

B3.3 — Muscle & Motility

Why it happens

B3.3.1 — Adaptations

- Movement = universal feature

↳ Two types:

1. Movements within organism (all)
2. Locomotion => moving from 1 place to another (some)

Motile: organisms that can do locomotion (Panda, humans)

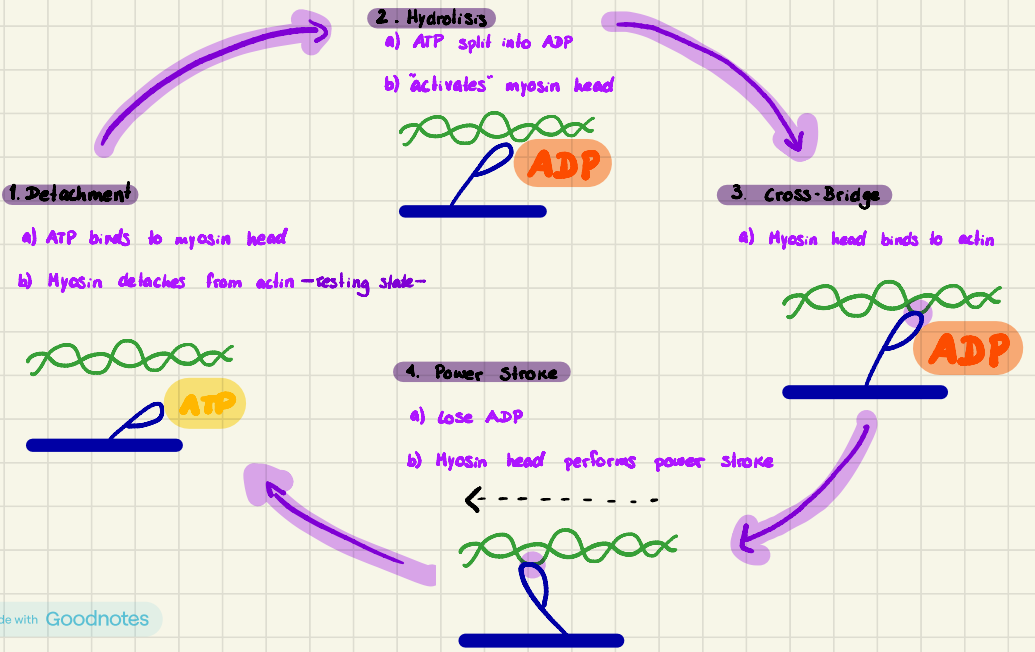
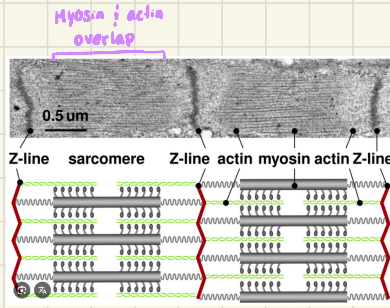
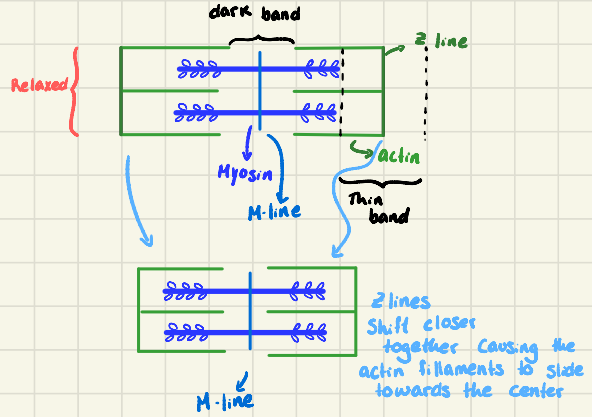
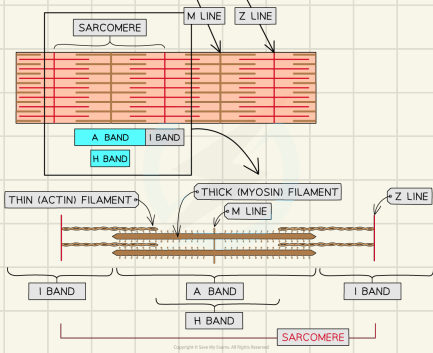
Sessile: organisms that remain in one location [no locomotion] - (Plants, corals)

B3.3.9 — Reasons for locomotion

- i. Finding food
- ii. Escaping danger
- iii. Finding a mate
- iv. Migration

Contraction/relaxation of muscles

BS.3.2 - Sliding filament of muscle contraction



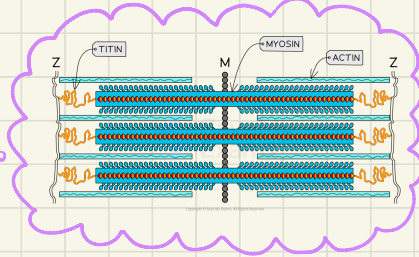
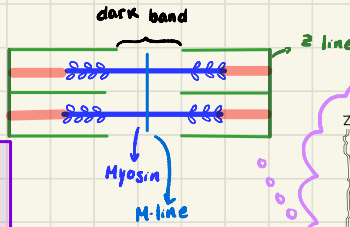
83.3.3 - Titin's role

- Connects Z line to myosin
- Prevents Z lines from moving too far apart
- Big polypeptide

If the muscle is relaxed, titin is stretching, as it's holding the Z line and myosin filaments away from each other.

↳ Titin = elastic.

↳ it stores potential E as it stretches and allows for a strong contraction when it recoils.



83.3.8 - antagonistic muscle action

- Internal intercostal muscles } antagonistic muscles
- External intercostal muscles }

	Inhaling	Exhaling
intercostals contracting?	External	Internal
what happens to rib?	up + out (expand)	inward / down (smaller)

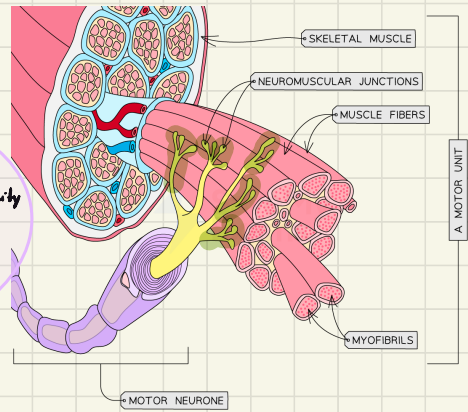
Many neuromuscular junctions... if high intensity contraction, high # of motor units activated. If low intensity contraction, low # of motor units activated.

83.3.4 - Motor units

Neuromuscular junction ⇒ where a motor neuron meets a muscle fiber

Acetylcholine ⇒ the neurotransmitter responsible for muscle contraction

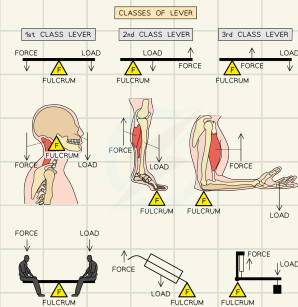
Motor unit ⇒ motor neuron + all of the muscle fibers it connects to



83.3.5 - Role of skeletons

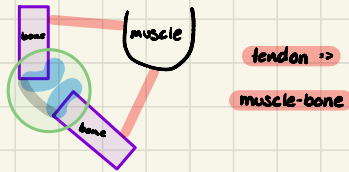
- Bones and exoskeletons = anchorage for muscles & act like levers
 - a) endoskeleton - inside } → humans } provides support
 - b) exoskeleton - outside } Same function } → arthropods
- Muscles = anchored to skeleton
 - ↳ skeletons have a pivot point called "fulcrum"

Fulcrum ⇒ pivot point for a joint } connects 1 part that moves and 1 that doesn't.
 ? it doesn't move itself



Joints allow movement

B3.3.6 — synovial joints



ligament =>

bone-bone

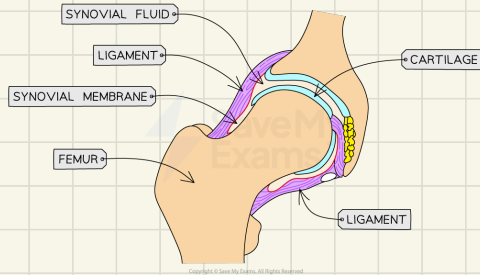
Synovial capsule

fluid

Cartilage =>

reduce friction between

bones



B3.3.7 — Range of motion

Hinge joint: joints that can only flex & extend (knee & elbow)

- Stable but limited range of motion

Ball and socket joint: joints capable of rotation, adduction, abduction, protraction, retraction (hip, shoulder)

- Wider range of motion
- Requires additional components

Goniometer: measures joint angles

- can investigate range of motion

Dif. body systems!

B3.3.10 — marine mammals

1. Streamlined body shape

- ↳ Teardrop shape
- ↳ smooth, hairless body to ↓ friction

2. Airways

- ↳ Blowholes
- ↳ Mouth ≠ connect to lungs

3. Locomotion

- ↳ Fins, flippers, tails
- ↳ Blubber to increase buoyancy