

Laboratory Exercise 29

Dissection of the Sheep Brain

Materials Needed

Dissectible model of human brain
Preserved sheep brain
Dissecting tray
Dissection instruments
Long knife

For Demonstration:

Frontal sections of sheep brains



Safety

- Wear disposable gloves when handling the sheep brains.
- Save or dispose of the brains as instructed.
- Wash your hands before leaving the laboratory.

Mammalian brains have many features in common. Human brains may not be available, so sheep brains often are dissected as an aid to understanding mammalian brain structure. However, the adaptations of the sheep differ from the adaptations of the human, so comparisons of their structural features may not be precise. The sheep is a quadruped, therefore the spinal cord is horizontal, unlike the vertical orientation in a bipedal human. Preserved sheep brains have a different appearance and are firmer than those that are removed directly from the cranial cavity because of the preservatives used.

Purpose of the Exercise

To observe the major features of the sheep brain and to compare these features with those of the human brain.

LEARNING OUTCOMES

After completing this exercise, you should be able to

1. Examine the major structures of the sheep brain.
2. Locate the larger cranial nerves of the sheep brain.
3. Summarize several differences and similarities between the sheep brain and the human brain.

EXPLORE

Procedure—Dissection of the Sheep Brain

1. Obtain a preserved sheep brain and rinse it thoroughly in water to remove as much of the preserving fluid as possible.
2. Examine the surface of the brain for the presence of meninges. (The outermost layers of these membranes may have been lost during removal of the brain from the cranial cavity.) If meninges are present, locate the following:

dura mater—the thick, opaque outer layer

arachnoid mater—the delicate, transparent middle layer attached to the undersurface of the dura mater

pia mater—the thin, vascular layer that adheres to the surface of the brain (should be present)

3. Remove any remaining dura mater by pulling it gently from the surface of the brain.
4. Position the brain with its ventral surface down in the dissecting tray. Study figure 29.1, and locate the following structures on the specimen:

cerebral hemispheres

gyri (convolutions)

sulci

longitudinal fissure

frontal lobe

parietal lobe

temporal lobe

occipital lobe

cerebellum

medulla oblongata

spinal cord

5. Gently separate the cerebral hemispheres along the longitudinal fissure and expose the transverse band of white fibers within the fissure that connects the hemispheres. This band is the *corpus callosum*.
6. Bend the cerebellum and medulla oblongata slightly downward and away from the cerebrum (fig. 29.2).

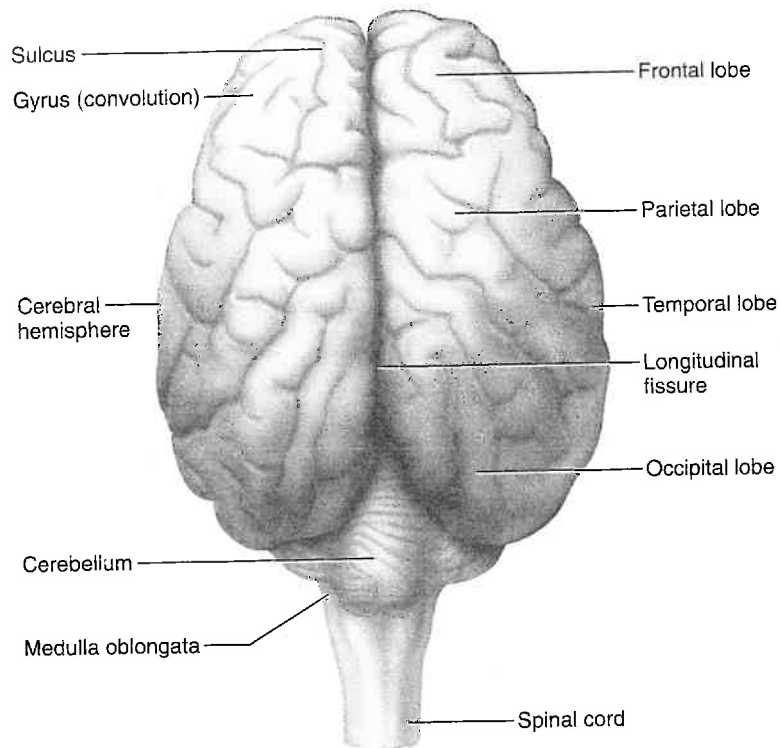


Figure 29.1 Dorsal surface of the sheep brain.

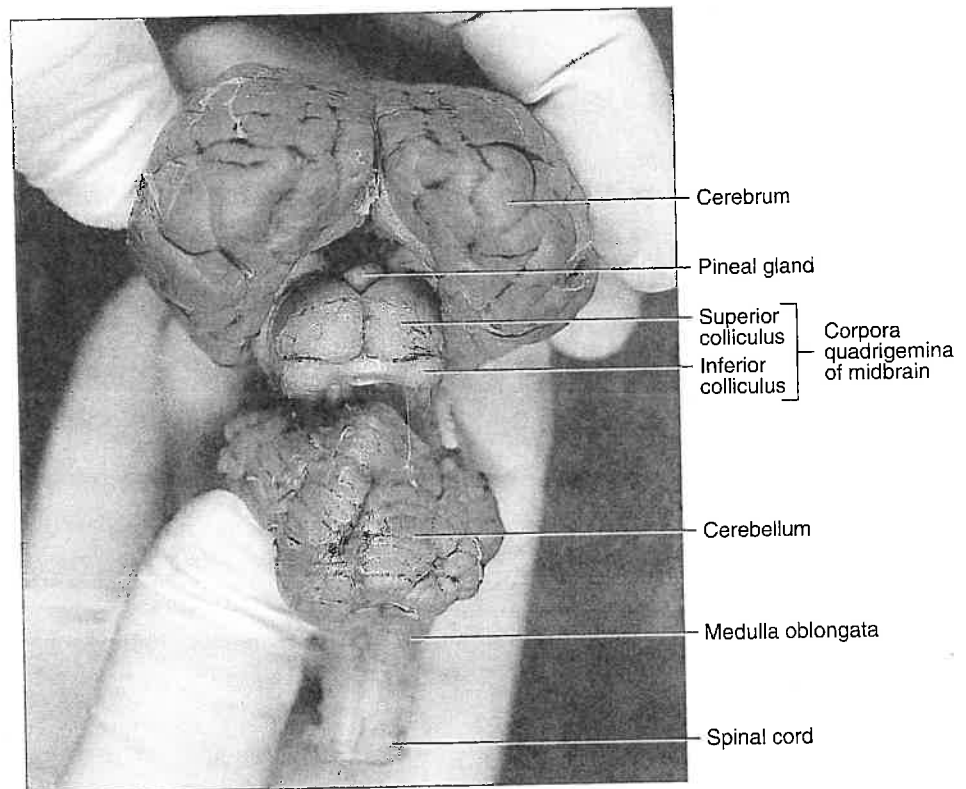


Figure 29.2 Gently bend the cerebellum and medulla oblongata away from the cerebrum to expose the pineal gland and the corpora quadrigemina.

This will expose the *pineal gland* in the upper midline and the *corpora quadrigemina*, which consists of four rounded structures, called *colliculi*, associated with the midbrain.

7. Position the brain with its ventral surface upward. Study figures 29.3 and 29.4, and locate the following structures on the specimen:

longitudinal fissure
olfactory bulbs
optic nerves

optic chiasma
optic tract
mammillary bodies
infundibulum (pituitary stalk)
midbrain
pons

8. Although some of the cranial nerves may be missing or are quite small and difficult to find, locate

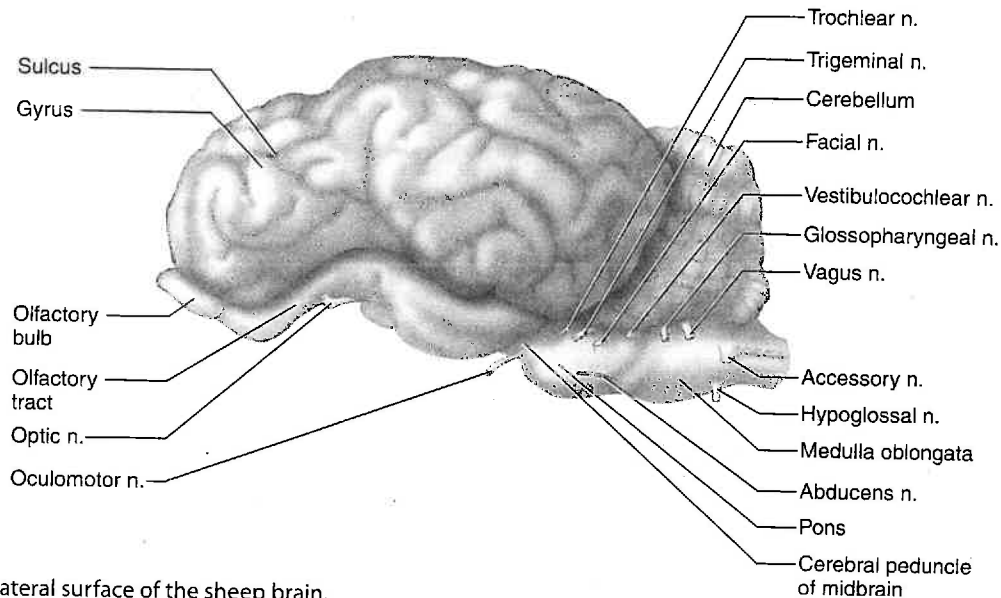


Figure 29.3 Lateral surface of the sheep brain.

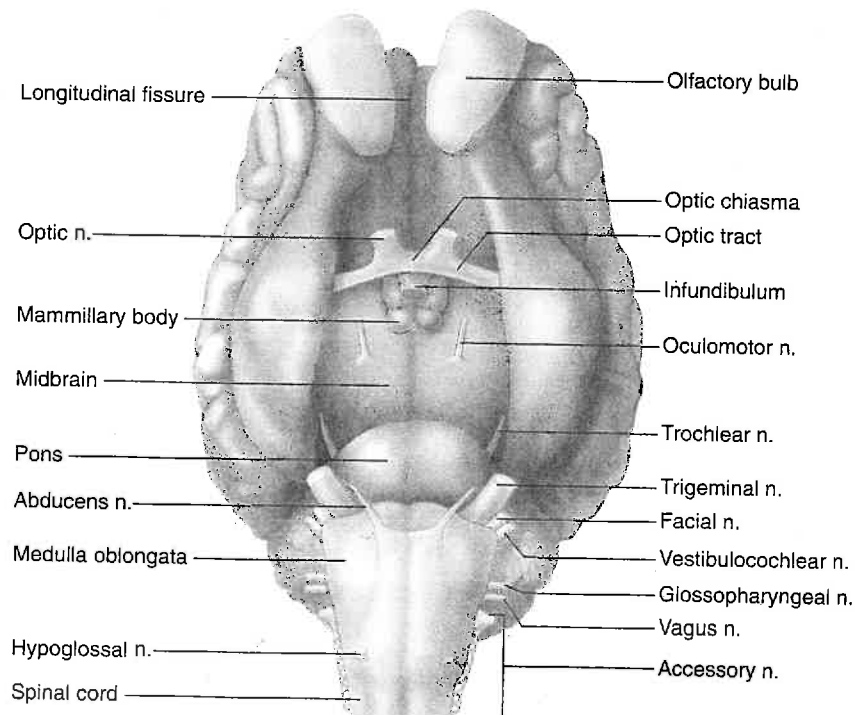


Figure 29.4 Ventral surface of the sheep brain.

as many of the following as possible, using figures 29.3 and 29.4 as references:

oculomotor nerves

trochlear nerves

trigeminal nerves

abducens nerves

facial nerves

vestibulocochlear nerves

glossopharyngeal nerves

vagus nerves

accessory nerves

hypoglossal nerves

9. Using a long, sharp knife, cut the sheep brain along the midline to produce a median section. Study figures 29.2 and 29.5, and locate the following structures on the specimen:

cerebrum

olfactory bulb

corpus callosum

cerebellum

white matter

gray matter

lateral ventricle (one in each cerebral hemisphere)

third ventricle (within diencephalon)

fourth ventricle (between brainstem and cerebellum)

diencephalon

optic chiasma

infundibulum

pituitary gland (this structure may be missing)

mammillary bodies

thalamus

hypothalamus

pineal gland

midbrain

corpora quadrigemina

superior colliculi

inferior colliculi

pons

medulla oblongata

Demonstration

Observe a frontal section from a sheep brain. Note the longitudinal fissure, gray matter, white matter, corpus callosum, lateral ventricles, third ventricle, and thalamus.

10. Dispose of the sheep brain as directed by the laboratory instructor.

11. Complete Parts A and B of Laboratory Report 29.

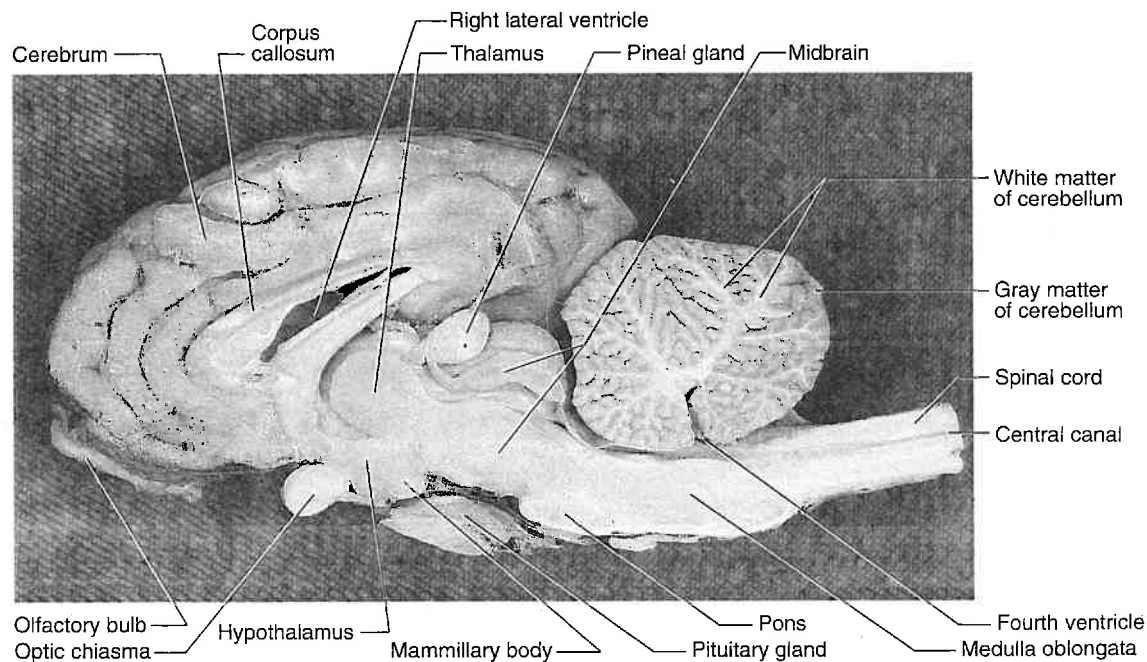


Figure 29.5 Sagittal (median) section of the right half of the sheep brain dissection.