

**TOPIC: INTRODUCTION TO PROTOZOA:STRUCTURE AND LIFE
OF PARAMOECIUM**

LECTURE NO:01

B.SC PART 1

ZOOLOGY(HONS.)-PAPER I-GROUP A

CHAPTER 2

DATE: 24TH MARCH 2020

AUTHOR: DR.NIRMAL KUMARI

Objectives:

To study General characters of Phylum Protozoa and its classification up to order.

Study of *Paramecium* with particular reference to locomotion, Osmoregulation and reproduction.

Introduction

The Protozoa are heterogeneous assemblage of some 50,000 cellular or single- cell organism found worldwide in most habitats. Protozoa means 'first animal' the simplest form of animal life. Protozoa are unicellular microorganisms (eukaryotes) that lack cell walls. They are found in marine habitat or soil, in fresh water bodies, symbiotic, some forms are parasites in other organisms. Protozoa depends on nutrition, temperature, pH, and some depends on sunlight.

Protozoa were defined as unicellular protists with animal-like behavior, such as movement. Protozoa were regarded as the partner group of protists to protophyta, which have plant-like behavior, e.g. photosynthesis. The term protozoan has become highly problematic due to the introduction of modern ultra structural, biochemical, and genetic techniques, which have showed that the group does not form a clade as required by modern classifications. Modern unicellular clades within Eukaryotes which may be viewed as approximately collectively replacing the class of protozoa include: *Excavata*, *Amoeba*, *Chromalveolata* and *Rhizaria*.

Protozoans are usually single-celled heterotrophic eukaryotes containing non-filamentous structures that belong to any of the major lineages of protists. They are restricted to moist or aquatic habitats (i.e., they are obligate aquatic organisms). Many protozoan species are symbionts, some are parasites, and some are predators of feces bacteria and algae. There are an estimated 50,000 protozoan species.

The Protozoa are considered to be a subkingdom of the kingdom Protista, although in the classical system they were placed in the kingdom Animalia. More than 50,000 species have been described, most of which are free-living organisms; protozoa are found in almost every possible habitat. The fossil record in the form of shells in sedimentary rocks shows that protozoa were present in the Pre-Cambrian era. Anton van Leeuwenhoek was the first person to see protozoa, using microscopes he constructed with simple lenses. Between 1674 and 1716, he described, in addition to free-living protozoa, several parasitic species from animals, and *Giardia lamblia* from his own stools.

General characters and classification

General Characters of protozoa

- They are aquatic (fresh and salt water) free living parasitic, symbiotic or commensally. Usually microscopic with oval, elongated, spherical or ever changing shape

They show cellular level of organization, where all the activities of the body are performed by a single cell.

The protozoan cell body is either naked or surrounded by a non rigid pellicle. Cellulose is absent in the pellicle.

Some protozoans secrete shells of various inorganic compounds as external covers.

They possess different types of locomotory organs.

They may bear flagella (flagellates), cilia (ciliates) or pseudopodia (amoeboid).

Locomotory organs are absent in the parasitic forms.

They are holozoic (animal-like) and feed largely on bacteria, microscopic algae and minute animals such as rotifers or on other protozoan's including members of their own species.

Some are holophytic (plant-like); they contain chlorophyll and prepare their own food by photosynthesis (Euglena).

The parasitic protozoans devour on materials obtained from the hosts (Monocystis).

Some are saprozoic (subsisting on dead organic matter) and saprophytic (feeding on liquid food).

The osmotic concentration of cell body (Osmoregulation) is maintained by one or more contractile vacuoles and these contractile vacuoles are help in excretion.

The excretory product is ammonia.

Asexual reproduction takes place by binary fission or budding.

Sexual reproduction is performed by the fusion of gametes or by conjugation. Examples:

Free living- *Euglena* (Fig.1), *Amoeba* (Fig.2), *Noctiluca* (Fig.3), *Paramecium* (Fig.4), *Elphidium* (Polystomella)

Parasitic- *Monocystis*, *Entamoeba*, *Giardia* (Fig.5), *Plasmodium* (Fig.6), *Trypanosome*, etc

The single cell of the body performs all the vital activities.

Encystment occurs to tide over the unfavorable conditions and to help in the dispersal of race.

In certain animalcules, the life cycle is complicated and exhibits alternation of generations.

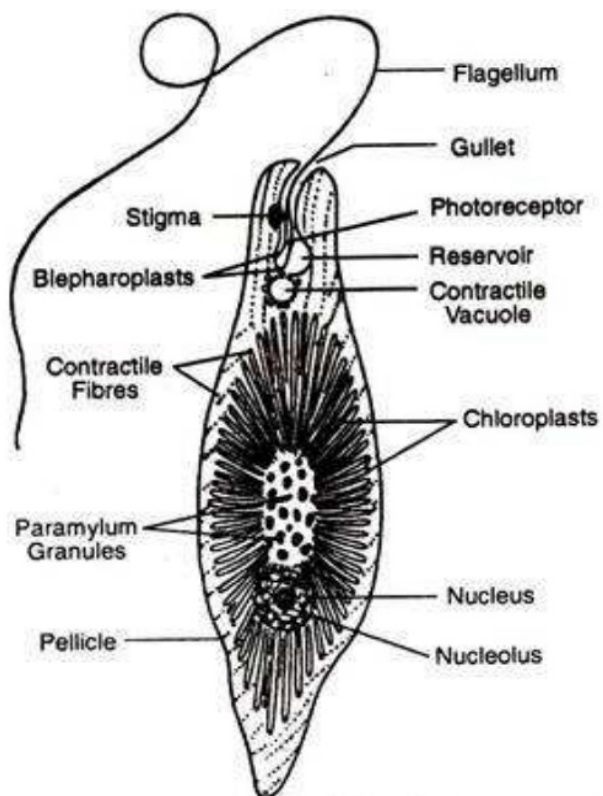


Fig. 1 Euglena

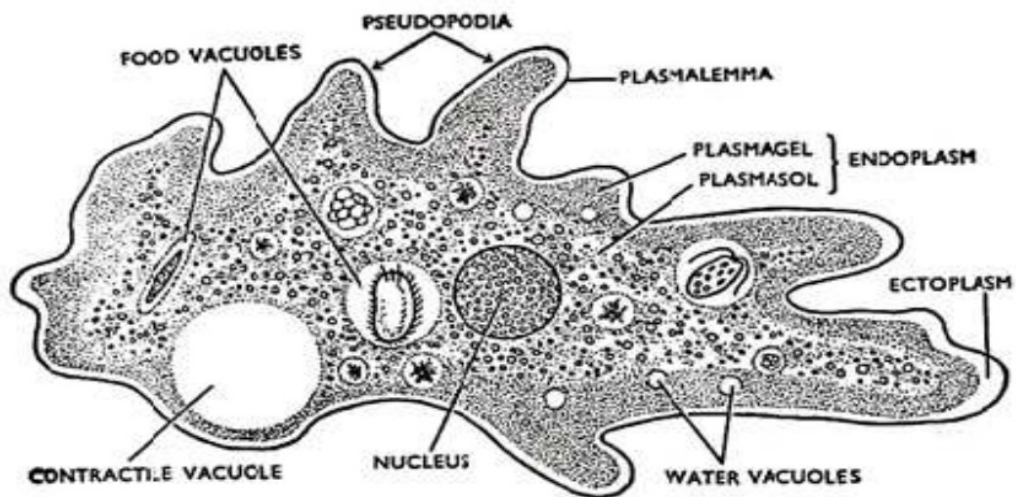


Fig. 46. *Amoeba proteus*.

Fig.2: *Amoeba*

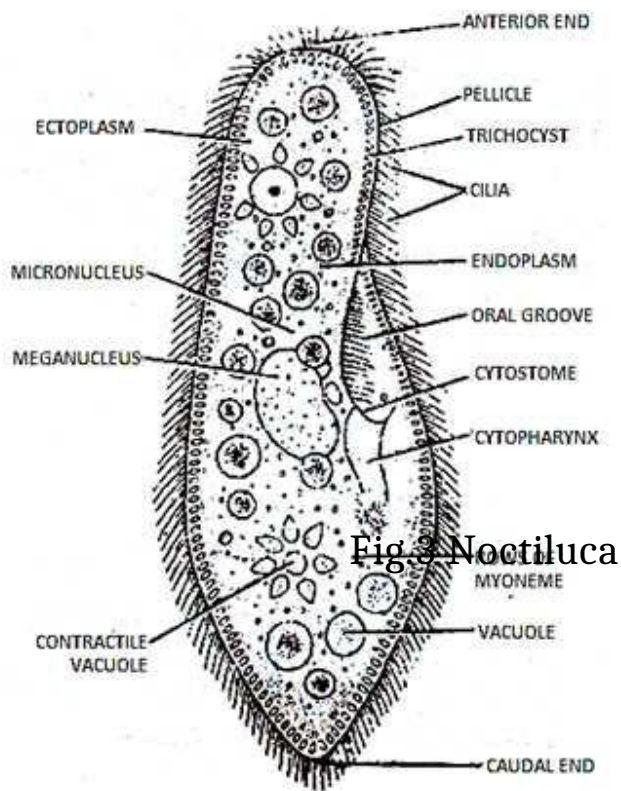
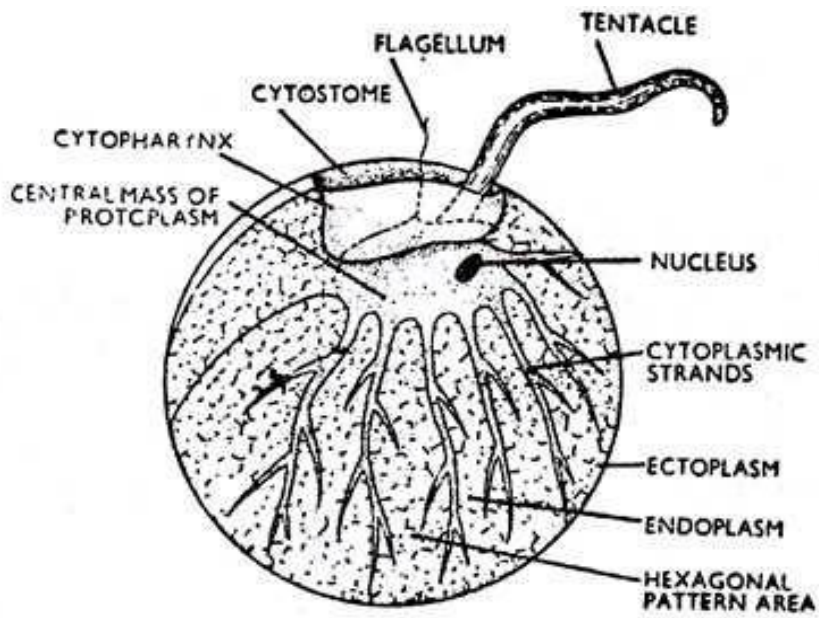


Fig.3 Noctiluca

Fig.4: Paramecium

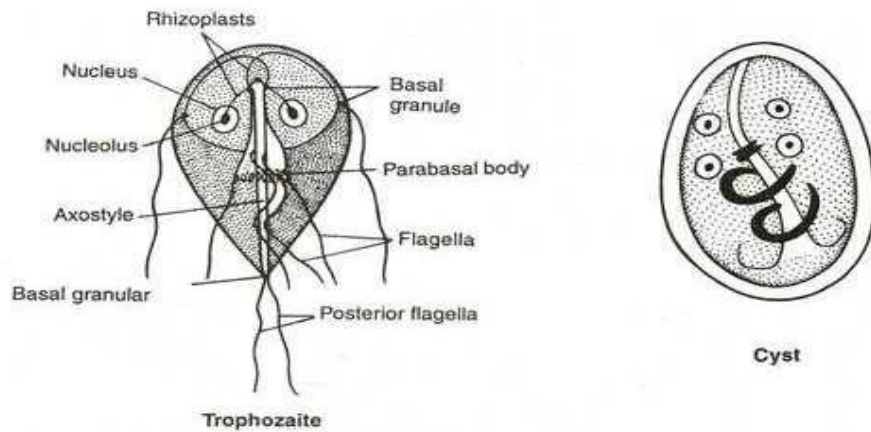


Fig.5 Giardia

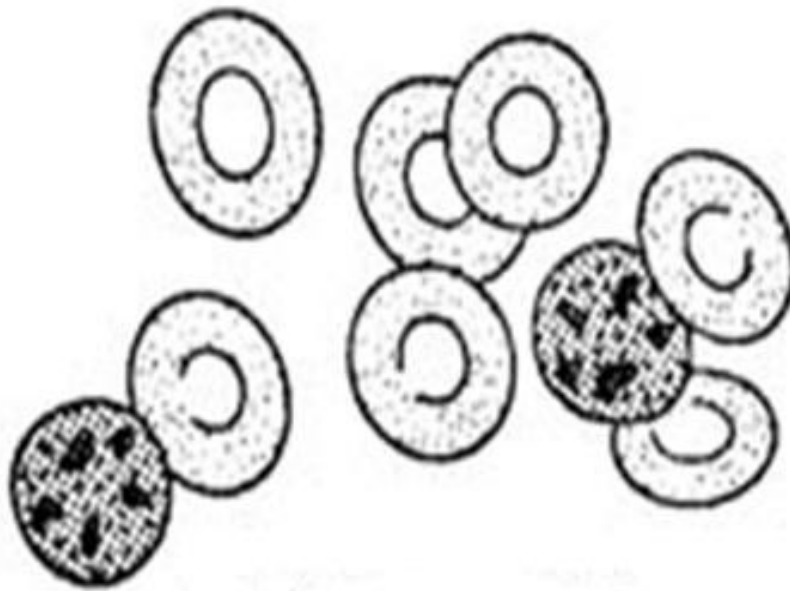


Fig.6: *Plasmodium* (In Red Blood Cells)

Distribution

Habit and habitat:

Paramecium is occurrence in fresh water ponds, lakes, rivers and streams. It is also found in abundance in stagnant water bodies.

Shape and size:

Pellicle:

The body is covered by a thin firm but elastic pellicle. Pellicle consists of three membranes.

a)-The outer or surface membrane is continuous with the membrane surrounding the cilia. b)-The outer and inner membranes of the alveoli thus form the middle and inner membranes of the pellicle.

Cilia:

The entire body surface is covered by a uniform covering of hair like protoplasmic processes, the cilia.

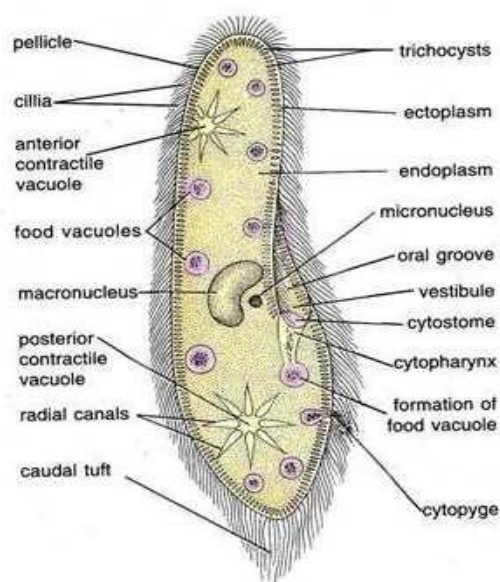


Fig.7. Paramecium Caudatum

Paramecium is unicellular microscopic organism. Its size varies in different species being 120-250 μ in *P. Aurelia* and 170-290 μ in *P. Caudatum*. It is commonly known as slipper animalcule. Its body is asymmetrical with flat oral and a convex aboral or dorsal surface.

Oral apparatus:

In Paramecium, there is a broad, shallow oral groove on the ventral surface. The oral groove extends obliquely backwards into a conical funnel shaped depression called vestibule. It leads into the buccal cavity followed by narrow cytopharynx through narrow apertures, the Cytosomes. Cytopharynx at its proximal end formed food vacuoles. Buccal cavity, at its right side is bordered by a row of cilia forming endoral membrane. At left side are the three groups of 4 rows of cilia. These are ventral peniculus, dorsal peniculus and quadrulus. From endoral membrane ribbed pellicles extends up to cytostome. Nemedesmal fibre are present in the cytostome & Cytopharynx.