

Name _____

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MCB 135E, First Midterm October 6, 1995

Points per question in parenthesis.

1. (6) List the major functions of the male and female gonads at fertilization.
The Ovum

The Sperm _____

2. (8) Name the three original brain cranial vesicles and draw and name the subsequent five vesicles

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3. (9) List 3 organs/tissues/systems derived from these 3 primordial embryonal layers

ectodermmesodermentoderm

4. (9) Phenylketonuria is an inborn error of metabolism, characterized by an increased level of _____ in the urine,
a decreased activity of the enzyme _____.

Multiple Choice Questions. Only one answer per question. Two points per question.

5. The primary gonad is essentially:

- a) bisexual
- b) male
- c) female
- d) all of the above
- e) none of the above

6. Ovarian dysgenesis (Turner syndrome) is characterized by the following sex chromosomal pattern:

- a) XO
- b) XXX
- c) XXY
- d) trisomy 21
- e) mosaic

7. After implantation, the hormone responsible for the maintenance of the ovarian corpus luteum and the secretion of estrogens and progesterone is:

- a) pituitary LH
- b) pituitary FSH
- c) placental hCG
- d) placental hCS
- e) ACTH

8. Dehydrotestosterone is:

- a) a metabolite of testosterone
- b) derived from testosterone by the enzyme 5α reductase
- c) necessary for the differentiation of male genitalia
- d) all of the above
- e) none of the above

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9. In the newborn, daily sleep lasts:
- 10 hours
 - 16 hours
 - 8 hours
 - 12 hours
 - none of the above
10. In the developmental timetable of the brain, the last maturational event chronologically is:
- cell proliferation
 - cell migration
 - synaptogenesis
 - myelination
 - all of the above
11. Of the major steroid hormones of the adrenal cortex, the first to be secreted prenatally in the largest amounts are:
- glucocorticoids (cortisol)
 - mineralocorticoids (aldosterone)
 - norepinephrine
 - epinephrine
 - sex hormones (dehydroepiandrosterone)
12. The activity of the glycolytic enzyme, glyceraldehyde-P-dehydrogenase in the brain is:
- greater prenatally than postnatally
 - greater postnatally than prenatally
 - the same postnatally and prenatally
 - depends on the presence of high O_2 levels
 - none of the above
13. Gonadectomy or administration of sex hormones early during development (e.g. neonatally in the rat) induces later changes (in adulthood) in sexual behavior:
- removal of testis neonatally and appropriate treatment with estrogen and progesterone in adulthood induces lordosis in male rats
 - administration of testosterone neonatally induces development of lordosis in adult male rats
 - removal of ovary neonatally and administration of testosterone induces lordosis in adult female rats
 - normal males show lordosis in adulthood
 - ovariectomized female rats show lordosis in adulthood
14. Sexual differences in the brain are based on the observations that:
- the cerebral cortex is larger in females than males
 - the preoptic area in the hypothalamus (SDN-POA) in several animal species is larger in males than females
 - some nuclei in the limbic system (regulating sex behavior) are larger in females than in males
 - the spinal nucleus of the bulbocavernosus (SNB) muscle is larger in females than males
 - all of the above

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- 15. Compensatory mechanisms to prevent fetal hypoxia (i.e. Everest in utero!) include:
 - a) spray release of blood in maternal placental sinuses
 - b) production of fetal hemoglobin
 - c) priority of oxygenated blood to specific organs
 - d) all of the above
 - e) none of the above

True/False Questions. Two points per question.

- 16. The ductus arteriosus is situated between the pulmonary artery and the descending branch of the aorta
- 17. Blood supply and circulation in the lungs is as abundant in the fetus as it is in the adult
- 18. The bone marrow is the major source of red blood cells in the fetus

Fill Ins. Two points per blank.

- 19. The neural crest will give rise to _____ and _____
- 20. The surface cells of blastocyst grow _____ (faster/slower) than its inner cells.
- 21. The two major "protagonists" at implantation are, _____ and _____
- 22. The production of HCG will reach its peak in the _____ month/week of pregnancy and will decline very rapidly after _____ month/week.
- 23. Three major structures unique to the fetal circulation are:
 - _____
 - _____
 - _____
- 24. Spongioblasts are the precursor cells for astrocytes and _____

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25. (20) Discuss the role of the following hormones in fetal growth:

Insulin

Growth Hormone

Insulin-like-Growth Factor I

Insulin-like-Growth Factor II

Human Chorionic Somatomammotropin