Physiology of Human Development (MCB 135E)
Final
December 16, 1997

Name:_____

Multiple Choice: 3 points each

1. Anorexia:

   a. is characterized by loss of appetite for food.
   b. occurs most frequently in pubertal girls.
   c. is associated with growth retardation.
   d. is manifested by extreme low body weight (emaciation).
   e. all of the above.

2. Kwashiorkor is a form of malnutrition due to lack or deficiency of:

   a. proteins.
   b. sugars.
   c. lipids.
   d. water.
   e. all of the above.

3. Marasmus is a form of malnutrition due to lack or deficiency of:

   a. proteins.
   b. sugars.
   c. lipids.
   d. water.
   e. all of the above.

4. In response to stress, the secretion of the following hormone is increased:

   a. cortisol
   b. aldosterone
   c. insulin
   d. growth hormone
   e. all of the above

5. Cortisol secretion from the adrenal cortex is regulated by hypothalamic CRH and pituitary ACTH. The secretion of aldosterone:

   a. occurs in the cells of the glomerulosa layer
   b. is regulated by the peptide angiotensin II
   c. is regulated by circulating levels of electrolytes
   d. is regulated by ACTH secretion, as for cortisol
   e. a, b, and c

Name:_____

6. Consequences of stress include all of the following, except:

   a. muscle wasting
   b. stimulation of growth (in childhood)
   c. production of ulcers due to reduced resistance of gastric wall to infection by Helicobacteri pylori
   d. diarrhea due to increased intestinal motility
   e. hyperglycemia and increased incidence of non-insulin dependent diabetes

7. During stress, functions that are stimulated include the following, except:

   a. increased cardiac rate.
   b. increased lipolysis.
   c. increased secretion of CRH.
   d. increased secretion of ACTH.
   e. increased glycogen storage in liver.

8. During stress, functions that are inhibited include the following, except:

   a. increased sex drive.
   b. decreased growth.
   c. decreased appetite.
   d. decreased response to pain.
   e. decreased size of thymus.

9. Responses to stress reach maturity at the end of adolescence when:

   a. the hypothalamo-pituitary-adrenocortical axis has matured
   b. the hypothalamo-sympathetic adrenomedullary axis has matured
   c. efficient coordination between a and b has occurred
   d. immune functions of self-recognition, cell-mediated and humoral-mediated immunity are well established
   e. all of the above

10. Regarding the development of muscle, which of the following statements is least accurate?

   a. muscle originates from mesoderm.
   b. myoblasts are primordial muscle cells and are capable of replication.
   c. muscle tissue grows by replication of new muscle fibers.
   d. muscle fibers retain their capacity for hypertrophy in response to exercise even in the adult and the aged
   e. the metabolic pattern of maturing muscle (slow, fast) fibers continues to develop after birth.

Name:_____

11. The characteristics of slow muscle fibers include all of the following except:

    a. larger diameter than fast muscle fibers
    b. prominent in muscles of posture
    c. reliance on oxidative phosphorylation for generation of ATP
    d. receive richer capillary supply than fast muscle fibers
    e. long latency

12. The following statements about acetylcholine (ACh) are correct, except

    a. ACh is the neurotransmitter at the myoneural junction
    b. during early development, ACh is released exclusively at the myoneural junction
    c. in the mature muscle, ACh is released exclusively at the myoneural junction
    d. ACh may have organizational actions in muscle
    e. the pattern of ACh release may be responsible for the differentiation fast and slow muscle fibers.

13. Which maternal hormone can reduce fetal testosterone production when the pregnant mother is exposed to chronic stress?

    a. ACTH
    b. cortisol
    c. chorionic gonadotropin
    d. progesterone
    e. estradiol

14. What factors are involved in sexualization of the brain?

    a. genetic
    b. hormonal exposure during critical periods
    c. socialization
    d. all of the above
    e. none of the above

15. Which of the following statements is false?

    a. macrophages and neutrophils have phagocytic activities
    b. B-cells have antigen processing and presentation activity
    c. macrophages have antigen processing and presentation activity
    d. immunoglobulin A is most abundant in breast milk
    e. T-helper cells produce Interleukin I upon interacting with B-cells

Name:_____

16. Which of the following statements is false?

a. B-cells differentiate into plasma cells
b. the thymus reaches its maximum weight about the time of puberty
c. the CD-8 receptor is a component of T-helper cells
d. complement factors can recognize antibodies associated to cell membrane antigens
e. complement factors induce cell lysis

17. Which of the following statements is false?

a. IgE is responsible in part for allergic reactions
b. IgG can cross the placenta and provide some protection during fetal development
c. IgM is the most abundant immunoglobulin in adult blood
d. the spleen develops at about 14-16 weeks of gestation
e. glucorticoid hormones such as cortisol have anti-allergic actions

18. Which of the following statements is false?

a. The natural killer cell protects against cancer.
b. All lymphocytes are derived from stem cells which are produced in bone marrow.
c. Viral infections often invoke a T-killer cell response.
d. The spleen produces thymosin peptides that help T-cell maturation.
e. The thymus produces thymosin peptides that help T-cell maturation.

19. Regarding antibodies, which of the following statements is LEAST accurate?

a. IgA antibodies are secreted across the respiratory and gastrointestinal mucosa to help prevent bacteria and viruses from adhering to the epithelium.
b. Antibodies are Y-shaped proteins that can attach to antigens at one end and to various immune-related cells at the other end.
c. Mature B cells are only capable of producing antibodies against a single antigen.
d. Antibodies help neutralize viruses and toxins but do not play a role in the destruction of bacteria.
e. Given the greater susceptibility of children to infectious diseases, vaccination toward several bacteria and viruses is recommended in infancy and childhood.

Name:_____

20. Regarding the development of antibody production, which of the following statements is LEAST accurate?

a. Antibody levels reach mature levels before birth in response to antigens that cross the placenta.
b. Maternal IgG antibodies readily cross the placenta.
c. IgA antibodies are the last of the five major classes of antibodies to reach mature levels.
d. IgM antibodies are the first antibodies produced perinatally and during the initial response to a novel antigen at any point in life.
e. Maternal IgG antibodies provide the newborn with passive immune protection.

21. Regarding the thymus, which of the following statements is LEAST accurate?

a. The thymus is largest relative to body size at birth.
b. The thymus shrinks at puberty under the influence of corticosteroids.
c. The thymus is the site of T-cell maturation.
d. T-cells originate from stem cells located in the spleen.
e. The thymus grows at a progressively slower rate from birth to puberty.

22. Regarding the gonadostat, which of the following statements is LEAST accurate?

a. The primary gonadostat is based in the GnRH-producing neurons of the hypothalamus.
b. In females, GnRH is secreted in short pulses every few hours.
c. In females, the magnitude and frequency of GnRH pulses vary over the menstrual cycle.
d. In males, GnRH secretion is not secreted in short pulses every few hours.
e. GnRH stimulates the synthesis and release of gonadotropins (LH and FSH) from the anterior pituitary gland.

Name:_____

23. Regarding maturation of the hypothalamic-pituitary-gonadal axis, which of the following statements is LEAST accurate?

a. Gonadotropin secretion remains low during childhood but increases just before and at puberty
b. When appropriately stimulated by LH, the gonads of an infant are capable of secreting substantial amounts of steroid hormones.
c. In many mammals and possibly humans, melatonin secreted by the pineal gland inhibits the release of gonadotropins.
d. Onset of puberty is independent from the maturation of limbic-hypothlamic connections.
e. Gonadotropin secretion is more sensitive to the stimulatory action of GnRH at puberty.

24. Menarche:

a. represents the first menstruation
b. coincides with the 2nd peak of whole-body accelerated growth
c. depends on the maturation of the hypothalamo-pituitary-ovarian axis
d. is thought to be undergoing a "secular trend"
e. all of the above

25. The menstrual cycle is divided into a follicular (proliferative) and luteal (secretory) phase. Each phase is dependent on the presence of one or two pituitary/ovarian hormones:

a. The follicular phase is characterized by increasing estrogens levels.
b. The follicular phase depends on FSH.
c. The follicular phase depends on LH.
d. The luteal phase is characterized by high progesterone and estrogen levels.
e. a, b, and d.

26. Estrogens:

a. have both a positive and a negative feedback on pituitary and hypothalamus
b. have no positive or negative feedback on pituitary and hypothalamus
c. decrease uterine contractility
d. do not affect mammary gland development
e. do not affect growth and maintenance of bone

6

Name:_____

27. At approximately halfway (14-15 days) through the menstrual cycle, the following events occur:

a. ovulation
b. decrease of LH levels
c. increased secretion of relaxin
d. disappearance of corpus luteum
e. none of the above

28. Testosterone:

a. is the major hormone secreted by the testes.
b. is secreted by the interstitial (Leydig) cells
c. its secretion is regulated by the gonadotropin LH
d. is necessary for the optimal function of Sertoli cells
e. all of the above

29. All of the following are male secondary sexual characteristics acquired at puberty except:

a. a beard
b. an increased incidence of acne
c. a deep voice
d. increased fat in the buttocks
e. an enlarged penis

30. At puberty, the increase in cardiac output is due to several factors, except:

a. increased cardiac rate
b. increased cardiac contractility
c. increased cardiac stroke volume
d. increased venous return
e. increased sympathetic stimulation

31 At menarche, the following cardiovascular events occur, except:

a. increased systolic blood pressure.
b. decreased pulse rate.
c. increased pulse pressure.
d. increased diastolic pressure after severe exercise.
e. decreased cardiac output after severe exercise.

7

Name:_____

32. Basal metabolic rate:

a. decreases progressively during childhood.
b. is always higher in boys than in girls.
c. reaches a peak before and during puberty in boys, higher in boys than in girls.
d. after severe exercise, increases more in boys than in girls.
e. all of the above.

33. The following are typical patterns of cognition and behavior in boys, except:

a. physical aggressiveness.
b. early development of capacity for spatial abstraction.
c. preference for throwing projectiles.
d. preference for nurturing dolls, pets, and siblings.
e. all of the above patterns.

True A- False B: 2 points each

34. A / B The placenta blocks all harmful chemicals from reaching the fetus.

35. A / B The lack of 5-alpha reductase stimulates the masculinization of the male genitalia

36. A / B In precocious pseudopuberty, some secondary sexual characteristics show early development while the gonads have not yet matured

37. A / B True precocious puberty is due to an early but otherwise normal pattern of gonadal development

38. A / B Thalidomide is a drug with tranquilizing actions for the mother but induces phocomelia in the fetus

39. A / B Small-for-date newborns represent a group of newborns at risk for survival at birth and/or optimal function at later ages

Name:_____

40. A / B Oxytocin stimulates production of milk by the mammary gland

41. A / B The fetal heartbeat can be heard through auscultation by 4 to 5 months of gestation

42. A / B Fetal hemoglobin carries more oxygen than adult hemoglobin

43. A / B Because prolactin inhibits GnRH, breast feeding may be used as a form of contraception

44. A / B The loop of Henle is shorter in infants than in adults

45. A / B The function of the prostate, a male secondary sex organ, is regulated by the blood levels of dihydrotestosterone

46. A / B Myelinogenesis in humans is essentially a late fetal and postnatal process continuing until the late twenties

47. A / B The diaphysis is that part of long bones most susceptible to the growth-promoting action of hormones

48. A / B The optimum time for fertilization of the ovum is one week after ovulation

49. A / B For infants, the difficulty in maintaining body temperature is primarily due to high heat loss because of the larger body surface than at later ages

50. A / B Brown fat in infants is responsible for a large decrease in heat production

51. A / B In infant respiratory distress syndrome, respiratory difficulty is due to excess production of surfactant

52. A / B Oxytocin, a peptide released from the posterior pituitary, relaxes uterine smooth muscles

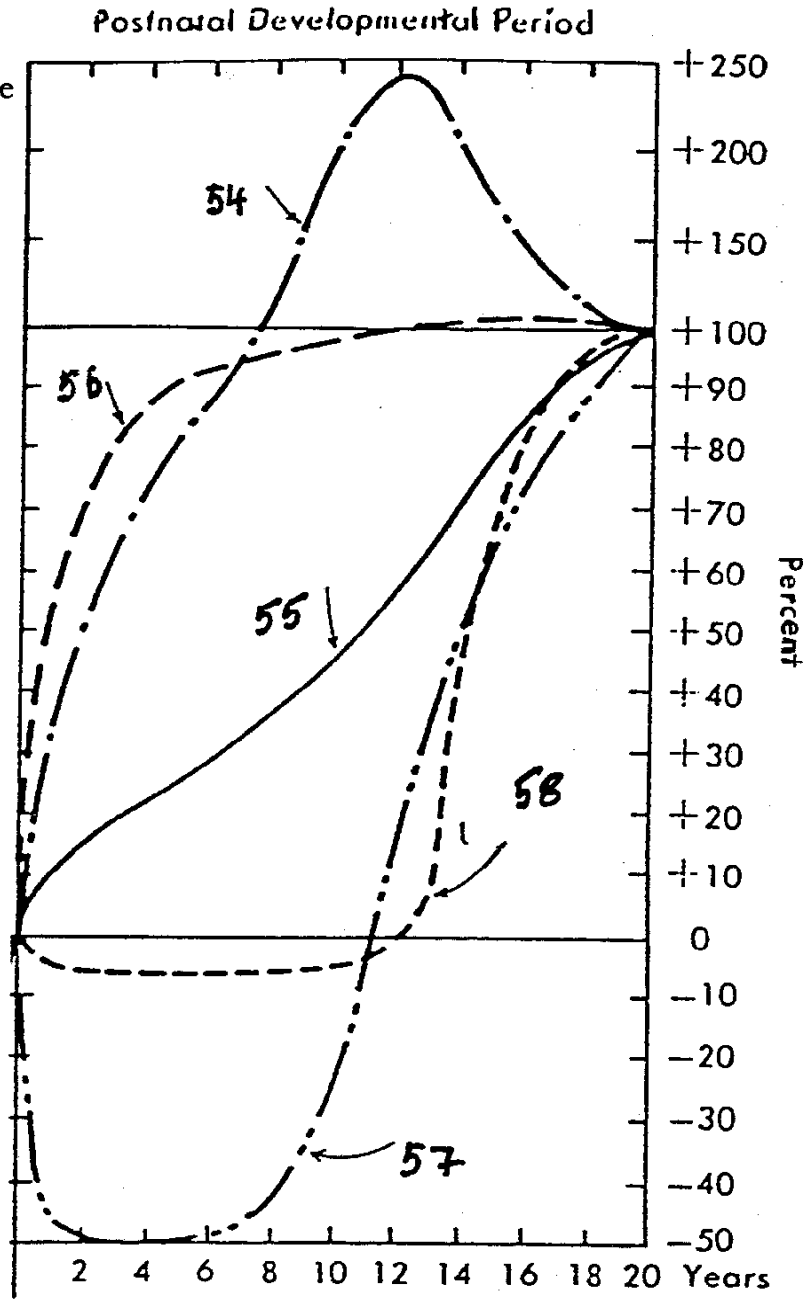
53. A / B Antidiuretic hormone (ADH), a peptide released from the posterior pituitary, is necessary for water reabsorption in the collecting ducts of the kidney

Name:_____

54-58: 3 points each

Match the curve for growth rate of 5 organs illustrated on the right with the appropriate organ undergoing that growth rate pattern during childhood and adolescence.

a. uterus
b. brain
c. thymus
d. viscera (heart, liver, etc.) and whole body
e. adrenals



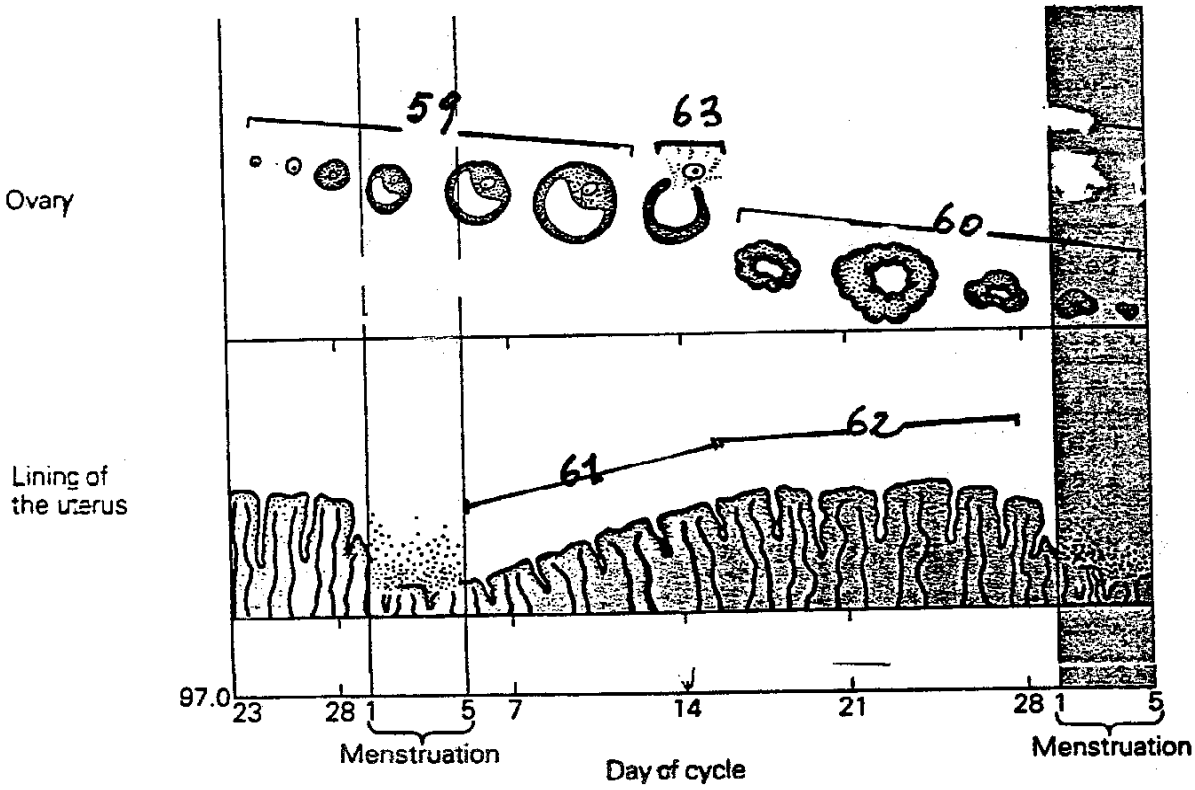
10

Name:_____

59-63: 3 points each

Match the events during the menstrual cycle illustrated on the right with the appropriate phase/ event in the ovary and uterus.

a. Follicular phase
b. Ovulation
c. Luteal phase
d. Uterine mucosa proliferation
e. Uterine mucous secretion and hyperhemia



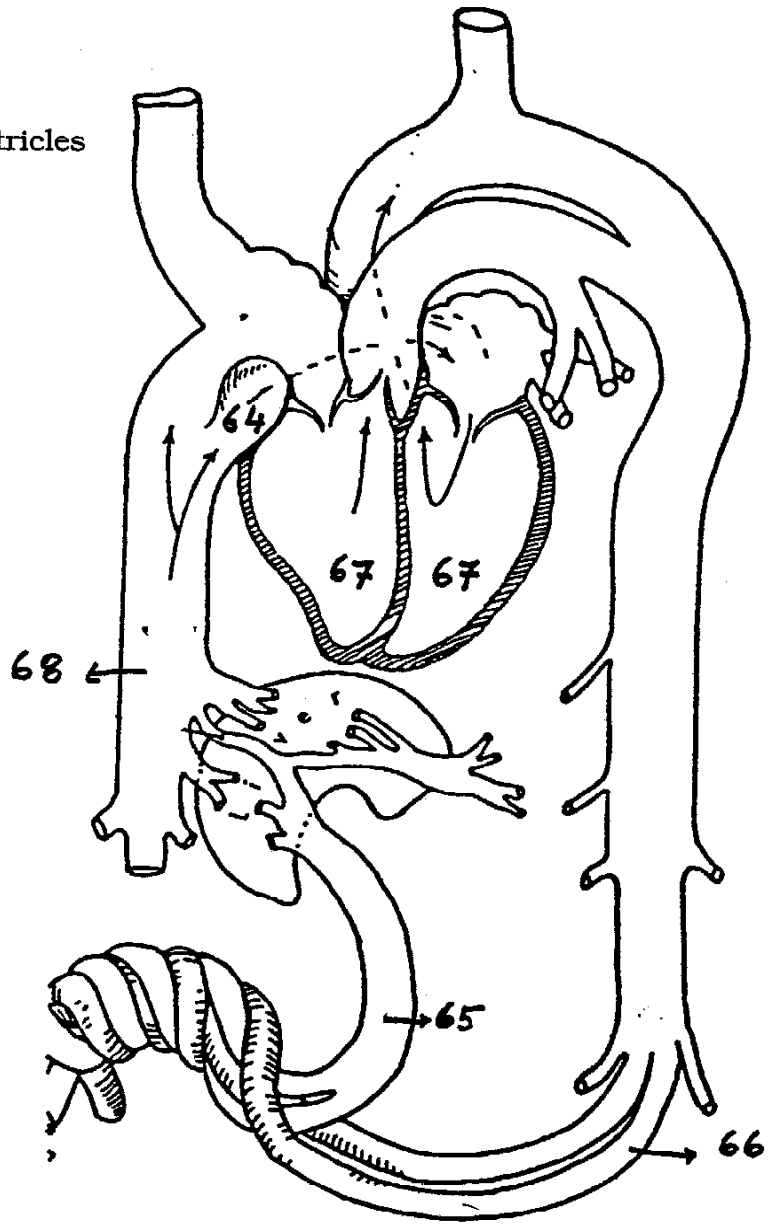
11

Name:_____

64-68: 3 points each

Match the specific structure of the fetal circulation with the appropriate number on the figure.

a. umbilical vein
b. umbilical artery
c. inferior vena cava
d. foramen ovale
e. left and right cardiac ventricles



12