

# Mr.Epithelium's Anatomy and Physiology Test SSSS 2020 EXAM

One 8.5 x 11 notes sheet is allowed, along with 1 non-programmable calculator dedicated to computation.

**Good luck!**

**Points: 180**

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## Instructions:

- **You have 40 minutes to complete this test packet.**
  - o There are 9 stations, with **5 minutes per station** allotted.
- One 8.5 x 11 notes sheet is allowed, along with 1 non-programmable calculator dedicated to computation per person.
- Point values are denoted using brackets [ ] in front of each question.
- Tiebreakers are the total score of the following stations, in order: 6, 8, 1
- **Good luck! Have fun, feedback is greatly appreciated** (PM *Mr.Epithelium* on Scioly).

# Station 1 Figures (18 points)

Figure 1.0

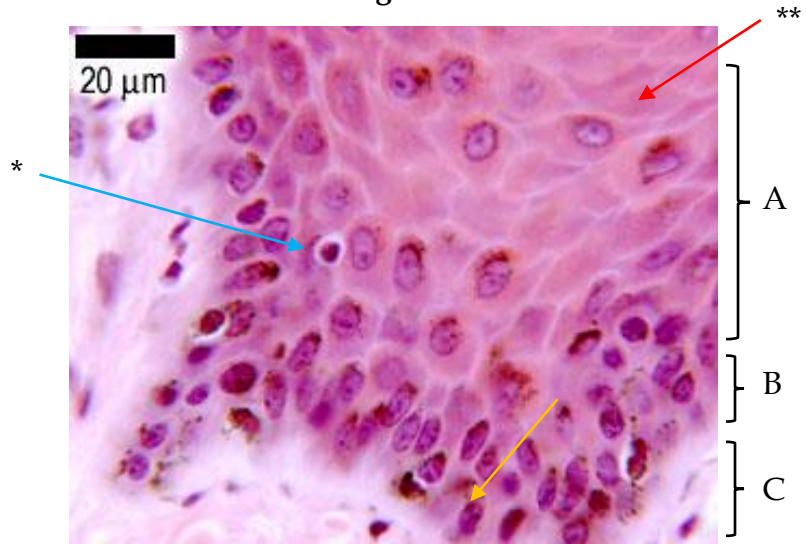


Figure 1.1

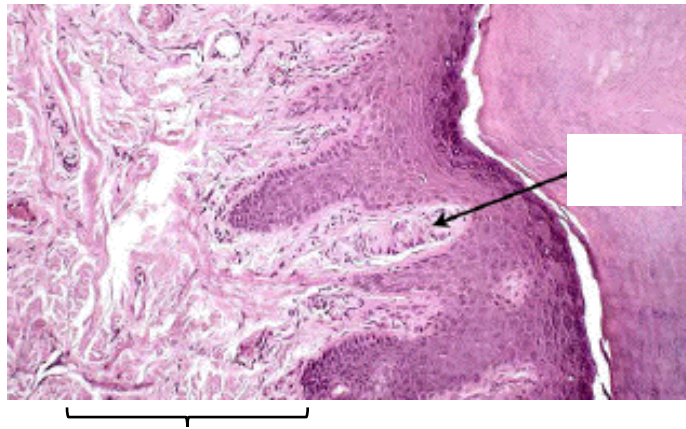
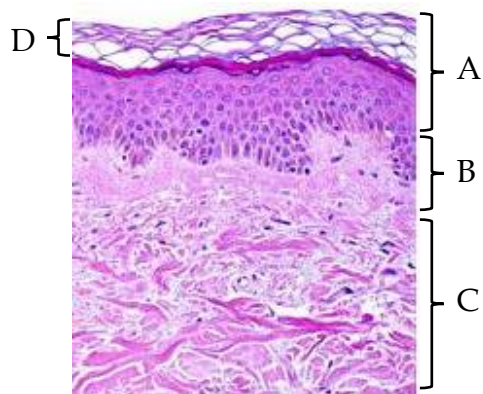


Figure 1.2



## Station 1 (18 points)

Questions 1-7 refer to Figure 1.0.

1. [1] What type of cell is indicated by the blue arrow (\*)?
2. [1] What type of cell is indicated by the red arrow (\*\*)?
3. [1] What does label A indicate?
4. [1] What does label B indicate?
5. [1] What does label C indicate?
6. [1] What type of connection occurs between layers B and C?
7. [1] Using the measurement given, estimate the width of the cell labeled with the blue arrow.

Questions 8-9 refer to Figure 1.1.

8. [1] What skin receptor is shown in the picture?
  - a. [1] What type of touch does this receptor sense?
  - b. [1] What type of skin are these receptors most concentrated in?
9. [1] What type of tissue makes up the layer indicated by the bracket?

Questions 10-13 refer to Figure 1.2.

10. [1] What type of epithelium makes up label A?
11. [1] What type of tissue makes up label C?
12. [1] What does label D indicate?
  - a. [1] An acidic secretion sometimes covers label D. What is this called?
  - b. [1] What is the function of this secretion?
13. [1] What are the finger-like projections in label B called?
  - a. [1] Name one function of these projections.

## Station 2 Figures (20 points)

*Figure 2.0*



### **Word Bank**

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Anagen	Club	Spinosum
Basale	Granulosum	Telogen
Catagen	Lanugo	Terminal
Corneum	Lucidum	Vellus

## Station 2 (20 points)

Questions 14-18 refer to Figure 2.0.

14. [1] What condition relating to skin color is shown in (a)?
  - a. [1] What pigment is responsible for this condition?
15. [1] What condition relating to skin color is shown in (b)?
  - a. [1] What organ is affected in people with this condition?
16. [1] What condition relating to skin color is shown in (c)?
  - a. [1] **Bonus!** What condition results in the hallmark symptom shown in (c)?
17. [1] Which condition(s) above activate thermoreceptors?
18. [1] What receptor could sense the environment related to condition (a)?









Use the **Word Bank** to answer questions 19-30. Some questions may have multiple answers.

19. [1] The "peach fuzz" hairs covering much of the body.
20. [1] The hair is not growing in what phase(s)?
21. [1] The shortest phase of hair growth.
22. [1] Sensible perspiration occurs in this layer.
23. [1] This layer includes Merkel cells.
24. [1] Layer(s) of the epidermis that have live keratinocytes.
25. [1] Layer of skin exclusively found in thick skin.
26. [1] Type(s) of hair that include(s) eyebrows and eyelashes.
27. [1] Layer(s) of the epidermis found in thin skin.
28. [1] Layer(s) of the skin that contain(s) the protein eleidin.
29. [1] Hair that is attached to an inactive follicle.
30. [1] Layer(s) of the epidermis secrete lamellar granules.

# Station 3 Figures (22 points)

Table 3.0

Slides 1-8 are shown in Table 3.0

<p>1.</p>  A close-up photograph of a forearm showing a large, well-demarcated, erythematous (red) patch with a slightly raised, central area, characteristic of erythema multiforme.	<p>2.</p>  A close-up photograph of a skin lesion on an arm, showing a classic target lesion with a central dark brown/black area, a surrounding red ring, and an outer white ring.
<p>3.</p>  A close-up photograph of a skin area showing several target lesions of varying sizes, some with central crusting or necrosis.	<p>4.</p>  A close-up photograph of a skin area showing multiple target lesions, some with a central vesicle or bulla.
<p>5.</p>  A close-up photograph of a single target lesion on a skin surface, showing the characteristic concentric rings.	<p>6.</p>  A close-up photograph of a target lesion with a prominent central vesicle or bulla, surrounded by a red ring.
<p>7.</p>  A photograph of a person's elbow showing several target lesions on the skin.	<p>8.</p>  A close-up photograph of a skin area showing several target lesions, some with central crusting.

## Station 3 (22 points)

Questions 31-40 refer to Table 3.0.

*Note: Disease, disorder, and injuries are used synonymously in this section*

31. [1] What disease is shown in slide 1?
  - a. [1] What layers of the skin are affected by this disease?
32. [1] Does slide 2 show malignant melanoma?
  - a. [2] Use one letter of the ABCD's of melanoma to back up your answer.
33. [1] What disease is shown in slide 3?
  - a. [1] Who is most at risk for this disease?
34. [1] What disease is shown in slide 4?
  - a. [1] What is the primary cause of this disease? Be specific!
35. [1] What disease is shown in slide 5?
  - a. [1] Name a prevention method for this disease.
36. [1] What disease is shown in slide 6?
  - a. [1] What pathogen can be a cause of this disease?
37. [1] What disease is shown in slide 7?
  - a. [2] What layers of the dermis are affected by this disease, if any at all?
38. [1] What disease is shown in slide 8?
  - a. [1] What specific type of this disease is shown in the slide?
39. [2] Which slide(s) can be caused by bacteria?
40. [2] Which slide(s) can be caused by overexposure to sunlight?

# Station 4 Figures (20 points)

Figure 4.0

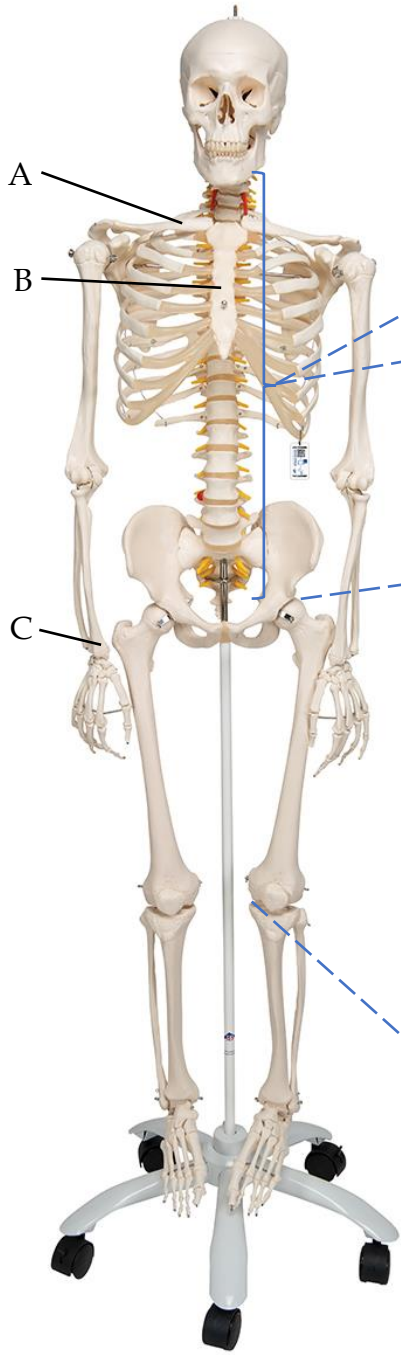


Figure 4.1

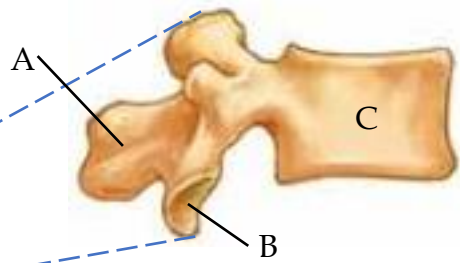
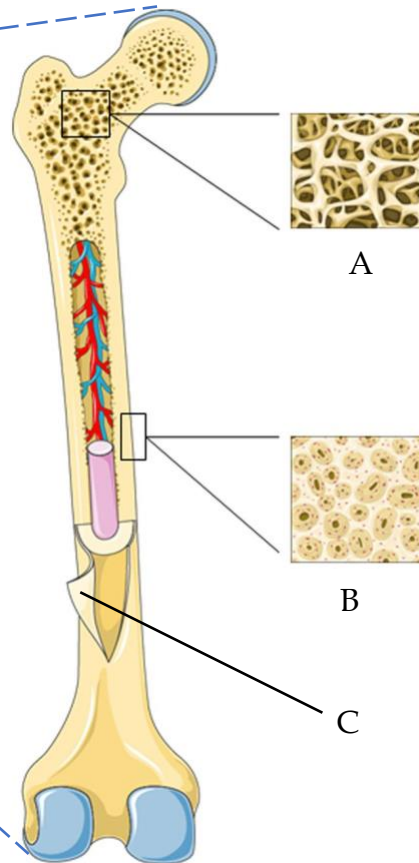


Figure 4.2





## Station 4 (20 points)

Questions 41-45 refer to Figure 4.0.

41. [1] What bone is shown by label A?
  - a. [1] What type of bone is the clavicle?
42. [1] What bone is shown by label B?
  - a. [1] What are the three parts of this bone?
43. [1] What bone is shown by label C?
44. [1] Is this skeleton most likely male or female?
45. [1] Which label(s) point to bones in the axial skeleton?

Questions 46-49 refer to Figure 4.1.

46. [1] What type of vertebra is shown?
  - a. [1] How many of this type of vertebra are in an adult human skeleton?
47. [1] What does label A identify?
48. [1] What does label B identify?
49. [1] What does label C identify?

Questions 50-53 refer to Figure 4.2.

50. [1] What bone is shown in this figure?
51. [1] What type of bone tissue is shown by label A?
52. [1] What type of bone tissue is shown by label B?
  - a. [1] What is the structural unit of this type of bone tissue?
53. [1] What is shown by label C?
  - a. [1] What binds/attaches label C to the bone?
54. [1] What chemical compound makes up most of the bone matrix?
55. [1] Which hormone can increase blood concentration of calcium by increasing calcium reabsorption in the small intestine?

## Station 5 Figures (22 points)

Figure 5.0

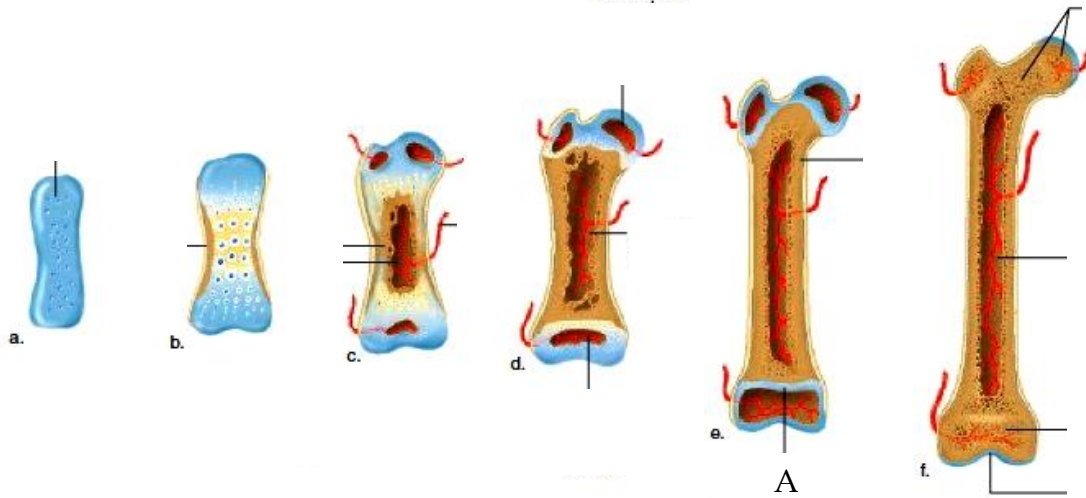
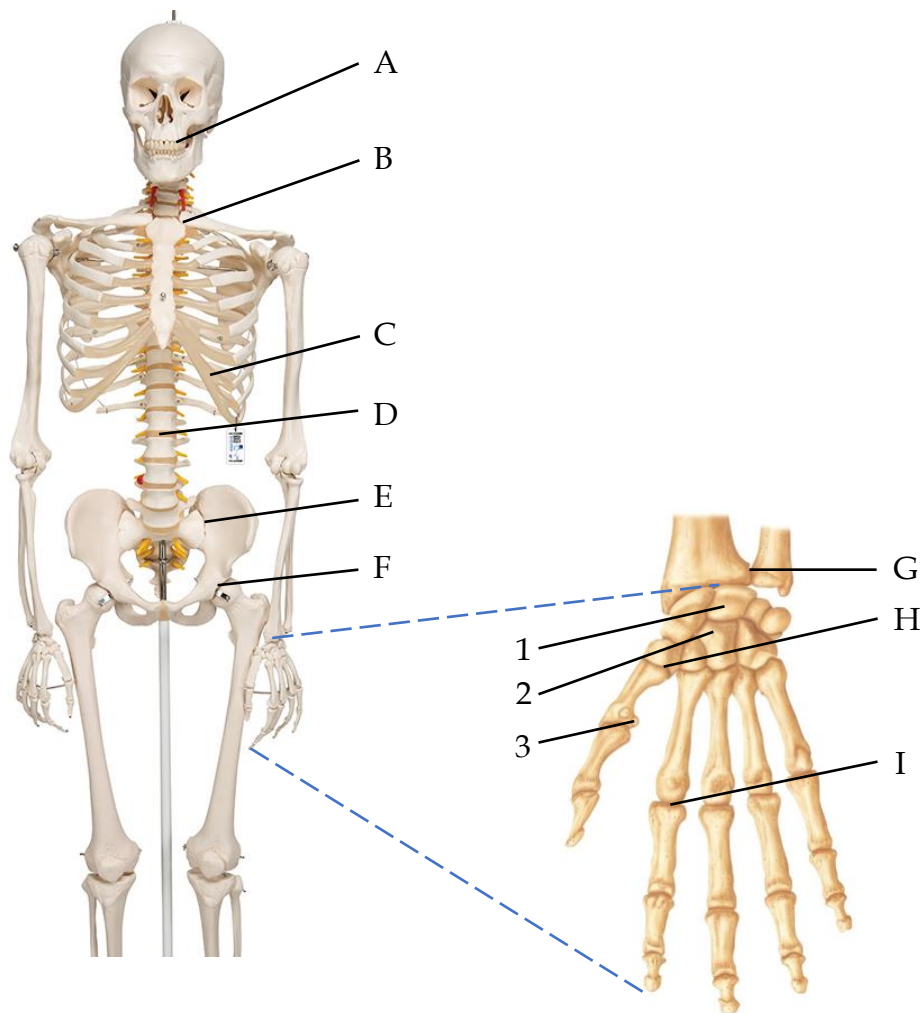


Figure 5.1



## Station 5 (22 points)

Questions 56-60 refer to Figure 5.0. Stages a-f are shown.

56. [1] What type of ossification is shown?
57. [1] In which stage does the primary ossification center first appear?
58. [1] In which stage does the secondary ossification center first appear?
59. [1] What does label A indicate?
60. [1] The medullary cavity is shown in Stage f. What bone cell is mainly responsible for the formation of the medullary cavity?
  - a. [1] What ion do these cells release to aide in their main function?

Questions 61-70 refer to Figure 5.1.

Question number	Label	Structural classification	Functional classification	Bones involved
61. [2]	A	[0.5]	[0.5]	[1]
62. [2]	B	[0.5]	[0.5]	[1]
63. [2]	D	[0.5]	[0.5]	[1] Be specific!
64. [2]	E	[0.5]	[0.5]	[1]
65. [2]	F	[0.5]	[0.5]	[1]

66. [1] What type of cartilage is shown in Label C?
67. [1] What bone is Label 1 pointing to?
  - a. [1] What bone is Label 2 pointing to?
68. [1] What type of synovial joint is Label G?
69. [1] What type of bone is Label 3 pointing to?
70. [1] What Label(s) (A-I) are pointing to areas of the appendicular skeleton exclusively, if any?

## Station 6 Figures (18 points)

*Figure 6.0*



*Figure 6.1*



## Station 6 (18 points)

Questions 71-75 refer to Figure 6.0.

*Note: Disease, disorder, and injuries are used synonymously in this section*

71. [1] What type of fracture is shown?
  - a. [1] What type of imaging was used to view this fracture?
72. [1] What disease is a likely cause of this type of fracture?
73. A cause of this disease can be the stimulation of RANKL.
  - a. [1] Given the functions of various skeletal hormones, what hormone stimulates the release of RANKL?
  - b. [1] Predict the bone cell that is stimulated by RANKL.
74. [1] What is one way a patient could be diagnosed with this disease?
75. Another cause of this disease affects mesenchymal stem cells.
  - a. [1] Given the effect of this disease, predict which lineage of cells derived from mesenchymal stem cells that are affected by this disease.
  - b. [2] Given the types of cells in bone, what lineage of cells might mesenchymal stem cells “divert” to instead of the type of cell in the previous question?

Questions 76-80 refer to Figure 6.0.

*Note: Disease, disorder, and injuries are used synonymously in this section*

76. [1] What disease is shown?
  - a. [1] What type of imaging was used to view this fracture?
  - b. [1] What type of this disease is shown?
77. [1] The section of the figure labeled with an asterisk (\*) is between what two vertebrae?
78. [1] Would a 50 year old male who smokes and works in a warehouse be at risk for this disease?
79. [1] What nerve is usually affected by this form of disease?
  - a. [1] What common symptom arises from the affection of this nerve?
80. [2] Would corticosteroids be a viable treatment for this disease?

## Station 7 Figures (20 points)

Figure 7.0  
Slides A-C are shown below

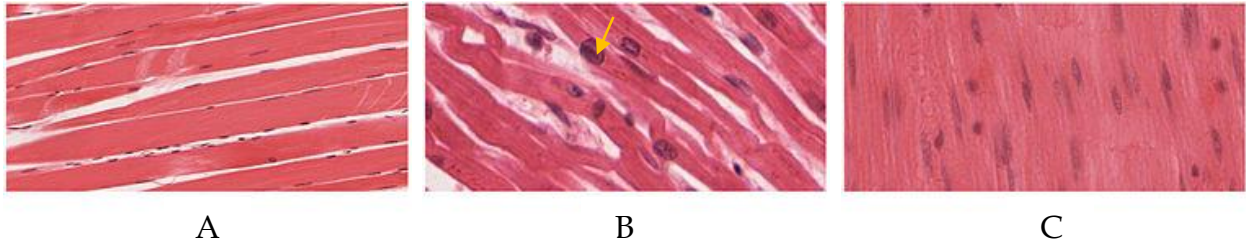
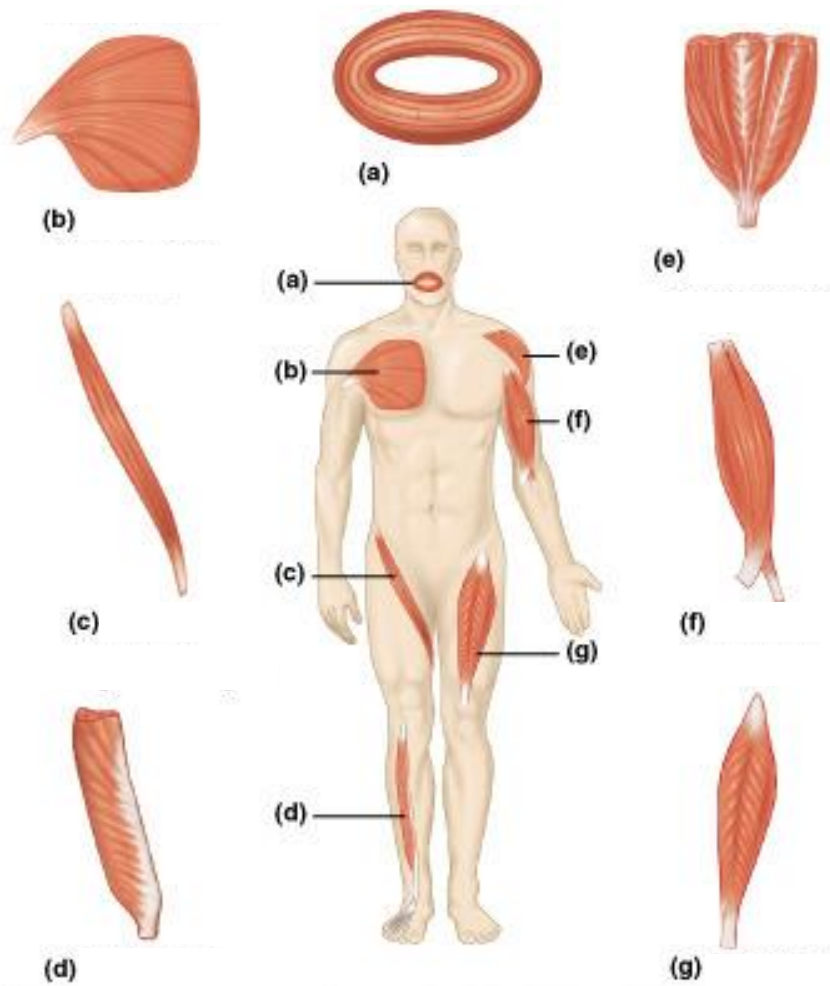


Figure 7.1  
Muscles (a)-(g) are shown below



## Station 7 (20 points)

Questions 81-90 refer to Figure 7.0.

81. [1] What type of muscle tissue is shown in Slide A?
82. [1] What type of muscle tissue is shown in Slide B?
83. [1] What type of muscle tissue is shown in Slide C?
84. [1] What structure is the arrow in Slide B pointing to?
85. [1] In cardiac muscle, what protein does calcium bind to initiate contraction?
86. [1] In smooth muscle, what protein does calcium bind to initiate contraction?
87. [1] Which Slide(s) have terminal cisternae?
88. [1] Which Slide(s) can be controlled by pacemaker cells?
89. [1] Which Slide(s) is/are striated?
90. [1] Which Slide(s) can undergo tetanus?

Questions 91-100 refer to Figure 7.1.

91. [1] What muscle is shown in (a)?
92. [1] What muscle fiber organization is shown in (a)?
93. [1] What muscle is shown in (b)?
94. [1] What muscle fiber organization is shown in (b)?
95. [1] What muscle is shown in (c)?
96. [1] What muscle fiber organization is shown in (c)?
97. [1] What muscle is shown in (e)?
98. [1] What muscle is shown in (f)?
99. [1] What muscle is shown in (g)?
100. [1] How many muscles in Figure 7.1 have an origin within the axial skeleton?

## Station 8 Figures (21 points)

Figure 8.0

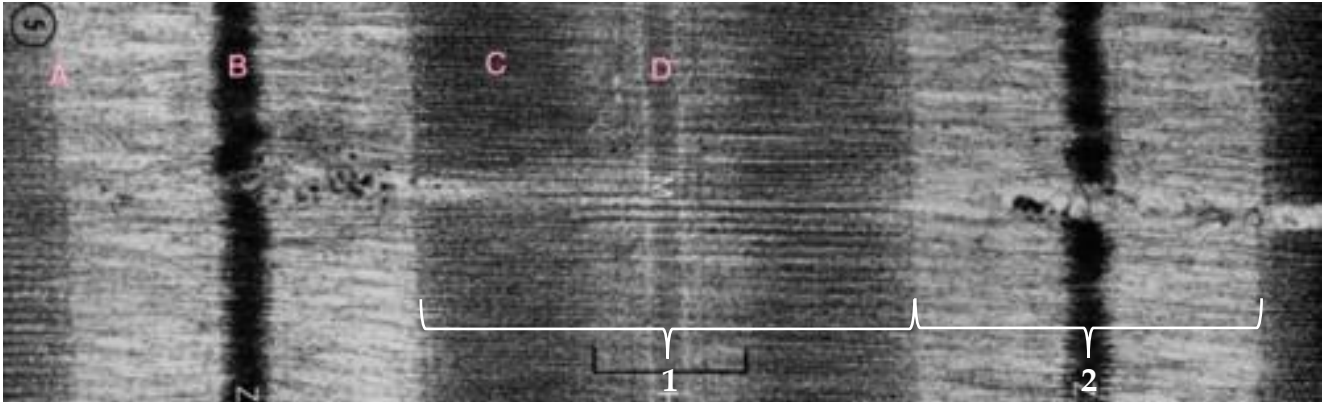
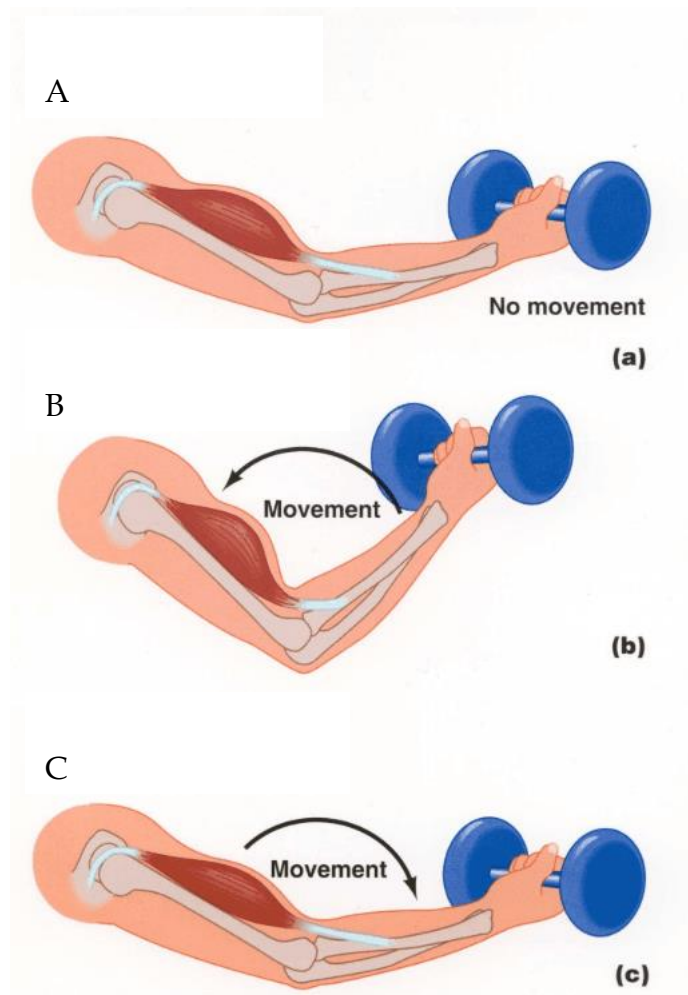


Figure 8.1

Three different scenarios (A-C) are shown below.





## Station 8 (21 points)

Questions 101-105 refer to Figure 8.0.

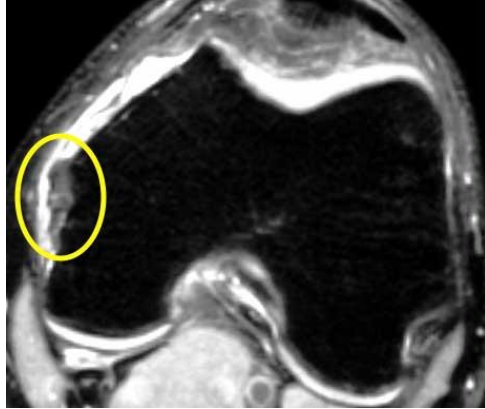
101. [1] What does Label B indicate?
  - a. [2] There are two proteins that are anchored at Label B. What are they?
102. [1] What does Label D indicate?
  - a. [1] There is one protein that is anchored at Label D. What is it?
103. [1] What does Label 1 indicated?
  - a. [1] Does Label 1 shorten during contraction?
  - b. [1] Does Label 1 contain thin filaments?
104. [1] What does Label 2 indicate?
  - a. [1] Does Label 2 shorten during contraction?
  - b. [1] Does Label 2 contain thin filaments?
105. [1] Is the H zone visible in this Figure?

Questions 106-110 refer to Figure 8.1.

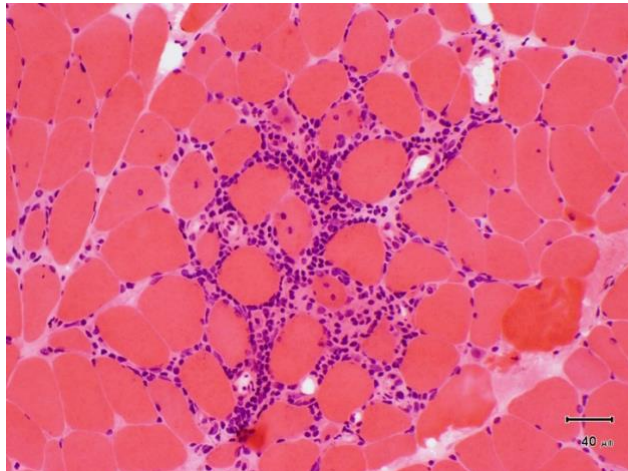
106. [1] What type of contraction is shown in scenario A?
  - a. [1] What is the relationship between the value of tension produced by the muscle and the load?
107. [1] What type of contraction is shown in scenario B?
  - a. [1] What is the relationship between the value of tension produced by the muscle and the load?
108. [1] What type of contraction is shown in scenario C?
  - a. [1] What is the relationship between the value of tension produced by the muscle and the load?
109. [1] What muscle is shown in this Figure?
  - a. [1] What is the origin of this muscle shown in the Figure (name a bone)?
110. [1] What scenarios are examples of an isotonic contraction?

## Station 9 Figures (19 points)

*Figure 9.0*



*Figure 9.1*



*Figure 9.2*



## Station 9 (19 points)

Questions 111-115 refer to Figure 9.0.

111. [1] Is the injury shown a strain or sprain?
  - a. [1] Sprains and strains can be difficult to tell apart due to symptoms. Name one symptom that strains and sprains have in common.
  - b. [1] What structure do these injuries affect?
112. [1] A special kind of fracture can arise when a bone is pulled rather sharply during the injury. What is it?
113. [1] Where in the body was this Figure taken?
114. [2] What grade of this injury occurs when the affected structure has been completely torn?
115. A common treatment option for mild forms of this injury is R.I.C.E.
  - a. [2] What does R.I.C.E. stand for?

Questions 116-117 refer to Figure 9.1.

116. [1] What disease is shown in this Figure?
  - a. [2] What specific form of this disease is shown?
  - b. [1] What is a common symptom of this form?
117. [1] What type of diseases can be a cause of this disease? Examples include psoriasis and myasthenia gravis.

Questions 118-120 refer to Figure 9.2.

118. [1] The child shown in the figure is likely getting an oral vaccine for what disease?
119. A symptom of this disease is flaccid paralysis.
  - a. [2] Explain how this disease causes flaccid paralysis.
  - b. [1] Flaccid paralysis is also present in what other 2020 disease?
120. [1] Do most people who contract this disease actually show symptoms?