

Muscle and motility **HL only**

Motile vs sessile

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Four reasons for locomotion

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An example of migration

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Sarcomere

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Sliding filament model

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Role of ATP in muscle contraction

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Titin

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**Why are antagonistic muscles
needed?**

Foraging for food, escaping from danger, searching for a mate and migration.

Motile organisms move from place to place (e.g. Atlantic salmon); sessile organisms are fixed but move parts (e.g. Venus flytrap closing its leaf).

The repeating unit of a myofibril between two Z lines, containing overlapping actin and myosin filaments.

Arctic terns fly between Arctic breeding grounds and the Antarctic each year.

ATP binding detaches myosin from actin; its hydrolysis re-cocks the myosin head for the next power stroke.

Myosin heads bind actin, swivel and pull it towards the sarcomere centre using ATP; filaments slide, sarcomere shortens.

Muscle tissue can only exert force when it contracts, so a second muscle is needed to pull the body part back.

Immense spring-like sarcomere protein that helps sarcomeres recoil after stretching and prevents overstretching.

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Intercostal muscles as an antagonistic pair

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Motor unit

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What happens at a neuromuscular junction?

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Two roles of skeletons in movement

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Exoskeleton vs endoskeleton

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Ligament vs tendon

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Bones at the hip joint

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How is range of motion measured?

One motor neuron, all the muscle fibres it stimulates and the neuromuscular junctions that connect them.

Fibres in different orientations: external intercostals move ribs up and out, internal move them down and in; each stretches the other.

Anchorage for muscles and levers that pivot at joints.

Acetylcholine is released, binds to receptors on the muscle fibre and depolarises it, triggering contraction.

Ligament: bone to bone, stabilises the joint.
Tendon: muscle to bone, transmits force.

Exoskeleton (arthropods): outside, muscles on inner surface. Endoskeleton (vertebrates): inside, muscles attached outside by tendons.

As joint angles in degrees, using a goniometer or computer analysis of images, in each dimension of movement.

The head of the femur fits into a socket in the pelvis: a ball-and-socket synovial joint.

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Swimming adaptations of marine mammals

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How does a dolphin's tail movement differ from a fish's?

The dolphin's horizontal fluke moves up and down; a fish's tail moves from side to side.

Streamlining, forelimbs as flippers, tail as a fluke moved up and down, and a blowhole for breathing between dives.