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Use the following information to answer the next two questions.

Normally, skeletal muscle contractions are stimulated and controlled by nerve cells. Calcium ions (Ca^{2+}) also play an important role in the way muscles are controlled, as demonstrated by a series of experiments using isolated muscle fibres. These fibres can be manipulated in various ways:

- They can be stimulated with electrodes to mimic the effect of nerve cells.
- Ca^{2+} in solution can be injected into the fibres.
- A chemical that removes Ca^{2+} already present in the fibres can be injected.

The results from experiments using these procedures are given in the table below.

The Effect of Calcium Ions on Muscle Fibre Contraction

Experiment	Procedures		Results
	Electrode Stimulation	Ca^{2+} injected or removed	
1	on	neither	contraction
2	off	injected	contraction
3	on	removed	no contraction

1. Interpret the results of these experiments.

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2. What evidence is there from these experiments that calcium ions are normally present in muscle tissue?

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*Use the following additional information to answer the next four questions.*

Additional experiments using injections of radioactive Ca^{2+} show that the ions are stored within the sacs of the sarcoplasmic reticulum in resting muscle tissue. When the tissue is stimulated to contract with electrodes, the radioactive Ca^{2+} ions are found among the actin and myosin filaments as shown below.
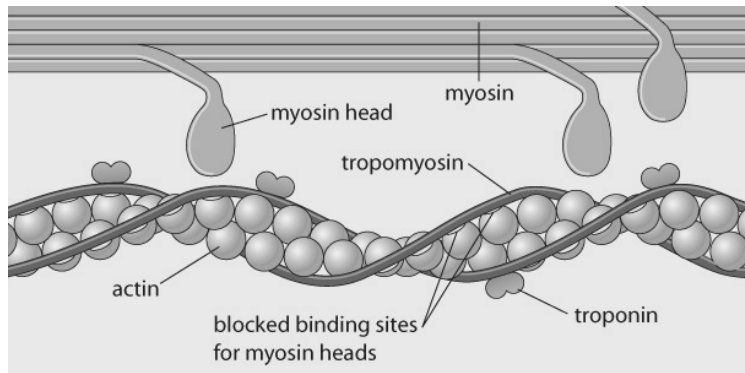
The muscle is at rest.
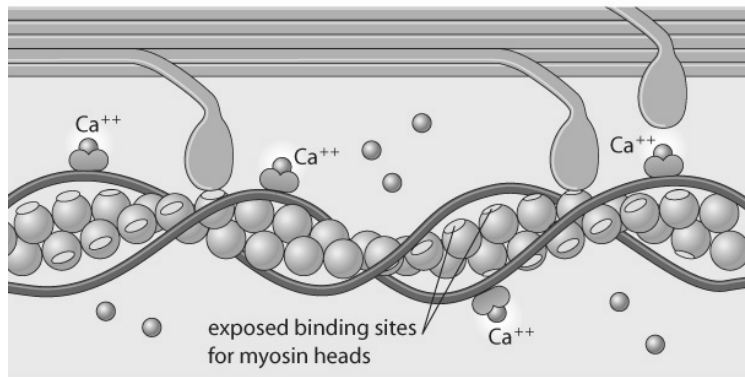
The muscle is contracting.

3. Refer to diagram of the muscle at rest above, and explain what effect a lack of tropomyosin would have in muscle tissue.

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4. The diagram of the muscle contracting shows the role of calcium ions in repositioning tropomyosin. Where are these ions stored when the muscle is at rest? What causes them to move among the actin and myosin filaments?

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5. What happens to calcium ions and tropomyosin to cause a muscle to relax?

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6. Use a flow chart to describe the series of events that starts with stimulation and ends with relaxation.

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