

Procedure

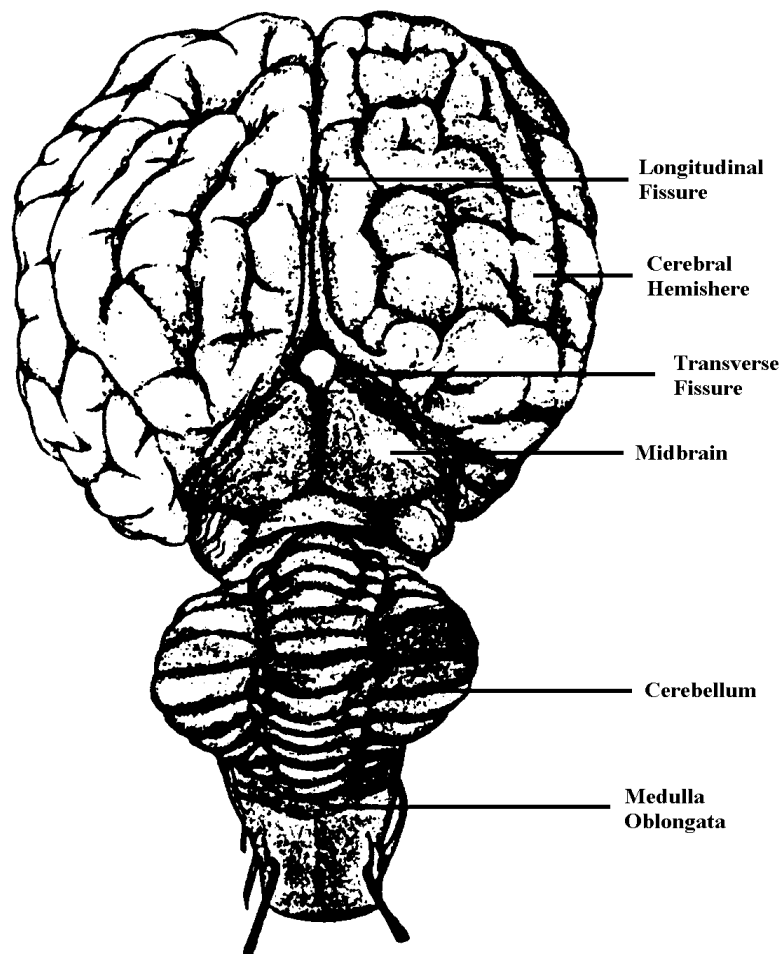
1. The brain and spinal cord of the fetal pig are very similar in structure to the human and sheep brain, although smaller. Since the cranial bones and vertebral column are not fully ossified, it is relatively easy to remove the brain and to expose the spinal cord of the fetal pig.
2. Make an incision through the skin of the fetal pig from the shoulders to the pelvis. Separate the skin from the muscles and pull it to the side. If you wish, the skin in this area may be removed.
3. Cut through the muscles on each side of the vertebral column from the mid-thoracic region to the pelvis to expose the **vertebral column**.
4. With fine, sharp scissors cut off the tops of the vertebral arches. Then insert the tip of the scissors in the vertebral cavity. Next, cut lengthwise through the bones of the vertebral column, just lateral to the center of the column. It may be easier to cut the bone if the other hand is placed under the abdominal region of the pig, arching the back of the pig. Remove the bone and expose the spinal cord.
5. Examine the **spinal cord**. The **dura mater** surrounds the cord. The dorsal roots of the spinal nerves should be visible emerging from the cord. The **spinal nerves** are visible as fine white threads running out to the muscles.
6. Place the pig on its back and examine the interior of the thoracic cavity. A white thread should be visible running lengthwise, parallel to each side of the vertebral column. This is the **sympathetic trunk**. The swellings on the trunk are the **ganglia** of this lateral chain.
7. Remove the skin from the entire dorsal surface of the skull, from the eyes to the neck.
8. Chip away the skull bones, starting with the **fontanelles**. Use a bone scalpel and metal probe until the **brain** is completely exposed.
9. Separate the spinal cord from the **medulla oblongata** at the **foramen magnum** by making a cut through the spinal cord caudal to the medulla.
10. Carefully lift out the brain from the cranial cavity, severing each **cranial nerve** and the stalk of the **pituitary gland** as far from the brain as possible. The **olfactory bulbs** usually tear off from the brain and may be visible in the floor of the cranial cavity. Identify the stalk of the pituitary in the floor of the cranial cavity.
11. The brain is surrounded by three layers of **meninges**. The outermost, the **dura mater**, may be seen surrounding the brain of the fetal pig if the surrounding cranial bones were carefully removed.

12. The inner two layers of the meninges can be seen covering the brain. The **arachnoid**, the middle layer, lies between the dura mater and the **pia mater**, the innermost vascular layer of the meninges. The arachnoid is most easily distinguished from the pia mater in the region overlying the grooves on the brain surface, since the pia mater dips into the grooves and the arachnoid does not.

13. Observe the anterior paired **cerebral hemispheres** and the posterior **cerebellum** on the dorsal surface of the brain. The cerebral hemispheres are separated from each other by the **longitudinal fissure**; the cerebellum is separated from the cerebral hemispheres by the **transverse fissure**, see Figure 1.

14. Spread the cerebral hemispheres apart and observe deep in the longitudinal fissure the thick transverse band of fibers, the **corpus callosum**, that connects the cerebral hemispheres.

Figure 1 Dorsal View of the Fetal Pig's Brain with the Cerebellum Separated from the Cerebral Hemispheres

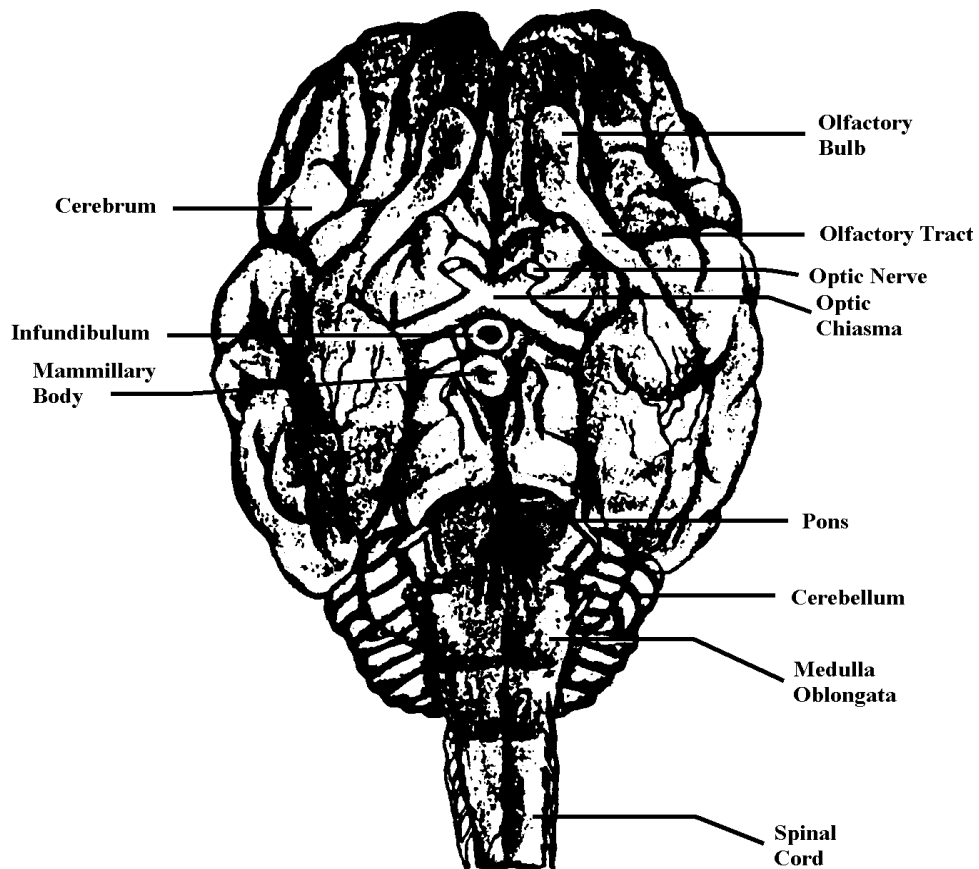


15. The surface of each hemisphere is composed of numerous **convolutions**. The raised area of each convolution is called the **gyrus**, the depression a **sulcus**.

16. The roof of the **midbrain** (mesencephalon) can be seen by spreading the cerebral hemispheres and cerebellum apart, see Figure 1.

17. Posterior to the cerebral hemispheres is the **cerebellum**. The cerebellum is connected with the brain stem by three prominent fiber tracts.
18. Observe the ventral surface of the brain, see Figure 2. A pair of **olfactory bulbs** can be seen beneath the cerebral hemispheres. These bulbs receive the **olfactory neurons** from the nose.
19. A white band, the olfactory tract, extends from each bulb along the ventral surface of the cerebral hemispheres.
20. The ventral surface of the diencephalon, the **hypothalamus**, is posterior to the olfactory tracts. The optic nerves undergo a partial crossing over at the anterior border of the hypothalamus, forming the cross known as the **optic chiasma**.
21. The remainder of the hypothalamus is the oval area lying posterior to the optic chiasma, covered by the pituitary gland. Do not remove the gland. The infundibulum can be seen connecting the pituitary to the hypothalamus.
22. Posterior to the infundibulum is the rounded main **mammillary body**. There are two in humans.

Figure 2 Ventral View of the Fetal Pig Brain



23. Posterior to the midbrain is the **pons**. This is composed primarily of white fibers, many of which run transversely across the pons out to the cerebellum.
24. The **medulla oblongata** is posterior to the pons. The longitudinal bands of tissue at each side of the medulla oblongata are known as the pyramids.
25. To see the remaining parts of the brain, you must make a sagittal section of the brain. Compare the specimen with Figure 3. Relocate the **corpus callosum**, which consists of the white fibers connecting the two cerebral hemispheres.
26. Relocate the hypothalamus. Note the **pineal body** dorsal to the midbrain.
27. The beginning of the spinal cord may be seen connected to the medulla oblongata. A canal known as the **central canal**, which is present in the center of the cord.
28. Note the treelike arrangement of **gray** and **white matter** in the cerebellum. This arrangement is known as the arbor vitae or “tree of life.” The gray matter of the cerebellum is on the outside, the white is toward the center.
29. The outer layer of the cerebral hemispheres, the **cortex**, is also composed of gray matter. Make a shallow incision through the cortex in order to see the white matter located beneath.

Figure 3 Sagittal Section through the Fetal Pig Brain

