

The protozoa

Define of protozoa

Characteristics of protozoa

Classification of protozoa

The medical Parasites

Define of protozoa

Protozoa are the " first animals " they are unicellular, non – photosynthetic, eukaryotic organisms. They are included under the kingdom portista. The study of protozoa is called " Protozoology ".

In microbiology, protozoa is studied with reference to parasites. The study of parasites is called " Parasitology ".

The common protozoans are:

Euglena	Chlamydomonas	Volvox
Amoeba	Entamoeba	Monocystis
Paramecium	Opalina	Plasmodium
Trypanosma	Leishmania	Giardia
Trichomonas	Toxoplasma	Cryptosporidium
Pneumocystis	Balantidium	Isospora
babesia	Naegleria	Cyclospora

Protozoans are aquatic. They are marine or freshwater animals. Some live in moist soils. Some live as **Parasites**.

The structure of the parasite:

1. The cell is made up of a plasma membrane, cytoplasm and nucleus.
2. The plasma membrane may have outer protective coverings such as, pellicle, shell, test or Lorica.
3. The cytoplasm is made up of an outer ectoplasm and an inner endoplasm. Ectoplasma is gel – like and endoplasm is sol – like.

4. The cytoplasm contains cell organelles such as mitochondria, one or two nuclei, Golgi apparatus [complex], Endoplasmic reticulum, ribosomes, lysosomes, contractile vacuole, food vacuole, etc.
5. The nucleus is typical eukaryotic. It has nuclear membrane, nucleoplasm and chromosomes. Normally one nucleus is present [E.g. Amoeba]. But paramecium has two nuclei. One Micronucleus and another macronucleus.
6. Most of protozoans are single – celled organisms but volvox is a colony.

Nutritional of protozoans:

The mode of nutrient is:

- 1- Autotrophic nutrition.
- 2-Holozoic nutrition.
- 3- Parasitic.

Amoeba uses pseudopodium for gathering food; Paramecium uses cilia, suctorian use tentacles.

Reproduction of protozoans:

Reproduction is asexual and sexual methods. Asexual Method or asexual reproduction is binary fission. [E.g. Amoeba, Euglena, etc.] multifission [E.g. Amoeba], and plasmodium and budding.

Sexual reproduction is by conjugation, [E.g. paramecium], and isogamy, [E.g. Monocystis, etc].

Classification of protozoans:

Protozoans are classified into 5 classes. They are:

Class 1: Flagellata: E.g. Euglena, Trypanosoma Giardia, Leishmania.

Class 2: Rhizopoda: E.g. Amoeba, Entamoeba.

Class 3: Ciliophora: E.g. Paramecium, Balantidium.

Class 4: Sporozoa: E.g. Plasmodium, Toxoplasma cryptosporidium,
Babesia.

Class 5: Mycetozoa: E.g. Didynium.

The important protozoans causing diseases are:

1. Entamoeba histolytica = Amoebiasis [amebic dysentery or Amebiasis and liver abscess]
2. Plasmodium = Malaria
3. Trypanosoma = Trypanosomiasis [African sleeping sickness and chaga's disease]
4. Giardia = Giardiasis
5. Toxoplasms = Toxoplasmosis
6. Pneumocystis = Pneumonia
7. Trichomonas = Trichomoniasis
8. Leishmania = Leishmaniasis and kala – azar
cutaneous leishmaniasis
mucocutaneous =
9. Balantidium = Dysentery
10. Naegleria = Meningitis
11. Babesia = Babesiosis

The medical Parasites:

Parasites occurs into two distinct forms:

1. Unicellular ((single – celled)) protozoa; and
2. Multicellular ((Metazoa)) called Helminths or worms. For Medical pupose, protozoa can be suddived into four groups;
 - 1- Sarcodina: E.g. Amoeba and Entamoeba ((Rhizopoda)).
 - 2- Sporozoa: E.g. Plasmodium, Toxoplasma and cryptosporidium.
 - 3- Flagellate: (Mastigophora or zoomostigophora) = [E.g. Giardia, Trypanosoma and Trichomonas vaginalis].
 - 4- Ciliate or Ciliophora: E.g. Paramecium..

Metazoan are subdivided into two phyla:

- 1- The platy helminthes ((flatworms)).
- 2- The Nematelminthes ((round worms and Nematodes)).

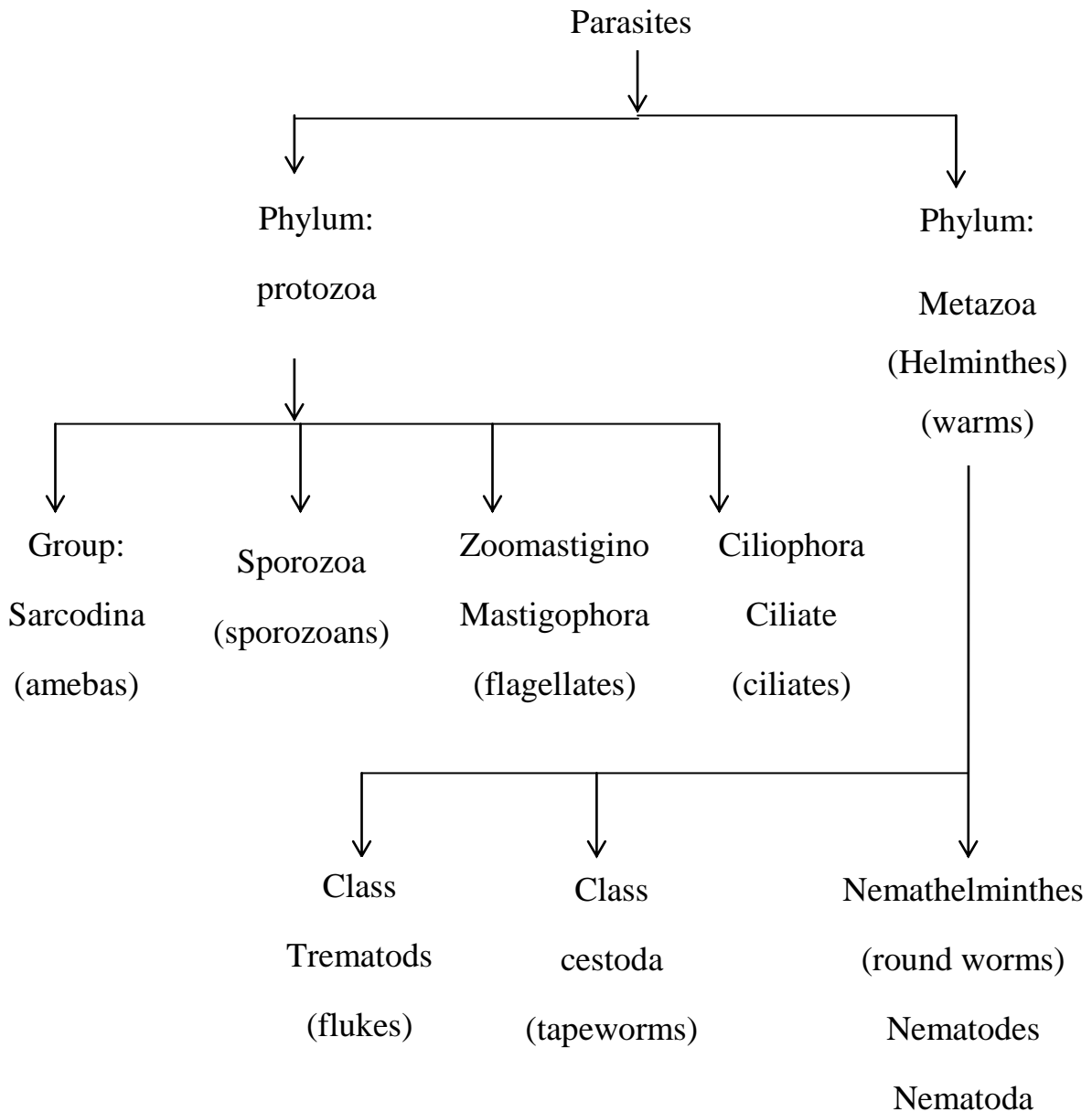
The phylum Platyhelminthes contains two Medically important classes;

- 1- Class: Trematoda; ((flukes)).
- 2- Class: Cestoda; ((tape worms)).

While Nematelminthes contains one class only

- 1- Nematode; ((Nematodes and round worms)).

This classification is shown in this figure:



The major and minor protozoan pathogens:

They are grouped according to the location in the body where they most frequently cause disease.

- 1- **Within the intestinal tract**, three organisms the ameba E.g. *Entamoeba histolytica*, the flagellate E.g. *Ciardia lamblia* and the sporozoa E.g. *Cryptosporidium* species are the most important.

- 2- **In the urogenital tract**; the flagellate E.g. *Trichomonas vaginalis* is the important pathogen.
- 3- **The blood and tissue** protozoa are varied group consisting of the flagellates; E.g. Trypanosoma and leishmania and the sporozoans E.g. plasmodium and Toxoplasma. The important lung pathogen is pneumocystis Molecular data indicated that it is related to yeasts such as *Saccharomyces cerevisiae*.

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