# Quadrant II – Transcript and Related Materials

**Programme: Bachelor of Science (First Year)**

**Subject: Zoology**

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**Paper Title: Diversity of Non chordates and Cell Biology**

**Unit: 01**

**Module Name: Locomotory organelles and locomotion in Protozoa**

**Module No: 05**

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## ABSTRACT:

In protozoans, the locomotory organelles are mainly associated with the body surface. They can take place by either cellular extension as seen in pseudopodia, pellicular contractile structures such as myonemes or with the help of locomotory organelles like flagella and cilia. Locomotion by pseudopodia is termed as amoeboid movement whereas in flagellates it is termed as the flagellar movement. Similarly, the type of locomotion caused due to the movement of cilia is called the ciliary movement. Contraction and expansion of the body due to presence of myonemes helps the organism to glide over surfaces. This type of movement is known as gliding movement.

## Notes

In protozoans, the locomotory organelles are mainly associated with the body surface. They are of four main types:

1. **Pseudopodia**
2. **Flagella**
3. **Cilia**
4. **Myonemes**

## 1. PSEUDOPODIA:

E.g. *Amoeba proteus.* They are temporary finger-like projections withdrawn by the body. They aid in locomotion as well as nutrition. They are the characteristic of Sarcodina. There are mainly four types of pseudopodia, namely, lobopodia, filopodia, rhizopodia (reticulopodia) and axopodia.

a. **Lobopodia:** Short, blunt projection.
b. **Filopodia**: Long and filamentous with blunt end.
c. **Rhizopodia:** Branched structures and may form network with the adjacent pseudopodia.
d. **Axopodia:** Stiff structures with a hard, central axial filament. They mainly help in capturing food.

**LOCOMOTION:** The type of movement performed by pseudopodia is termed as amoeboid movement. For the movement to take place, the cytoplasm moves in the direction of the movement. So, the ectoplasm first forms a projection and the endoplasm then flows into it to form the pseudopodia.

## 2. FLAGELLA:

E.g. *Euglena viridis*. They are filamentous, whip-like structure which arises from the basal granule. The flagellum has two main parts, an outer protoplasmic sheath and an inner filament called the axoneme. The flagella may sometimes bear fine lateral processes called the mastigonemes.

There are five types of flagella:

**Stichonematic:** Mastigonemes are present on one side of the flagellum.

**Pantonematic**: Mastigonemes are present on both the sides of the flagellum.

**Acronematic:** Mastigonemes are absent but the flagellum ends with terminal filaments.

**Pentachronematic:** Mastigonemes present on the lateral sides of the flagellum and ends with terminal filament.

**Simple flagellum:** Mastigonemes and terminal filament absent.

**LOCOMOTION:** Locomotion in flagellates is termed as flagellar movement. The flagellum undergoes lateral movements and exerts pressure on the water. Waves of contraction also pass from one end of the flagella to the other. This results in forward propulsion of the organism.

## 3. CILIA:

E.g. *Paramecium.* They are short, ectoplasmic projections that arise from the basal granule. Cilia may be present on the entire body or restricted to specific regions.

**LOCOMOTION:** The type of movement performed by cilia is termed as ciliary movement. The cilia bend with rapid strokes to help in locomotion. When the cilia bend backwards, the organism moves forward. Similarly, if the cilia are directed forwards, the organism moves backwards. The backward movement of the cilia is termed as effective stroke and when the

cilia return to its initial position, it is termed as recovery stroke. The ciliates usually move through a spiral path.

## 4. MYONEMES:

E.g. *Monocystis*. The organism is covered by thin, flexible and tough pellicle layer which is present below the plasma membrane. This pellicle is made up of fine, contractile fibrils termed as myonemes. The myonemes contract and expand that help the organism to glide over the surface. This type of movement is called the gliding movement or gregarine movement in case of *monocystis.*