum _____
8. Efferent fibers extend to trigeminal and facial nerve to _____
9. Efferent fibers extend to motor neurons of the spinal cord to _____

IV. Cerebrum

A. General Structure and Function

1. The left and right hemispheres are separated by a _____
2. The numerous folds of the cerebral surface are called _____
 - a. Singular form of term is _____
3. The grooves between the folds are called _____
 - a. Singular form of term is _____
4. Where is the central sulcus? _____
5. The precentral gyrus is located _____
 - a. Functionally the precentral gyrus is the _____

6. The postcentral gyrus is located _____
 - a. Functionally the postcentral gyrus is the _____
 7. The lobes of the cerebral hemisphere are named for _____
 8. Functionally the frontal lobe is important in:
 - a. Voluntary _____
 - b. _____
 - c. _____
 - d. Sense of _____
 - e. _____
 9. Functionally the parietal lobe is the major center for _____ & _____ of sensory information
 10. What landmark separates the frontal and parietal lobe? _____
 11. The occipital lobe functions in _____
 12. Functionally the temporal lobe _____ & _____ input for:
 - a. _____ b. _____ &
 - c. Plays _____
 - d. Functionally the "psychic cortex" _____
 13. What landmark separates the temporal lobe from the rest of the cerebrum? _____
 14. What is the insula? _____
 15. Gray matter on the outer surface of the cerebrum is the _____ & clusters deep inside the brain are _____
 16. What is the cerebral medulla? _____
 17. Specify the connections made by each type of cerebral medulla nerve fiber:
 - a. Association fibers _____
 - b. Commissural fibers _____
 - c. Projection fibers _____
- B. Basal Nuclei**
1. Located on both sides of the brain (bilaterally) in the:
 - a. _____
 - b. _____

- c. _____
2. Functionally the nuclei are involved in _____
3. Collectively they are called the _____ & include the:
 - a. _____
 - b. _____

C. Limbic System

1. Plays a central role in basic _____ such as:
 - a. _____
 - b. _____
 - c. _____ &
 - d. Also involved in _____
2. Structurally the limbic system consists of:
 - a. Certain _____
 - b. Various _____ &
 - c. Tracts _____

V. Meninges and Cerebrospinal Fluid

A. Meninges

1. The dura mater is the _____ and most _____
2. Specify where each of the three dural folds is located:
 - a. Falx cerebri _____
 - b. Tentorium cerebelli _____
 - c. Falx cerebelli _____
3. The dura mater is tightly _____
4. Functionally the dura mater and dural folds help _____ and _____
5. Functionally the dural venous sinuses collect _____ & _____
 - a. The sinuses empty into _____
6. Describe the structure of the arachnoid mater: _____
7. The space between the dura and arachnoid mater is called _____

- a. This space contains _____
 8. The pia mater is bound _____
 9. The space between the arachnoid and pia mater is called _____
 - a. This space contains:
 1. _____
 2. _____ & is
 3. Filled with _____
- B. Ventricles**
1. The spaces within the CNS are lined with _____
 2. Each cerebral hemisphere contains a _____ called the _____
 3. Structurally the septa pellucida _____
 - a. These lie just inferior to the _____ & are _____
 4. Where is the third ventricle located? _____
 5. The lateral ventricles and third ventricle are connected through two _____
 6. Where is the fourth ventricle located? _____
 7. The third ventricle is connected to the fourth ventricle by _____
 8. The fourth ventricle is continuous with _____ of the spinal cord
 9. The fourth ventricle is also continuous with the _____
- C. Cerebrospinal Fluid (CSF)**
1. Similar in composition to _____ with most _____
 2. Functionally CSF bathes the CNS and provides _____
 - a. CSF also provides some _____ to CNS tissues
 3. A choroid plexus is composed of:
 - a. Specialized _____
 - b. Support _____ &
 - c. Associated _____
 4. In the choroid plexus substances must pass through cells because the endothelial cells are joined by _____

- a. This is referred to as the _____ barrier
5. Cerebrospinal fluid fills the:
- _____
 - _____ of the _____ & _____
 - _____ of the spinal cord
6. Cerebrospinal fluid circulates from the:
- _____
 - Through the _____ into _____
 - Through the cerebral _____ into _____
 - From the fourth ventricle to the _____ space
 - Into the dural venous sinuses through the _____

VI. Blood Supply to the Brain

- A. Blood reaches the brain through two different sets of arteries:
- _____
 - _____
- B. What forms the basilar artery? _____
- C. The basilar artery and internal carotid arteries contribute to _____
 _____ also known as _____
- D. Specify which portions of the cerebrum are supplied by each of the following:
- Middle cerebral artery _____
 - Anterior cerebral artery _____
 - Posterior cerebral artery _____
- E. The blood-brain barrier is created by _____

VI. Development of the CNS

- A. The CNS begins as a flat plate called the _____
- B. The process proceeds as:
- The lateral sides of the _____ become elevated as waves called _____

 - The crest of each fold is called a _____

- b. The groove between the two crests is called _____
2. The neural folds move toward each other & the _____ fuse to create a _____
 - a. The cephalic portion becomes the _____
 - b. The caudal portion becomes the _____
3. A series of pouches develops in _____
 - a. The pouch walls become _____
 - b. The pouch cavities become _____
4. The neural tube develops _____ that cause the brain to be oriented _____ to the spinal cord

VII. Cranial Nerves

A. General

1. The 12 pairs of cranial nerves are referenced by _____
 - a. Which nerve is most anterior? _____
 - b. Which nerve is most posterior? _____
2. List the three possible functions associated with cranial nerves:
 - a. _____
 - b. _____
 - c. _____
3. Sensory functions include:
 - a. Special senses like _____
 - b. General senses like _____
4. Somatic motor functions involve control of _____
5. Proprioception informs the brain about _____
 - a. The brain receives proprioception information in cranial nerves that are innervating _____ muscles
6. Parasympathetic function involves regulation of:
 - a. _____
 - b. _____
 - c. _____

1. These functions are part of the _____
- B. Functionally the olfactory nerve (I) is _____ for _____
- C. Functionally the optic nerve (II) is _____ for _____
- D. Functionally the oculomotor nerve (III) is (use Table 13.5 as needed):
1. Motor to four extrinsic eye muscles:
 - a. _____
 - b. _____
 - c. _____
 - d. _____
 2. Motor to the upper eyelid _____
 3. Parasympathetic to the smooth muscle of:
 - a. _____
 - b. _____
- E. Functionally the trochlear nerve (IV) is a _____
that innervates _____ (from Table 13.5)
- F. Functionally the trigeminal nerve (V):
- a. Supplies motor innervation to:
 1. Muscles of _____
 2. One _____
 3. One _____
 4. Two _____
 - b. Also carries proprioception from the _____ joint
 1. As a result damage to this nerve can interfere with _____
 - c. Involved in sensory cutaneous innervation from three branches called:
 1. _____
 2. _____
 3. _____
 - d. Two branches innervate teeth and associated structures:
 1. _____
 2. _____
- G. Functionally the abducens nerve (VI) is a _____

that innervates _____ (from Table 13.5)

H. Functionally the facial nerve (VII) is:

1. Somatic motor to:

- a. All _____
- b. Small _____
- c. Two _____

2. Sensory for _____ from _____

3. Parasympathetic innervation of:

- a. _____ & _____ salivary glands
- b. _____

I. Functionally the vestibulocochlear nerve (VIII) is entirely _____ for
_____ & _____

J. Functionally the glossopharyngeal nerve (IX) is:

1. Somatic motor to one _____

2. Parasympathetic to the _____

3. Sensory for:

- a. Sense of _____ from _____ tongue
- b. Tactile sensations from posterior _____, middle _____,
and _____
- c. Blood pressure, blood carbon dioxide, blood oxygen, and blood pH from:
 1. _____
 2. _____

K. Functionally the vagus nerve (X) is:

1. Somatic motor to most muscles of the:

- a. _____
- b. _____
- c. _____

2. Sensory for:

- a. Taste _____
- b. Inferior _____ and _____
- c. Assists the _____ in transmitting sensory stimulation

- from receptors in the _____ and _____
- d. _____ and _____ organs
3. Parasympathetic fibers to _____ & _____ organs
- L. Functionally the accessory nerve (XI) is:
1. Somatic motor to (use Table 13.5):
 - a. _____
 - b. _____
 - c. _____
 - d. _____
- M. Functionally the hypoglossal nerve (XII) is:
1. Somatic motor to:
 - a. _____
 - b. _____
 - c. _____
 - d. _____
- N. Reflexes in the Brainstem Involving Cranial Nerves
1. Involve sensory input from _____ or _____
 2. Involve motor output from _____
 3. List two examples of brainstem reflexes involving cranial nerves:
 - a. _____
 - b. _____