

CHAPTER 10**HANDOUT**

Experiments with Isolated Skeletal Muscle

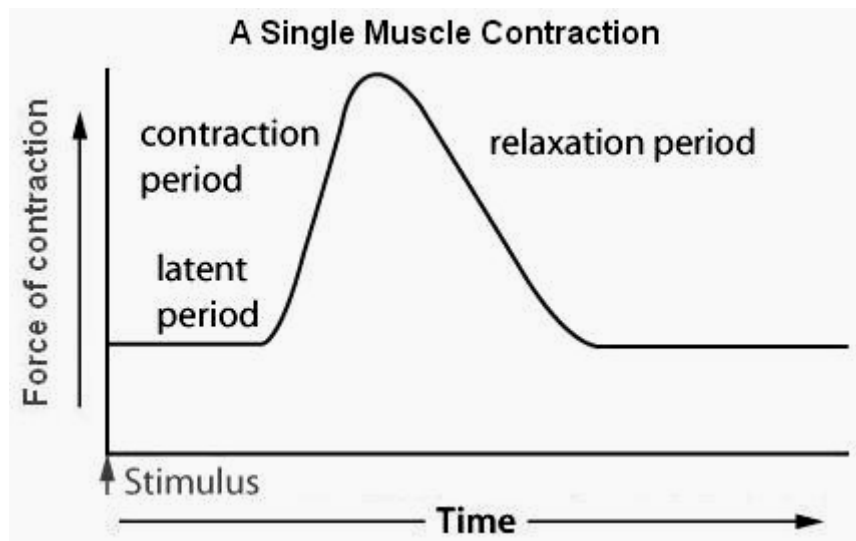
BLM 10.2.2

After studying the chemical reactions in actin and myosin molecules and the sliding filament model of muscle contraction, it is time to look at the overall behaviour of muscle tissue. How do our muscles produce the millions of coordinated movements we make every day?

Physiologists have experimented with pieces of skeletal muscle removed from the body to discover how muscles produce short, rapid movements or the long, sustained contractions involved in posture and prolonged activities like lifting and holding an object in your hand. Isolated muscle is stimulated with an electrode to investigate various types of responses. A graph showing the force of contraction produced by the muscle over time is called a myogram.

Muscle Twitch

When isolated muscle receives a single stimulus at or above a certain threshold strength, it twitches, as demonstrated in the myogram in the figure below.



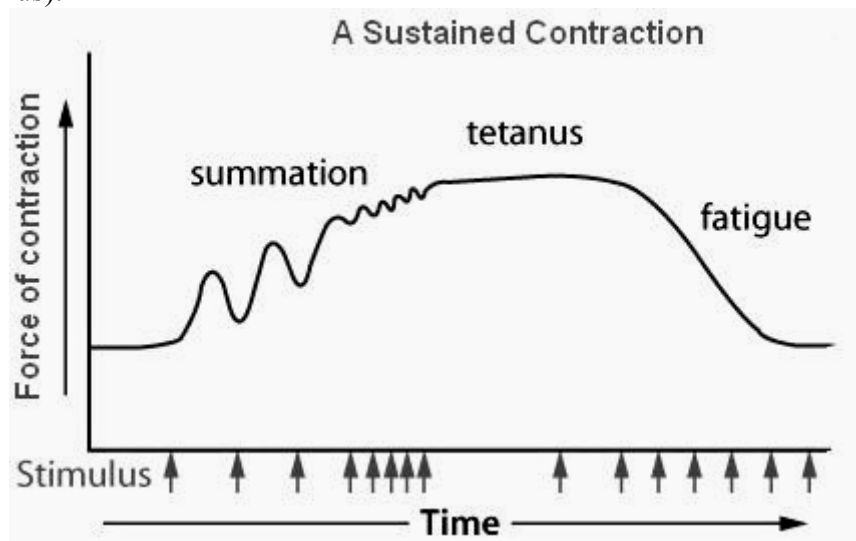
1. Recalling your knowledge of the sliding filament theory, describe what is occurring in the myofilaments during each stage of the muscle twitch.

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2. All muscle fibre twitches occur with the same force of contraction. How can you explain the fact that you can vary the strength of your muscle contractions depending on the work to be done?

Tetanus

When muscle is stimulated with a rapid series of threshold stimuli, it produces a sustained contraction (tetanus).



3. What is summation? What happens to the force of contraction of the muscle when summation occurs?

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4. Coordinated movement and posture of the body involves producing tetanus in some muscles, while other muscles are relaxed. Explain.
