

Lesson 16

LOCOMOTION AND MOVEMENT

Summary

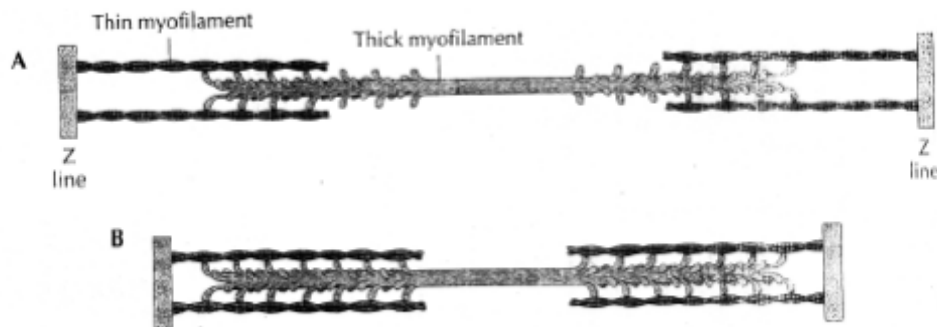
• Movement is when the living Organism moves a body part or parts to bring without a change in the position of the organisms. Locomotion is when the movement of a part of the body leads to change in the position and location of the organism. Both of these are brought about by the joint efforts of the skeletal and muscular systems. Movement is seen in both vertebrates and invertebrates.

TYPES OF MOVEMENTS FOR LOCOMOTION

• Cilia and flagella are organelles which help in movement. Cilia are many and move together causing a wavy motion. Ciliary *protozoa* locomote with the help of cilia. Flagella may be one or two and with whip like strokes help in Locomotion. Human sperms, certain algae like *Chlamydomonas* move from one place to another with the help of flagella.

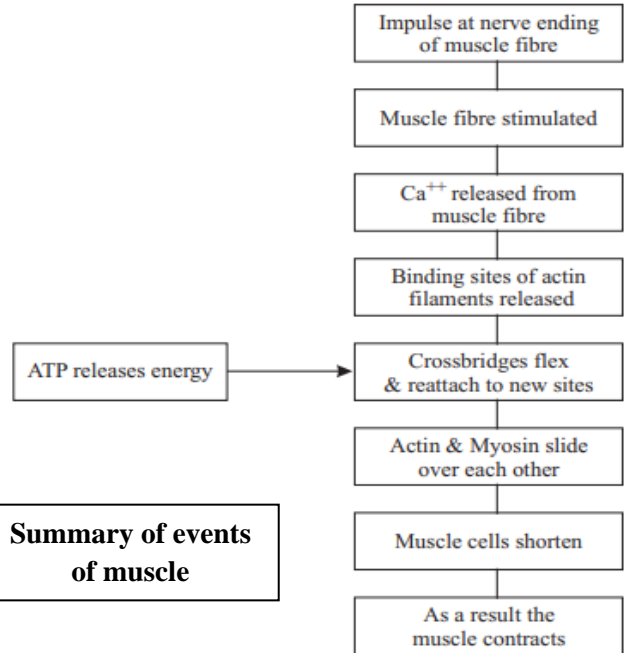
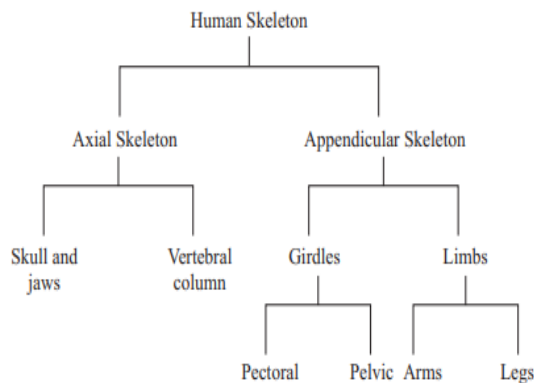
MUSCULAR MOVEMENT IN ANIMALS

- Muscles are a tissue made of muscle cells, also called muscle fibres. Muscle fibres are made of thick and thin myofilaments made of myosin and actin protein molecules respectively.
- The unit of contraction is termed a **sarcomere** and it contains both the myofilaments which slide between Z lines.
- **Actin** and **myosin**(Contractile Protein) filaments in a muscle fibre (muscle cell) slide over each other to cause Locomotion. Hence the muscle is said to contract through sliding of these two kinds of myofilaments and this is termed sliding model of muscle contraction.
- The biological energy, ATP or Adenosine Triphosphate is required for muscle contraction.
- Nerve impulse stimulates muscle movement.



Sliding model of muscle contraction

- Skeleton supports the body, gives rigidity to body, provides surface for attachment of muscles, and protects soft internal organs like the brain, heart, lungs etc.
- Vertebrate skeleton is made of bone and cartilage. Bones and cartilages are connective tissues made of ossein and cartilage which are also part of human skeleton.
- Bones are joined to each other by ligaments & to muscles by tendons.
- Human skeleton is divided into axial skeleton which includes skull and vertebral column and appendicular skeleton comprised of bones of girdles and limbs.



MUSCULAR AND SKELETAL DISORDERS

- Hereditary muscular and skeletal disorders are myasthenia gravis and muscular dystrophy.
- Arthritis and Rheumatism are bone disorders.
- Osteoporosis leads to softening of the bones due to Ca and Vitamin D deficiency.
- Gout results from increase in level of uric acid in blood.

MOVEMENTS IN PLANTS

- Plants do not possess the ability to move from one place to another but various types of movement take place within plants, including phototropism, hydrotropism, geotropism, thigmotropism.
- Plants show movements in response to external stimuli like light, water, gravity, called TROPIC MOVEMENTS.
- NASTIC MOVEMENTS are induced by certain stimuli like contact, change in day length, temperature, etc. Unlike tropic movements in nastic movements the plant parts do not move in the direction of stimulus e.g. flowers of Portulaca, bloom in the day

Test Yourself

1. Name the contractile proteins which remain present in animal.
2. Draw the sliding model of muscle contraction showing Z line in it.
3. Mention the muscular and skeletal disorders in human being.

