

Muscles homework 1: Microscopic muscle structure and contraction.

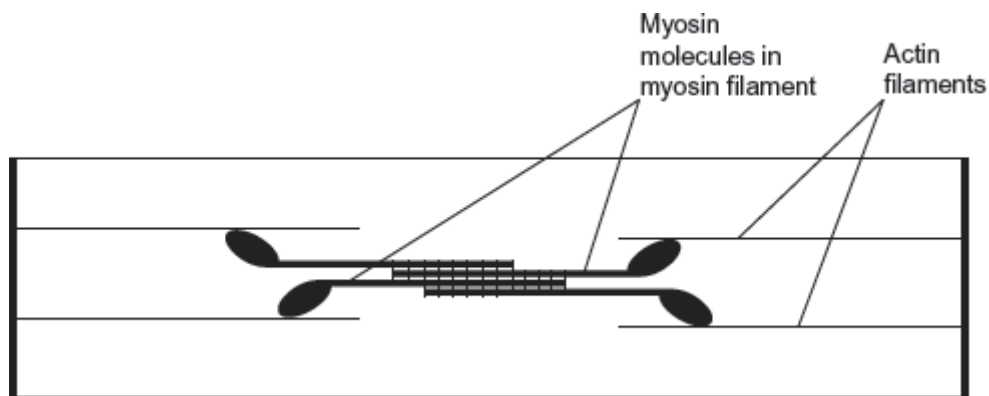
Q1. (a) A sarcomere is made up of different molecules.

Complete the table by naming the molecule that carries out the function described.

Function	Name
Attaches to Z line at the end of the sarcomere	
Breaks down ATP	
Covers binding site on actin in relaxed myofibril	

(3)

(b) The diagram shows the arrangement of actin and myosin in a sarcomere.



One form of muscle disease is caused by a mutated allele of a gene. This leads to production of myosin molecules that are unable to bind to other myosin molecules.

If myosin molecules are unable to bind to other myosin molecules, this prevents muscle contraction.

Use the diagram and your knowledge of how muscles contract to suggest why.

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 (3)

Q2. (a) Describe the role of each of the following in muscle contraction.

(i) Tropomyosin

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(2)

(ii) ATP

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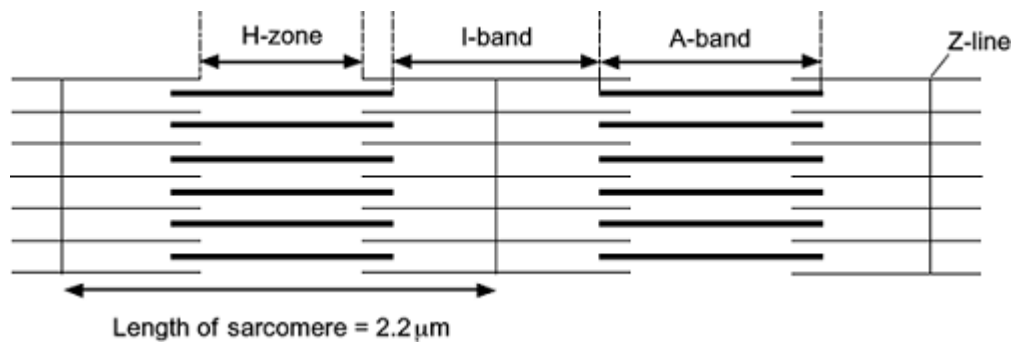
(2)

(b) Explain how muscles maintain posture.

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(3)

Q3. The diagram shows two relaxed sarcomeres from skeletal muscle.



(a) When the sarcomeres contract, what happens to the length of

(i) the I-band

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(1)

(ii) the A-band?

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(1)

(b) The length of each sarcomere in the diagram is 2.2 μm. Use this information to calculate the magnification of the diagram. Show your working.

Magnification

(2)

(c) People who have McArdle's disease produce less ATP than healthy people. As a result, they are not able to maintain strong muscle contraction during exercise. Use your knowledge of the sliding filament theory to suggest why.

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(3)

Q4.

- (a) What is the role of ATP in myofibril contraction?

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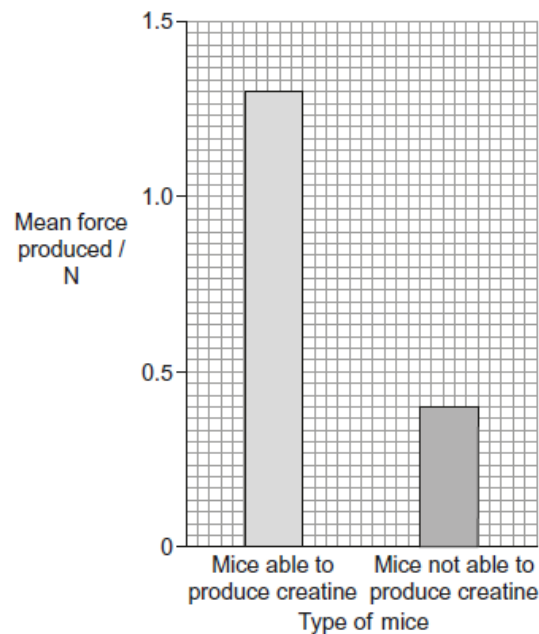
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(2)

- (b) Scientists investigated the effect of not being able to produce creatine on the force produced by muscle. They used mice with a mutation that made them not able to produce creatine. The force produced when these mice gripped with their paws was compared with the force produced by normal mice that were able to produce creatine.

The graph shows the scientists' results.



- (i) What was the percentage fall in the mean force produced by mice not able to produce creatine, compared with the normal mice? Show your working.

Answer %

(2)

(ii) Suggest an explanation for these results.

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.....(2)