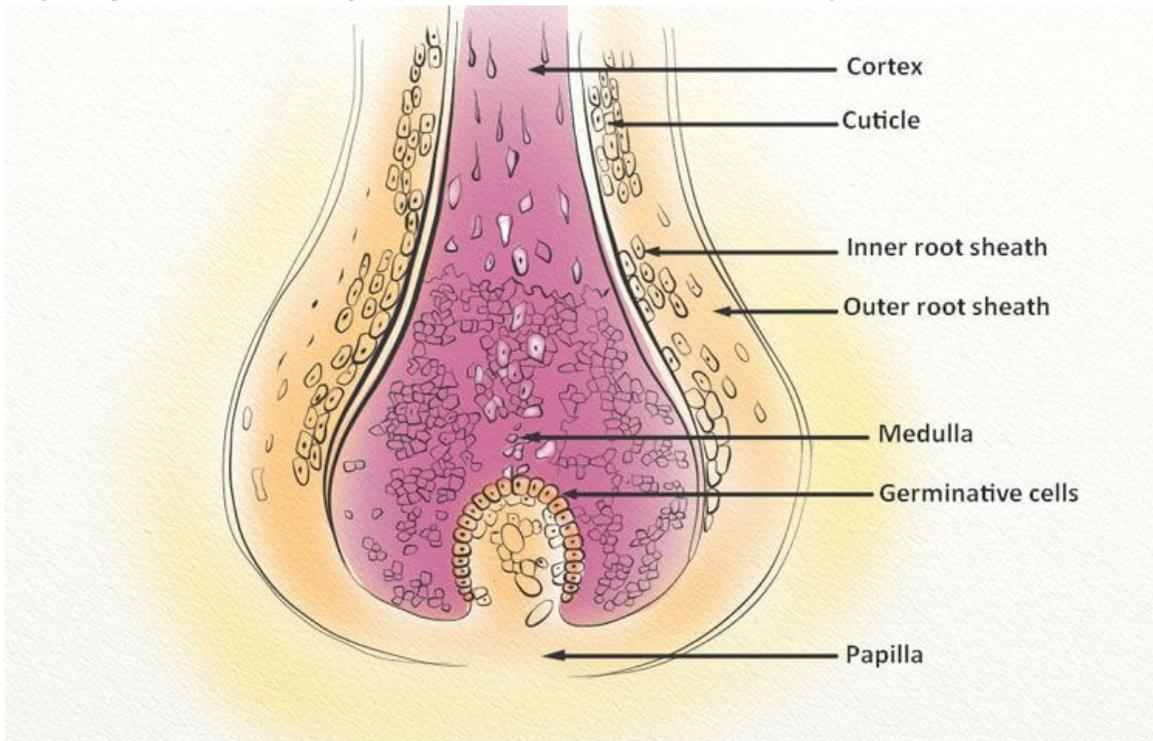


Answer key:

1. (Any 4 of these, two points total)

- Regulates body temperature
- Protects internal organs and tissues
- protects the body from UV radiation
- disposes waste through secretion of sweat
- Acts as a temporary storage site for fat
- Prevents dehydration
- Detection of changes in the environment
- protects invasion of infectious organisms

2. (two points for each part labeled AND function listed)



Cortex- contains most of your hair's pigment

Cuticle- outermost part of the hair shaft. It is formed from dead cells, overlapping in layers, which form scales that strengthen and protect the hair shaft.

Inner root sheath- structure of the lower part of the hair follicle that surrounds and protects the growing hair, derived from the matrical cells of the follicular bulb.

Outer root sheath- an extension of the epidermal basal layer, contains functional compartments: the bulge, which serves as a reservoir for hair stem cells, and the sebaceous gland, responsible for hair lubrication.

Medulla(only found in thick hairs)- serves as the marrow of the hair

Germinative cells- provides new cells to replenish lost skin from shedding

Papilla- contains many blood vessels that supply nutrients to nourish the growing hair.

3. (one point each)

- Anagen (growth phase): Most hair is growing at any given time. Each hair spends several years in this phase.
- Catagen (transitional phase): Over a few weeks, hair growth slows and the hair follicle shrinks.
- Telogen (resting phase): Over months, hair growth stops and the old hair detaches from the hair follicle. A new hair begins the growth phase, pushing the old hair out.

4. (3 points) Cutaneous membrane

5. (1 point for each skin layer named AND described)

Stratum corneum- most superficial layer of the epidermis, contains 15-30 layers of dead skin cells to prevent microbes from invading, dehydration, and provides mechanical protection

Stratum Lucidum- transparent layer only found in the palms of the hands and the soles of the feet, composed of dead and flattened keratinocytes: densely packed with eleiden, a clear protein rich in lipids which gives the transparent appearance.

Stratum granulosum- has a grainy appearance, due to keratinocytes as they are pushed from the stratum spinosum and keratin and keratohyalin make up the bulk of the keratinocyte mass in the stratum granulosum and give the layer its grainy appearance, bind intermediate keratin filaments together. Waterproof function.

Stratum spinosum- cells in very close contact, bound, when dehydrated create little spikes that indicate where they are bonded, strong binding layer.

Stratum basale-(also called the stratum germinativum) deepest epidermal layer, has a simple cuboidal epithelium, produces melanin and keratinocytes

Papillary dermis- uppermost layer of the dermis, is composed of fine and loosely arranged collagen fibers: loose areolar connective tissue. Supplies nutrients to layers of the epidermis and regulates temperature.

Reticular dermis- lower layer of the dermis, composed of dense irregular connective tissue. Provides structure and elasticity to the skin.

Hypodermis- mainly used for fat storage, consists of loose connective tissue, lobules of fat and contains larger blood vessels and nerves than those found in the dermis.

6. (2 points each)

-epidermal pigmentation (pigments in epidermis/the amount of melanin produced)

-dermal circulation (blood flow in dermis)

-carotene, a yellow pigment that gives a yellow tint to the skin

One point each:

7. C

8. E

9. A

10. G

11. F

12. H

13. B

14. D

15. A

16. D

17. A

18. B

19. C

20. B

21. B

22. B

23. D

24. C

25. A

26. C

27. B

28. C

29. A

- 30. A
- 31. D
- 32. C

Skeletal (part 2):

33. (two points total)

- Protects internal organs
- Stores minerals, especially calcium
- Supports the soft organs of the body
- Provides sites for muscle attachments which help with movement

34. (.5 points for each suture labeled)

1. Coronal Suture 2. Frontal 3. Parietal 4. Nasal 5. Squamosal Suture 6. Ethmoid 7. Lacrimal 8. Sphenoid 9. Lambdoidal Suture 10. Occipital 11. Temporal 12. Zygomatic 13. Maxilla 14. Mandible

35. (4 points total)

Endochondral ossification is the method of forming a bone through a cartilage intermediate while intramembranous ossification directly forms the bone on the mesenchyme. Endochondral ossification forms every bone in the body except for the clavicles, flat bones of the skull, and the mandible. Intramembranous ossification forms the flat bones of the skull, mandible and clavicle.

36.

Bone collar formation -- The primary ossification center develops in the center of the bone, osteoblasts found in the bone will secrete osteoid against the walls of the diaphysis. This bone collar gives the developing bone structural support to begin hardening.

Cavitation -- The chondrocytes go through hypertrophication/enlargement and signal the hyalin cartilage to harden into bone(calcification). The calcified hyalin cartilage is impermeable to the diffusion of nutrients, chondrocytes cant receive any nutrients they begin to die and leave small cavities, leaving room in the hardened bone for blood vessels to travel through.

Periosteal bud invasion -- periosteal region is invaded by a bud containing blood vessels and nerves. This allows nutrients, osteoblasts and osteoclasts cells to enter into the cavities that were previously inhabited by chondrocytes. Osteoblasts secrete osteoid into the remaining hyaline cartilage and give rise to early spongy bone.

Diaphysis elongation -- the diaphysis region elongates. The elongated region is powered by cells dividing in the primary center of ossification. This elongated region is the medullary cavity.

Epiphysial ossification -- The Epiphysis will develop their own centers of ossification. These centers are known as the secondary centers of ossification.

37.

Appositional growth is growth in diameter/width.

38.

Congenital scoliosis is scoliosis that you're born with, caused by an underdeveloped spine in the womb, and Neuromuscular scoliosis is curving of the spine caused by a neurological or muscular condition.

39. A. Epiphysis, B. Diaphysis, C. Epiphysis, D. Epiphysial line, E. Spongy bone, F. Articular cartilage, G. Endosteum, H. Nutrient arteries, I. Periosteum, J. Yellow bonw marrow, K1. Periosteum, K2. Articular cartilage, L. Spongy bone.

- 40. F
- 41. C
- 42. E

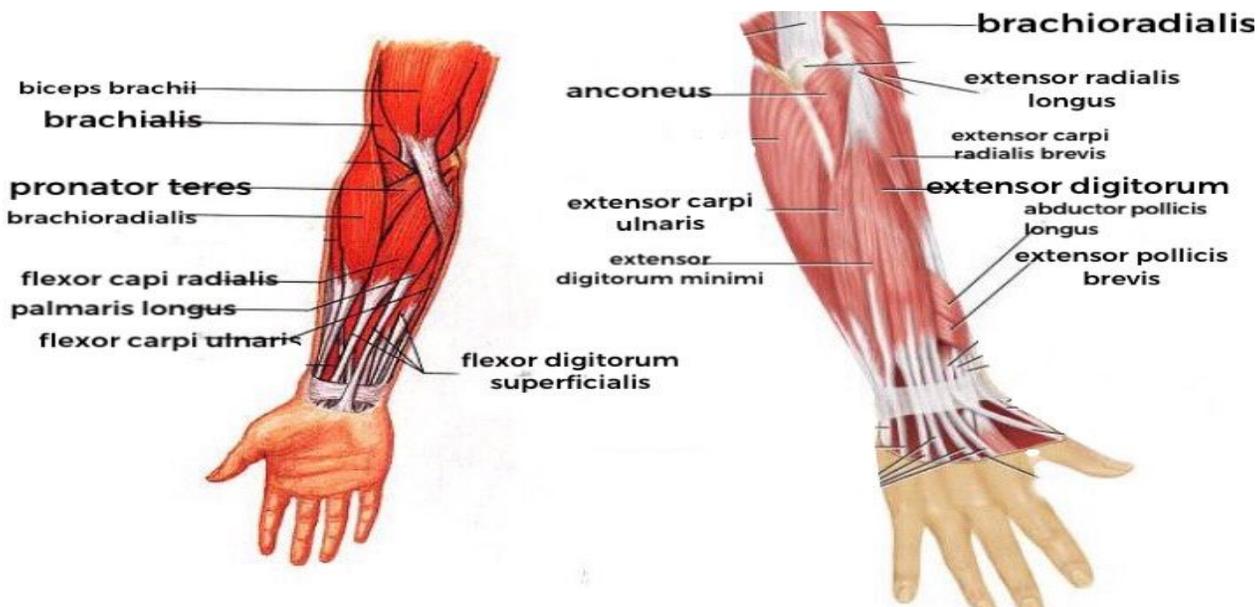
- 43. J
- 44. B
- 45. I
- 46. A
- 47. D
- 48. H
- 49. G
- 50. C
- 51. A
- 52. B
- 53. A
- 54. B
- 55. D
- 56. D
- 57. C
- 58. D
- 59. A
- 60. A
- 61. C
- 62. B
- 63. A
- 64. A
- 65. A

Muscular: (Part 3)

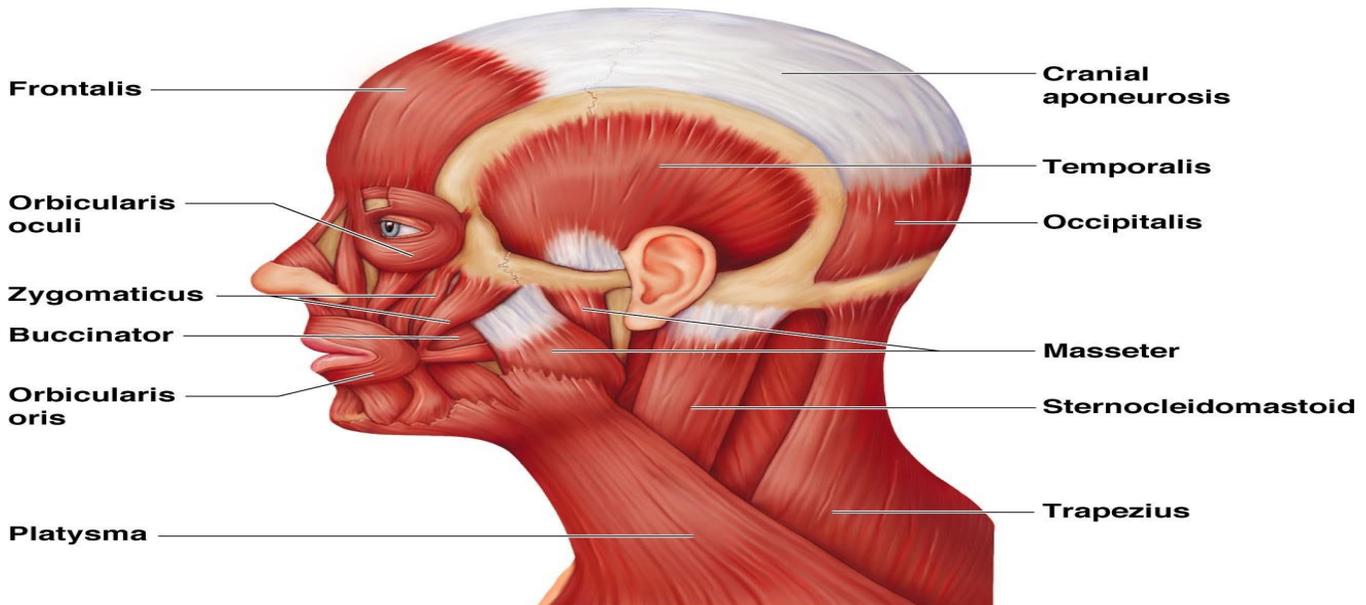
66. **2 points total**(some examples):

- produce movement
- produces heat to maintain body temperature
- helps maintain posture
- provides joint stability

67. **.5 pts for each muscle labeled**



68. .5 pts for each muscle labeled



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69. 2 points

BCAAs stand for branched-chain amino acids, they are important because they promote muscle building after exercise and suppress muscle breakdown.

70. 2 points

The all or none principle describes that the strength of a response of a nerve cell or muscle fiber is not dependent upon the strength of the stimulus. If a stimulus is above a certain threshold, a nerve or **muscle** fiber will fire.

71. .5 pts for each phase listed.

Lag phase- time between the activation of a motor neuron until the **muscle** contraction occurs

Contraction phase- cross-bridges between actin and myosin form.

Relaxation phase- When the muscle relaxes the tension decreases, calcium is actively transported back into the sarcoplasmic reticulum using ATP. The troponin moves back into position blocking the myosin binding site on the actin and the **muscle** passively lengthens.

72. C

73. G

74. D

75. E

76. F

77. H

78. B

79. A

80. A

81. B

82. B

83. C

84. D

85. D

86. C

- 87. A
- 88. B
- 89. B
- 90. A
- 91. D
- 92. D
- 93. C
- 94. A
- 95. C
- 96. D
- 97. B