

Chapter 13: Brain and Cranial Nerves

I. Development of the CNS

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

II. 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 _____ &

III. 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

IV. 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 _____

V. 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 _____

VI. 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 _____
- 5. Cerebrospinal fluid fills the:
 - a. _____
 - b. _____ of the _____ & _____
 - c. _____ of the spinal cord
- 6. Cerebrospinal fluid circulates from the:
 - a. _____
 - b. Through the _____ into _____
 - c. Through the cerebral _____ into _____
 - d. From the fourth ventricle to the _____ space
 - e. Into the dural venous sinuses through the _____

VII. Blood Supply to the Brain

- A. Blood reaches the brain through two different sets of arteries:
1. _____
 2. _____
- 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:
1. Middle cerebral artery _____
 2. Anterior cerebral artery _____
 3. Posterior cerebral artery _____
- E. The blood-brain barrier is created by _____

VIII. 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 _____
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 the 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. _____