

Reproductive System Concept Questions

1. It is important that only one sperm fertilize an egg. Predict the result of the fertilization of an egg by more than one sperm. (If more than one sperm fertilized an egg, the zygote would have an extra set of chromosomes (*i.e.*, it would be polyploid).)
2. Explain how each of the following could be described as an adaptation that helps to ensure fertilization:
 - a) seminal fluid (Seminal fluid provides hormones and other components to protect sperm and help them move through the female reproductive tract.)
 - b) production of millions of sperm (Producing millions of sperm increases the chance that one will reach the egg.)
 - c) cilia lining the walls of the oviducts. (Cilia help to sweep the egg through the oviduct toward the sperm.)
3. A couple is having difficulty conceiving so their doctor suggests they avoid using their hot tub. Suggest a reason for the suggestion. (Spermatogenesis occurs normally only when the testes are cooler than normal body temperature. Extensive use of a hot tub (or of very tight-fitting underwear) can cause a decrease in sperm quality and number.)
4. All humans start out as females but those with a y chromosome become males during early embryonic development. As we would expect, females and males have analogous structures that have slightly different functions. For each of the following, identify the female structure that is analogous to the male structure.
 - a) testes (Ovaries.)
 - b) vas deferens (Oviducts.)
 - c) penis (Clitoris.)
5. Most ectopic pregnancies are tubal. Explain why they are dangerous. (The oviduct cannot expand to accommodate the growing fetus like the uterus can so internal bleeding occurs. It can be fatal if not detected.)
6. Suppose a woman's oviducts were blocked.
 - a) Predict whether she will produce eggs. (Yes.)
 - b) Predict whether she could she become pregnant. (No, except by medical intervention.)
7.
 - a) Identify the fertile period of the menstrual cycle. (The fertile period is 10-14 days after the first day of the last flow phase.)
 - b) Explain why females are fertile only during this period. (The egg is only present and viable for about 48 hours after ovulation.)
8. Estrogen is at its highest just before ovulation. Explain how this happens and why it is important. (Estrogen is produced by the follicle throughout follicular phase so it is highest at the end of the phaser. It causes thickening of the endometrium and triggers the release of LH.)
9. Explain how negative feedback regulates the level of FSH during the menstrual cycle. (FSH causes a follicle to develop, leading to ovulation. After ovulation the corpus luteum keeps the progesterone concentration high, suppressing FSH, so a second egg is not released. If fertilization does not occur the corpus luteum disintegrates and progesterone falls, allowing FSH to accumulate again.)

10. Describe the hormone changes that trigger the beginning of a new menstrual cycle. (Progesterone from the corpus luteum inhibits the hypothalamus and pituitary. The resulting decline in LH causing the corpus luteum to disintegrate. Without the corpus luteum, there is a drop in progesterone which releases the pituitary and hypothalamus from inhibition so FSH is produced again. The surge in FSH triggers a new ovarian cycle. The lack of progesterone triggers contractions of the myometrium, starting flow phase.)
11. Predict what would happen if the corpus luteum disintegrated during pregnancy. (Progesterone would not be produced so the uterine wall would be shed, terminating pregnancy.)
12. Explain why it is important that the menstrual cycle is stopped during pregnancy and how hormone interactions achieve this. (The embryo releases hCG which maintains the corpus luteum so that progesterone production continues. Without progesterone, contractions of the myometrium would begin and the embryo would be shed with the endometrium.)
13. a) Explain how the birth control pill prevents pregnancy. (The birth control pill contains estrogen and progesterone which inhibit the hypothalamus and pituitary, inhibiting the release of FSH, thereby preventing ovulation.)
b) Explain why a woman does not take birth control pills for the entire 28 days of the menstrual cycle. (The concentration of progesterone and estrogen must be allowed to decline to induce flow phase at the end of the cycle.)
c) Identify the days of the menstrual cycle on which the pill is not taken. (The sugar pills replace the hormone pills for the last 7 (or for some brands, 4) days of the cycle, allowing flow phase.)
14. Propose a reason doctors recommend that women avoid most medications and alcohol during pregnancy. (During pregnancy, especially early development, the fetus is sensitive to potentially harmful molecules that can cross the placenta.)
15. A family friend began menopause eight or nine months ago and says she is worried about an unplanned pregnancy because of her age. Propose reasoning that would support or refute her concern. (She cannot become pregnant naturally (although some cases of pregnancy during the first few months of menopause have been reported) because ovulation stops.)
16. The fetus is unable to breathe oxygen or eat *in utero*. Identify the important substances that must pass through the placenta. (Nutrients and oxygen pass from the mother to the fetus while wastes and carbon dioxide must be removed. Some antibodies are also able to cross the placenta.)
17. Sometimes physical trauma to the mother can affect the fetus. Predict how partial detachment of the placenta from the endometrium would affect the fetus. (The fetus would not get sufficient nutrition so lower birth weight could result.)
18. If a woman is past her due date or complications are suspected, her obstetrician might induce labor. Propose a way in which this could be done. (Drugs which mimic oxytocin trigger the contractions which lead to childbirth.)