

Sheep brain dissection instructions

Materials

- Sheep brain
- Tray and cover
- Scalpel
- Probe
- Gloves, goggles, coat
- Biohazard waste bag

SAFETY FIRST

- Wear personal protective equipment as directed – coat, goggles, gloves
- No horsing around – stay on task. Brain preservative is mildly toxic, practice knife safety with scalpels
- Scalpels remain in trays at all times
- Only one person should handle the brain at a time if using the scalpel
- Dispose of all brain material in biohazard bag
- Dispose of scalpel in sharps bucket when directed

Goals

- Learn the relative positions of major brain structures, with specific focus on neural engineering-relevant areas – motor structures, sensory structures, homeostatic structures
- Learn about similarities between human and other mammal brains
- Learn safe laboratory procedures

Getting oriented

1. Look at your brain. Look for:
 - a. Four different lobes of neocortex (frontal, parietal, occipital, temporal)
 - b. Division between the temporal lobe and the other regions (lateral sulcus)
 - c. Division between frontal and parietal lobes (central sulcus)
 - d. Cerebellum
 - e. Parts of brainstem
 - f. Spinal cord
 - g. Olfactory bulbs
 - h. Pituitary gland
 - i. Mammillary bodies
2. On the end of the spinal cord, look for the white and gray matter. (Hint: white matter towards the edges.)
3. See next page for illustrations.

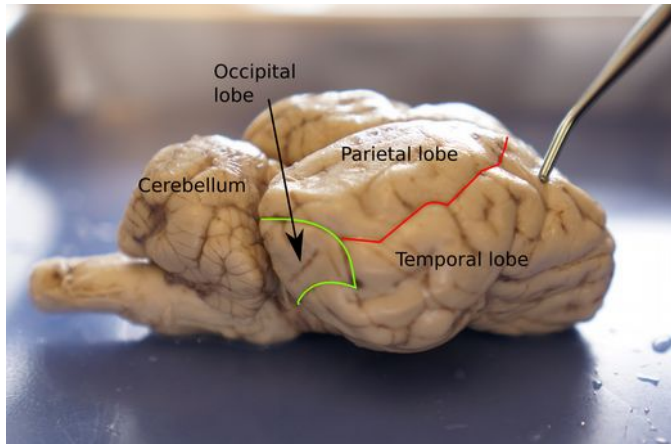


Figure 1: lateral view.

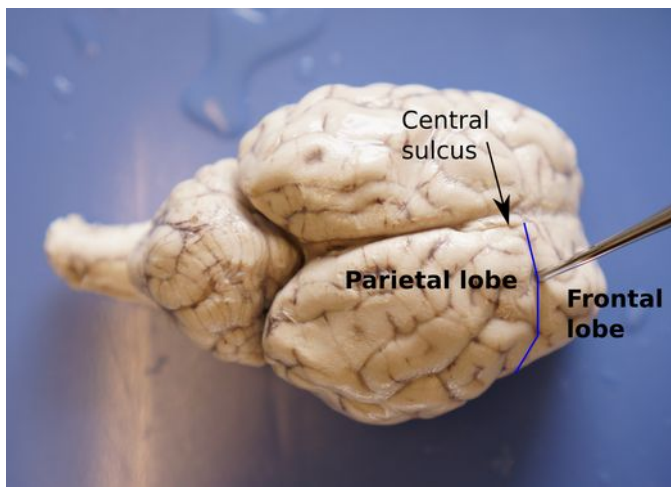


Figure 2: superior view.

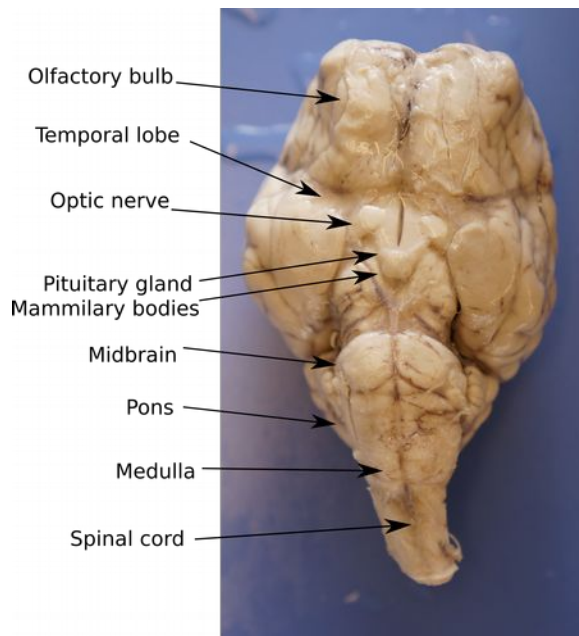


Figure 3: inferior view.

First cut: longitudinal fissure

1. Cut the entire brain in half down the longitudinal fissure, which divides the hemispheres. Set one half aside.
2. Look for:
 - a. Thalamus
 - b. Vermis (wrinkly insides) of cerebellum
 - c. Brainstem parts – medulla, pons, midbrain
 - d. Cortex – notice the wrinkles
 - e. Hypothalamus
 - f. Superior and inferior colliculus
 - g. Pineal body
3. Look through the gap in the corpus callosum – this space is called the lateral ventricle. Notice how large it is. You may find frilly tissue inside – this is called the choroid plexus, and it makes cerebrospinal fluid that then flows through the ventricles.

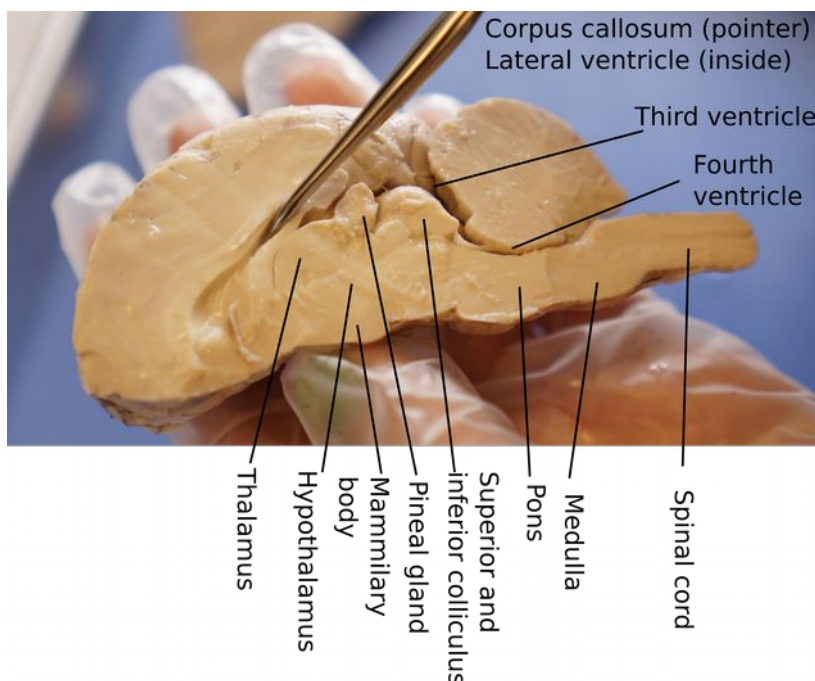


Figure 4: medial surface.

Second cut: remove cerebellum

1. On BOTH halves of your brain, cut the cerebellum free right at its base. Try not to cut through the brainstem – it's better to cut cerebellum a little bit if you have to. Set the cerebellums aside.
2. Under where the cerebellum was, you can now see the cerebellar peduncles, which connect the cerebellum to the brainstem. You have also exposed the fourth ventricle, which is indirectly connected to the lateral ventricle.
 - a. Think about the function of the ventricles and how their placement relates to their job.

Third cut sequence: horizontal

1. On one hemisphere, cut horizontally through the top of the thalamus. It's better to aim too high and have to make a second, lower cut than to cut too low. On this and subsequent cuts, look for:

- a. Hippocampus
 - b. Basal ganglia – caudate and putamen
 - c. Internal capsule (white matter)
 - d. Thalamus
 - e. Anterior commissure
 - f. Globus pallidus
 - g. Hippocampus
 - h. Amygdala
 - i. Hypothalamus
2. If you don't see all these structures, that's normal – your cut may be a little too high or low.
 3. Continue slicing off thin horizontal sections to see additional structures.

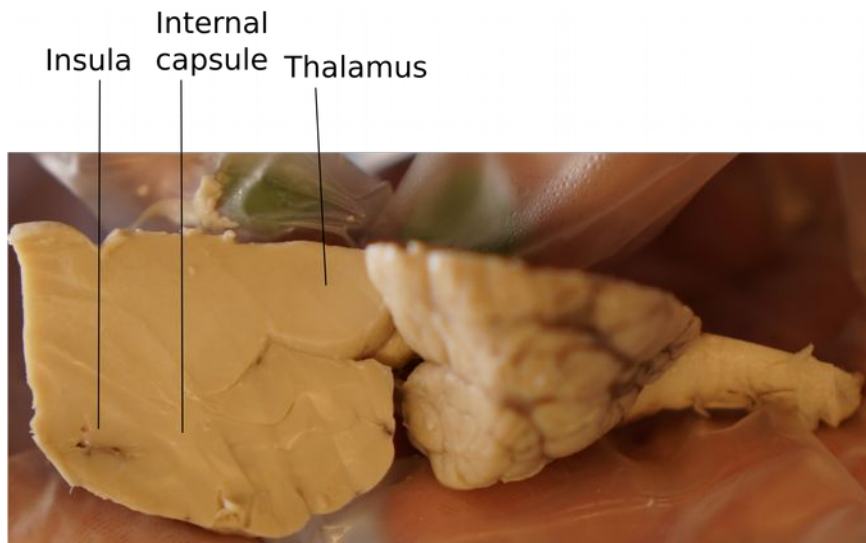


Figure 5: example horizontal cut. This cut was too high for the hippocampus to be visible. The basal ganglia are faint.

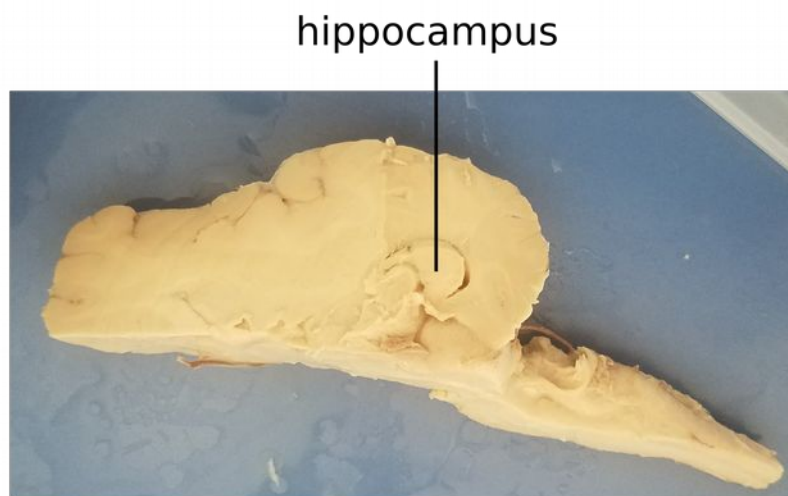


Figure 6: example horizontal cut. This cut, just inferior to the one in Figure 5, shows the hippocampus.

Fourth cut sequence: coronal

1. On the other half of the brain (the intact half), cut coronally at the central sulcus. Notice the primary motor and somatosensory regions, and how much closer to the very anterior part of the brain of a sheep than of a human.
2. You will see the folds of cortex and some white matter.
3. Continue slicing off thin coronal sections to see additional structures. You should find the hippocampus, amygdala, basal ganglia, thalamus, and more.

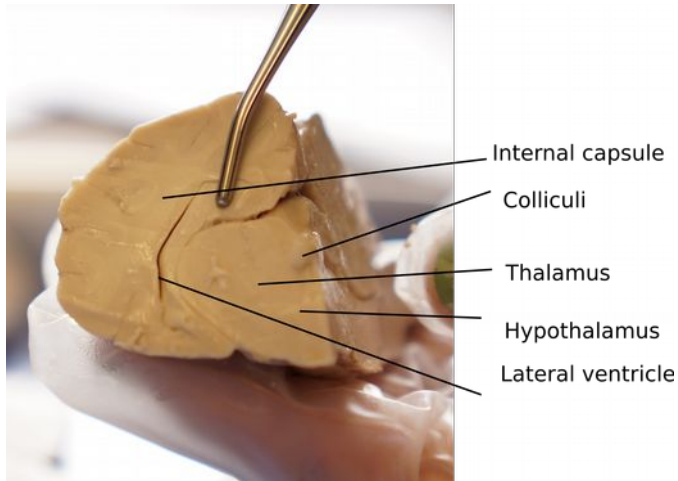


Figure 7: example coronal cut.

You can use the rest of the time to continue exploring the brain, making additional cuts if you choose.