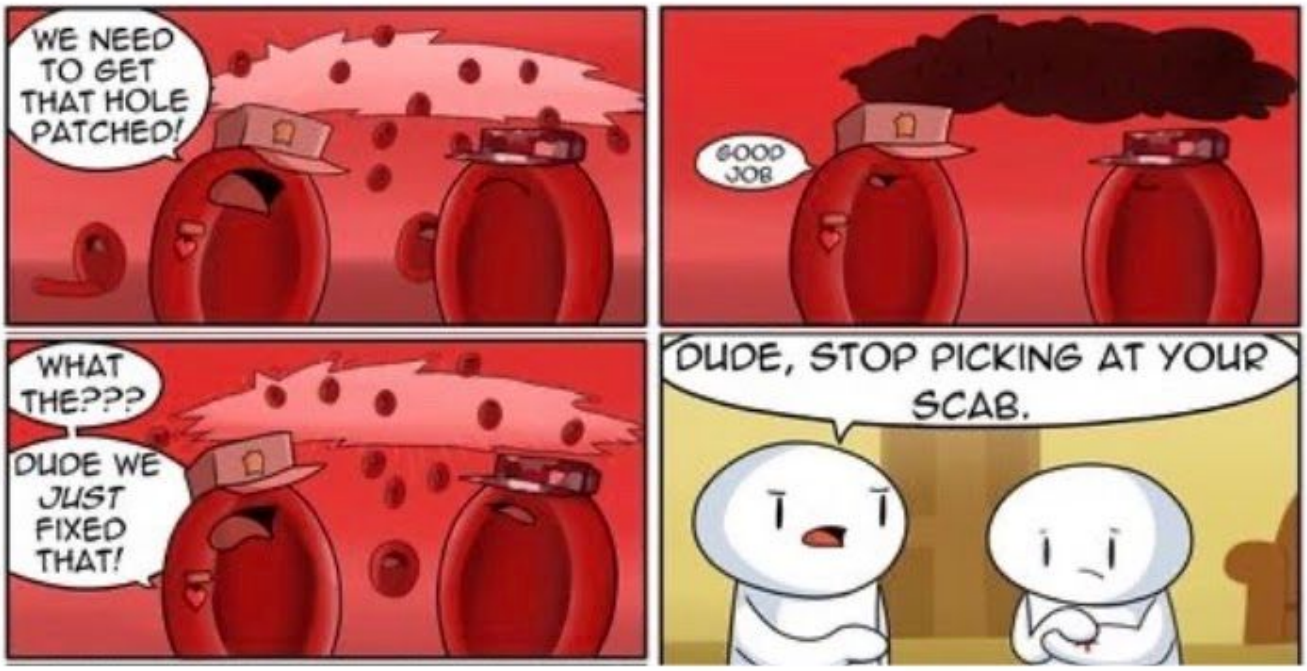
ANATOMY AND PHYSIOLOGY ANSWER KEY

Bay Academy By: Rexana Chen



TOTAL POINTS: __ /142

Team Number: ___ Names: _____

School Name: _____

Section 1: Integumentary System

1.) List all 5 layers of the epidermis (in order) and state their main functions (1 point for each correct label + 1 point for each function + 1 point if it's in order) - 11 points total.

Stratum Corneum: 20 layers of dead keratinocytes filled with only keratin protein which is useful because keratin is very strong.
Stratum Lucidum: It is a thin, clear layer of dead skin cells and it's only present in thick skin (palms + soles of the feet)
Stratum Granulosum: Keratinocytes change and they start to flatten. The nuclei and organelles disintegrate and keratinization begins.
Stratum Spinosum: It has a layer of keratinocytes 8-10 cells deep. There are plenty of melanosomes and dendritic cells. Here cells divide rapidly. Gives skin both strength and flexibility.
Stratum Basale/Germinativum: It's the growing layer/base of it. Attached by hemidesmosomes which separate it from the dermis below. Descends into the dermis in what are called Epidermal ridges. These are required because there are no blood vessels in the epidermis, so all nutrients must be obtained through diffusion from the dermis. There are germinative cells, which are large stem cells that replace shed cells in the surface. Also, melanocytes have processes which extend throughout this layer in order to distribute the melanin. Nervous receptors provide information about external stimuli to the brain. It is also the site of keratinocyte formation.

2.) Why are epidermal ridges and dermal papillae needed? (1 point)
These are required because there are no blood vessels in the epidermis, so all nutrients must be obtained through diffusion from the dermis.

3.) In what type of food is carotene found in? (1 point)

Carrots and squashes

4.) What can carotene be synthesized into? (1 point)
Vitamin A

5.) When exposed to sunlight, melanocytes will gradually increase their production of melanin. When will the maximum production take place? (1 point)

a. 12 hours after the exposure
b. 24 hours/1 day after the exposure
c. 5 days after the exposure
d. 10 days after the exposure

6.) What are lentigines? (1 point)
Lentigos, also called liver spots, are small brown or black spots on the body, and are common in older people. They contain abnormal melanocytes and are similar to freckles. They usually occur on sun-exposed skin.

7.) What is it called when your face turns blue? (1 point)
Cyanosis

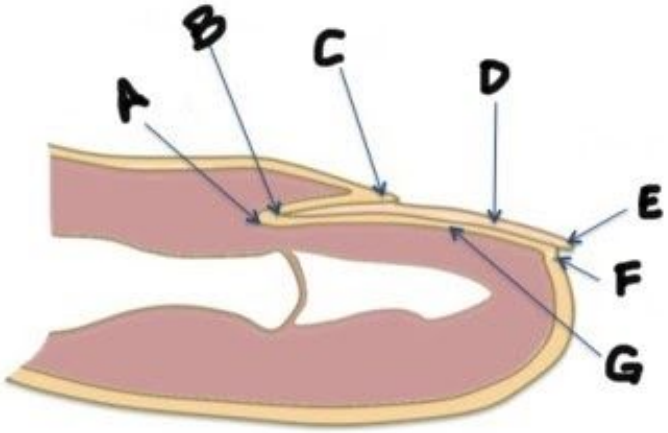
8.) What causes vasodilation? (1 point)

a. Blood vessels become wider because of embarrassment
b. Blood vessels become wider because of fear
c. Blood vessels become narrower because of fear
d. Blood vessels become narrower because of embarrassment

9.) What 2 layers of the skin carry out the function to synthesize Vitamin D3 and why those 2? (1 point for each name + 1 point for the explanation) - 3 points total
This function is carried out by the two deepest layers, the stratum germinativum and the stratum Spinosum because a low amount of UV radiation is needed.

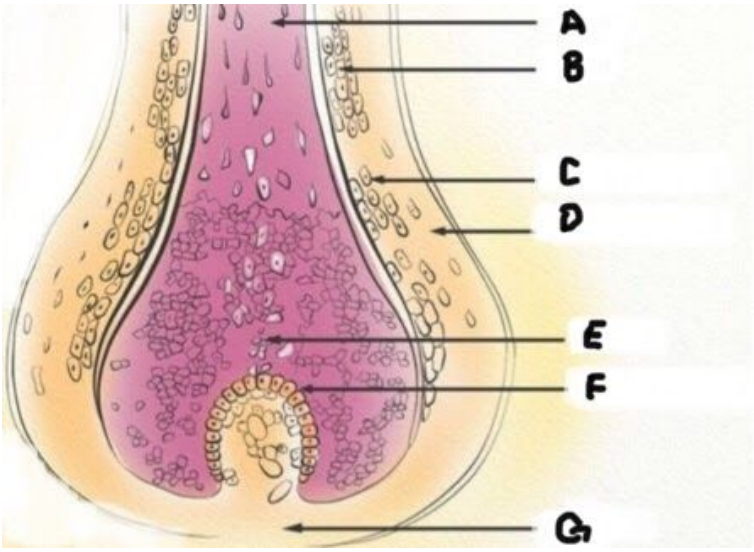
Label the image:

(1 point for each correct label) - 7 points total



10.) A_____Nail Matrix
11.) B_____Nail Root
12.) C_____Cuticle
13.) D_____Nail Plate
14.) E_____Distal Edge of Nail Plate
15.) F_____Hyponychium
16.) G_____Nail Bed

Label the image and explain the function of each part:
(1 point for each correct label + 1 point for each function) - 14 points total



17.) A_____Cortex
Cortex- contains most of your hair's pigment

18.) B_____Cuticle
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.

19.) C_____Inner Root Sheath
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.

20.) D_____Outer Root Sheath
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.

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

22.) F_____Germinative Cells
Germinative cells- provides new cells to replenish lost skin from shedding

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

24.) What part of a follicle is only present in thick hair? (1 point)
Medulla

25.) Name and describe all the stages of hair growth and how long it lasts in order:
(1 point for each name + 1 point for each description + 1 point for the order + 1 point for how long it lasts—each one) - 13 points total
Anagen is the active growth stage of hair. During this stage, the hair

contains its highest amount of melanin. This stage lasts between 3-6 years.
Cartagena is a transition stage in which hair stops growing, but the hair is not shed. During this stage, the follicle is being reabsorbed. This stage lasts 2-3 weeks.
Telegen is a resting stage, during which the follicle moves away and the hair begins to fall for the development of a new hair. This stage lasts between 6-8 weeks
Return to anagen/Early anagen/Anagen is when the hair growth cycle continues as anagen begins again.The old hair has shed and a new follicle has formed. A new hair begins growing to replace the hair that was shed.

26.) What are the 3 different types of hair and how are they different? (1 point for each name + 1 point for each explanation)
Lanugo, colloquially referred to as "peach fuzz", is very fine, soft hair often found on infants. If lanugo grows on the body of an adult, it is typically a sign of anorexia nervosa.
Terminal hairs are thick, coarse hairs that grow during puberty.
Vellus hair is short, fine downy hair found all over the body except for the palms of the hands and soles of the feet. It is thinner than lanugo.

27.) What do Root hair plexus and Meissner corpuscles react to? Select all that apply (1 point)

a. Touch
b. Pressure
c. Pain
d. Temperature

28.) What do Pacinian corpuscles and Ruffini endings react to? Select all that apply (1 point)

a. Touch
b. Pressure
c. Pain
d. Temperature

29.) What do free nerve endings react to? Select all that apply (1 point)

a. Touch
b. Pressure
c. Pain
d. Temperature

30.) What do Third-degree burns affect and what does it look like? (1 point)

a. It's dry and red and it affects the whole epidermis and part of the dermis
b. It's pink/red and it burns some or all of the epidermis and all of the dermis
c. It's black/brown and it affects all the layers of the skin
d. It's pink/red and shiny. It affects the epidermis and part of the dermis

31.) What do Second-degree burns look like? (1 point)

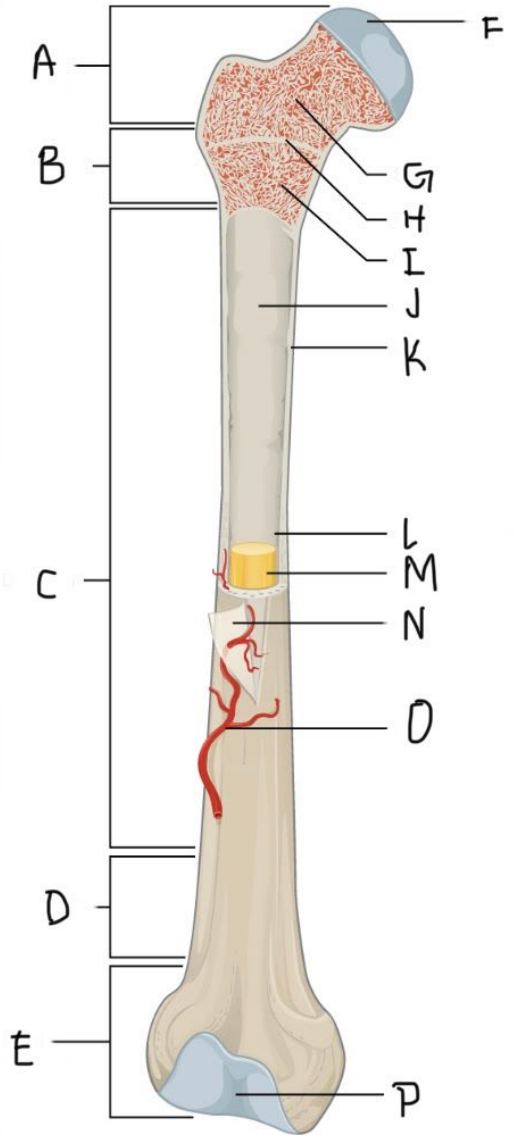
a. It's dry and red and it affects the whole epidermis and part of the dermis
b. It's pink/red and it burns some or all of the epidermis and all of the dermis
c. It's black/brown and it affects all the layers of the skin
d. It's pink/red and shiny. It affects the epidermis and part of the dermis

32.) What does a First-degree burn look like? (1 point)

a. It's dry and red and it affects the whole epidermis and part of the dermis
b. It's pink/red and it burns some or all of the epidermis and all of the dermis
c. It's black/brown and it affects all the layers of the skin
d. It's pink/red and shiny. It affects the epidermis and part of the dermis

Section 2: Skeletal System

Label the image:
(1 point for every label) - 16 points total



33.) A _____ Proximal Epiphysis
34.) B _____ Metaphysis
35.) C _____ Diaphysis
36.) D _____ Metaphysis
37.) E _____ Distal Epiphysis

38.) F _____ Articular cartilage
39.) G _____ Spongy Bone
40.) H _____ Epiphyseal Line
41.) I _____ Red Bone Marrow
42.) J _____ Endosteum
43.) K _____ Compact Bone
44.) L _____ Medullary Cavity
45.) M _____ Yellow Bone Marrow
46.) N _____ Periosteum
47.) O _____ Nutrient Artery
48.) P _____ Articular cartilage

49.) Where can you find Fibrous Cartilage and what are its functions? (1 point)

a. It provides support and it returns to its original shape. It's located between knee joints located within your knee joint.
b. It resists compression and prevents bone to bone contact. It's located between the bones of the sternum.
c. Provides stiff but somewhat flexible support and reduces friction between bony surfaces. It's located in the auricle of the external ear.
d. It resists compression and prevents bone to bone contact. It is located within knee joints

Match these words to the correct sentence:
~~Appositional growth, canaliculi, perichondrium, extracellular matrix, Interstitial growth, lacunae, water~~

(1 point for each correct match) - 7 points total

50.) Cartilage is mostly composed of water.
51.) Perichondrium is a layer of dense irregular connective tissue that cartilage is surrounded by.
52.) The extracellular matrix is a network of macromolecules that provide structural support to the cells surrounding it.
53.) Each lacunae houses a chondrocyte.

54.) Canaliculi connects lacunae to each other.
55.) Appositional growth occurs when a new bone matrix is secreted at the bone surface, causing its diameter to increase.
56.) Interstitial growth occurs when chondrocytes within the extracellular matrix divide and secrete new matrices. This causes the cartilage to expand from within itself.

57.) List 3 functions of bone markings:
(1 point each)
Joint motion, locking bones in place, providing structural support, providing stabilization, and providing protection.

58.) A tuberosity is a type of bone marking that makes room for muscle and ligament attachment. What makes it different from others? (1 point)

a. It's a very large, blunt, and irregularly shaped
b. It's a narrow ridge of bone that's not that noticeable
c. It's a narrow prominent ridge of bone
d. It's a rounded projection that is often roughened

59.) What are some examples of bone markings that are depressions and openings? Select all that apply. (1 point for each correct option) - 3 points total

a. Fissure
b. Condyle
c. Ramus
d. Sinus
e. Groove
f. Tubercle
g. Epicondyle

60.) What kind of cell responds to trauma by giving rise to bone forming cells and bone destroying cells? (1 point)

a. Osteoblasts
b. Osteocytes
c. Osteoclasts

d. Osteogenic cells

61.) What kind of fracture is this? (1 point)

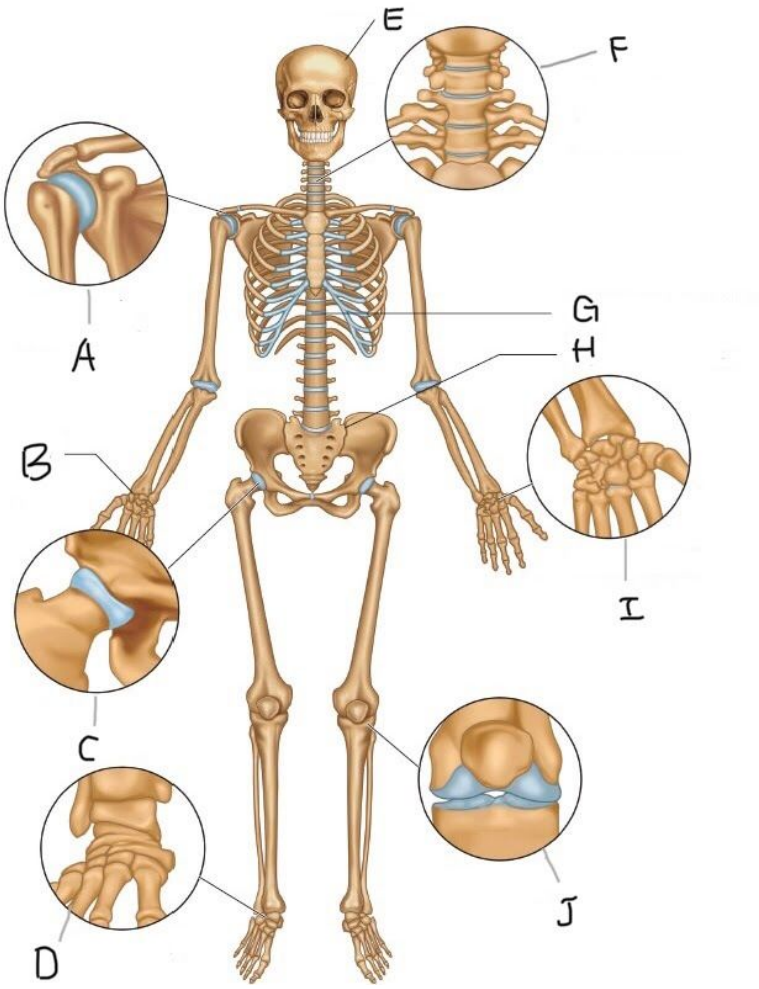
Greenstick

62.) Where is osteosarcoma usually found? (1 point)
At the end of long bones

63.) Is osteosarcoma more common in males or females and what age do people usually get diagnosed? (2 points)

a. Males, above 30
b. Males, under 25
c. Females, above 30
d. Females under 25

Label the joints:
(1 point for each correct label) - 10 points total



64.) A _____ Ball and Socket Joint
65.) B _____ Ellipsoidal Joint
66.) C _____ Ball and Socket Joint
67.) D _____ Plane Joint
68.) E _____ Fibrous Joint
69.) F _____ Swivel/Pivot Joint
70.) G _____ Cartilaginous Joint
71.) H _____ Synchondrosis
72.) I _____ Saddle Joint
73.) J _____ Hinge Joint

74.) What is it called when a broken bone pierces/ruptures through the skin? (1 point)

a. Ruptive fracture
b. Comminuted fracture
c. Transverse fracture
d. Compound fracture

75.) How are bones supplied with nutrients? (1 point)
a. Blood vessels
b. Stores it in yellow bone marrow
c. Red bone marrow
d. Bones don't need nutrients

76.) What does RICE stand for? (1 point) - You will not get the point if you get one incorrect
Rest
Ice
Compression
Elevation

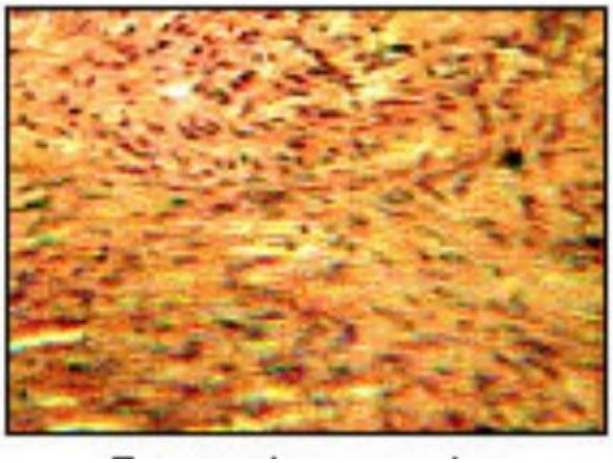
77.) When is RICE used? (1 point)
This system is used as current best management practice in the first 24-48 hours following an acute soft tissue injury.

Section 3: Muscular System

78.) What type of Muscle is this? (1 point)

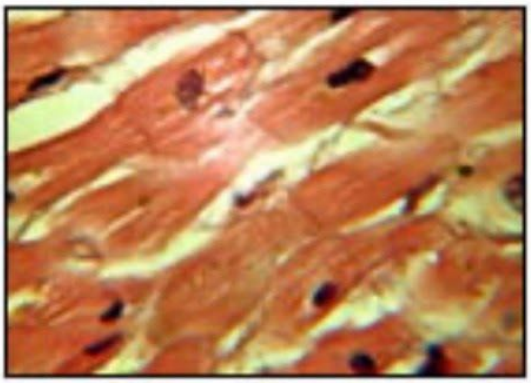
Skeletal Muscle

79.) What type of Muscle is this? (1 point)



Smooth Muscles

80.) What type of Muscle is this? (1 point)



Cardiac Muscle

81.) What are the 4 main functions of Muscles? (1 point for each function) - 4 points total

- Producing Movements
- Maintaining Posture
- Stabilizing Joints
- Generating Heat

82.) Thick myofilaments are primarily in the _____ and contain _____. (1 point)

a. Center, actin
b. Center, myosin

c. Side, actin
d. Side, myosin

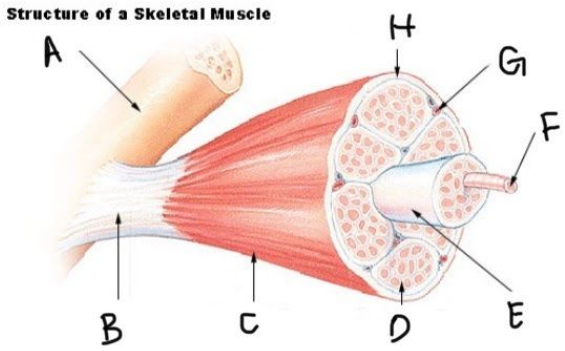
83.) Myosin, actin, tropomyosin, troponin, and titin all play a role in the _____, in which proteins slide past each other to generate movement. (1 point)
Cross-Bridge Cycle

84.) Muscle contraction requires energy, which is supplied by _____. (1 point)
a. ATP
b. RICE
c. Cells
d. Blood

85.) Each muscle cell has a _____, which is similar to the cytoplasm; the exception is that _____ has large numbers of glycosomes and myoglobin. (The two blank spaces are the same word) - 1 point
Sarcoplasm

86.) All muscles, even while relaxed, are almost always slightly contracted. This phenomenon is called _____. It doesn't produce active movements but instead keeps the muscles firm, healthy, and ready to respond to stimuli. It also assists in joint stabilization and posture maintenance. (1 point)
Muscle Tone

Label the Image:
(1 point for each correct label) - 8 total



87.) A _____ Bone
88.) B _____ Tendon
89.) C _____ Epimysium
90.) D _____ Endomysium
91.) E _____ Fascicle
92.) F _____ Muscle Fiber
93.) G _____ Blood Vessel
94.) H _____ Perimysium

95.) Smooth muscle is organized into 2 sheets. What are those sheets called and which is the outer layer and which is the inner? (1 point)

a. Longitudinal Layer (outer layer) and circular layer (inner layer)
b. Longitudinal Layer (inner layer) and circular layer (outer layer)
c. Epimysium Layer (outer layer) and perimysium (inner layer)
d. Epimysium Layer (inner layer) and perimysium (outer layer)

96.) ATP is produced in cardiac muscles via _____. (1 point)

a. Cells
b. Blood Flow
c. Cells in the muscles
d. Aerobic Pathways

97.) Cardiac muscle contraction is _____ than skeletal muscles and _____ than smooth muscles. (1 point)

a. Faster, slower
b. Slower, faster

98.) What does ATP bind to in skeletal muscles? (1 point)

a. Actin
b. Myosin
c. Troponin
d. Nebulin

99.) Which type of connective tissue is found between muscle fibers? (1 point)

a. Epimysium
b. Endomysium
c. Perimysium
d. Myomysium

100.) Muscle cells need a lot of energy and respond quickly which means it has a higher number of _____? (1 point)

Mitochondria