

Biology of Reproduction- Zool 326 Exam 2

ANSWER ALL THE QUESTIONS ON THE ANSWER SHEET. THE ANSWER ON THE ANSWER SHEET IS YOUR OFFICIAL ANSWER. Some critical words are **boldfaced**. This exam is 7 pages long. Mark your answers clearly, as ambiguous letters or words will be marked wrong.

I. **MULTIPLE CHOICE:** There is only one answer per question.

1. In a female with a 28-day menstrual cycle the proliferative phase generally occurs from days/day

- A. 1-5. B. 5-13. C. 14. D. 15-26. E. 28.

2. While there may be a variety of “causes” of premenstrual syndrome, which one of the following can be associated with premenstrual syndrome?

- A. high levels of dopamine
B. low levels of FSH
C. excessive levels of vitamin B6
D. low levels of oxytocin
E. excessive levels of prolactin

3. Which of the following is considered to be a **positive** sign of pregnancy?

- A. missing a menstrual cycle
B. water retention
C. increased frequency of urination
D. decreased levels of LH
E. none of the above is a positive sign of pregnancy

4. For sperm to successfully reach an ovum contractions **must occur** in the

- A. uterus. B. cervix. C. vagina.
D. isthmus of the oviduct. E. in the ampulla of the oviduct.

5. The human fetus develops from which of the following structures?

- A. amnion B. inner cell mass C. cytotrophoblast
D. syncytiotrophoblast E. More than one of the above

6. Of the following statements regarding the amnion which one is correct?

- A. The amnion fuses with the yolk sac.
B. The amnion is derived from the syncytiotrophoblast.
C. The amnion is derived from fetal ectodermal cells.
D. The amnion consists of both maternal and fetal tissue.

- E. Germ cells migrate from the amnion to the fetal gonads.
7. A secondary oocyte is produced
- following ovulation.
 - after the completion of Meiosis I.
 - only if fertilization occurs.
 - in response to high levels of progesterone.
 - more than one of the above.
8. A species in which the female gives live birth, but the fetus derives nourishment primarily from the egg while inside the female is describing as being
- oviparous.
 - viviparous.
 - ovoviviparous.
9. Of the following which represents the correct order of the stages of early embryonic development?
- decidua response, missed menstrual cycle, chorionic villi form
 - morula, chorionic villi form, implantation, blastula forms
 - zygote, blastula, morula, implantation
 - morula, blastocoel, decidua response, chorionic villi form
 - chorionic villi form, implantation, extraembryonic membranes form
10. Based upon your knowledge of the timing of ovulation and the characteristics of x- and y-bearing sperm when would be the best time to have sexual intercourse to increase the chance of producing a girl?
- at the end of the menstrual flow
 - two days before ovulation
 - at the time of ovulation
 - two days after ovulation
11. Release of cortical granules
- is triggered by attachment of the sperm to ZP-3 receptors.
 - helps prevent polyspermy.
 - stimulates the acrosomal reaction.
 - causes capacitation of the sperm.
 - aids sperm in penetrating the corona radiata.
12. Of the following which would **not be present** on day 2 of the menstrual cycle?
- Graafian follicle
 - oogonia
 - primary follicle
 - primordial follicle
13. The _____ is/are responsible for the digestion of maternal blood vessels so that the developing embryo can receive nutrients from the mother.

- A. allantois
- B. amnion
- C. chorionic villi
- D. syncytiotrophoblast
- E. yolk sac

14. Of the following which is associated with treating menopausal symptoms with estrogen?

- A. an increase in the probability of suffering a heart attack
- B. an increase in osteoporosis
- C. an increase in uterine cancer
- D. an increase in the occurrence of hot-flashes
- E. more than one of the above

15. Of the following statements regarding the fetus in the uterus, which one is correct?

- A. The fetal portion of the placenta is derived primarily from the yolk sac.
- B. The entire chorion is surrounded by uterine tissue.
- C. The umbilical cord consists of both maternal and fetal tissue.
- D. Maternal blood crosses over into the fetal circulation.
- E. The placenta lies within the decidua parietalis.

16. Of the following which is correct regarding a primary oocyte?

- A. It is haploid.
- B. It is arrested in metaphase of Meiosis II.
- C. It contains 46 chromosomes, but has double the genetic material.
- D. It is arrested in anaphase of Meiosis I.
- E. It contains the 1st polar body.

17. How many sperm are produced from each secondary spermatocyte?

- A. 1
- B. 2
- C. 3
- D. 4

18. Estrogen is initially produced and secreted by _____.

- A. primordial follicles
- B. primary follicles
- C. secondary follicles
- D. tertiary follicles
- E. the corpus luteum

19. During the secretory phase of the menstrual cycle women often retain water. Water retention is caused by sodium retention. _____ is responsible for the increased retention of sodium.

- A. Androstenedione
- B. Aldosterone
- C. FSH
- D. hCG
- E. Estrogen

20. The estrous cycle **differs** from the ovarian cycle in that

- A. a corpus luteum only develops in an ovarian cycle.
- B. there is no follicular phase in the estrous cycle.
- C. high levels of progesterone are produced prior to ovulation in the estrous cycle.

- D. after ovulation estrogen levels remain high in the ovarian cycle, but drop dramatically in the estrous cycle.
- E. FSH stimulates ovulation in the ovarian cycle while LH stimulates it in the estrous cycle.

21. Following fertilization implantation usually occurs between days

- A. 1 and 3.
- B. 3 and 5
- C. 5 and 10
- D. 11 and 15.
- E. after 15 days

22. Premenstrual syndrome is most likely to occur during which days of the menstrual cycle (assume an average length menstrual cycle)?

- A. 1-5
- B. 5-13
- C. 14
- D. 15-26
- E. 28

23. Of the following which one/s produce testosterone?

- A. thecal cells
- B. granulosa cells
- C. chorionic villi
- D. luteal cells
- E. more than one of the above

24. Of the following statements regarding the ovarian cycle which one is correct?

- A. Thecal cells produce estrogen.
- B. Graafian follicles contain secondary oocytes.
- C. The follicular phase is the least predictable of the ovarian phases.
- D. Primordial follicles turn into tertiary follicles.
- E. In humans the average cycle is less than 25 days in length.

25. Increasing day length stimulates estrus in female weasels, while mating will trigger ovulation. Based upon this information weasels undergo _____ estrus and _____ ovulation?

- A. induced/induced
- B. induced/spontaneous
- C. spontaneous/induced
- D. spontaneous/spontaneous

26. Of the following which one is correct?

- A. The placenta consists of **only** fetal tissue.
- B. The umbilical cord consists of both fetal and maternal tissue.
- C. The umbilical vein carries oxygenated blood.
- D. Fetal lungs exchange oxygen via amniotic fluid.
- E. The placenta is formed prior to implantation.

27. The peak in estrogen is responsible for (this means that estrogen directly regulates the event regardless of whether or not any other hormonal changes occur.)

- A. capacitation of the sperm.
- B. production of FSH receptors on granulosa cells.

- C. the thinning of the cervical mucus.
- D. completion of Meiosis I.
- E. conversion of granulosa cells to thecal cells.

28. Of the following which one represents the correct order for sperm in penetrating an ovum?

- A. zona pellucida, vitelline membrane, perivitelline space, corona radiata
- B. corona radiata, perivitelline space, vitelline membrane, zona pellucida
- C. vitelline membrane, zona pellucida, corona radiata, perivitelline space
- D. corona radiata, zona pellucida, perivitelline space, vitelline membrane
- E. zona pellucida, corona radiata, perivitelline space, vitelline membrane

29. hCG helps prevent maternal rejection of the blastula

- A. by inhibiting the action of leukocytes.
- B. by stimulating the production of maternal protease.
- C. by stimulating the production of weak antigens.
- D. by preventing antibodies from binding to surface antigens
- E. because it is the same as that produced by the mother so the female immune system fails to recognize the blastula as a foreign object.

II. Short Answer:

30. Name the major steroid that is produced during $\Delta 4$ steroidogenesis, but not during $\Delta 5$.

31. Which gland is responsible for the production of estrogen in a female after menopause?

32. How long is the average menstrual cycle?

33. During earlier embryonic development the allantois disappears. Name the specific structure to which the allantois contributes.

34. Name the portion of the blastula that initially penetrates the stratum functionalis (be specific).

35. In humans the placenta is directly bathed in maternal blood. This type of placenta is known as a _____ placenta.

36. The degeneration of the _____ triggers the menstrual phase of the menstrual cycle.

37. In which portion of the female reproductive tract is the sperm aided in its efforts by ciliary activity?
38. Name the two hormones that drive the menstrual cycle.
39. This type of follicle is characterized by a fluid-filled antrum and the presence of a cumulus oophorus. Name it.
40. Name the portion of the sperm in which the energy for travel through the female reproductive system is stored.

III. Matching. (An answer may be used more than once in all of the matching sections)

Match the Hormone or compound with what it does.

- | | |
|--------------|--------------------|
| A. prolactin | E. FSH |
| B. estrogen | F. progesterone |
| C. hCG | G. oxytocin |
| D. LH | H. androstenedione |

- _____ 41. Stimulates mitosis of thecal cells.
- _____ 42. This compound helps weaken the walls of the follicle prior to the surge in LH.
- _____ 43. Stimulates cells in the stratum functionalis to secrete interstitial fluid.
- _____ 44. This compound stimulates the cells of the blastula to produce estrogen and progesterone.
- _____ 45. This compound **directly** stimulates contractions in the myometrium..
- _____ 46. This compound stimulates a local release of protease by cells of the endometrium leading to the digestion of the zona pellucida.
- _____ 47. Modern home pregnancy test kits test for the presence of _____.

EXAM CONTINUES ON NEXT PAGE

Match the structure with the event.

- | | |
|-------------------|-------------------------|
| A. zona pellucida | E. perivitelline space |
| B. acrosome | F. syncytiotrophoblast |
| C. corona radiata | G. cytotrophoblast |
| D. blastocoel | F. stratum functionalis |

_____ 48. Hyaluronidase is used to penetrate this layer.

_____ 49. This structure is surrounded by the yolk sac.

_____ 50. Contains the hormones necessary to penetrate the ovum.