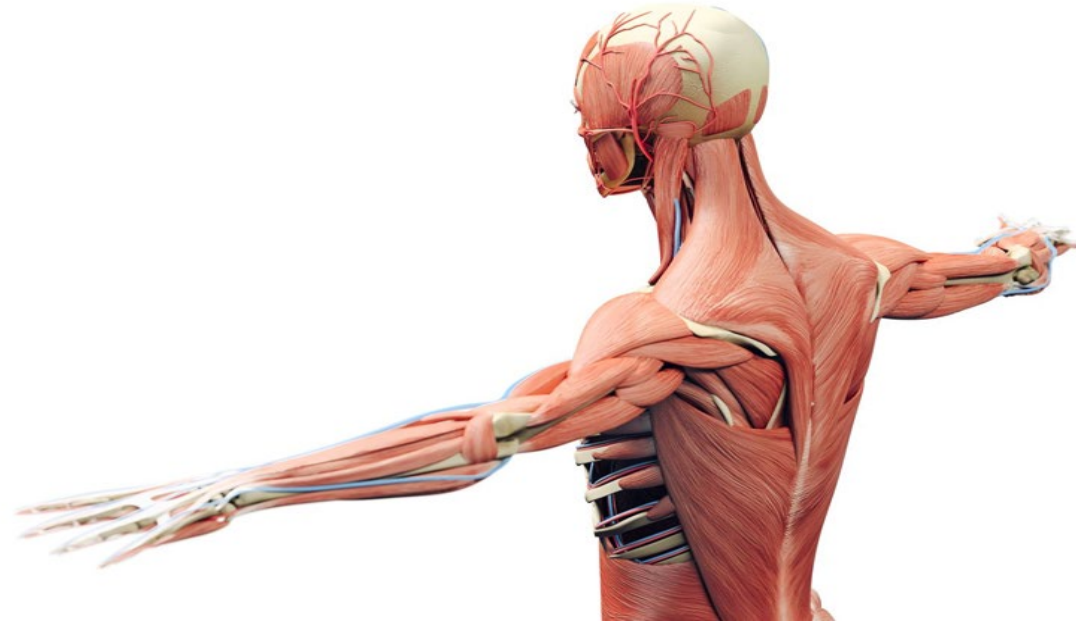


Basra University –Pharmacy College



Physiology Lab. Tetanus and Fatigue of Muscle Contraction

1st semester 2023-2024

Lecturer

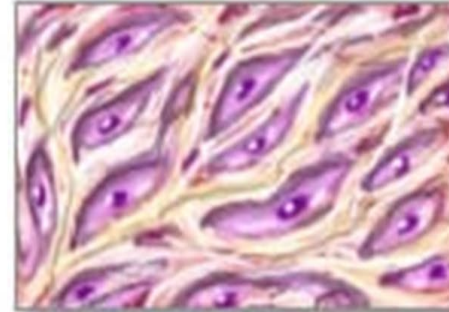
Hussein Mohammed Abboud

Introduction

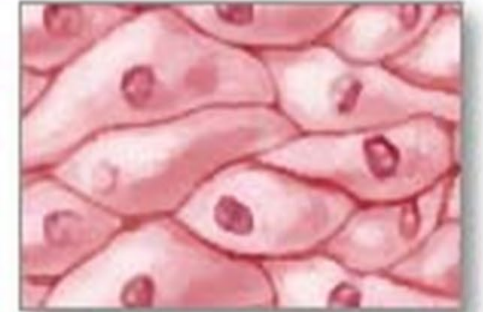
There are four types of tissues

- Connective tissue : supporting organ and cells
- Epithelial tissue : protection the body
- Nervous tissue : control & communication
- Muscular tissue : produce movement of the body

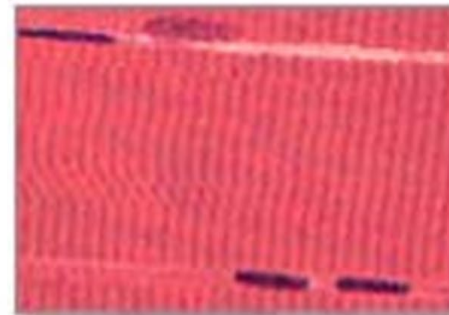
Four types of tissue



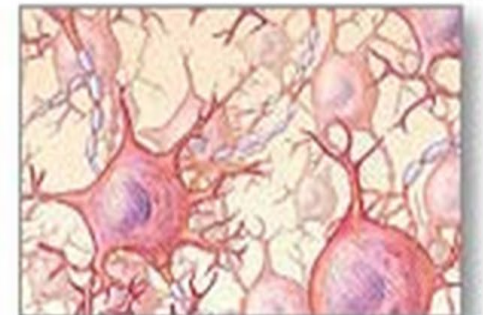
Connective tissue



Epithelial tissue



Muscle tissue



Nervous tissue

Introduction

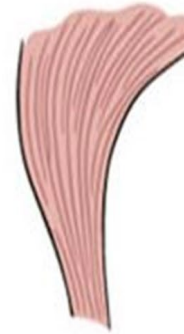
Muscular tissue

- Cardiac muscle : Involuntary
- Smooth muscle : Involuntary
- Skeletal muscle : Voluntary (under control)

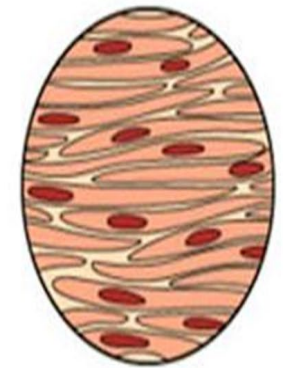
Cardiac muscle



Skeletal muscle



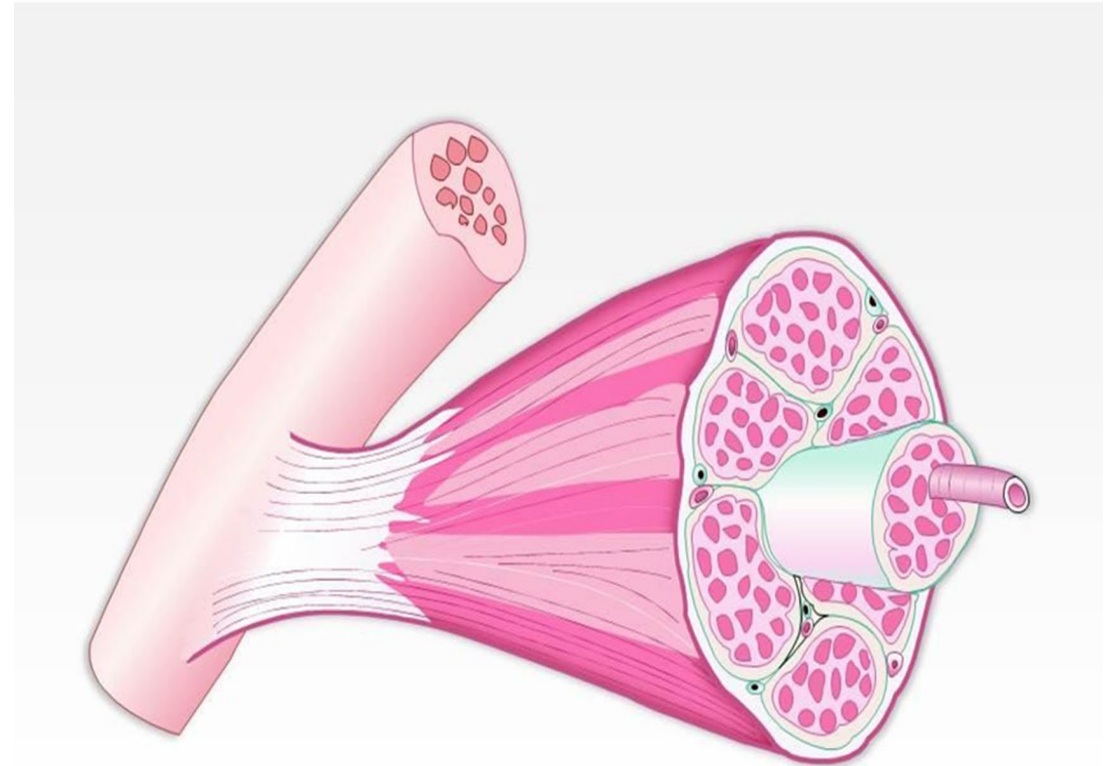
Smooth muscle



Microstructures of muscle tissue

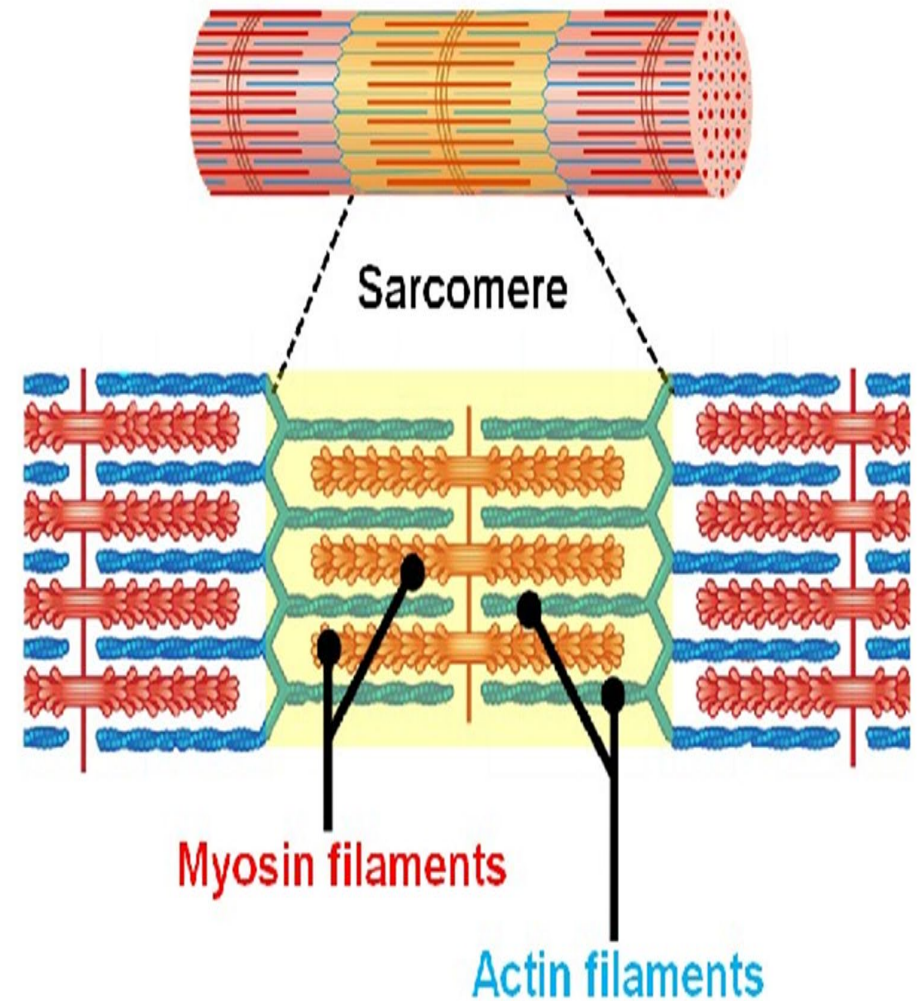
- Connective tissue which covers the entire skeletal muscle called Epimysium
- Connective tissue which wraps around a fascicle (bundle) of muscle fibers called Perimysium
- Connective tissue which encloses a single muscle fiber called Endomysium

A skeletal muscle fiber – With Labels Removed

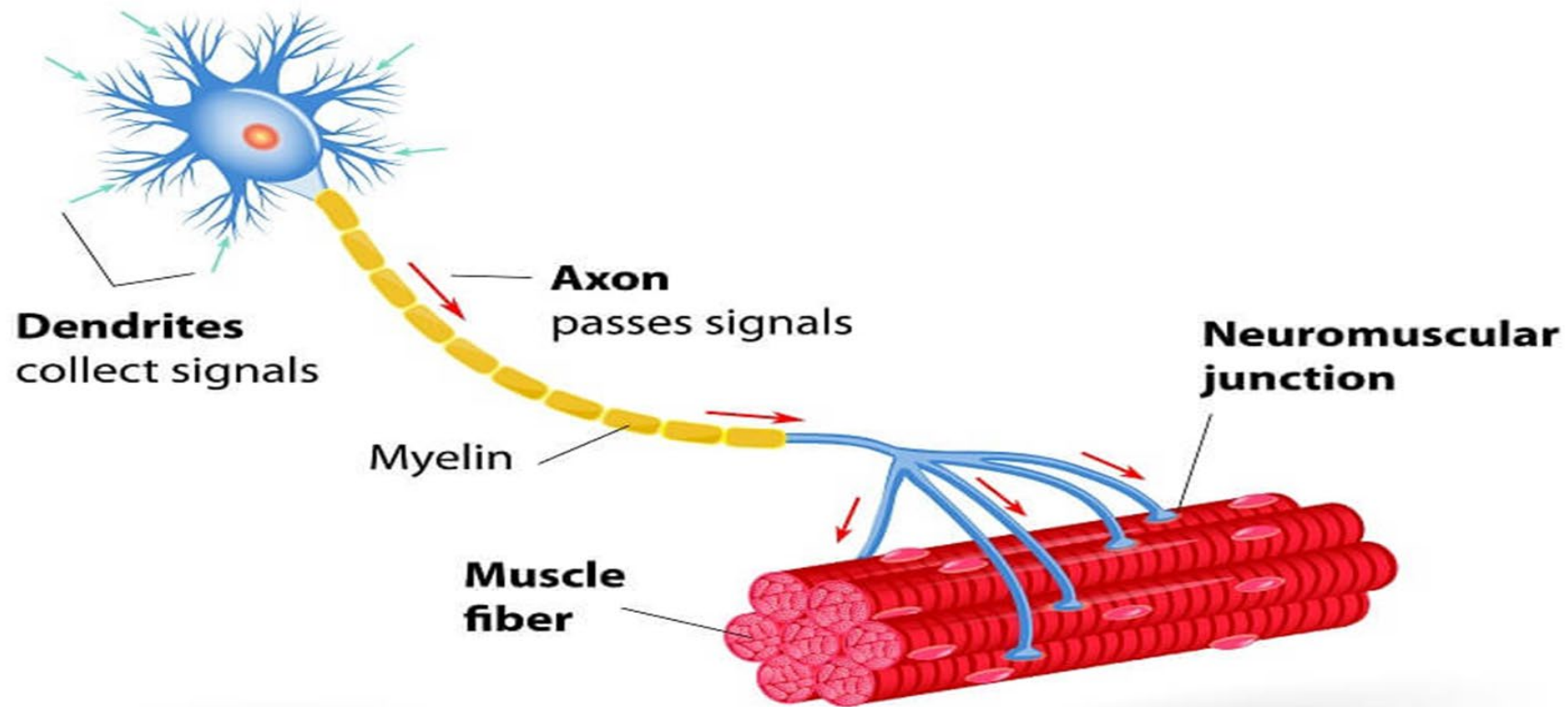


Sarcomere:

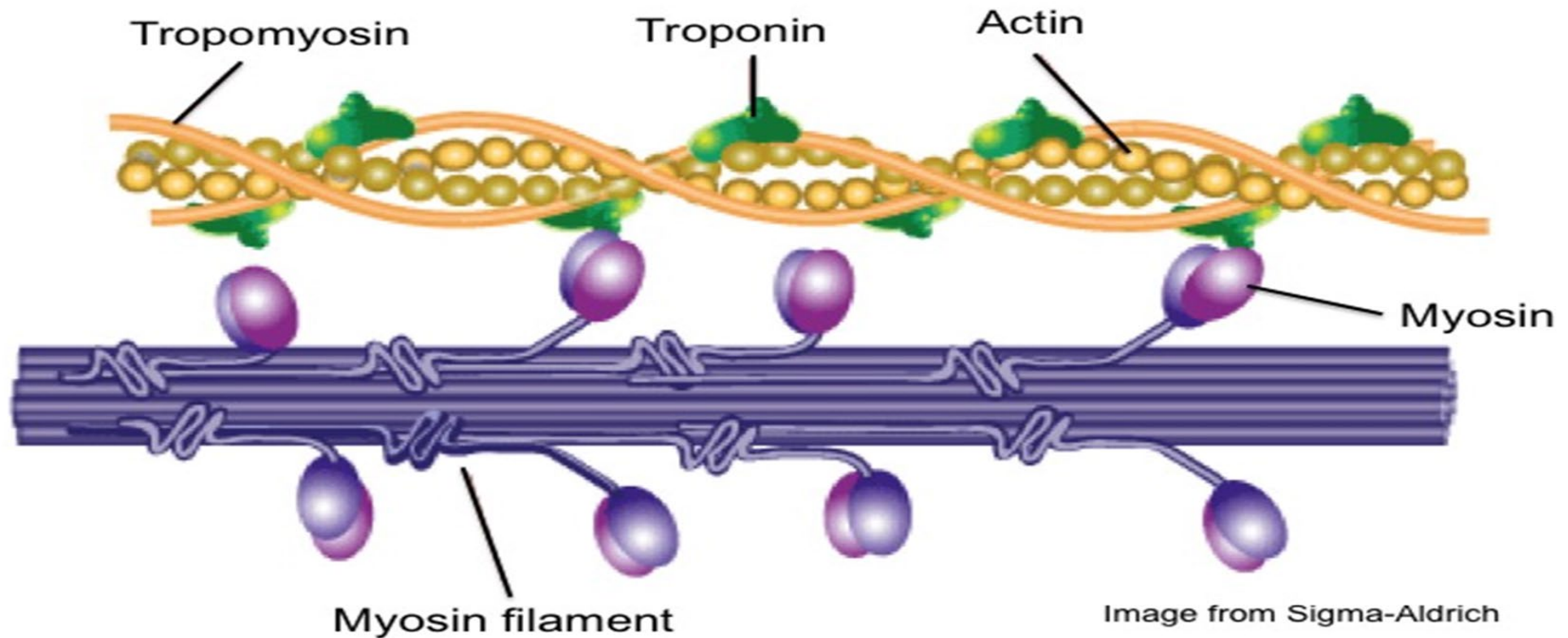
- The distance between two successive z lines in each muscle fiber.
- A sarcomere is the basic contractile unit of muscle fiber.
- Each sarcomere is composed of two main protein filaments: actin and myosin Which are the active structures responsible for muscular contraction.
- These filaments are closer together in the case of muscle contraction, further than relaxation.



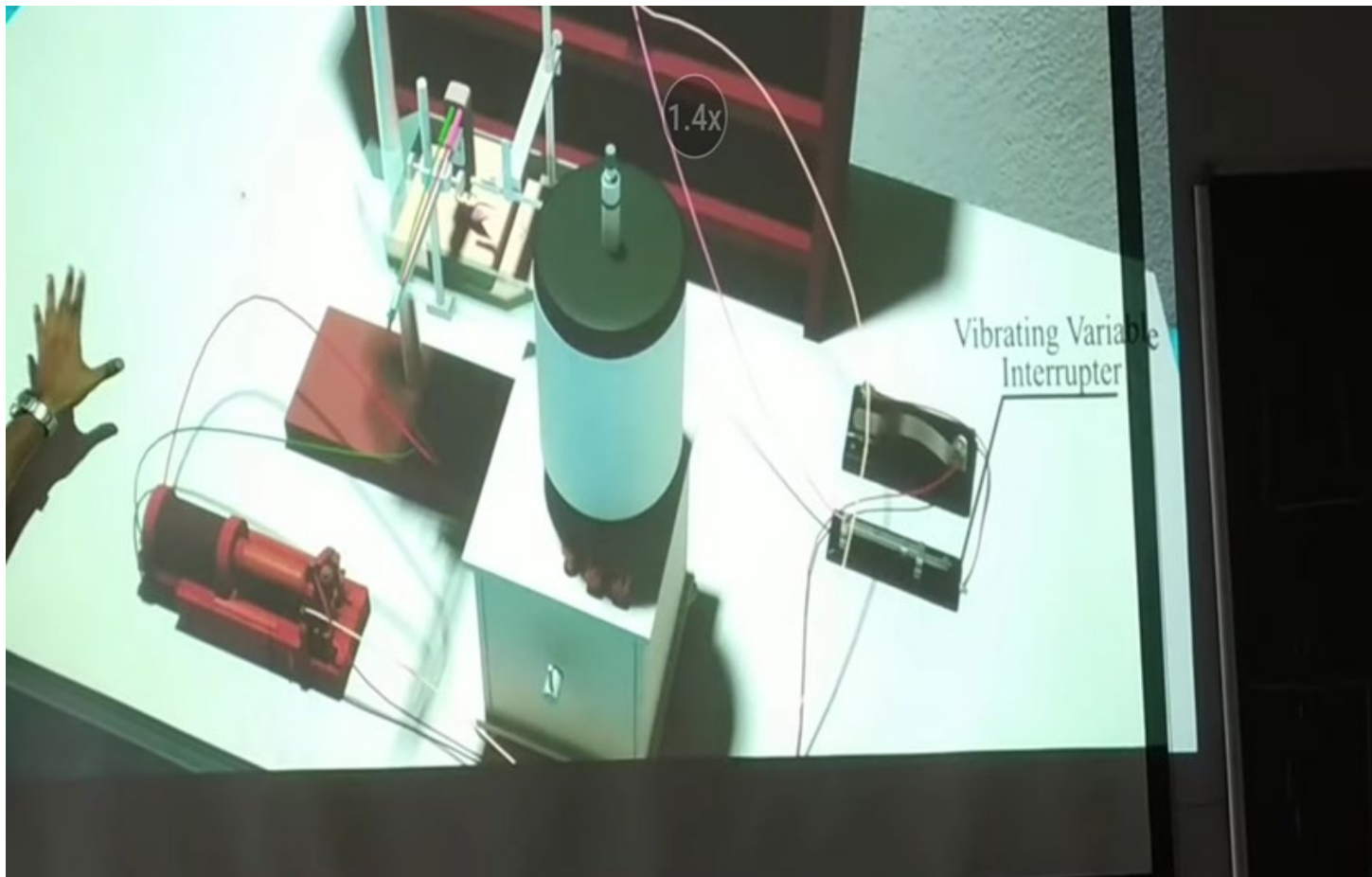
An action potential (AP) travels along a motor nerve to its endings on muscle fibers



Muscle contraction thus results from an interaction between the actin and myosin filaments that generates their movement relative to one another

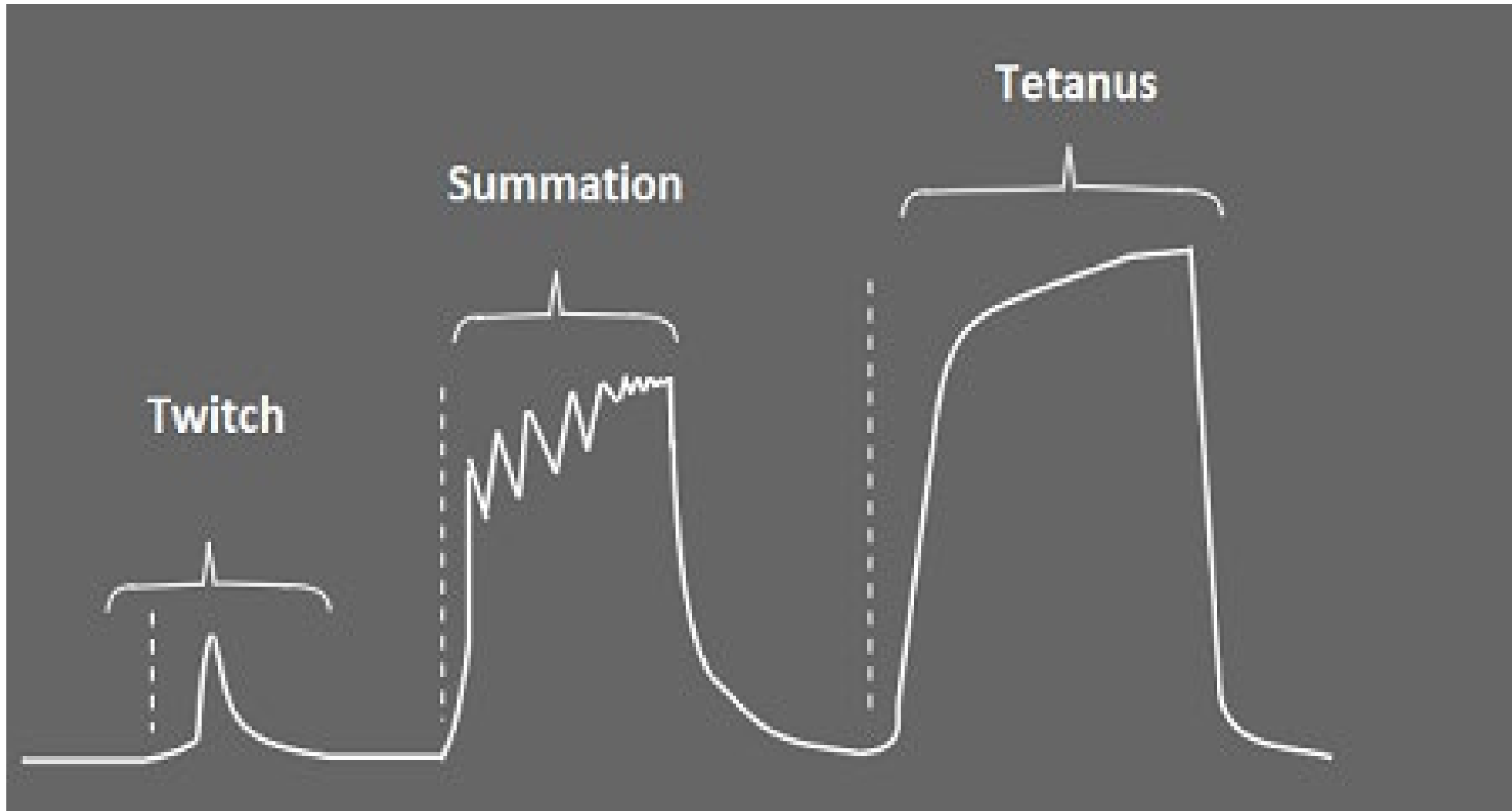


Electric kymograph is used to record muscle contraction and there are several scenarios to observe this physiological function of muscle.



When many successive stimuli are applied by using electric kymograph the response of the muscle depends on the frequency of stimulation:

- **Simple muscle twitch:**
- The contraction generated due to a single stimuli followed by a relaxation phase.
- **Wave summation** : muscle twitches are fused together.
- **Incomplete tetanus** : muscle experiences quick cycles of contraction with a short relaxation phase for each.
- **Complete tetanus:** If the stimulus frequency is so high that the relaxation phase disappears completely.
- **Muscle fatigue** : if the muscle runs out of oxygen and adenosine triphosphate (ATP)



Twitch, summation and tetanus

References

A TEXTBOOK OF PRACTICAL PHYSIOLOGY

8th edition CL GHAI

JAYPEE

All The Best