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MCB135E - Physiology of Human Development
Friday, October 4, 1996

I. (30) Multiple choice questions, only one choice is correct, 3 points for each correct choice:

1. The corpus luteum in the ovary:
 - A. Develops at the site of the ruptured follicle at ovulation
 - B. Secretes large amounts of estrogens and progesterone during the first week after ovulation
 - C. Regresses if fertilization does not occur
 - D. Is stimulated to continue to secrete large amounts of estrogens and progesterone beyond one week after ovulation by Human Chorionic Gonadotropin (hCG)
 - E. All of the above

2. In the 6-8th week embryo, differentiation of the ovary and female secondary sex organs depends on:
 - A. The presence of circulating levels of testosterone
 - B. The presence of circulating high levels of estrogens
 - C. The presence of circulating high levels of progesterone
 - D. The absence of testosterone and its organizing actions
 - E. None of the above

3. In ovarian dysgenesis (Turner syndrome), sex chromosomes are:
 - A. XY
 - B. XXY
 - C. XO
 - D. XXX
 - E. None of the above

4. Insulin is the basic hormone of growth for the fetus. Its mechanisms of action include:
 - A. Direct action on metabolism
 - B. Indirect action from stimulation of IGF-II
 - C. Stimulation of gluconeogenesis
 - D. A and B
 - E. None of the above

5. All the following systems and tissues derive from the mesoderm except
 - A. body smooth and striated muscles
 - B. nervous system
 - C. blood
 - D. the adrenal cortex
 - E. the kidney

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6. The placenta has all of the following functions except:
- A. Regulates diffusion of O₂ and CO₂ between maternal & fetal blood
 - B. Transports nutrients from the maternal blood to fetal tissues
 - C. Secretes several hormones
 - D. Produces immunoglobulins (antibodies)
 - E. Promotes removal of fetal metabolic waste products
7. In the newborn, the following functions of the Central Nervous System are less active than at later ages (child, adolescent, adult) except:
- A. Voluntary
 - B. Autonomic (vegetative)
 - C. Reflex
 - D. Motor
 - E. Sensory
8. The organizational actions of thyroid hormones (primarily, triiodothyronine, T₃) on brain development include:
- A. Stimulation of neural cell proliferation
 - B. Stimulation of myelinogenesis (myelin formation)
 - C. Binding of T₃ to nuclear receptors
 - D. Synergism with Nerve Growth Factor (NGF)
 - E. All of the above
9. Growth hormone from the anterior pituitary is present prenatally; however, its presence:
- A. Is necessary for fetal body growth
 - B. Is not necessary for fetal body growth
 - C. Is necessary for development of hypothalamic regulation of GH secretion, postnatally
 - D. Is necessary for insulin secretion
 - E. BC are correct
10. Presumptive signs of pregnancy include:
- A. Diarrhea and vomiting
 - B. Weight loss
 - C. Decreasing skin pigment
 - D. Breast enlargement
 - E. All of the above

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II. (10) Compare sleep patterns between infant and adult with respect to the followings parameters

Sleep Parameters	Infant	Adult
Mean sleep duration (HOURS)		
% REM sleep		
Type of sleep of sleep onset		
Nocturnal and/or diurnal		
Rhythmicity (ultradian or circadian) (HOURS)		

III. (12) List 3 major functions of ovum and sperm at fertilization:

OVUM

1

2

3

SPERM

1

2

3

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IV. (16) List the 5 brain secondary vesicles and the 10 major neural structures deriving from these vesicles .

BRAIN VESICLES

NEURAL STRUCTURES

1

2

3

4

5

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V. (20) Indicate (1) location (2) major functions and (3) time of involution or transformation of the following structures characteristic of prenatal circulation:

1. yolk sac

2. allantois

3. ductus venosus

4. foramen ovale

5. ductus arteriosus

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VI. (12) Label each with the name of the appropriate hormone and correlate the high and low levels of the hormones with the respective prenatal functional changes/needs. (Hint: 1, 2 are steroid hormones; 3, 4 are protein hormones)

