

Human Anatomy and Physiology I

Lab 10 The nervous system

Sheep brain dissection

Lab Exercises 10-1

The sheep brain is quite similar to the human brain except for proportion. The sheep has a smaller cerebrum. Also, the sheep brain is oriented anterior to posterior (more horizontally), while the human brain is oriented superior to inferior (more vertically.)

Materials

Dissection tools and tray, lab gloves, preserved sheep brain.

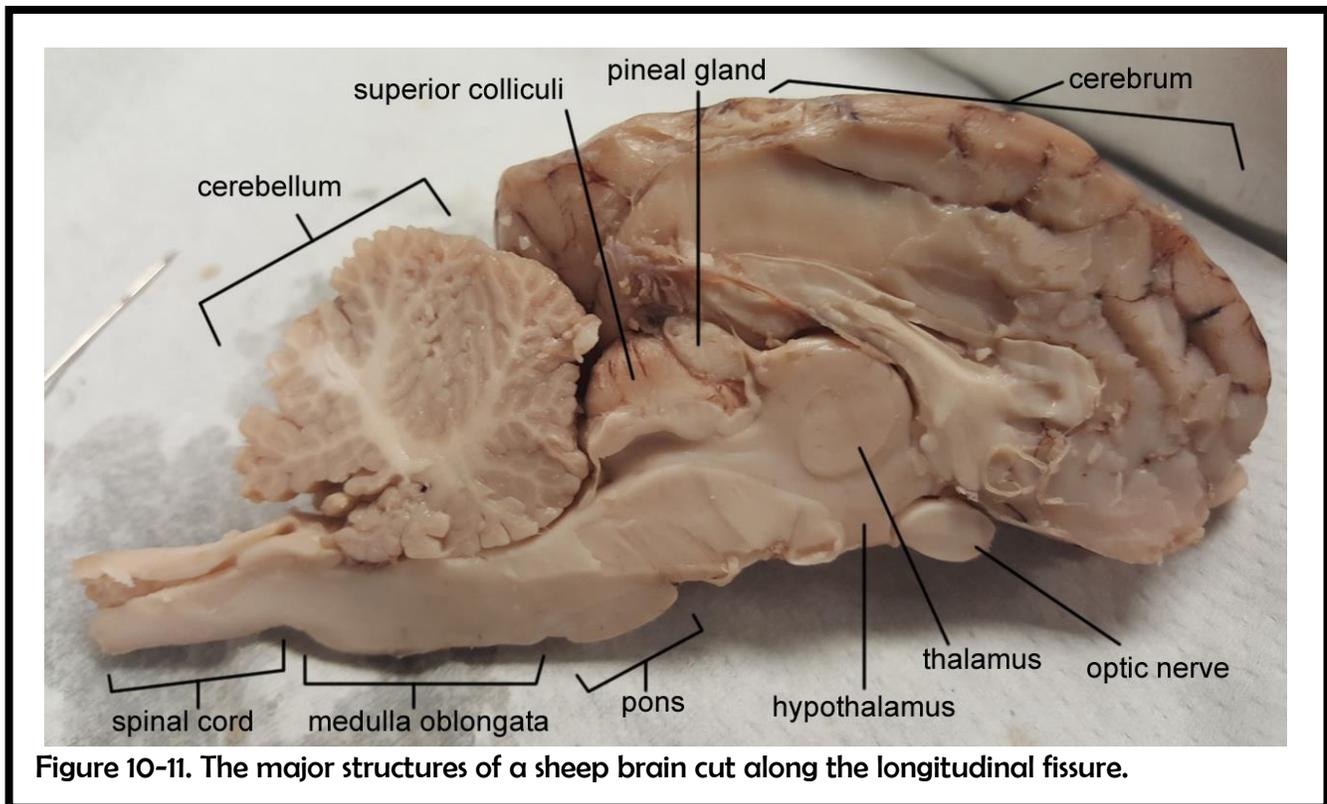


Figure 10-11. The major structures of a sheep brain cut along the longitudinal fissure.

Examining the external sheep brain.

1. The tough outer covering of the sheep brain is the dura mater, the outermost meninges membrane covering the brain. Remove the dura mater to see most of the structures of the brain, but remove it carefully, so as to leave all the other structures beneath it intact. Removing the dura mater from the cerebellum at the back of the brain can be tricky. Look for areas on the side of the brain that you can snip to peel the dura mater off.
2. Note the second meninges membrane, the arachnoid mater, below the dura mater.

3. The cerebrum half is missing the longitudinal fissure – which divides the brain into nearly symmetrical left and right hemispheres. But the transverse fissure is clearly visible.
4. The surface of the cerebrum is covered with large folds of tissue called gyri. The grooves between the gyri are sulci. The deeper sulci are often called fissures. The fissures are used as landmarks to divide the surface of the cerebrum into the four lobes.
5. Locate each lobe of the brain: the frontal lobe, the parietal lobe, the occipital lobe, and the temporal lobe.
6. The smaller, rounded structure at the back of the brain is the cerebellum. The cerebellum has smaller gyri that are roughly parallel to one another. Compare the gyri of the cerebellum to those of the cerebrum.
7. Carefully bend the cerebellum to get an inside glimpse of the brain. The bumps you see are the superior colliculi. The smaller bumps underneath are the inferior colliculi.
8. If you gently push the colliculi down, you can see the tiny nub of the pineal gland. Find the pineal gland.
9. Turn the brain over so that the cerebrum is down. With the half brains you may need to prop it up with pins. The most prominent structure visible on the ventral side of the sheep brain is half of the optic chiasma, which is where the two optic nerves cross over each other and form an “X” shape. You will only see half the structure. Find the optic chiasma half on your brain. You may have removed the optic removed the chiasma with the dura mater. If you can't find it, replace the dura mater to see it is there.
10. The pituitary gland is a large round structure under the optic chiasma, attached by the infundibulum (also known as the pituitary stalk.) Find the pituitary gland. If you removed this area with the dura mater, you may need to replace the dura mater to see it.
11. Toward the front of the brain are two prominent round structures, the olfactory bulbs. Find them.
12. Toward the posterior of the brain, in order moving away from the optic chiasma are the three bulges that indicate the three components of the brain stem, the midbrain, the pons, and the medulla oblongata. Find all three.
13. The oculomotor nerves may be visible to each side of the pituitary gland and stalk. This is another part that by have been removed with the dura mater. Find the oculomotor nerves.

Lab Exercises 10-2

Examining the internal sheep brain

Materials

Dissection tools and tray, lab gloves, preserved sheep brain with the dura mater removed.

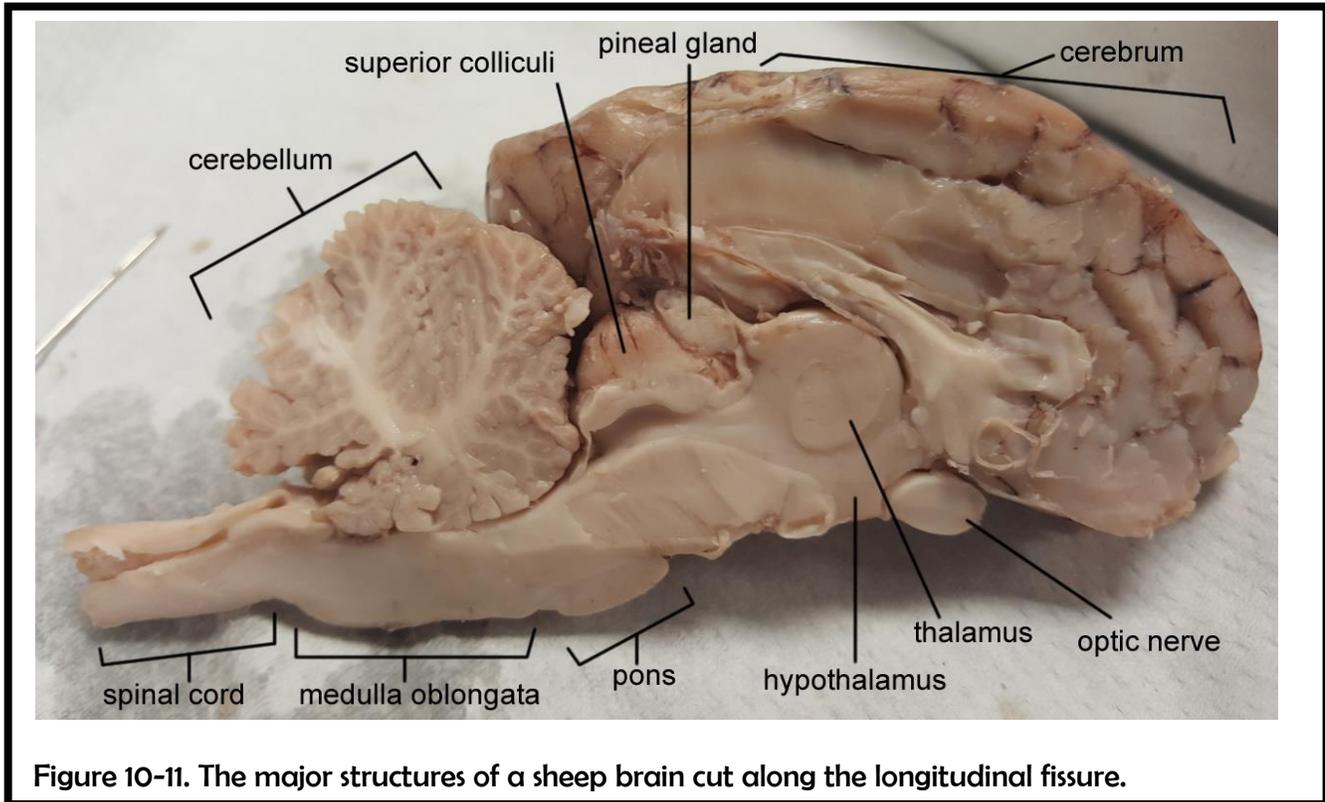


Figure 10-11. The major structures of a sheep brain cut along the longitudinal fissure.

1. Use a knife or a scalpel to cut the specimen along the longitudinal fissure. This will allow you to separate the brain into the left and right hemispheres. Lay one side of the brain on your tray to locate the structures visible on the inside. You should also cut through the cerebellum.
2. The corpus callosum had been connecting the two cerebral hemispheres and can now be clearly seen in the brain section. Find the corpus callosum.
3. The tiny space within the corpus callosum (which holds cerebrospinal fluid) is called the lateral ventricle. Underneath it, you can find another space called the third ventricle. There are other ventricles in the brain, but those are the easiest to located in a preserved specimen. Find the lateral ventricle and the third ventricle.
4. The white area between the lateral ventricle and the third ventricle is called the formix. The fourth ventricle is the space under the cerebellum.
5. Inferior to the corpus callosum is the thalamus. It is round and almost perfectly centered. Find the thalamus.
6. Just behind the thalamus is the pineal gland. Find it.

7. The hypothalamus is toward the ventral side of the brain. It is round but lower than the pineal gland. Find it.
8. Find the pons, medulla oblongata, and the spinal cord.
9. If you haven't already, use your knife or scalpel to cut a sagittal section of the cerebellum and find the arbor vitae, so named because its white matter form a pattern that resembles a tree.
10. Use a scalpel to cut a cross section of the cerebrum in the occipital lobe area. You should be able to see the color and texture differences of the gray matter (at the cerebral cortex making up the outer edge of the cross-section) and the white matter (the interior portions of the cerebrum.)
11. Dispose of your brain as per your instructor's directions.

Lab exercises 10.4

1. Fill in the names of the indicated structures in Figure 10-13.

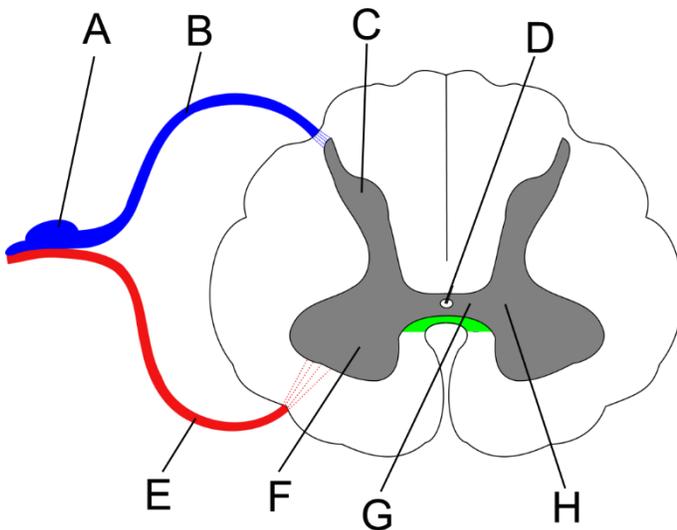
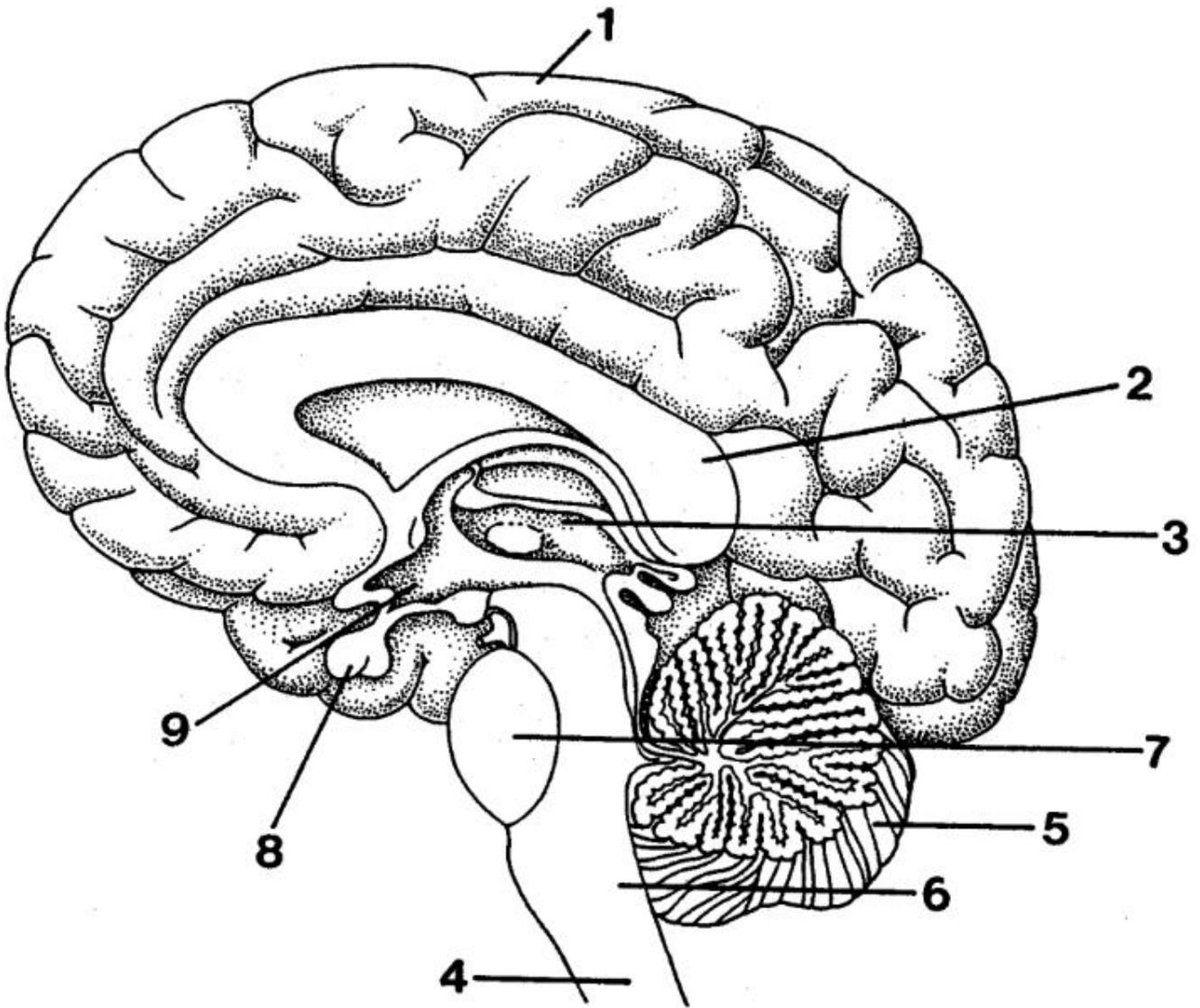


Figure 10-13. A cross-section of the human spinal cord. Fill in the names of the structures indicated by the letters.

Lab exercises 10.5

1. Fill in the names of the structures indicated by the numbered labels in the figure below.



Lab exercises 10.6

1. Fill in the names of the structures indicated by the numbered labels in the figure below.

