

Introduction

Fetal pigs are readily available, since farmers find it profitable to breed female pigs which they plan to sell. Thus pig fetuses are byproducts of the slaughter houses. The period of gestation is 112 to 115 days, and there are, on the average, about seven to eight offspring in a litter. At birth the pigs vary from 30 to 40 centimeters in length. The approximate age of the fetus can be determined by measuring the length of the body from the tip of the snout to the rump (not including the tail). The following are approximate body length to age relationships: Graph these numbers on the graph paper at the end of this lab. Then measure your pig and determine its approximate age at the time of its death. See Direction #8, page 3 of this lab.

Gestation Table

Body Length in cm	Gestation Time in Days
1	21
2	35
3	49
4	56
22	100
40	115

As a laboratory animal the fetal pig has a number of advantages. It is relatively inexpensive so that usually a maximum of two students can be assigned to an animal. Since they are small, they do not require much storage space. The animals are mammals and, therefore, their structures are similar to those of humans. In addition to relatively mature organs, there are also fetal structures present that are directly comparable to those of human beings. These include the umbilical cord and the circulatory structures which are specialized for fetal circulation.

As the fetal pig is dissected and studied, the structures identified should be compared with those of the human. Dissection is not merely “cutting” the animal, but a systematic technique of bringing into view structures which, in their normal position, cannot readily be seen. Follow instructions exactly. Do not cut or remove any structure unless directed to do so. Always separate structures carefully, especially blood vessels, by moving connective tissues out of the way. It is best to use the dull probe for this task.

You may find that the substances used to preserve the specimens are irritating to your skin. If so, wear thin rubber or plastic gloves. Remove as much of the preservative from your specimen as possible by frequently washing it with tap water. Keep your fingers away from your eyes during dissection.

At the conclusion of each laboratory period, clean up the working area thoroughly. Put the pig in the container provided by your teacher. To identify your pig, you should attach an earring that is unique, making it easy for you to find your pig each time a dissection is made. Do not leave any solid material in the sink. Clean and dry the laboratory table and the dissection tools that were assigned to you.

The terms right and left always refer to the pig’s right and left. In a quadruped, anterior or cranial refers to the head end; posterior or caudal to the tail end; dorsal or superior to the back; ventral or inferior to the belly. Lateral refers to the side, medial to the position of a structure nearer the midline of the body.

Procedure

1. Examine the pig for body hair, although this is usually not conspicuous at this time. Is body hair present? _____
Look under the chin for some longer hairs.

2. Note the epitrinchium, the layer of embryonic skin that is visibly peeling. This is lost as the hair develops. It may be removed by rinsing the pig in tap water. Use a sink with a disposal, if possible. The fetal skin will easily plug a sink; and care should be taken to prevent this.

3. On the head locate the following structures:
 - a. The mouth, bounded by upper and lower jaws and soft lips, is sometimes partially open, revealing a soft tongue. The front end of the head is prolonged into a snout. The snout is used for rooting around in the soil for roots, insects, and other materials used by the pig for food. Do you have a snout? _____

 - b. Observe the two nostrils (external nares) at the end of the snout.

 - c. The eyes (usually closed) are covered by upper and lower eyelids fringed with eyelashes. Use a probe and pull the upper eyelids apart. The nictitating membrane should be visible in the medial corner of the eye. This transparent membrane, which is referred to as a third eyelid, can move across the eyeball with the eye open, thus providing protection. Check your partner's eye for this structure. Is it present? _____

 - d. The opening into the ear is called the external acoustic (auditory) meatus and the flattened flap of skin is called the pinna, or auricle. The pinna and the external acoustic meatus make up the external ear in the pig as well as in the human.

4. Note that the short neck joins the thorax in front of the first pair of legs. There is usually an incision in the right lateral part of the neck where the blood was withdrawn and colored latex was injected. The arteries should be represented with a red latex and while the veins were filled with a blue latex rubber.

5. The trunk can be divided approximately into two general regions, consisting of an anterior thorax and a posterior portion, the abdomen.
 - a. Note that the front limbs are attached to the thorax. The ribs making up the thorax are soft at this stage of development because they are made of cartilage.

 - b. Locate the nipples which are present in both sexes. These form a double row of small teats or mammary papillae on the ventral surface of the abdomen. The number and location of the mammary glands vary in different species but the glands are one of the distinguishing characteristics of all mammals.

 - c. Observe the umbilical cord near the center of the ventral surface of the abdomen. If the cord is long enough, make a fresh cut across the end of it. Three large blood vessels should now be visible. The largest of these is the umbilical vein which carries blood from the placenta to the fetal pig. This vessel may contain blue latex. The other two, smaller and with thicker walls, are the umbilical arteries, which may contain red latex. These vessels carry blood from the fetus to the placenta. Between or near the umbilical arteries; is a small, hard core of tissue called the allantoic stalk. All the structures present in the cord are embedded in a gelatinous connective tissue. Look up the function of the placenta and record its purpose below. Do all mammals develop from a placenta? _____

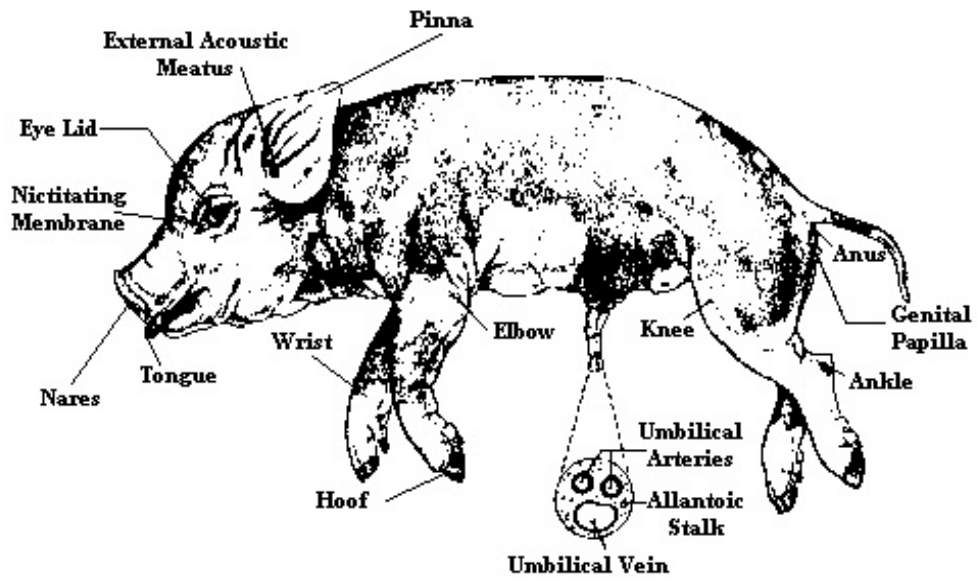
- d. Locate the anus just ventral to the tail. This is the posterior opening of the digestive tract. The anus is a sphincter muscle. Describe a sphincter muscle. _____
- e. Determine the sex of your fetal pig. In the female, the external urogenital opening, with a small genital papilla projecting from it, is ventral to the anus. This is the common opening of the urinary and reproductive tracts. In the male the external urogenital opening is a very small hole just posterior to the umbilical cord at the tip of the penis. If your specimen is a male, note the two scrotal sacs below and ventral to the anus. The penis lies under the skin, passing from the urogenital opening posteriorly between the hind legs. Each student is expected to identify the sexual organs in both sexes. Compare your fetal pig with that of the opposite sex. Is your pig a male or female? _____
What structure was present that helped you identify its gender? _____

6. Note that there are only four toes or digits on each limb as compared to five in humans.
7. Examine the legs and note that they have the same general structure as that of humans and other animals, although they are somewhat modified.
- a. Examine the posterior surface of one of the hind legs and note the large protuberance about two inches above the toes. This is comparable to the human heel, and the region from it to the toes corresponds to the human foot. Since the pig walks on the tips of the toes, the ankle and most of the foot is above the ground.
- b. Locate the wrist and elbow of the forelimb and the knee and ankle of the hind limb.
8. Use a piece of string to measure the length of your pig. Stretch the string along its back from the base of its tail to the tip of its nose. Make your measurement in centimeters. How many centimeters is it? _____

Use the data from the Gestation Table and build a line graph on the graph paper at the end of this lab. From the slope of your plotted points, determine the age of your pig in terms of gestation. How many days was your pig in gestation?

9. Place a distinctive earring on your pig so that you will be able to find it easily amongst the others. Most of the fetal pigs will look similar and it will be hard to identify yours. Once pinned, you may now return the pig to its designated container. Wash your hands and clean up the area. Dissecting tools should be cleaned, dried off, and returned to their proper spot.

Figure 1 External View of a Female Fetal Pig



Graph Paper to Determine the Age of the Fetal Pig

