EXPERIMENT

AIM

To study identify common diseases causing organisms like Ascaris, Entamoeba, Plasmodium, Ringworm through permanent slides or specimens. Comment on symptoms of diseases that they cause.

MATERIAL REQUIRED

Specimens or slides of the following-Ascaris, Entamoeba, Plasmodium, ringworm, microscope.

THEORY

Disease is often used more broadly to refer to any condition that causes pain, disfunction, distress, social problems, or death to the person afflicted, or similar problems for those in contact with the person. In this broader sense, it sometimes includes injuries, disabilities, disorders, syndromes, infections, isolated symptoms, deviant behaviors, and atypical variations of structure and function, while in other contexts and for other purposes these may be considered distinguishable categories. Diseases can affect people not only physically, but also mentally, as contracting and living with a disease can alter the affected person's perspective on life.

REQUIREMENTS

Permanent slides of Plasmodium, Entamoeba, specimen of Ascaris and ringworm fungi (Microsporum, Dermatophyton, Trichophyton, etc.) and a compound microscope.

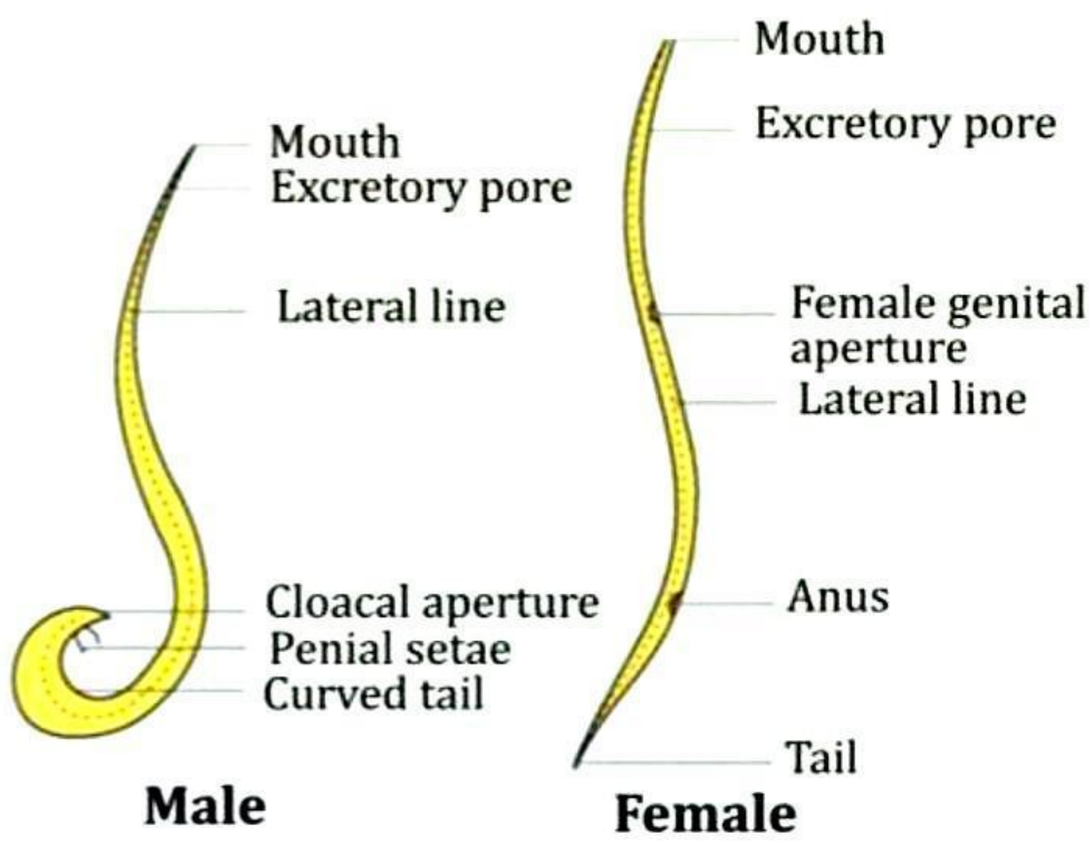
OBSERVATION

I. Ascaris lumbricoides intestinal (Roundworm)

Classification:

Kingdom	-	Animalia
Phylum	-	Nemathelminthes
Class	-	Nematoda
Genus	-	*Ascaris*
Species	-	*lumbricoidea*

1. **Occurrence:** Cosmopolitan.
2. Endoparasite of small intestine of human
3. beings and it also infects pigs and cattle.
4. Causes Ascariasis disease; more common in children.



5. Source of infection: Polluted water, soil and vegetables.

6. **Care must be taken in:**
   - **(i)** Disposal of human faecal matter.
   - **(ii)** Vegetables must be washed properly before eating.
   - **(iii)** Children should not be allowed to consume soil.

Symptoms:

1. As it infests the host intestine so Ascaris may obstruct intestinal passage causing abdominal discomfort like colic pains.
2. Impaired digestion, diarrhoea and vomiting.
3. May affect mental efficiency and retard body growth in children.
4. Tiredness, weight loss, muscular pain.

Identifying Features:

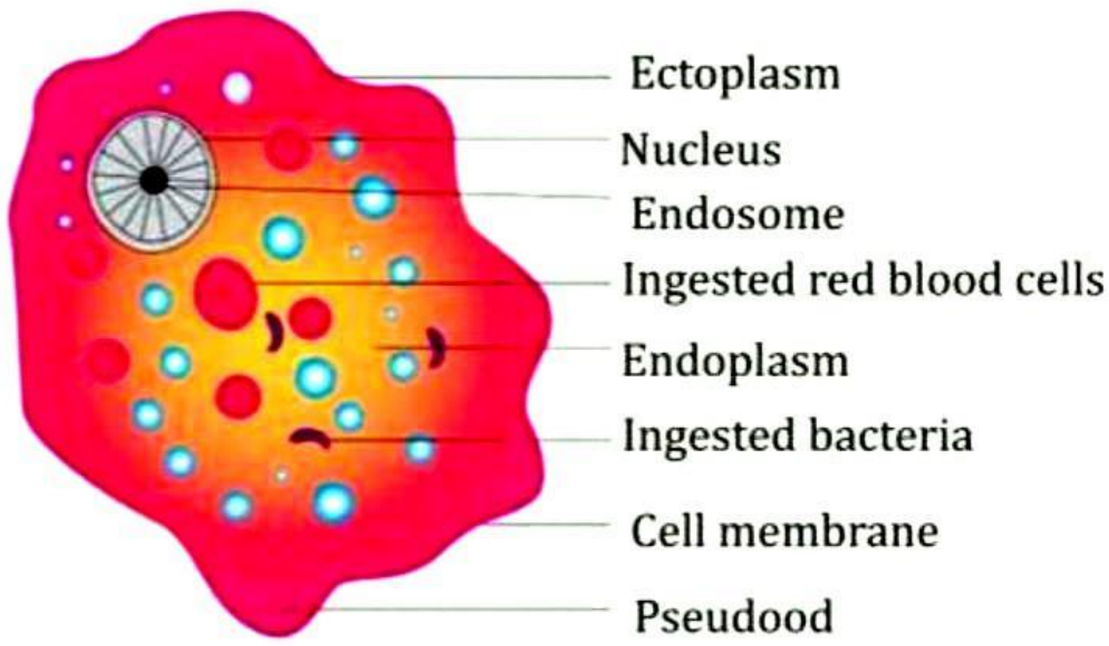
1. Elongated, cylindrical body with tapering ends.
2. Exhibits sexual dimorphism, i.e., males and females can be identified from external morphology. Males are smaller than females and male has a curved tail whereas female has a straight end.
3. Male worms have common genital and anal pore called cloacal aperture whereas female worm has separate anal and genital pores.
4. Male worm has a pair of needle like penial setae in cloaca.
5. Body covered by cuticle resistant to host's digestive juices.
6. Derives food from host.
7. Dorsal, ventral and two lateral lines exist lengthwise.

II. Entamoeba histolytica

Classification:

Phylum - Protozoa
Genus - *Entamoeba*
Species - *Histolytica*

1. **Occurrence:** Cosmopolitan. It is also an intestinal parasite.
2. Causes Amoebiasis (Am dysentery)
3. Source of infection: Contaminated food and water.
4. **Care to be taken:**
   - **(i)** Proper disposal of faecal matter.
   - **(ii)** Cleanliness during preparation and consumption of food.



Symptoms:

1. Pain in abdomen.
2. Patient passes blood along with faeces.
3. Dysentery.
4. Parasite may perforate intestinal wall causing ulcers.
5. Cysts appear in the faecal matter of infected person.

6. May enter liver, lungs or spleen.

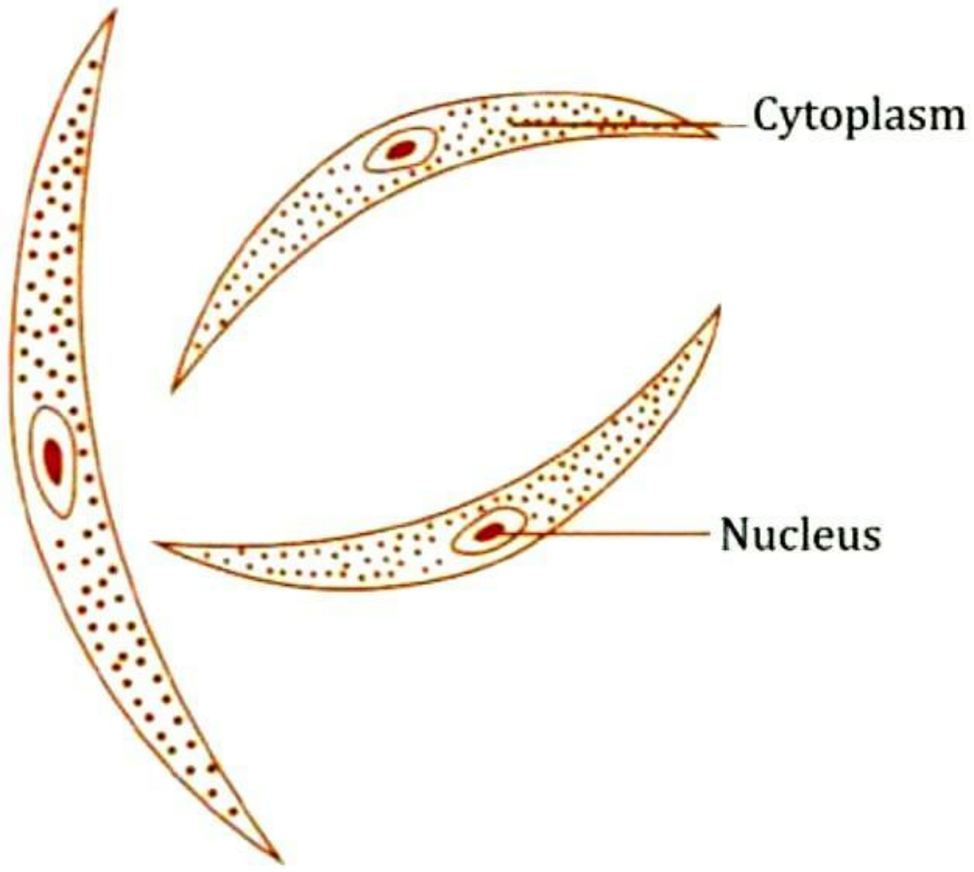
Identifying Features:

1. Monogenetic (single host life cycle), protozoan endoparasite of man.
2. Single celled, microscopic.
3. Eats RBCs and ruptures cells of host intestine through holozoic nutrition.
4. Has only one pseudopodium; single nucleus but number of food vacuoles.
5. Reproduces asexually and forms cysts during unfavourable conditions.
6. Cyst ruptures to release active parasites in the host intestine.

III. Plasmodium vivax (Malarial parasite)

Classification:

Class	-	Sporozoa
Phylum	-	Protozoa
Genus	-	Plasmodium
Species	-	vivax



1. A protozoan, found in red blood cells of man.
2. Causes Malaria.
3. **Source of infection:** Through bite by female anopheles, mosquito and its infective stage is sporozoite.
4. **Care must be taken-**
   - **(i)** Use mosquito nets and repellent creams.
   - **(ii)** Maintain proper drainage system.
   - **(iii)** Spray kerosene oil or petroleum over
   - **(iv)** stagnant water as in coolers.
   - **(v)** Larvae and pupae may be destroyed
   - **(vi)** by spraying DDT, BHC (Benzene hexa chloride).
   - **(vii)** Larvicidal fish like Gambusia must be introduced in water containing larvae and pupae.

Symptoms:

1. Rapidly rising body temperature upto 103°F - 105°F with shivering and chills; intense headache.
2. Muscular pains.
3. Fever subsides with sweating and it's a cyclic fever repeating after 24-48 hours
4. Restlessness, loss of appetite and sleeplessness.

Identifying Features:

1. A digenetic (completes life cycle in two hosts) protozoan endoparasite.
2. Life cycle of Plasmodium requires two hosts - man and female Anopheles mosquito; to complete its life cycle and thus is known as digenetic life cycle.
3. Mature form of Plasmodium, is called sporozoite which lives in salivary glands of female Anopheles and it is the infective stage.
4. Sporozoites are spindle-shaped and uninucleate.
5. Life Cycle-Female Anopheles mosquito injects sporozoites present in the saliva into the blood of the

host. Sporozoites infect the liver cells and divide by fission to produce merozoites which are again released into blood when the liver cells rupture. These then infect red blood cells and this causes shivering and fever. In RBCs the parasite matures into trophozoites which release daughter merozoites which get transformed into male and female gametocytes. The gametocytes are taken up by female Anopheles where the fertilization takes place and oocyst is formed which produces sporozoites that are taken to the salivary glands and are ready to infect again.

Transfer of sporozoites to blood of a human being through the bite of female Anopheles mosquito.

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Sporozoites reach liver through blood.

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The parasite reproduces by asexual reproduction in liver cells and the newly formed merozoites are released in the blood.

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These further reproduce asexually in red blood cells, bursting the red blood cells and releasing parasite (**merozoites**) and **haemozoin** that causes cycles of fever and chills.

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Released parasites infect new red blood cells

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Sexual stages develop in red blood cells and are known as **gametocytes**.

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These gametocytes are taken up by female Anopheles during the bite from the blood of the infected human being

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Fertilisation and development take place in the mosquito's intestine producing sporozoites.

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Sporozoites (= mature infectious stage) move to mosquito's salivary glands from intestine and are stored there

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When the mosquito bites another human being, sporozoites are released into the blood of the healthy person.

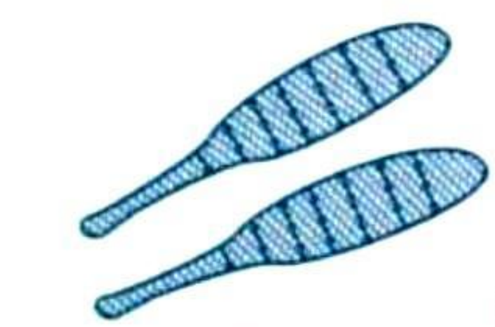
IV. Ringworm or Dermatophytoses or Tineas

Ringworm is an infectious disease caused by mycotic infections of keratinised areas of body (hair, skin, scalp and nails) caused by fungi belonging to species. of following genera- Microsporum, Trichophyton, Epidermophyton collectively known as Dermatophytes.

1. Ringworm of Scalp:

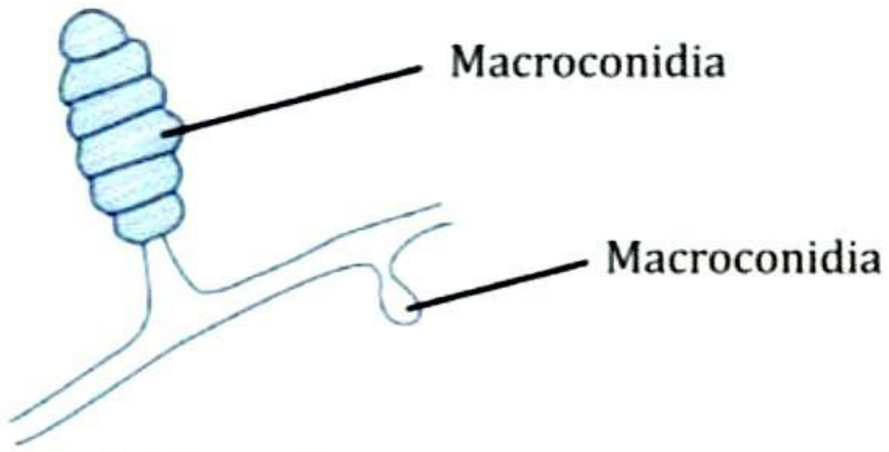
Causal organism - Trichophyton, Microsporum.

Symptoms- Formation of small, yellowish, cup-like crusts on scalp. Hair become grey and lusterless and may lead to permanent baldness.



Macroconidia of
Trichophyton

Macroconidia of
Epidermophyton



Conidia of Microsporus
Ringworm-Dermatophytes

2. **Ringworm of Body (Skin):**

   Causal organism - Epidermophyton, Microsporum, Trichophyton.

   Symptoms-Cutaneous (skin) infection appearing as flat, spreading ring-shaped lesions, followed by itching.

3. **Ringworm of Foot:**

   Causal organism - Epidermophyton, Trichophyton.

   Symptoms - Scaling or cracking of skin especially between toes. Blisters containing thin watery fluid may also occur.

4. **Ringworm of Nails:**

   Causal organism - Epidermophyton, Trichophyton.

   Symptoms - Nails become thickened, discoloured and brittle. Nails may also become chalky and disintegrated.

Life Cycle:

On keratinised tissues, these Dermatophytes produce fronds of hyphae; microconidia and macroconidia which are non-motile, asexual spores.

Mode of Transmission:

1. Direct contact with infected person or animals like dogs, cats and cattle.
2. Contact with barber's clippers.
3. Back of theatre seats, clothing contaminated with hair.
4. Using towel, clothes, comb of infected person.

Prevention:

1. Isolation of the infected person.

2. Boiling of contaminated caps after use.
3. Sterilisation of towels and clothing.
4. Maintain strict personal hygiene.
5. Dry areas between toes after bathing.

VIVA VOCE

Q1. What is meant by a parasite?

Ans. Parasite is basically a pathogen which lives on the body of the host and derives nutrition from it, thereby harming it.

Q2. Which organism causes malaria? Name the drug which is used to treat malaria.

Ans. Plasmodium vivax causes malaria. It is treated by a drug called quinine.

Q3. Which fungus causes ringworm disease?

Ans. Microsporum linosum.

Q4. How do you identify Entamoeba histolytica under a microscope?

Ans. It has a pseudopodium which helps to identify it easily under a microscope.

Q5. Give the other name of ringworm of scalp seen in children.

Ans. Dermatomycosis.

Q6. Why is Ascaris lumbricoides a nematode?

Ans. Round worm or Ascaris lumbricoides is a nematode because it is a triploblastic pseudocoelomate organism.