

Muscle Contraction Key Information

Muscle contraction in A Biology is explained by the sliding filament theory. This process occurs within the sarcomeres of muscle fibres, where myosin (thick filaments) bind to actin (thin filaments) using cross-bridges. ATP is required to power the movement of the myosin heads, which pull the actin filaments inward, shortening the sarcomere and causing contraction. The release of calcium ions from the sarcoplasmic reticulum is triggered by a nerve impulse, allowing myosin-binding sites on actin to become exposed. Muscle contraction continues as long as calcium ions and ATP are available.

Key words & definitions

Key word	Key information
Sliding Filament Theory	The explanation of how muscles contract by actin and myosin filaments sliding past each other to shorten the sarcomere.
Cross-bridge	The connection formed when a myosin head binds to an actin filament during contraction.
Myosin Head	The part of the myosin molecule that binds to actin and performs the power stroke using ATP.
Sarcoplasmic Reticulum	A specialised endoplasmic reticulum in muscle cells that stores and releases calcium ions.
Calcium Ions (Ca^{2+})	Ions released from the sarcoplasmic reticulum that enable myosin to bind to actin by exposing binding sites.
Actin	A protein that forms thin filaments in the sarcomere and interacts with myosin during muscle contraction.
Myosin	A protein that forms thick filaments in the sarcomere and binds to actin to generate muscle contraction.