

MCB135E, 1st midterm
October 2, 1998

Name: ____

SID: _____

I. (45 points) Multiple choice questions. Only one answer is correct. 3 / points each correct answer.

1. Growth and development are processes that:
 - A. continue throughout the lifespan
 - B. follow a precise, predictable timetable
 - C. can be influenced by genetic and environmental factors
 - D. can affect function during maturity and length of lifespan
 - E. all of the above

2. Ovulation depends on the following events, EXCEPT:
 - A. occurs at approximately the middle of the menstrual cycle
 - B. depends on high circulating levels of estrogens
 - C. depends on high circulating levels of progesterone
 - D. depends on LH surge
 - E. depends on high levels of GnRH

3. Fertilization occurs:
 - A. in the oviduct, close to the ovary
 - B. in the oviduct, close to the uterus
 - C. ovum can be fertilized as long as 48 hours after ovulation
 - D. ovum loses its capacity to be fertilized 10 hours after ovulation
 - E. A & C

4. Sperm and ovum resemble in many characteristics. Some of the major similarities are EXCEPT:
 - A. they have an haploid number of chromosomes
 - B. they derive from primitive cells by the processes of mitosis/meiosis
 - C. after puberty, sperm and ovum production continues throughout life
 - D. maturation of sperm and ovum depends on sex hormones
 - E. maturation of sperm and ovum depends on gonadotropins

5. At fertilization, the major functions of the sperm include all of the following, EXCEPT:
 - A. it reaches and penetrates the ovum
 - B. activates the ovum to nuclear and cytoplasmic division to achieve the haploid number of maternal chromosomes
 - C. provides food reserves for growth and development of zygote
 - D. contributes the paternal complement of chromosomes
 - E. determines the sex of the embryo

6. The Sertoli cells,
- A. are found along the wall of the seminiferous tubules
 - B. secrete chemical messengers for sperm production/maturation
 - C. phagocytize defective sperm
 - D. are stimulated by androgens and FSH
 - E. all of the above
7. The Turner's syndrome or ovarian dysgenesis is characterized by the following signs, EXCEPT:
- A. the sex chromosomes are XO
 - B. the ovary is underdeveloped and hypofunctioning
 - C. high stature
 - D. cardiac abnormalities
 - E. some deficits of the nervous system
8. Until the 6th embryonal week, the primitive gonad:
- A. is undifferentiated
 - B. is differentiated into a male type
 - C. is differentiated into a female type
 - D. is able to produce sex hormones
 - E. none of the above
9. The SRY gene or group of genes on the Y chromosome is responsible for inducing a cascade of differentiating events leading to:
- A. the differentiation of the Leydig cells of the testis
 - B. the production of testosterone
 - C. the production of the Mullerian inhibiting substance by the Sertoli cells
 - D. the masculinization of the male secondary sex organs
 - E. all of the above
10. Of the major CNS structures derived from the embryonal vesicles, those derived from the telencephalon include all of the following EXCEPT:
- A. cerebral cortex
 - B. limbic system
 - C. hypothalamus
 - D. corpus striatum
 - E. retina
11. In the human placenta, the following statements are correct, EXCEPT:
- A. maternal and fetal blood mix in the maternal sinuses
 - B. maternal and fetal blood do not enter in direct contact but are separated by the wall of the floating villi
 - C. exchange of gases occurs by diffusion from maternal to fetal blood
 - D. delivery of nutrients occurs from mother to fetus
 - E. removal of waste materials occurs from fetus to mother

Name: _____

SID: _____

12. The placenta reaches its peak (most optimal) function at midgestation, from then on the placenta :

- A. undergoes aging changes
- B. is less able to protect the fetus from environmental toxins
- C. may be responsible for insufficient fetal growth (small-for-date newborns)
- D. may be responsible for a decline in hormonal production
- E. all of the above

13. The following statements are correct EXCEPT:

- A. in the CNS, myelin formation depends on oligodendrocytes
- B. oligodendrocytes are glial cells
- C. myelin is essential for rapid conduction of nerve impulses
- D. myelin formation is exclusively a prenatal process
- E. myelin formation can continue until the 3rd decade of life

14. Certain features characterize the different age periods. Which of the following periods is INCORRECTLY matched to its characteristics?

- A. embryonic period: first trimester of prenatal life with rapid differentiation and establishment of organ systems
- B. early fetal period: second trimester of prenatal life with accelerated growth and elaboration of structures
- C. late fetal period: third trimester of prenatal life with rapid increase in body mass and cessation of placental function
- D. neonatal period, newborn: birth to end of second postnatal week
- E. pubertal period of adolescence: secondary sex organs maturation

15. In the fetus, the major source of energy derives from:

- A. sugar and carbohydrates
- B. proteins
- C. Lipids
- D. none of the above
- E. all of the above

II (14 points) . True (A) False (B) 2 points each correct answer

16. Androgens (such as testosterone) 'activate' male behavior prenatally and 'organize' CNS structures postnatally

17. Lordosis, a special posture in female rats designed to favor copulation, is dependent on the presence of estrogens (estradiol) during neonatal days 1-4

Name: KEY
SID: _____

- 18. In neonates, total daily REM sleep is longer than in adults
- 19. Growth hormone (GH) from the pituitary is present in the fetus and is necessary for fetal growth
- 20. Newborns see colors, and by 3-4 months postnatally, infants can distinguish colors as well as adults.
- 21. The newborn is significantly more susceptible to hypoxia than the adult due to its reliance on glycolytic respiration
- 22. The 3 germ layers of the gastrula (ectoderm, mesoderm and endoderm) will eventually differentiate into all the embryo's tissues and organs.

III. (21 points) Describe the 3 fetal structures that are unique to the fetal circulation:

- 23. (6 points) Name them
 - (a.)
 - (b.)
 - (c.)
- 24. (6 points) Indicate their connections and the blood oxygen/nutrients content (high, medium or low?) that they carry.
 - (a.) Carries blood with _____ to the _____ oxygen/nutrient content from the _____
 - (b.) Carries blood with _____ to the _____ oxygen/nutrient content from the _____
 - (c.) Carries blood with _____ to the _____ oxygen/nutrient content from the _____
- 25. (3 points) Explain in a few sentences their physiological significance with respect to the requirements of the fetal circulation and fetal growth.

Name: _____

SID: _____

IV (20 points, 2 points each correct answer) Match the hormone/endocrine conditions on the left with the appropriate functions/characteristics on the right. Use each answer once.

- | | |
|---------------------------------------|--|
| 26. testosterone | A. Maintains corpus luteum and its hormonal secretions |
| 27. human chorionic gonadotropin | B. Is secreted by the fetal testis by the 6-8 embryonal weeks |
| 28. human chorionic somatomammotropin | C. Is necessary for conversion to dihydrotestosterone |
| 29. Mullerian inhibitor substance | D. Regulates maternal metabolism |
| 30. prenatal thyroid insufficiency | E. Induces regression of Mullerian ducts |
| 31. 5-alpha reductase | F. Cretinism |
| 32. dihydrotestosterone | G. Is necessary for differentiation of the male internal genitalia |
| 33. progesterone | H. Is one of the hormones of the fetal adrenal cortex with low levels until late pregnancy |
| 34. estradiol | I. Is produced by the thecal cells from the ovarian follicle |
| 35. aldosterone | J. Is necessary for preparing the uterus for implantation of the blastocyst. |