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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

   CONTRIBUTES MATERNAL GENES

   RESECTS ALL SPERMS BUT ONE

   PROVIDES NUTRIENT RESERVES FOR EARLY DEVELOPMENT

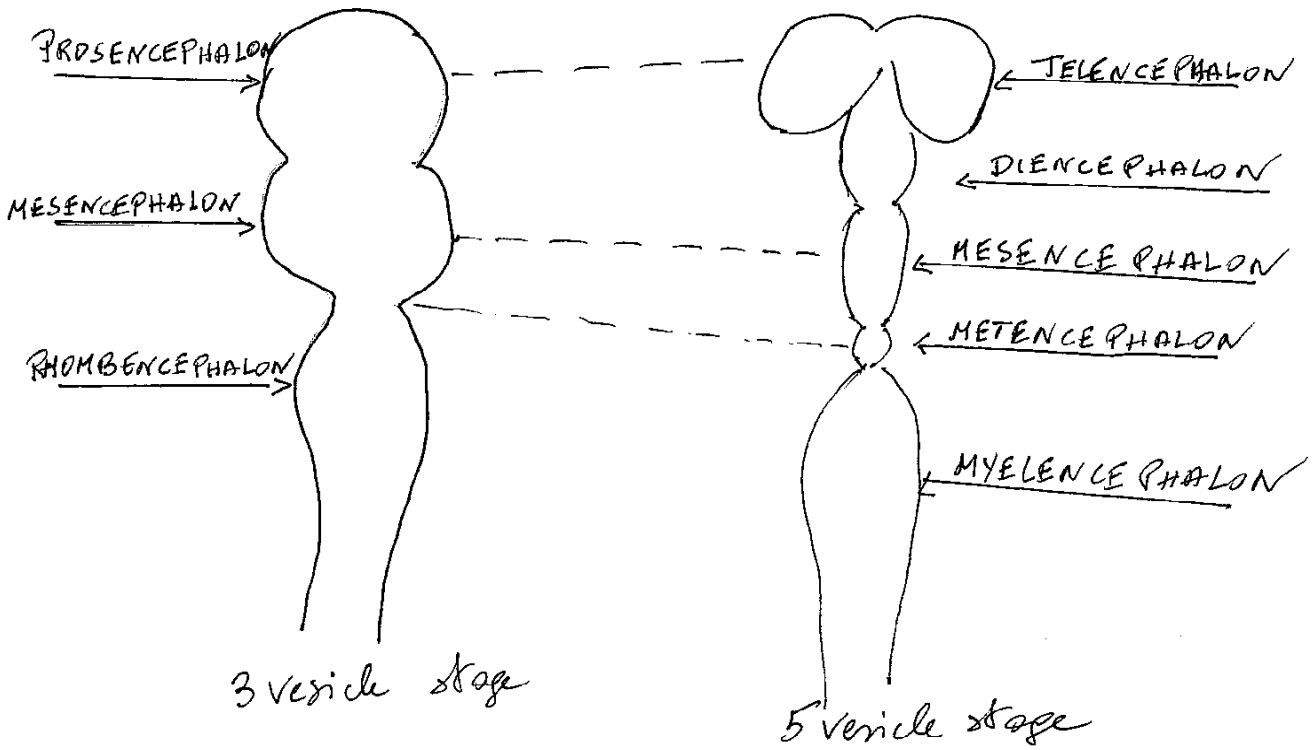
   The Sperm

   REACHES & PENETRATES THE OVUM

   ACTIVATES OVUM TO COMPLETION OF 2nd MEIOTIL DIVISION

   CONTRIBUTES PATERNAL GENES

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

ectoderm	mesoderm	entoderm
skin	all connective tissues	epithelium lining GI tract
ant. pit	teeth	thyroid, liver, pancreas
epithelium of sense organs of nose	muscles	epithelia of respiratory tract
anal canal	blood, blood vessels	bladder
	cortex of adrenals	urethra
	lining of body cavities	

4. (9) Phenylketonuria is an inborn error of metabolism, characterized by an increased level of PHENYLALANINE in the urine,

a decreased activity of the enzyme TYROSINE HYDROXYLASE

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

5. The primary gonad is essentially:
(a)
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)
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:
(c)
a) pituitary LH
b) pituitary FSH
c) placental hCG
d) placental hCS
e) ACTH

8. Dehydrotesterone is:
(d)
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:
   a) 10 hours
   b) 16 hours
   c) 8 hours
   d) 12 hours
   e) none of the above

10. In the developmental timetable of the brain, the last maturational event chronologically is:
    a) cell proliferation
    b) cell migration
    c) synaptogenesis
    d) myelination
    e) 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:
    a) glucocorticoids (cortisol)
    b) mineralocorticoids (aldosterone)
    c) norepinephrine
    d) epinephrinc
    e) sex hormones (dehydroepiandrosterone)

12. The activity of the glycolytic enzyme, glyceraldehyde-P-dehydrogenase in the brain is:
    a) greater prenatally than postnatally
    b) greater postnatally than prenatally
    c) the same postnatally and prenatally
    d) depends on the presence of high O_2 levels
    c) 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:
    a) removal of testis neonatally and appropriate treatment with estrogen and progesterone in adulthood induces lordosis in male rats
    b) administration of testosterone neonatally induces development of lordosis in adult male rats
    c) removal of ovary neonatally and administration of testosterone induces lordosis in adult female rats
    d) normal males show lordosis in adulthood
    c) ovariectomized female rats show lordosis in adulthood

14. Sexual differences in the brain are based on the observations that:
    a) the cerebral cortex is larger in females than males
    b) the preoptic area in the hypothalamus (SDN-POA) in several animal species is larger in males than females
    c) some nuclei in the limbic system (regulating sex behavior) are larger in females than in males
    d) the spinal nuclues of the bulbocavernous (SNB) muscle is larger in females than males
    e) 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

(d)

True/False Questions. Two points per question.

16. (T) F The ductus arteriosus is situated between the pulmonary artery and the descending branch of the aorta

17. T (F) Blood supply and circulation in the lungs is as abundant in the fetus as it is in the adult

18. T (F) 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 spinal ganglia and sympathetic (+adrenal medulla) parasympathetic ganglia.

20. The surface cells of blastocyst grow faster (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 8-10 weeks month/week of pregnancy and will decline very rapidly after ~12 weeks month/week.

23. Three major structures unique to the fetal circulation are:
    ductus venosus
    ductus arteriosus
    foramen ovale

24. Spongioblasts are the precursor cells for astrocytes and oligodendrocytes.

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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