

# Exercise 14

**Aim:** To identify common disease-causing organisms and the symptoms of the diseases

**Principle:** There are quite a large number of organisms that are parasitic/pathogenic to humans. These organisms substantially damage the human body and cause diseases, which may even be fatal sometimes. These organisms exhibit characteristic features in their external morphology. Symptoms of the diseases caused by them are also specific.

**Requirement:** Preserved specimens/permanent slides/photographs of *Ascaris*, *Entamoeba*, *Plasmodium*, Ring-worm fungus and compound microscope

## Procedure

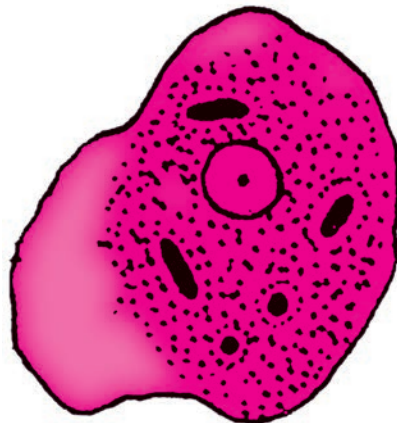
Observe the preserved specimens/slides/photographs and note down the features in the practical record book. Take care to observe all the minute details and draw labelled diagrams of the pathogens.

## Observation

### A. *Entamoeba*

Observe the following features of the parasite in the slide or photograph:

- (i) It is unicellular.
- (ii) Shape of the cell is irregular due to pseudopodia.
- (iii) A single nucleus is present eccentrically in the cell.
- (iv) \*In the nucleus a peripheral ring of granule of nucleoprotein and central karyosome are observed. Rest of the space in the nucleus looks empty (Fig. 14.1).
- (v) A few food vacuoles may be seen in the cytoplasm. Contractile vacuoles are absent.
- (vi) \*Mature quadrinucleated cysts may be present.



**Fig. 14.1** An *Entamoeba*

**Note:** *Entamoeba* is an intestinal parasite in humans and causes amoebic dysentery. The symptoms of the disease are frequent loose, mucus filled watery stools, abdominal pain and spasms.

### Systematic position

Phylum – Protozoa  
 Class – Rhizopoda  
 Type – *Entamoeba histolytica*

\* Distinctive feature of the pathogen

### B. *Plasmodium vivax*

- (i) It is an intracellular endoparasite seen easily within the RBC of the infected person.
- (ii) It is unicellular.
- (iii) The most diagnostic stage of the parasite is "signet ring" stage in the erythrocytes, within which it appears as a rounded body (Fig. 14.2).
- (iv) It has a big vacuole inside, and the cytoplasm is accumulated at one place containing the nucleus. Because of the above mentioned features, the parasite appears as a ring.

Search the stage in the blood film slide, find the signet-ring stage, and draw its labeled diagram.

**Note:** It is a protozoan parasite causing malaria in humans. When an infected female anopheles mosquito bites a healthy person, it injects the infective stage, sporozoite, into the peripheral blood vessels. The infective stage undergoes several rounds of multiplication in liver and erythrocytes.

**Symptoms:** Intermittent high fever with chills followed by profuse sweating at an interval of alternate days.

### Systematic position

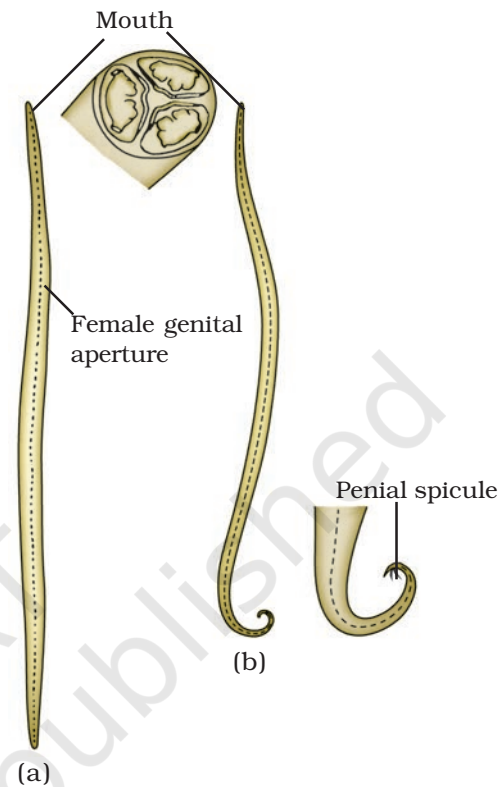
Phylum – Protozoa  
 Class – Sporozoa  
 Type – *Plasmodium vivax*

## EXERCISE 14

### C. *Ascaris*

The external features of round worm are as follows:

- (i) Body long (20 to 40 cm), cylindrical (5 to 6 mm diameter) with no segmentation (Fig. 14.3).
- (ii) Sexes are separate; the females are longer than the males.
- (iii) Both the ends are pointed; posterior end of male is ventrally curved.
- (iv) Mouth is situated at the anterior end, and is surrounded by three lips, one present mid-dorsally and rest two lips are situated ventrolaterally (for viewing these lips a magnifying lens is needed).
- (v) Single longitudinal lines are present on the dorsal, ventral and on the two lateral sides, all along the length of the body. Out of these the lateral lines are comparatively more distinct than the others lines.
- (vi) Excretory pore is present on the ventral surface slightly behind the anterior end.
- (vii) In addition to the ventrally curved posterior tip, the male worm has a pair of penial spicules very close to the cloacal opening.
- (viii) In case of female specimen a female genital aperture is present mid-ventrally about one third distance from the anterior end.



**Fig. 14.3** *Ascaris* (a) Female (b) Male

### Systematic position

- Phylum – Aschelminthes  
Class – Nematoda  
Type – *Ascaris lumbricoides*

**Note:** Round worm or *Ascaris* is one of the common parasite found in the intestine of human beings.

**Symptoms:** (a) Irregular bowel, (b) Occasional vomiting, (c) Anaemia

### Trichophyton (*Ringworm fungus*)

It is a fungus that feeds on keratin of the skin of human beings. The features as observed under the microscope are:

1. Texture of hyphae is waxy, glabrous to cotton like.
2. Unstained hyphae are white, yellowish brown to reddish brown in colour.

### Systematic position

- Kingdom – Fungi  
Class – Deuteromycetes  
Type – *Trichophyton rubrum*

### Symptoms

Ringworm is a contagious fungal infection of the skin. Infected area of skin is itchy, red, raised, scaly patches (with sharply defined edges). It is more red on the periphery than in the center creating a ring like appearance.