Inside a Muscle Fiber Lab: Low-write

Name _____

Date _____

Period _____

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Do Now This is a real electron microscope picture of the inside of one human muscle cell. It is magnified many thousands of times. 2 minutes, before you open the lab

A. Describe the pattern you see.

B. A muscle fiber is: ☐ A bundle of cells ☐ One whole cell ☐ A thread inside a cell

☐ I can label the parts of a skeletal muscle fiber.

☐ I can name the bands of a sarcomere and the filaments that make them.

☐ I can relate each part of a fiber to its job.

Part 1. Parts of a fiber (Tab 1)

SEP 2 Developing and Using Models · CCC Systems and System Models

Click every part in the drawing. Read what each one looks like. Then do Step 2, Look closely.

1. What does each part look like? Copy a phrase from the box.

Pick from: thin outer skin · holes that lead into tubes · lacy net · long striped rods · bean shapes · flat ovals at the edge

Part	What it looks like	Part	What it looks like
Sarcolemma		**Myofibril**	
T-tubule		**Mitochondrion**	
SR		**Nucleus**	

2. Look closely. Tick one in each row.

Which part covers the whole cell?	☐ Myofibril ☐ Sarcolemma ☐ SR
Which part wraps each myofibril like a net?	☐ T-tubule ☐ Nucleus ☐ SR
Where are the nuclei?	☐ in the center ☐ at the edge ☐ inside myofibrils

3. Which part fills most of the inside of the fiber? ☐ Myofibrils ☐ Mitochondria ☐ Nuclei

4. Predict. The tubes that go inside help the signal reach
☐ only the outside of the cell ☐ every part of the cell at once

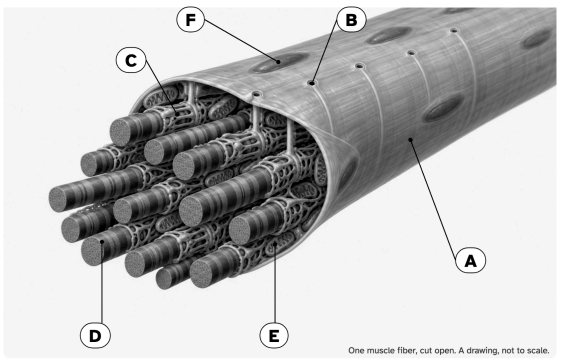
READ FIRST. In the lab, find the green Learn It box and read it. Then answer 5 to 7.

5. Which part does each job? Tick one in each row.

Carries the signal deep inside the fiber.	☐ T-tubule ☐ SR ☐ Mitochondrion ☐ Myofibril
Stores calcium, lets it out on a signal.	☐ T-tubule ☐ SR ☐ Mitochondrion ☐ Myofibril
Makes ATP, the energy for pulling.	☐ T-tubule ☐ SR ☐ Mitochondrion ☐ Myofibril
Does the pulling.	☐ T-tubule ☐ SR ☐ Mitochondrion ☐ Myofibril

6. Label the drawing. Use the word bank.

Word bank: sarcolemma · T-tubule · SR · myofibril · mitochondrion · nucleus



Letter	Part
A	
B	
C	
D	
E	
F	

7. Model check (SEP 2). A fiber is very long and thick. Without T-tubules, the signal would reach the middle of the fiber ☐ at the same time ☐ too late, so the myofibrils would not all pull ☐ together ☐ apart

Part 2. Read the stripes (Tab 2)

SEP 4 Analyzing and Interpreting Data · CCC Structure and Function

Click spots 1 to 4. Read how dark the picture is, and look at the slice of filaments under each spot.

8. Copy your records for each spot. Write yes or no for the filaments.

Spot	Darkness (0 to 100)	Thick filaments?	Thin filaments?
1			
2			
3			
4			

9. Darkest spot: ☐ 1 ☐ 2 ☐ 3 ☐ 4
Lightest spot: ☐ 1 ☐ 2 ☐ 3 ☐ 4

10. Spot 3 is darker than spot 1 because it has ☐ more protein in the way ☐ less protein in the way: thick and thin filaments, not just thin.

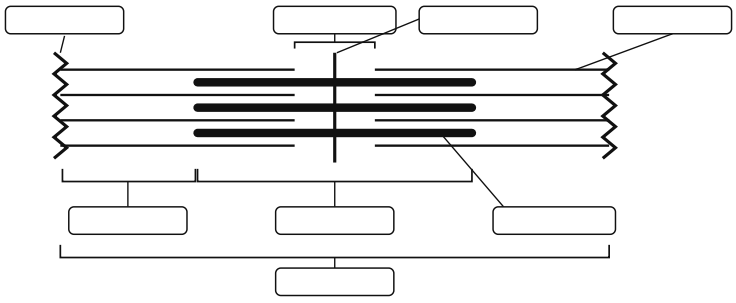
READ FIRST. In the lab, find the green Learn It box and read it. Then answer 11 to 13.

11. Name each spot. Tick one in each row.

Spot 1	☐ I band	☐ Z line	☐ A band	☐ H zone
Spot 2	☐ I band	☐ Z line	☐ A band	☐ H zone
Spot 3	☐ I band	☐ Z line	☐ A band	☐ H zone
Spot 4	☐ I band	☐ Z line	☐ A band	☐ H zone

12. Label the sarcomere. Use the word bank.

Word bank: Z line · M line · H zone · I band · A band · thick filament · thin filament · sarcomere



13. Thick filaments are made of ☐ myosin ☐ actin
Thin filaments are made mostly of ☐ myosin ☐ actin
One sarcomere goes from ☐ Z line to Z line ☐ A band to A band

Part 3. Built for the job (Tab 3)

SEP 6 Constructing Explanations · CCC Structure and Function

Click all three parts. Read the bars for each muscle.

14. Copy the records table from the lab. Write "none" where a muscle has no bar.

Muscle	Myofibrils (%)	Mitochondria (%)	SR (%)
Human thigh			
Hummingbird flight muscle			
Rattlesnake tail muscle			
Mouse leg, fast muscle			
Mouse leg, slow muscle			

15. How many times as much SR? Example, not yours: 12 ÷ 3 = 4 times. Yours: 26 ÷ 2.9 = about
☐ 3 times ☐ 9 times ☐ 23 times

16. The most mitochondria: ☐ Human thigh ☐ Hummingbird ☐ Rattlesnake tail
Its job is to ☐ work for a long time ☐ pull once, very hard

READ FIRST. In the lab, find the green Learn It box and read it. Then answer 17 to 18.

17. The rattle muscle is weak because it is only about _____% myofibrils. The human thigh is _____%. SR and mitochondria take up the ☐ room ☐ energy

18. Explain it (SEP 6). Finish each sentence. The marathon runner needs more _____, because they make energy for a long time. The weightlifter needs more _____, because they do the pulling. Evidence: the hummingbird, which works a long time, is _____% mitochondria.