

NAME: _____

DATE: _____

PARTNER: _____

REPRODUCTION AND DEVELOPMENT

VERTEBRATE REPRODUCTIVE SYSTEMS AND EMBRYONIC STRUCTURES

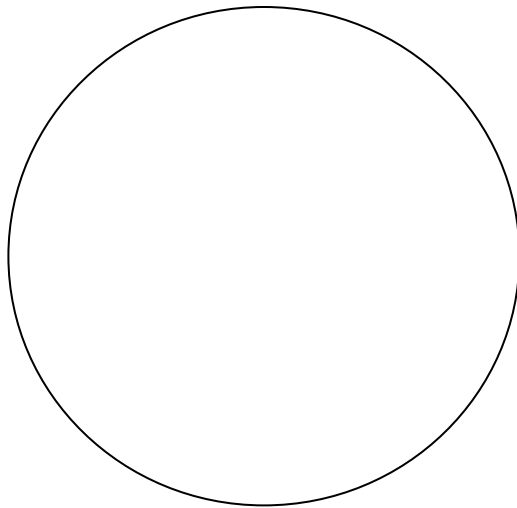
In this exercise we will focus on reproductive and developmental aspects of human systems, using animal models when appropriate. Your text should be used as a reference, and you may need to use outside sources to answer some questions as well.

I. REPRODUCTIVE STRUCTURES

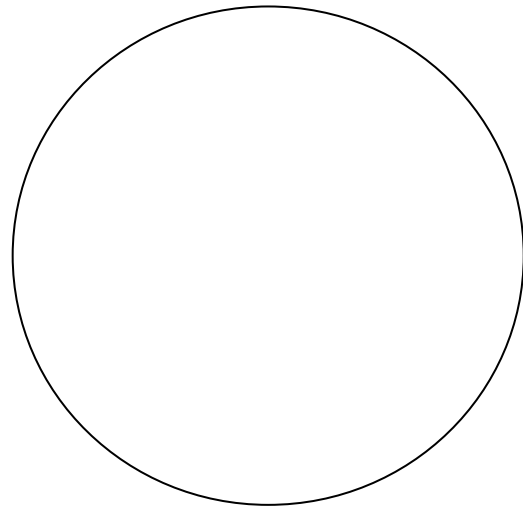
The ovaries and testes are the gonads, structures which produce gametes. Ovaries produce eggs in females, while testes produce sperm in males. Ovaries contain follicles, structures which house a developing egg inside a layer of other cells. Testes contain seminiferous tubules which house developing sperm.

A. Ovary and testis microscope slides

Examine the microscope slides of ovaries and testes. Draw a picture of what you see using the 10X objective lens.



Ovary



Testis

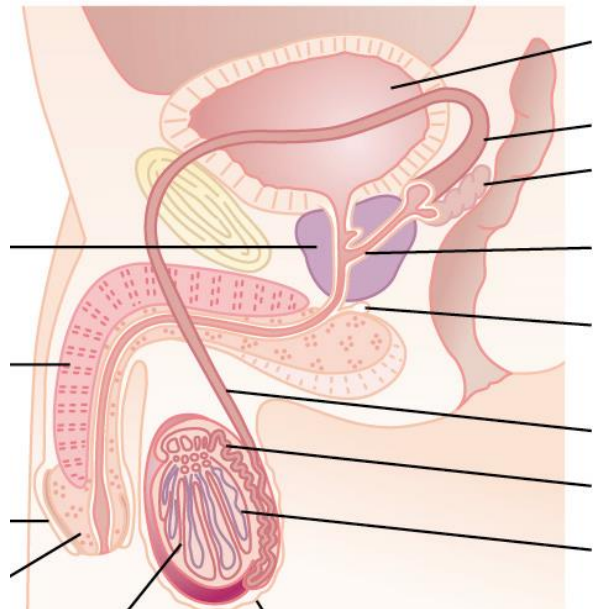
1. Find (and label in your drawing) two follicles of different maturity levels in the ovary slide. What is the function of each of these structures? _____

2. Find and label a seminiferous tubule in the testis slide. What is the function of this structure?

B. Male Reproductive System

1. Label the structures next to the lines on the diagram using the terms listed. Not all the lines will be labeled. Use your text as a reference. Then label where sperm are: 1) produced and 2) stored.

- A. bulbourethral glands
- B. ejaculatory duct
- C. epididymus
- D. penis
- E. prostate gland
- F. seminal vesicle
- G. seminiferous tubule
- H. testis
- I. urinary bladder
- J. vas deferens



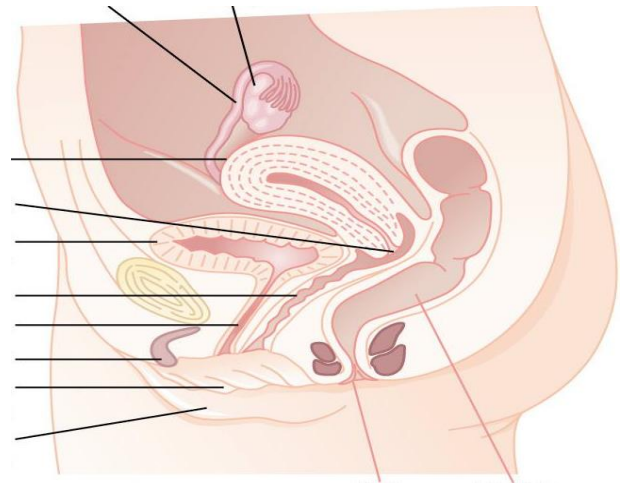
2. Look at slides of the following tissues and check off each as you finish them. Ask the instructor for help finding structures if necessary.

- Prostate gland – identify cuboidal epithelial cells which secrete fluid
- Penis (cross-section) – identify urethra and spongy tissue
- Sperm (indicate which species you observed here: _____)

C. Female Reproductive System

1. Label the structures next to the lines of the diagram using the terms listed. Use your text as a reference. Then label where eggs: 1) are produced and 2) would implant if fertilized.

- A. cervix
- B. clitoris
- C. labia majora
- D. labia minora
- E. ovary
- F. oviduct
- G. urinary bladder
- H. uterus
- I. vagina



2. Look at a slide of the uterus, and find the following structures; check off each as you finish them. Ask the instructor for help finding structures.

- Endometrium, a stratified squamous epithelium inside the uterus
- Arterioles in the endometrium
- Myometrium, a thick layer of smooth muscle comprising the wall of the uterus

II. DEVELOPMENT

Development begins at fertilization of an ovum by a sperm, proceeds in a regulated fashion through cleavage and gastrulation, then progresses into morphogenesis. In cleavage, simple cell division (mitosis) takes place until a blastula – a hollow ball of cells- is formed. Once formed, the blastula undergoes gastrulation, during which distinct tissue layers, called germ layers, are formed. There are 3 germ layers in mammals: endoderm, mesoderm, and ectoderm. During morphogenesis, organ development and growth occur. During cleavage and gastrulation, the conceptus is referred to as a zygote; during the period after implantation of the conceptus into the endometrium, the conceptus is referred to as an embryo; after 8 weeks of human gestation, or once organ development has begun, the conceptus is referred to as a fetus.

A. Cleavage

Examine the series of slides of starfish zygotes at the 2-cell, 4-cell, 8-cell, 16-cell, 32-cell and 64-cell stages. Describe here what you observe. Then watch the cleavage YouTube video on the lab computer. Does the overall size of the zygote (either starfish or frog) seem to change much between the stages? _____

B. Gastrulation

1. Watch the animation on frog gastrulation, then answer the following questions.

a. What are the three germ layers in a frog embryo? What does each give rise to?

b. What structures give rise to the digestive tract? Given what we have discussed this semester about protostomes vs. deuterostomes, how might the mouth of the frog eventually form? _____

C. Morphogenesis

1. Examine the 72-hr and 96-hr chick embryo plasmounts, both grossly (i.e., with just your eyes – pick it up and turn it around), and under a dissecting microscope. These are whole-mount preparations, meaning the entire embryo is there, instead of just a slice. Use your text as a reference for part b. Also, see the plasmount containing earlier embryos for reference.

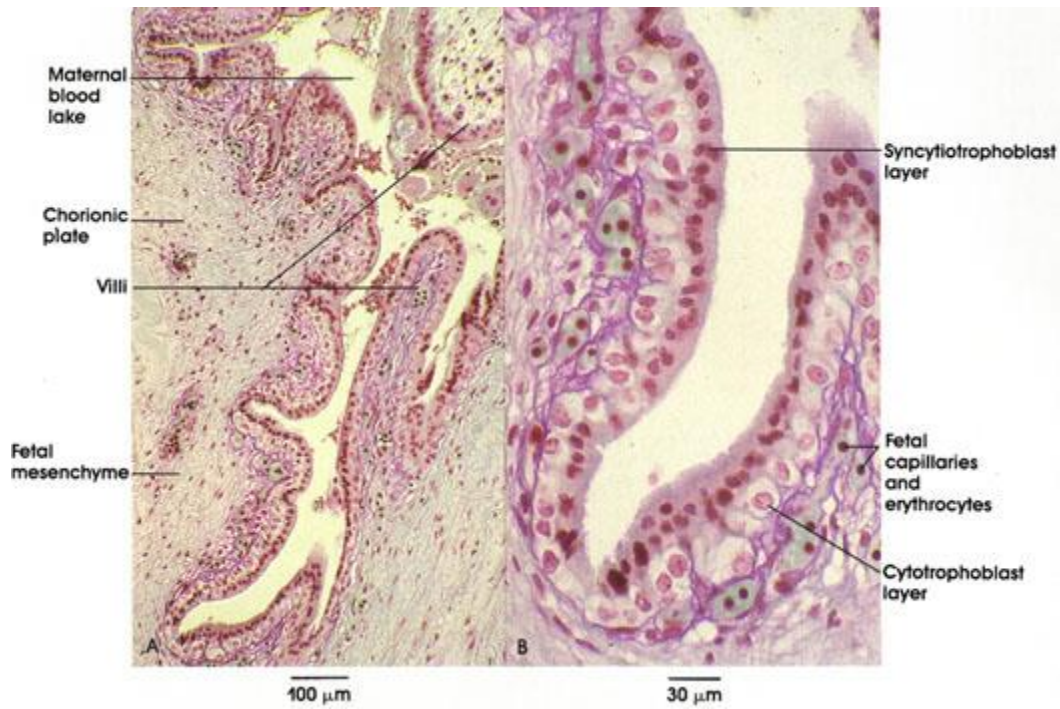
a. What general observations can you make in comparing the 72-hr and 96-hr specimens?

b. What structures are present or are much more developed at 96 hrs that are not present or are less developed at 72 hrs? _____

c. In this chick embryo, where do the nutrients come from to feed the growing chick? How is this different from a mammal? _____

D. Placenta

Examine the micrograph shown below of a human placenta. Pay attention to how the fetal villi extend into the maternal blood lake (shown on the left). Then on the right, a magnified view shows tiny fetal capillaries adjacent to the maternal blood lake (unlabeled large space).



1. Draw arrows on the picture on the right to show where exchange of gasses, nutrients, and waste products would happen between the mother's and baby's circulatory systems.
2. Observe the fetal lamb specimen with umbilical cord running between the placenta and the fetus. What does the umbilical cord do? What happens to the umbilical cord and placenta after a baby mammal is born? _____
