MUSCULAR SYSTEM

LOCOMOTION AND MOVEMENT

NEET 2024

IN 3D

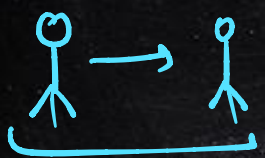
SEEP PAHUJA


75 HARD CHALLENGE
TEST SERIES
- Breathing & Exchange of Gases
- Body Fluids & Circulation
- Excretory Products & their elimination
Date: 5th Nov
Time: 12PM
60
MINUTES

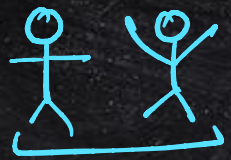
1 & 5:30

Locomotion and Movement

All locomotion are type of movements but all movements are not locomotion.



Displacement



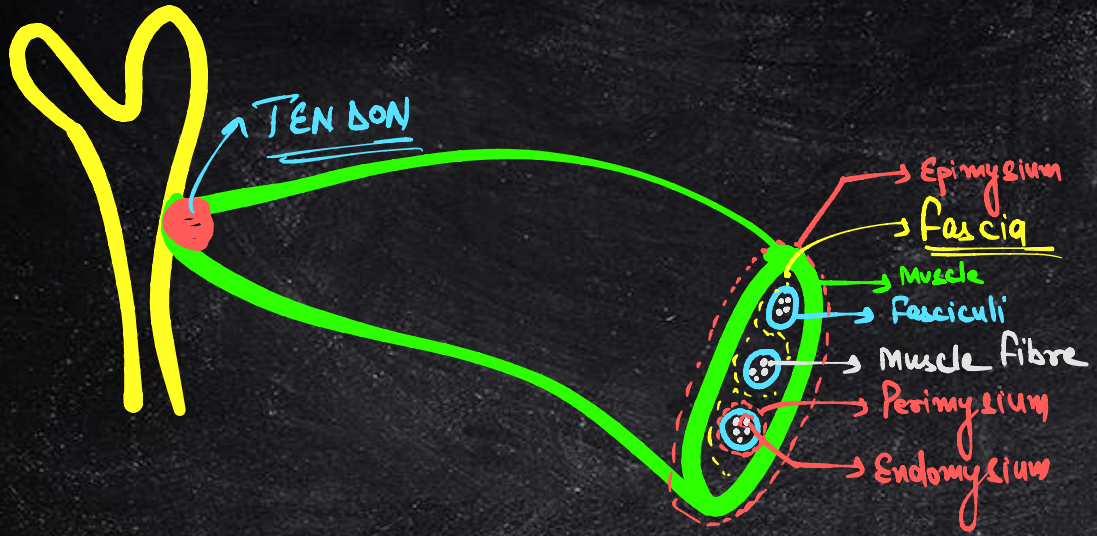
Moving at a same place

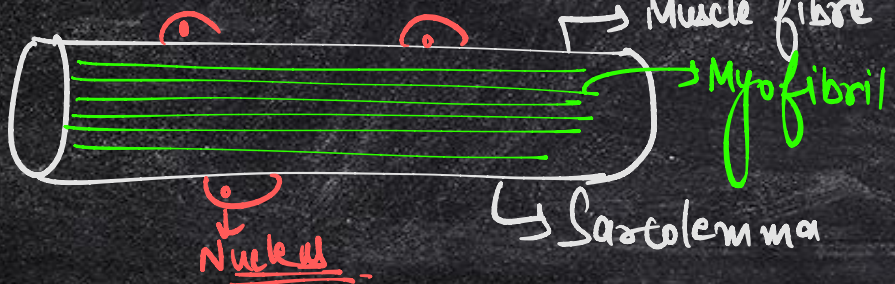
Types of Movements

- Amoeboid Movement
  - WBC and Macrophage
- Ciliary / Flagellar Movement
  - Lining of fallopian tube
  - Trachea and Bronchi
  - Ventricles of Brain.
  - H_2O Canal System. (Porifera)
  - Sperm

- Muscular System

SKELETAL MUSCLES





PM → Sarcolemma

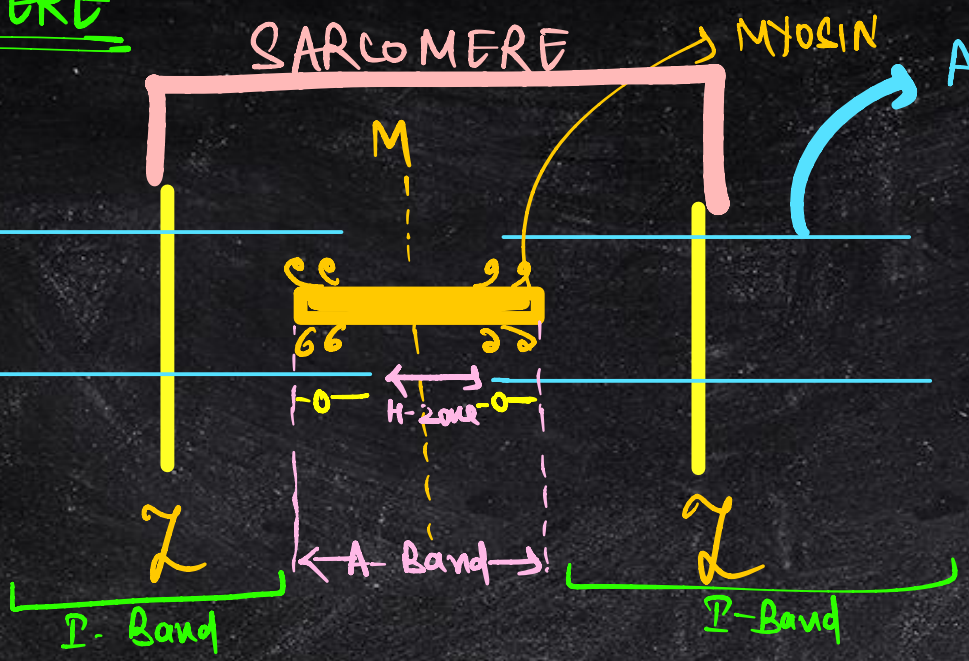
Mitochondria → Sarcosome

ER → Sarcoplasmic reticulum

Muscle
↓
Fasciculi
↓
Muscle cell / fibre
↓
Myofibril
↓
Myofilament

- Thick → MYOSIN
- Thin → ACTIN

SARCOMERE



Sarcomere = 1 A-Band + 2 × $\frac{1}{2}$ (I-Band)

Sarcomere = 1-A + 1-I

(Dark) A-Band - Anisotropic

(Light) I-Band - Isotropic

H-Zone - Hensens Zone

O-Zone → Overlapping zone

1 Thick filament surrounded by 6 thin filament

1 thin 3 thick filament.

Myosin Protein → THICK filament

Monomer → Meromyosin.

6 poly peptide chain

2 - long

4 - short.

HEXAMER

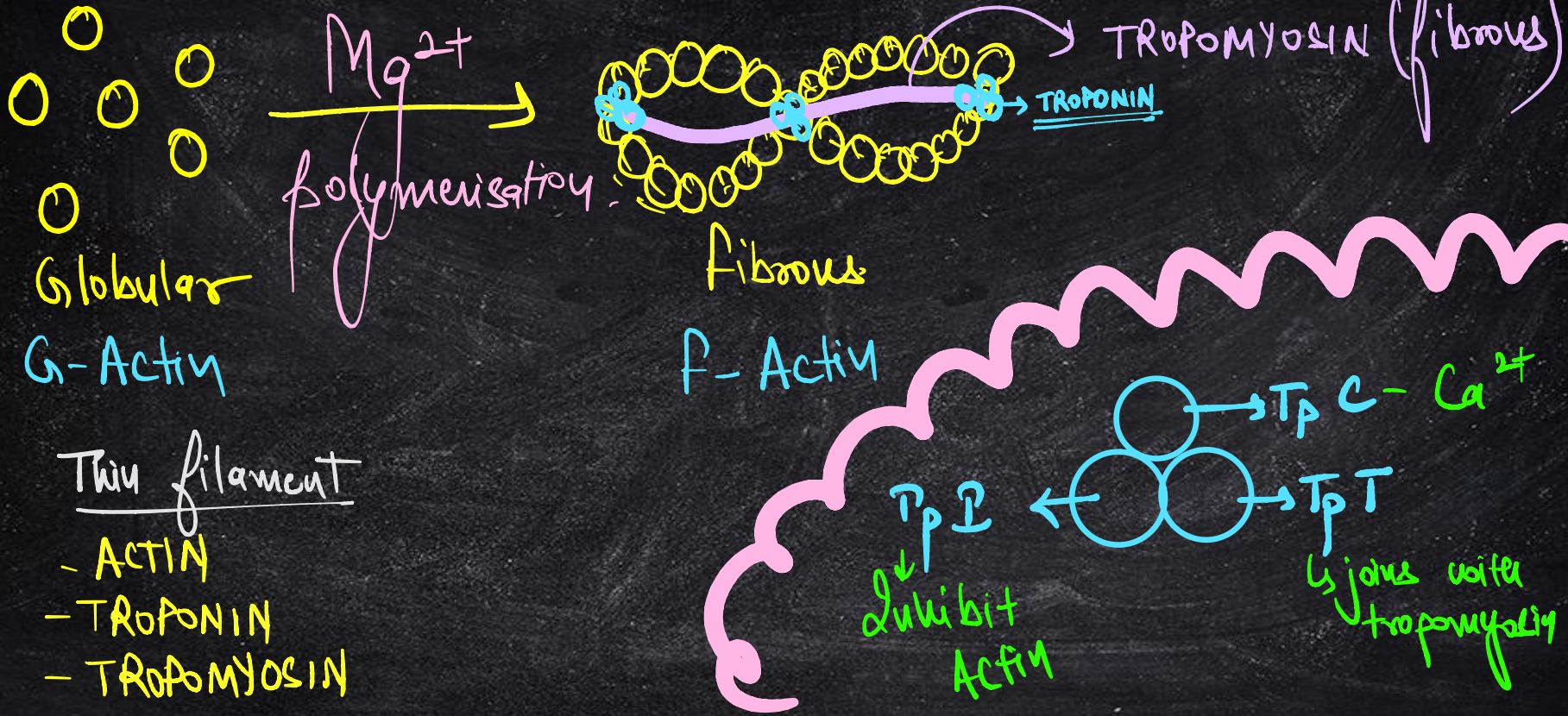
LMM - Light Meromyosin.

TAIL - fibrous

HMM - Heavy Meromyosin.

Head - globular

ACTIN → part of thin filament.



Thin filament

- ACTIN
- TROPONIN
- TROPOMYOSIN

Thick filament

- MYOSIN

Thin filament

- ACTIN
- TROPONIN
- TROPOMYOSIN

→ Contractile protein.

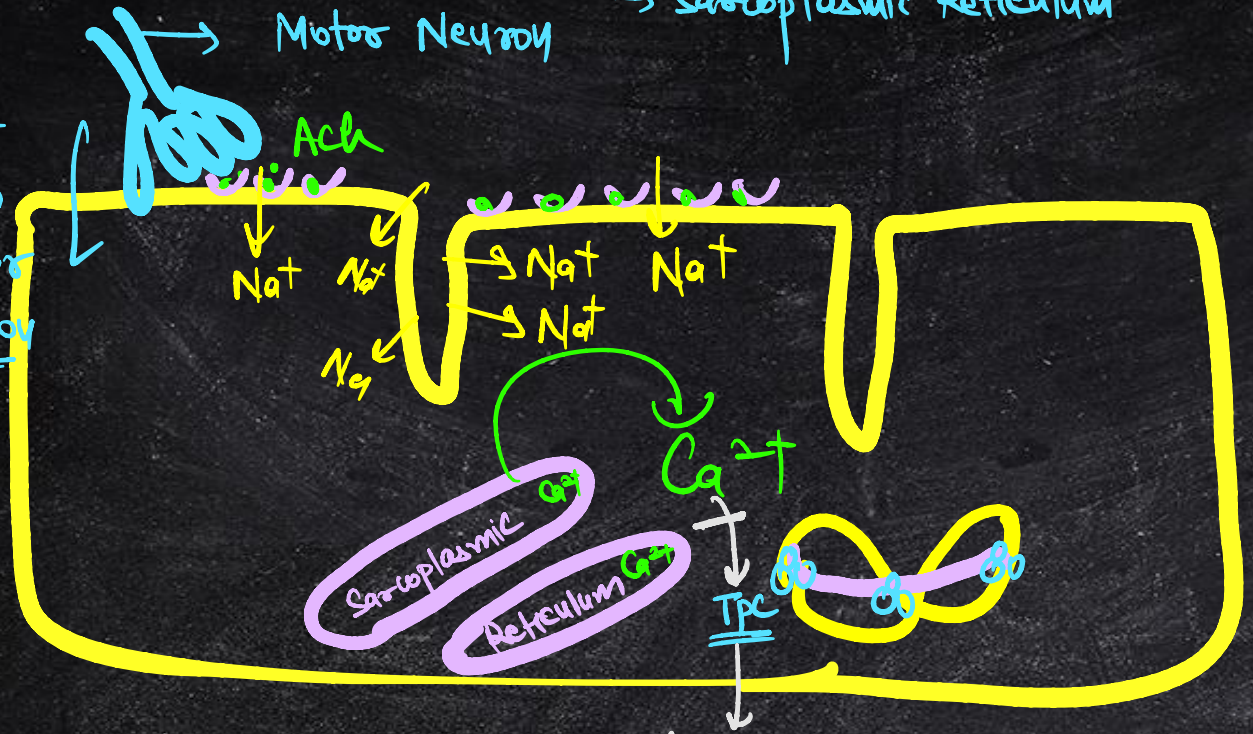
→ Regulatory proteins.

SARCO-TUBULAR SYSTEM → T-Tubule
→ Sarcoplasmic Reticulum

SR = Store House of Ca^{2+}

→ Motor Neuron

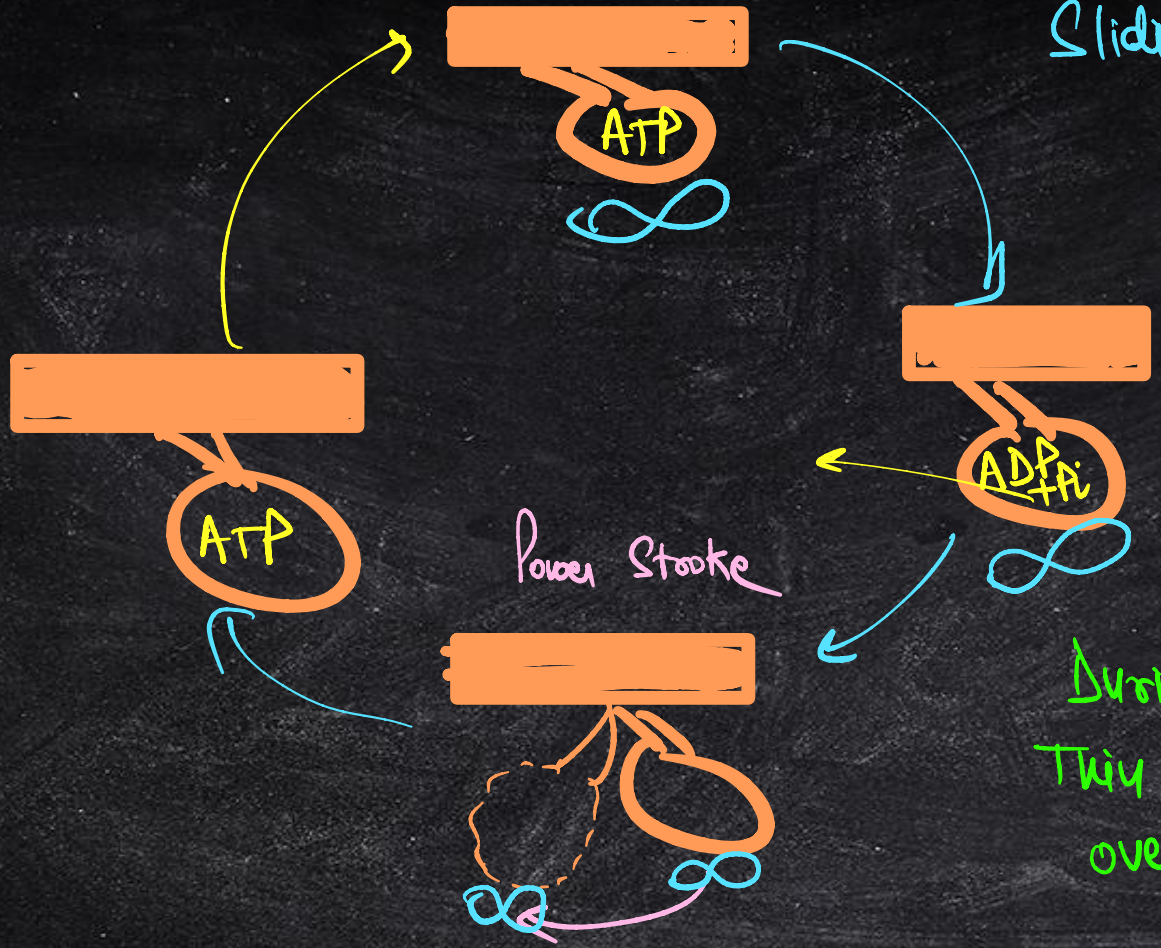
NMJ
- Neuro muscular Junction



- Conformational change
- deviate Tropomyosin & troponin

↓

Unmasking of Myosin Binding Site of Actin



Sliding filament theory

— by Huxley & Huxley

CROSS BRIDGE

During Contraction Thin filament slides over thick filament

Threshold Stimulus – Minimum strength of stimulus which cause contraction

All or none phenomena

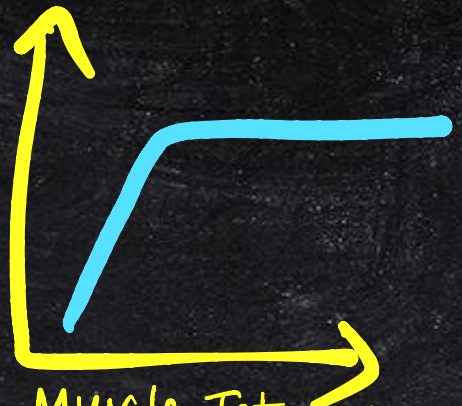
If threshold stimulus is applied → Complete Contraction

If Stimulus < Threshold → No contraction

Applicable to Muscle Cell/fibre

Not Muscle

Muscle Twitch



Muscle Tetanus.

Sustained contraction

Tropp.

MUSCLE RESPONSE.

Types of Skeletal Muscle

Red fibres	White fibre.
- High Myoglobin	- No Myoglobin
- Abundant Mitochondria	- Low no of Mitochondria
- SR - less	- More
- Slow to start	- fast to start
- Lactic Acid does not Accumulate	- LA accumulate.
- do not fatigue easily	- fatigue easily

eg - Back Muscle

- flight Muscle of kite
- Marathon Runner

eg Muscle of eye

- flight muscle of sparrow
- Sprinter.