

Biology of Reproduction- Zool 346 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 secretory phase generally occurs from days/day

A. 1-5. B. 5-13. C. 14. D. 15-26. E. 28.
2. On average puberty begins _____ in girls and ends _____ in girls compared with boys.

A. at the same age/earlier B. earlier/earlier C. earlier/at the same age
D. earlier/later E. later/later
3. In order for sperm to successfully pass through the cervix changes in the consistency of the cervical mucus must be stimulated by

A. estrogen. B. progesterone. C. oxytocin.
D. prostaglandins. E. seminal fluid.
4. During the ovarian cycle a surge in LH following a peak in estrogen

A. triggers the completion of Meiosis II.
B. causes sloughing of the stratum functionalis.
C. causes the exocrine glands in the endometrium to begin secreting mucus.
D. inhibits the ability of oxytocin to stimulate contractions.
E. stimulates ovulation.
5. Of the following statements regarding male puberty which one is correct?

A. Seminal fluid is produced before sperm.
B. Seminiferous tubules first develop during puberty.
C. The adrenal cortex produces all the initial androgens.
D. Testosterone exerts its organizational effects at this time.
E. Pubic hair is stimulated to grow by estrogen.
6. The proliferative phase of the menstrual cycle cannot begin until the _____ follicle begins to secrete hormones.

A. primordial B. primary C. secondary
D. tertiary E. Graafian
7. Internal female genitalia fail to develop if Sertoli cells produce

- A. Mullerian Inhibiting Substance. B. testosterone. C. surfactant.
D. ovarian reductase. E. DHEA.

8. Of the following statements regarding pregnenolone which one is correct?

- A. Pregnenolone is classified as a weak androgen.
B. It is converted to 17 hydroxypregnenolone in thecal cells and progesterone in granulosa cells.
C. It is the enzyme that converts progesterone to a weak androgen.
D. It is **secreted** by luteal cells.
E. It is secreted from thecal cells and converted in granulosa cells.

9. Exocrine glands in the stratum functionalis become functional during the _____ phase of the menstrual cycle.

- A. menstrual B. proliferative C. secretory

10. In females the onset of puberty is stimulated by a decrease in sensitivity of the hypothalamus to

- A. GnRH. B. FSH. C. progesterone.
D. testosterone. E. estrogen.

11. The following diagram is a representation of the structure of

- A. DHT B. estrogen C. progesterone D. testosterone

12. Of the following which would **not be present** on day 12 of the menstrual cycle (assume a 28- day cycle)?

- A. Graafian follicle B. primary oocyte C. corpus luteum
D. primary follicle E. primordial follicle

13. Of the following structures which one(s) does a person suffering from testicular feminization possess?

- A. a penis B. a vagina C. oviducts
D. ovaries E. more than one of the above

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

- A. a decreased likelihood of suffering a stroke
B. an increase in osteoporosis
C. a decrease in uterine cancer

- D. an increase in the occurrence of hot-flashes
E. none of the above
15. In the ovarian cycle, estrogen and FSH are in a system which operates in which of the following ways?
- A. High E => high FSH => higher E => higher FSH.
B. Low FSH => high FSH => high E => high FSH=> lower E => lower FSH.
C. High E has a negative feedback effect on FSH.
D. High FSH has an up-regulatory effect on E receptors.
E. High E causes follicles to become tertiary, while FSH has no effect.
16. On average how many sperm reach the oviduct? (assume sexual intercourse occurs near the time of ovulation). < equal less than
- A. < 100 B. < 10,000 C. about 100,000 D. 1,000,000
17. High levels of estrogen are associated with
- A. increased secretion of GnRH.
B. inhibition of the production of Growth Hormone during puberty.
C. a decreased probability of contractions in the myometrium.
D. increased self-confidence.
E. more than one of the above
18. Spermatogonia differ from oogonia in that
- A. they are derived from stem cells from the amnion.
B. they are haploid.
C. they can undergo mitosis.
D. the reduction division is completed after Meiosis II.
E. they do not migrate to the male gonad until after puberty.
19. In females 17-20% body fat is necessary
- A. before puberty can begin.
B. for breasts to reach functional maturity.
C. for menarche to begin.
D. for puberty to end.
20. Progestins are steroids containing _____ carbons.
- A. 18 B. 19 C. 21 D. 23 E. 27
21. During development the fetal testis are stimulated to produce testosterone by
- A. hCG (human chorionic gonadotropin).
B. by genes on the x chromosome.
C. the enzyme 5-alpha reductase.
D. maternal estrogen.
E. secretions from the Sertoli cells.

22. During the menstrual cycle an increase in aldosterone is associated with
- A. sloughing of the lining of the endometrium.
 - B. increased loss of sodium from the body.
 - C. increased release of GnRH.
 - D. production of hCG.
 - E. water retention.
23. Of the following statements regarding the estrous cycle which one is correct?
- A. thecal cells produce estrogen.
 - B. the corpus luteum develops before ovulation.
 - C. estrogen levels drop very low after ovulation.
 - D. ovulation occurs at the beginning of the estrous cycle.
 - E. none of the above are correct.
24. The counter current flow system
- A. prevents testosterone from entering the female circulatory system.
 - B. regulates blood flow to the stratum functionalis.
 - C. is involved in the migration of stem cells from the yolk sac.
 - D. permits exchange of excretory products from the Mullerian duct to the Wolffian duct during fetal development.
 - E. helps cool the testis to allow proper sperm development.
25. Of the following which one(s) is/are considered to be potential causes of PMS?
- A. the ratio of progesterone to estrogen
 - B. low levels of prolactin
 - C. high levels of oxytocin
 - D. low levels of estrogen during the follicular phase
 - E. more than one of the above
26. Of the following structures, in which one is the development dependent upon DHT?
- A. seminal vesicles
 - B. oviduct
 - C. Cowper's gland
 - D. seminiferous tubules
 - E. none of the above
27. Development of the external genitalia in the female fetus is controlled by
- A. testosterone.
 - B. DHT.
 - C. estradiol.
 - D. LH.
 - E. None of the above as it is not under hormonal control
28. In the delta 4 pathway of steroidogenesis cholesterol is converted to pregnenolone in _____ cells.
- A. granulosa
 - B. luteal
 - C. theca externa
 - D. theca interna

II. Short Answer:

29. By definition a primary spermatocyte contains how many chromosomes?
30. A sperm consists of three basic parts. Name the part that contains the genetic material (nucleus).
31. In a normal XY human the germ stem cells migrate from the yolk sac to which portion of the primordial gonad? (Be specific)
32. This type of follicle consists of a primary oocyte surrounded by 2 to 6 layers of tightly packed granulosa cells.
33. Name a cell type in the human female ovary that produces testosterone.
34. This compound helps weaken the walls of the follicle prior to the surge in LH.
- 35 + 36. Aromatase converts _____ (35) to _____ (36).

EXAM CONTINUED ON NEXT PAGE

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

A. Match the appropriate sex with the condition (unless specified, can occur at any time during the life of a person)

A. male only B. female only C. male and female

- _____ 37. During puberty the body's center of gravity shifts to the upper body.
- _____ 38. The adrenal cortex stimulates growth of facial hair.
- _____ 39. Estrogen stimulates the growth of the external genitals.
- _____ 40. During development estrogen contributes to the development of the adult patterned brain.

B. Match the structure with correct event.

- A. Wolffian Ducts
- B. urogenital fold
- C. Mullerian Ducts
- D. labioscrotal fold
- E. urethra
- F. genital tubercle

_____ 41. develops into the labia majora

_____ 42. develops into the glans penis

_____ 43. testosterone dependent

_____ 44. develops into the uterus.

B. Match the Hormone or compound with what it does.

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

_____ 45. This compound is produced but **NOT** secreted by granulosa cells.

_____ 46. Aspirin can reduce pain associated with the menstrual phase of the menstrual cycle by blocking the effects of

_____ 47. Hormone secreted by theca interna cells.

_____ 48. This compound is the precursor for the production of all other steroid hormones.

_____ 49. Granulosa cells are converted to luteal cells when receptors for this hormone occur.

_____ 50. This hormone stimulates the completion of Meiosis I in primary oocytes.