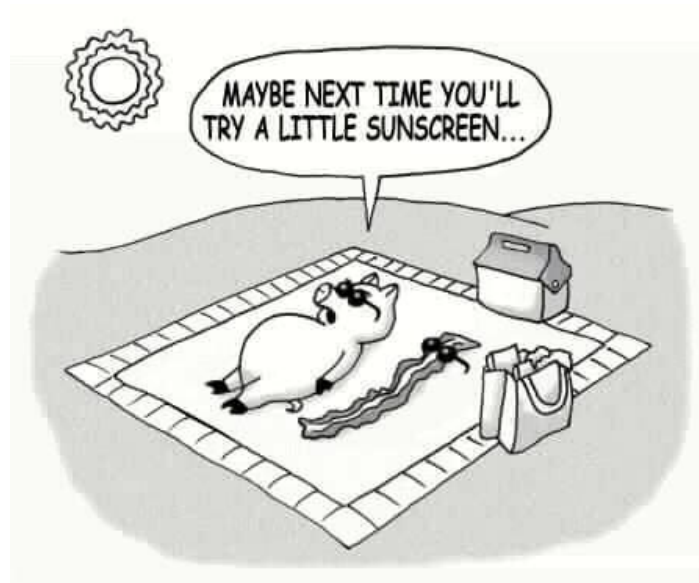


An Introduction to Pig Dissection

This little piggy went to the market...This little piggy stayed home...This little piggy became roast beef...



INTRODUCTION

In the following laboratory exercise, you will examine in some detail the external and internal anatomy of a fetal pig (*Sus scrofa*). As the pig is a mammal, many aspects of its structural and functional organization are identical with those of other mammals, including humans. Thus, our main learning goal is to help you better appreciate the structure and function of your own human anatomy through the study of **VERY SIMILAR fetal pig anatomy.**

The fetuses you will use in the following weeks were salvaged from pregnant sows being slaughtered for food. They are not raised specifically for dissection purposes. The fetuses are removed from the sow and embalmed with a preservative, which is injected through the umbilical cord. Next, red latex, a rubber-like compound, is injected under pressure through the umbilical cord to highlight the pig's arteries which carry blood away from the heart. Then blue latex is injected into a jugular vein through a cut made at the base of the throat to highlight the pig's veins which carry blood towards the heart. These latex injections will help students better understand the unique features of mammalian blood circulation.

With the possible exception of the abdominal cavity, organs rarely appear as they are presented in a diagram. If the purpose of this exercise were simply to have you memorize diagrams (or computer screens), we would do only that and bypass the expense, time, and controversy of dissecting! Dissection is a powerful teaching method, especially for concrete thinkers and visual learners. Only by dissecting can you really appreciate the structural and functional role of the many membranes, mesenteries, and connective tissues that will impede your progress every step of the way. Only by dissecting can you really appreciate the relationship between an organ's texture, location, and function.

During these exercises, keep several points in mind. First, be aware that "to dissect" does not mean "to cut up," but rather primarily "to expose to view." Actual cutting should be kept to a minimum. The main tools we will use to expose and examine all the pig's tissues and organs will be a "dissecting" scissors and a probe. **Never cut or move more than is necessary to expose a given part.** Second, pay particular attention to the spatial relationships of organs, glands, and other structures as you expose them. Realize that their positions are not random.

SAFETY AND HYGIENE

1. Practice safe hygiene when dissecting. Do not place your hands near your mouth or eyes while handling preserved specimens. Although most of the preservatives in use today are non-toxic to the skin, they may cause minor skin irritations. If the preservative gets on your skin, wash with soap and warm water.
2. If the preservative gets in your eyes, rinse them thoroughly with the safety eyewash.
4. Wear lab gloves and wash your hands at the conclusion of each day. **Latex-free gloves are available— if you have a latex allergy, be aware of the gloves you're using!!**

Daily Clean Up

1. Trash such as paper towels and gloves go in the BIG trashcan at the back of the room.
2. After bagging your pig and placing it back in the “coffin”, rinse your tools and tray and stack them neatly by the sink.
3. Spray your table with antibacterial spray and wipe until dry.

Behavior:

You are expected to maintain appropriate behavior throughout the days of dissection. If you behave inappropriately, you will not be allowed to continue dissection. This means that you will lose all points left for the remainder of the dissection. Inappropriate behavior includes leaving your group and wandering around the classroom, working on materials other than the dissection, handling equipment improperly, removing parts of the pig, and trying to “scare” others in the class with your pig. There will be no warnings. One offense and you will not be allowed to continue with the dissection.

About the Piggies:

The period of pregnancy or gestation for pigs is 112-115 days (**3 months, 3 weeks, 3 days**) and each female may produce a litter of 7-12. As the period of development proceeds, the pig embryos get longer, so an approximate age may be calculated from the length. (From Odlaug: Laboratory Anatomy of the Fetal Pig, William C. Brown, 1955.)

Time from Conception	Pig Length in mm
21 days	11 mm
35 days	17 mm
49 days	28 mm
56 days	40 mm
100 days	220 mm
114 days (birth)	300 mm

Time from Conception	Human Fetal Length in mm
70 days	61 mm
98 days	120 mm
124 days	160 mm
168 days	230 mm
210 days	280 mm
252 days	340 mm

Pig Classification

	PIGS	HUMANS
Kingdom	Animalia	Animalia
Phylum	Chordata	Chordata
Class	Mammalia	Mammalia
Order	Artiodactyla	Primates
Family	Suidae	Hominidae
Genus	Sus	Homo
Species	scrofa	sapiens

So, why dissect fetal pigs?

- **Similarity to human structure** -- Pigs are mammals. Consequently, all of the major structures found in humans are present in the fetal pig. With proper directions, they can all be readily found, especially with large, full term fetal pig specimens. There are some differences in structural details, mostly relatively minor in nature.

● Muscles

In almost every case, fetal pigs have the same muscles as humans, with some small variations in the size and location of some muscles related to the fact that pigs are quadrupedal (walk on four legs) and humans are bipedal. For example, the major chest and abdominal muscles found in humans are present in the pig. There are some differences in the location of chest muscles that attach to the shoulder girdle. In the hind limb, the pig has the same muscles as humans in the major thigh muscle groups: quadriceps femoris and the hamstrings. In the hip, however, there are some differences in the gluteal muscles.

*We will spend little time, if any, on muscles. You will have extensive coverage on muscles in Human Anatomy and Physiology.

- Internal Organs: Pigs have all of the same thoracic (chest) and abdominal organs as humans. There are a few small differences.

Liver - the human liver has four lobes: right, left, caudate and quadrate. The fetal pig liver has five lobes: right lateral, right central, left central, left lateral, and caudate.

Intestines: there is a significant difference in the structure of the fetal pig colon compared to the human colon. The pig colon is spiral.

Stomach, spleen, bile duct system, small intestines, kidneys, bladder, etc. - the remainder of the abdominal organs found in the fetal pig are basically the same as found in humans.

Thymus - the thymus is found in the same areas in pigs as in humans. However, it is much larger than most students expect. This is because the thymus is very active during fetal development. It gradually shrinks, relative to the rest of the body, throughout life.

Lungs - Like humans, pigs have multi-lobed lungs.

Pericardium, vena cava, esophagus, etc. - these other thoracic organs are basically the same in pigs and humans.

Uterus - Fetal pigs have a bicornate uterus compared to the simplex human uterus. This means that the pig uterus has two large horns in addition to the body. These horns are sometimes confused with the much smaller Fallopian tubes. It is the presence of these horns which allows pigs to have room for a litter of 8 or 10 pigs.

Urogenital Sinus – Female pigs have one urogenital opening that leads to the urethra and the vagina. While humans have a urogenital sinus during embryological development, it is lost during later development. Consequently, in humans the urethra and vagina have separate external openings.

Urethra, ovaries, uterine tubes, labia, mesenteries, testes, vas deferens, prostate gland, etc. - these structures are basically the same in the fetal pig and human.

Pre Lab Questions:

1. Why are we dissecting PIGS ... what is the learning goal?
2. What safety procedures should you follow during the dissection of the pigs?
3. Explain proper cleanup procedures at the end of each lab period?
4. Review Pig vs Human classification by completing the table below.

	PIGS	HUMANS
Class		Mammalia

5. What will happen if you get caught not following proper lab procedure?
6. T/F You are free to remove pig parts from the room.
7. T/F You should leave pig parts in the sink.
8. Define a “gestation period”? ... What is the gestation period for pigs? Humans?
9. If the pig fetuses we will dissect in class average **230** mm in length, approximately how **old** are they?
10. If a human fetus was the same size (230 mm), how **old** would it be?
11. List 4 ways that pigs are internally different than humans.