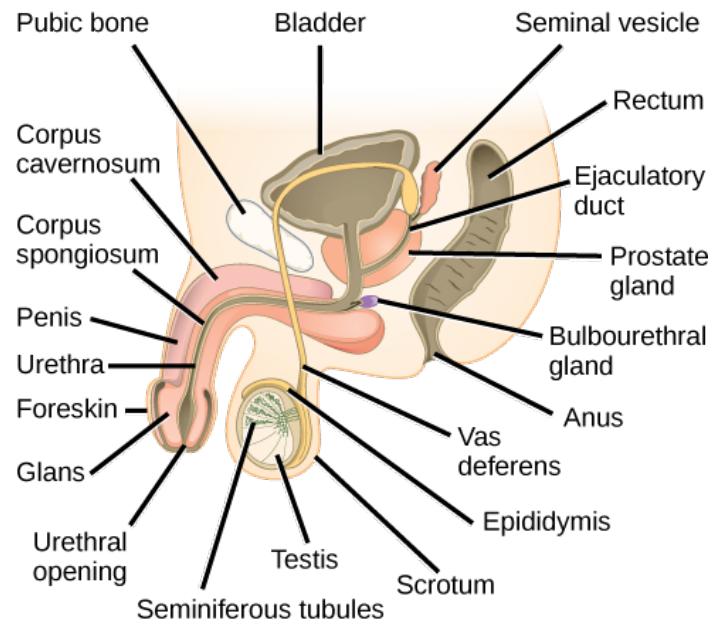


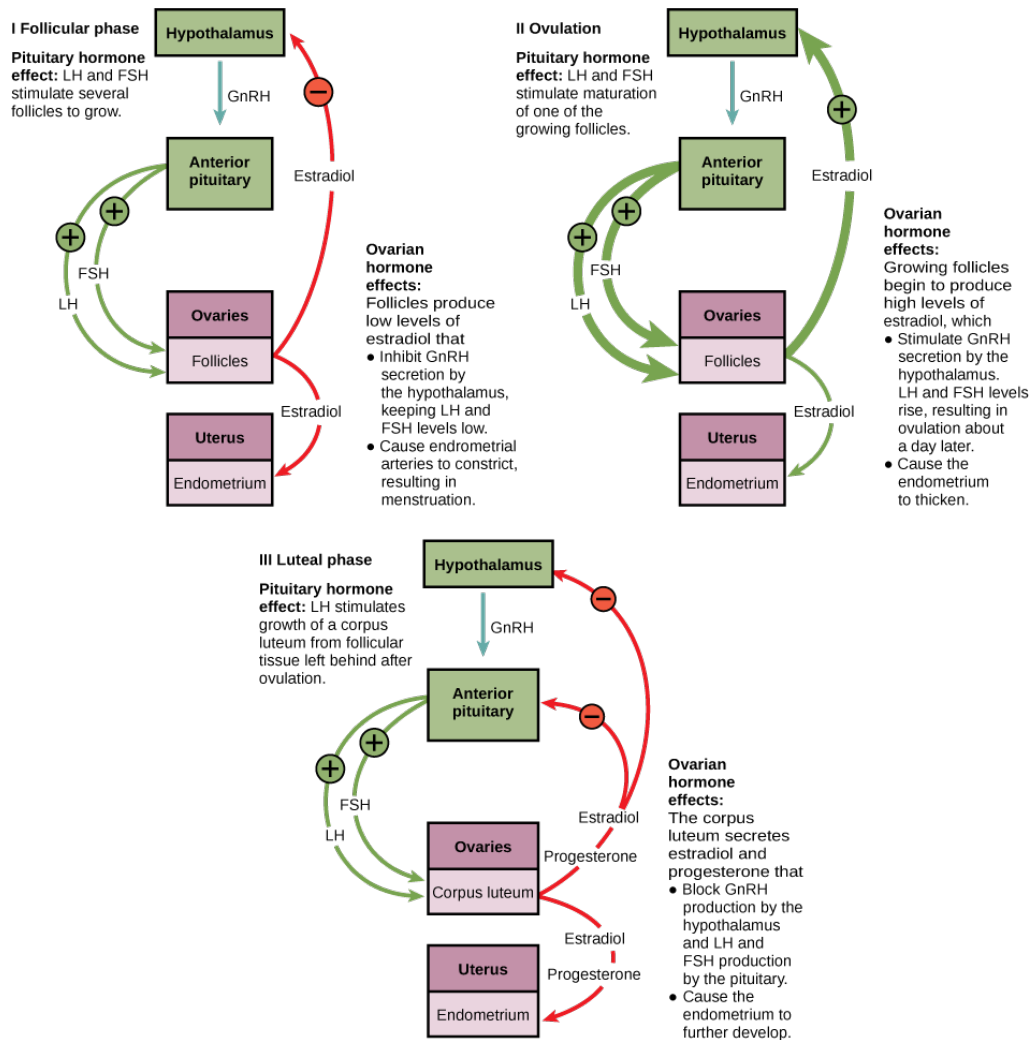
Biology 2eUnit 7: **Animal Structure and Function**Chapter 43: **Animal Reproduction and Development****Visual Connection Questions**

1. Which of the following statements about the male reproductive system is false?



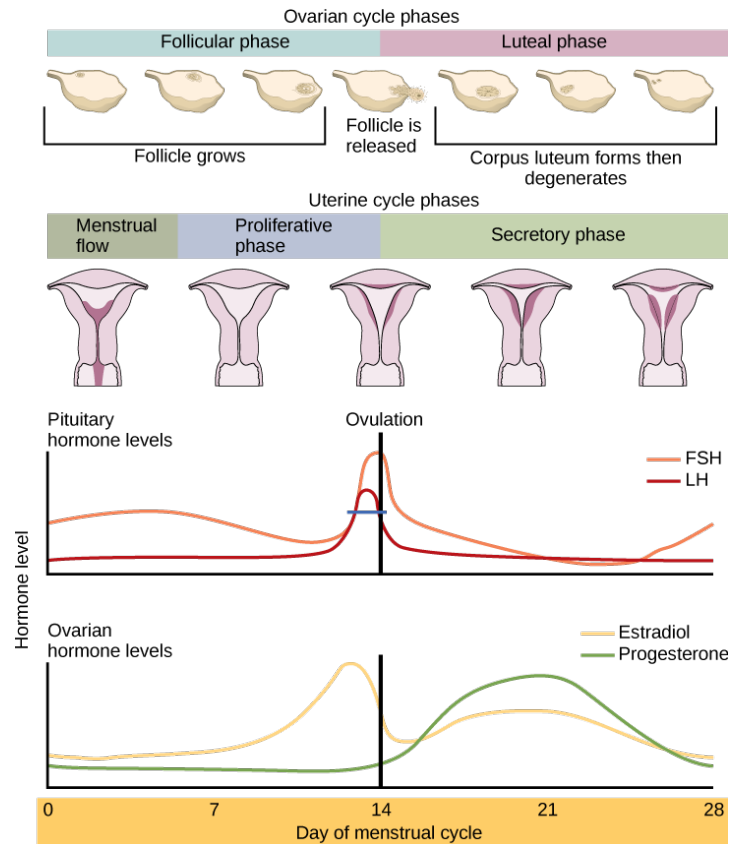
d. The prostate gland is located in the testes.

2. Which of the following statements about hormone regulation of the female reproductive cycle is false?



c. Both progesterone and estradiol are produced by the follicles.

3. Which of the following statements about the menstrual cycle is false?



b. Menstruation occurs just after LH and FSH levels peak.

Review Questions

4. Which form of reproduction is thought to be best in a stable environment?

a. asexual

5. Which form of reproduction can result from damage to the original animal?

b. fragmentation

6. Which form of reproduction is useful to an animal with little mobility that reproduces sexually?

d. hermaphroditism

7. Genetically unique individuals are produced through _____.

a. sexual reproduction

8. External fertilization occurs in which type of environment?

a. aquatic

9. Which term applies to egg development within the female with nourishment derived from a yolk?

c. ovoviviparity

10. Which term applies to egg development outside the female with nourishment derived from a yolk?

a. oviparity

11. Sperm are produced in the _____.

c. seminiferous tubules

12. Most of the semen is made by the _____ in the male reproductive system.

c. seminiferous tubules

13. Which of the following cells in spermatogenesis is diploid?

a. primary spermatocyte

14. Which female organ has the same embryonic origin as the penis?

a. clitoris

15. Which female organ has an endometrial lining that will support a developing baby?

d. uterus

16. How many eggs are produced as a result of one meiotic series of cell divisions?

a. one

17. Which hormone causes Leydig cells to make testosterone?

b. LH

18. Which hormone causes FSH and LH to be released?

c. GnRH

19. Which hormone signals ovulation?

b. LH

20. Which hormone causes the re-growth of the endometrial lining of the uterus?

d. progesterone

21. Nutrient and waste requirements for the developing fetus are handled during the first few weeks by:

b. diffusion through the endometrium

22. Progesterone is made during the third trimester by the:

a. placenta

23. Which contraceptive method is 100 percent effective at preventing pregnancy?

d. abstinence

24. Which type of short term contraceptive method is generally more effective than others?

b. hormonal

25. Which hormone is primarily responsible for the contractions during labor?

a. oxytocin

26. Major organs begin to develop during which part of human gestation?

b. first trimester

27. Which of the following is false?

b. The trophoblast is a germ layer.

28. During cleavage, the mass of cells:

d. does not change significantly

29. Which of the following gives rise to the skin cells?

a. ectoderm

30. The ribs form from the _____.

d. somites

Critical Thinking Questions

31. Why is sexual reproduction useful if only half the animals can produce offspring and two separate cells must be combined to form a third?

Sexual reproduction produces a new combination of genes in the offspring that may better enable them to survive changes in the environment and assist in the survival of the species.

32. What determines which sex will result in offspring of birds and mammals?

The presence of the W chromosome in birds determines femaleness and the presence of the Y chromosome in mammals determines maleness. The absence of those chromosomes and the homogeneity of the offspring (ZZ or XX) leads to the development of the other sex.

33. What are the advantages and disadvantages of external and internal forms of fertilization?

External fertilization can create large numbers of offspring without requiring specialized delivery or reproductive support organs. Offspring develop and mature quickly compared to internally fertilizing species. A disadvantage is that the offspring are out in the environment and predation can account for large loss of offspring. The embryos are susceptible to changes in the environment, which further depletes their numbers. Internally fertilizing species control their

environment and protect their offspring from predators but must have specialized organs to complete these tasks and usually produce fewer embryos.

34. Why would paired external fertilization be preferable to group spawning?

Paired external fertilization allows the female to select the male for mating. It also has a greater chance of fertilization taking place, whereas spawning just puts a large number of sperm and eggs together and random interactions result in the fertilization.

35. Describe the phases of the human sexual response.

In phase one (excitement), vasodilation leads to vasocongestion and enlargement of erectile tissues. Vaginal secretions are released to lubricate the vagina during intercourse. In phase two (plateau), stimulation continues, the outer third of the vaginal wall enlarges with blood, and breathing and heart rate increase. In phase three (orgasm), rhythmic, involuntary contractions of muscles occur. In the male, reproductive accessory glands and tubules constrict, depositing semen in the urethra; then, the urethra contracts, expelling the semen through the penis. In women, the uterus and vaginal muscles contract in waves that may last slightly less than a second each. In phase four (resolution), the processes listed in the first three phases reverse themselves and return to their normal state. Men experience a refractory period in which they cannot maintain an erection or ejaculate for a period of time ranging from minutes to hours. Women do not experience a refractory period.

36. Compare spermatogenesis and oogenesis as to timing of the processes and the number and type of cells finally produced.

Stem cells are laid down in the male during gestation and lie dormant until adolescence. Stem cells in the female increase to one to two million and enter the first meiotic division and are arrested in prophase. At adolescence, spermatogenesis begins and continues until death, producing the maximum number of sperm with each meiotic division. Oogenesis continues again at adolescence in batches of oogonia with each menstrual cycle. These oogonia finish the first meiotic division, producing a primary oocyte with most of the cytoplasm and its contents, and a second cell called a polar body containing 23 chromosomes. The second meiotic division results in a secondary oocyte and a second oocyte. At ovulation, a mature haploid egg is released. If this egg is fertilized, it finishes the second meiotic division, including the chromosomes donated by the sperm in the finished cell. This is a diploid, fertilized egg.

37. If male reproductive pathways are not cyclical, how are they controlled?

Negative feedback in the male system is supplied through two hormones: inhibin and testosterone. Inhibin is produced by Sertoli cells when the sperm count exceeds set limits. The hormone inhibits GnRH and FSH, decreasing the activity of the Sertoli cells. Increased levels of testosterone affect the release of both GnRH and LH, decreasing the activity of the Leydig cells, resulting in decreased testosterone and sperm production.

38. Describe the events in the ovarian cycle leading up to ovulation.

Low levels of progesterone allow the hypothalamus to send GnRH to the anterior pituitary and cause the release of FSH and LH. FSH stimulates follicles on the ovary to grow and prepare the

eggs for ovulation. As the follicles increase in size, they begin to release estrogen and a low level of progesterone into the blood. The level of estrogen rises to a peak, causing a spike in the concentration of LH. This causes the most mature follicle to rupture and ovulation occurs.

39. Describe the major developments during each trimester of human gestation.

The first trimester lays down the basic structures of the body, including the limb buds, heart, eyes, and the liver. The second trimester continues the development of all of the organs and systems established during the first trimester. The placenta takes over the production of estrogen and high levels of progesterone and handles the nutrient and waste requirements of the fetus. The third trimester exhibits the greatest growth of the fetus, culminating in labor and delivery.

40. Describe the stages of labor.

Stage one of labor results in the thinning of the cervix and the dilation of the cervical opening. Stage two delivers the baby, and stage three delivers the placenta.

41. What do you think would happen if multiple sperm fused with one egg?

Multiple sperm can fuse with the egg, resulting in polyspermy. The resulting embryo is not genetically viable and dies within a few days.

42. Why do mammalian eggs have a small concentration of yolk, while bird and reptile eggs have a large concentration of yolk?

Mammalian eggs do not need a lot of yolk because the developing fetus obtains nutrients from the mother. Other species, in which the fetus develops outside of the mother's body, such as occurs with birds, require a lot of yolk in the egg to nourish the embryo during development.

43. Explain how the different germ layers give rise to different tissue types.

Organs form from the germ layers through the process of differentiation. During differentiation, the embryonic stem cells express a specific set of genes that will determine their ultimate fate as a cell type. For example, some cells in the ectoderm will express the genes specific to skin cells. As a result, these cells will differentiate into epidermal cells. The process of differentiation is regulated by cellular signaling cascades.

44. Explain the role of axis formation in development.

Animal bodies have lateral-medial (left-right), dorsal-ventral (back-belly), and anterior-posterior (head-feet) axes. The dorsal cells are genetically programmed to form the notochord and define the axis. There are many genes responsible for axis formation. Mutations in these genes lead to the loss of symmetry required for organism development.