BIOL 319 Lecture Exam 2 Summer 2023 Form A

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 2. Acromegalic features
a. are caused by oversecretion of growth hormone after the growing years
b. entail the overgrowth of the superciliary ridge, mandible and cartilaginous structures of the face
c. choice (a) and this is almost always caused by a pituitary tumor of the somatotrophes (growth hormone secreting cells) of the pituitary
d. All of the above
e. None of the above

____ 3. Prostaglandins, histamines, IGF-1 and FGF-3 are
a. inflammatory
b. anti-inflammatory
c. steroids
d. paracrine factors (though IGF-1 can act also as a hormone)
e. all hormones

____ 4. Genes encoding the protein hormones IGF-1, GH, FGF-3, as well as the receptors for all of these hormones or growth factors all contribute to
a. the height a person will achieve
b. the degree to which calcium ion and phosphate ion are homeostatically regulated in the blood during middle age.
c. the degree to which thyroid hormone is successfully synthesized and secreted during infancy.
d. choices (a) and (b)
e. choices (b) and (c)

____ 5. Imagine a situation in which the somatotropin receptor is underexpressed in hepatocytes during childhood. Logically, the physiological effect would be
a. acromegaly
b. cretinism
c. choice (a) and hypocalcemia
d. choice (b) and hypercalcemia
e. undersecretion of IGF-1 and therefore a decrease in chondrocyte hyperplasia of the epiphyseal plate leading to decreased rate of long bone lengthening

____ 9. A treatment for pituitary dwarfism
a. injection of fibroblast growth factors
b. injection of fibroblast growth factor receptors
c. injection of growth hormone
d. injection of calcitonin
e. All of the above

____ 10. The radio-ulnar joint discussed in class is
   a. a synostosis
   b. a symphysis
   c. a synchondrosis
   d. a suture
   e. None of the above

____ 12. With a few exceptions, healthy fibrous joints are
   a. diarthrotic
   b. amphiarthrotic
   c. synarthrotic
   d. freely moveable and choice (a) as these choices are synonymous and specify the correct answer
   e. None of the above

____ 14. Characteristic(s) of the epiphyseal plate either histologically or physiologically
   a. chondrocyte hyperplasia
   b. chondrocyte mitosis and choice (a) as they refer to the same thing
   c. chondrocyte hypertrophy
   d. enlargement of chondrocytes and choice (c) as they refer to the same thing
   e. All of the above

Answer the following 3 questions as they pertain to the list below

1. calcium ion
2. calcitonin
3. testosterone
4. estrogen
5. IGF-1
6. calcidiol
7. parathyroid hormone
8. Fibroblast growth factor-3
9. Growth hormone releasing hormone
10. Growth hormone inhibiting hormone
11. thyroid hormone
12. somatotropin
13. calcitriol
14. cortisol

____ 15. Hypocalcemic hormone(s) and or growth factor(s) with physiologically minimal effects, but can be used at pharmacological levels to treat osteoporosis
   a. 5 only
   b. 5 and 8
   c. 2
   d. 5 and 7
   e. 2, 5 and 7

____ 16. Missing or in too low of a supply could put someone at risk of osteomalacia or rickets
   a. 1 and or 7
   b. 3 and or 4
   c. 1 and or 7
   d. 5 and or 7
   e. 1 and or 13.

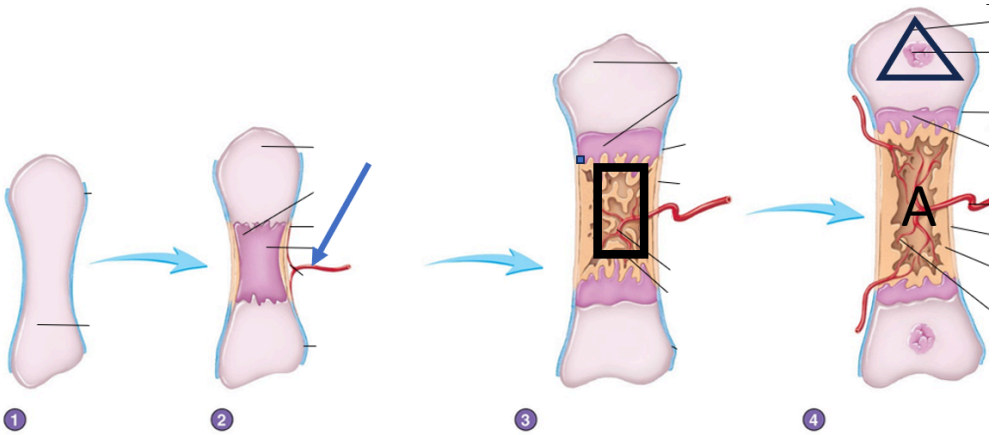
____ 17. Hormones that would promote chondrocyte hyperplasia within the epiphyseal plate **either directly or indirectly**
   a. 5,6,7 and 8
   b. 3,4,5,9,11 and 12

c. 12 only
d. 5,11 and 12
e. 12 only

____ 18. SERMs, bis-phosphonates, and the hormone calcitonin can all be used to treat
a. osteomalacia
b. rickets
c. diabetes
d. gigantism and or acromegaly
e. None of the above

____ 19. Joints discussed in class that can mature into synostoses
a. sutures
b. synchondrosis uniting the epiphysis and the diaphysis
c. synchondroses uniting the pubis, ischium and ileum within the acetabulum
d. All of the above
e. None of the above

Answer the following 3 questions based on the figure below that illustrates a process you should be familiar with



____ 21. Indicates Woven bone?
a. area within the rectangle
b. area with the letter "A" on top of it
c. object pointed to with the solid arrow
d. Choices (a) and (b)
e. Choices (a) and (c)

____ 22. What is happening within the region encapsulated by the triangle?
a. primary ossification
b. formation of the first of the two periosteal buds
c. initiation of bone collar formation
d. chondrocyte hypertrophy just prior to chondrocyte apoptosis that marks the beginning of secondary ossification
e. None of the above

____ 23. Which of the below is a characteristic of the object on the left (with the number 1 underneath it) which is the starting structure for the process shown above?
   a. Made entirely of hyaline cartilage, with an outer layer of perichondrium
   b. Made entirely of fibrocartilage, with an outer layer of periosteum
   c. Made entirely of woven bone, surrounded by an outer layer of periosteum
   d. Choice (a) and is the starting material of endochondral ossification
   e. Choice (b) and is the starting material of intermembranous ossification

____ 26. Vitamin that was named a vitamin before it was discovered that it is synthesized by the body and acts as a hormone
   a. Vitamin A
   b. B vitamins
   c. Vitamin C
   d. Vitamin D
   e. None of the above

____ 28. Intermembranous ossification occurs
   a. in the femur
   b. choice (a) and any other long bone in the body
   c. within flat bones of the skull only
   d. within diarthrotic joints
   e. within the clavicle and flat bones of the skull

____ 30. Women athletes whose athletic training promotes very low body fat can in turn cause suppression of estrogen secretion from their ovaries. This estrogen suppression can cause
   a. osteoclast activity to outpace osteoblast activity
   b. osteoblast activity to outpace osteoclast activity
   c. choice (b) and therefore an increase in bone density and thickness in the areas most stressed during athletic activity
   d. choice (a) and therefore an increased risk of developing osteoporosis despite the benefits of Wolff's law on bone density and growth from the athletic training
   e. an increase in vitamin D synthesis

____ 32. The last stage of intermembranous ossification
   a. Flowering or blooming of collections of osteblasts within the mesenchymal membrane
   b. Extension of "finger like projections" of bone that meld into one another forming woven bone
   c. A complete elimination of the woven bone by osteoclasts
   d. Differentiation of the organized intermembranous layers sandwiching woven bone into a periosteum followed by the birthing of ostebasts that grow compact bone on either side of what will become the spongy bone in the center
   e. None of the above

____ 34. Parathyroid hormone secretion at physiological levels
   a. stimulates osteoclasts and stimulates the kidney to put less calcium ion into the urine than otherwise
   b. stimulates osteoblasts
   c. stimulates the conversion of calcidiol to calcitriol by the kidney and choice (a)
   d. stimulates the kidney to put more calcium in the urine than otherwise and choice (b)

e. None of the above

____ 35. Calcitonin
a. is a steroid hormone that is hypercalcemic
b. is a protein hormone that has a relatively weak hypocalcemic effect compared to the opposing hypercalcemic effect of PTH
c. Could be used to treat Rickets
d. Could be used to treat osteomalacia
e. None of the above

____ 36. Underperformance of the parathyroid glands such that they do not secrete enough PTH when required, could directly cause
a. osteoporosis
b. depression of the nervous system and the muscular system causing muscle weakness and neurological depression, even leading to falling asleep or going into a coma
c. hyperexcitablity of the muscular system, potentially leading to convulsions
d. choices (a) and (b)
e. choices (a) and (c)

____ 37. Made completely or largely from fibrocartilage
a. synchondroses of the epithelial plate
b. joint between two pubis bones
c. cartilaginous "soft callus" found as a stage in healing of a broken bone
d. joint between two lumbar vertebrae
e. Choices (b), (c) and (d)

____ 38. Woven bone
a. is the first bone put down during embryonic ossification of flat bones of the skull that are undergoing intermembranous ossification
b. is produced during the first stages of primary ossification during endochondral ossification
c. choice (b) but is removed later by osteoclasts to create the medullary cavity within the diaphysis
d. comprises the bony callus formed during the healing of a broken bone
e. All of the above

____ 39. Cartilaginous joints that are always amphiarthrotic
a. synchondroses
b. synarthroses
c. diarthroses
d. symphyses
e. None of the above

____ 40. Early in life (infancy and toddlerhood) undersecretion of thyroid hormone could cause_____if not treated by thyroid hormone supplementation/replacement
a. abnormally high growth hormone secretion
b. abnormally high secretion of growth hormone releasing hormone
c. choices (a) and (b)
d. shortened stature and profound and permanent deficits in cognition/intellectual functioning
e. acromegaly

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Answer Section

MULTIPLE CHOICE

2. ANS: D PTS: 1
3. ANS: D PTS: 1
4. ANS: A PTS: 1
5. ANS: E PTS: 1
9. ANS: C PTS: 1
10. ANS: E PTS: 1
11. ANS: D PTS: 1
12. ANS: C PTS: 1
14. ANS: E PTS: 1
15. ANS: C PTS: 1
16. ANS: E PTS: 1
17. ANS: B PTS: 1
18. ANS: E PTS: 1
19. ANS: D PTS: 1
21. ANS: A PTS: 1
22. ANS: D PTS: 1
23. ANS: D PTS: 1
24. ANS: E PTS: 1
25. ANS: E PTS: 1
26. ANS: D PTS: 1
27. ANS: E PTS: 1
28. ANS: E PTS: 1
29. ANS: A PTS: 1
30. ANS: D PTS: 1
31. ANS: D PTS: 1
32. ANS: D PTS: 1
33. ANS: D PTS: 1
34. ANS: C PTS: 1
35. ANS: B PTS: 1
36. ANS: C PTS: 1
37. ANS: E PTS: 1
38. ANS: E PTS: 1
39. ANS: D PTS: 1
40. ANS: D PTS: 1