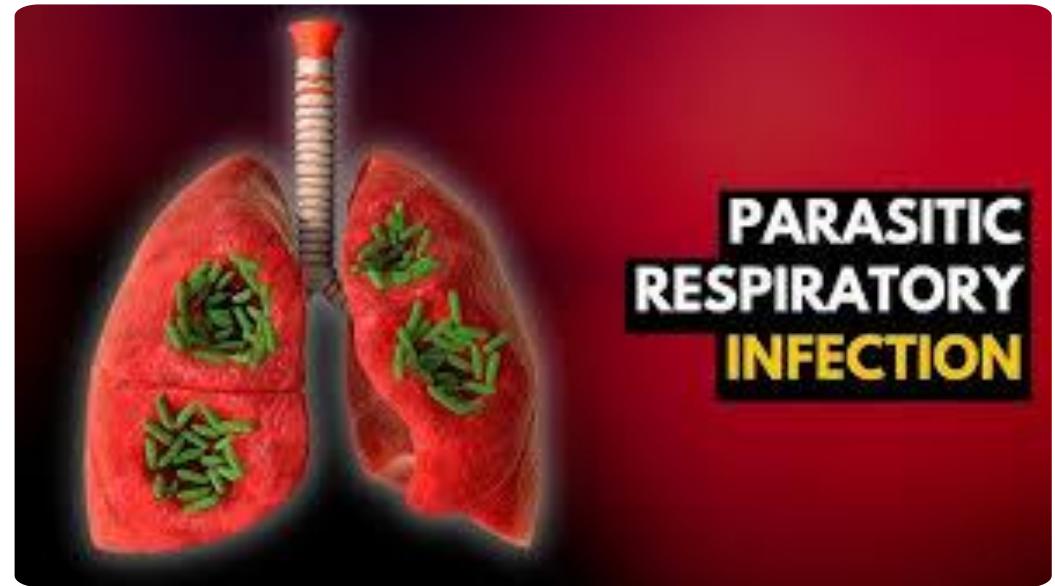


# **Parasitic Infection of the Renal System Practical session**

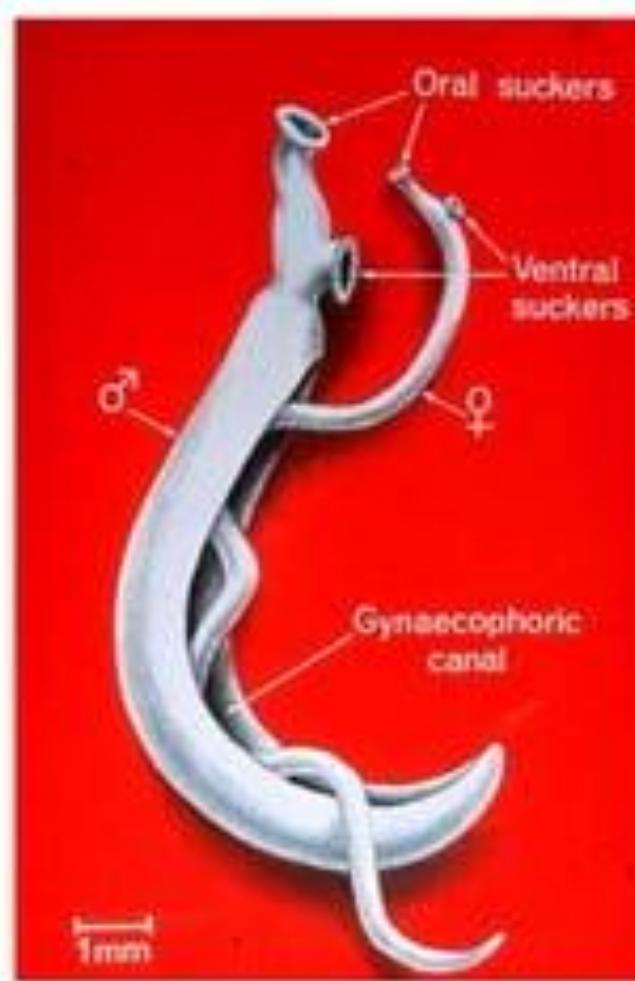
**Prepared by  
Dr: Nahed Elossily  
Associate professor of Medical  
Parasitology  
UTS-205**



# 1. *Schistosoma haematobium*

|                         |   |
|-------------------------|---|
| - Causative trematode : | <i>Schistosoma haematobium</i> ( <b>Blood fluke</b> )   |
| - Geog. Dist.           | Africa, South America, Middle East, Turkey, Southern Europe and India.                                      |
| - Definitive host:      | Man.  |
| - Habitat:              | Adults → Portal veins.<br><br>Oviposition → Vesical submucosal venules.                                     |
| - Intermediate host:    | <i>Bulinus truncatus</i> (freshwater snail)   |
| - Mode of infection:    | Cercariae penetrate the skin or buccal mucous membrane during contact with infected water or with drinking. |

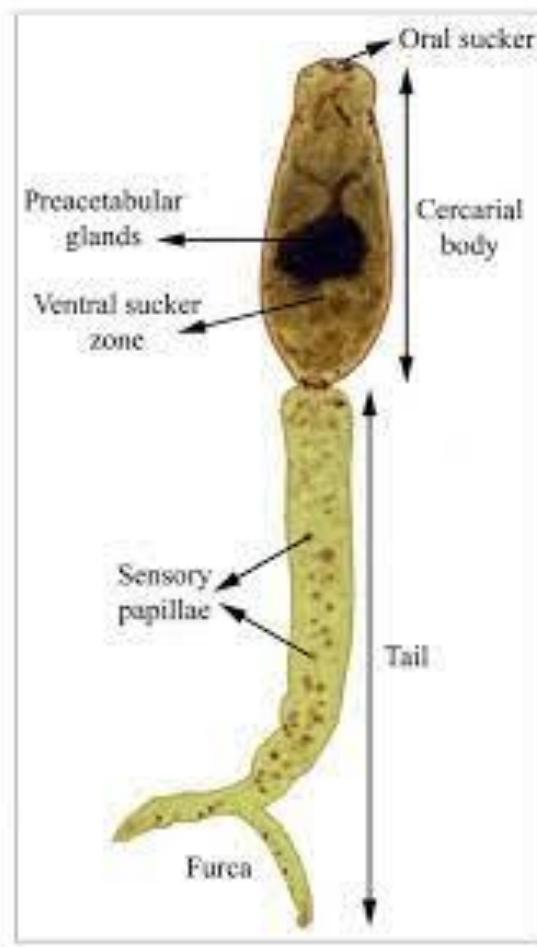
# *Schistosma haematobium* adult worm



## Morphology

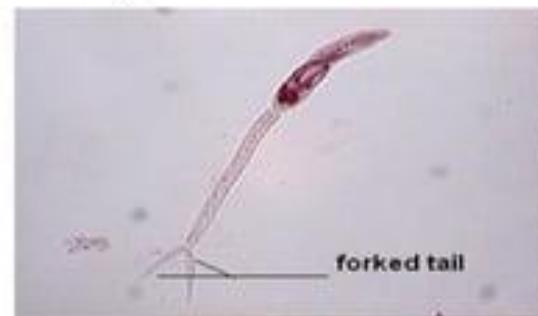
- Adult worms are 10 to 20 mm long
- Schistosomes have separate sexes
- the male has a canal in which the slender female worm resides

# *Schistosma spp (cercaria stage)*



## Infective Stage

- *Schistosoma* cercaria (forked tail).
- Found in fresh water.
- Penetrate the skin of human upon contact with water containing it.



# *Schistosma haematobium*

## EGG



## 2. *Enterobius vermicularis* (Pin worm, Seat worm, Family worm)

|                    |   |
|--------------------|---|
| Habitat:           | Large intestine mainly caecum, colon, rectum and appendix   |
| Final host         | Human specially children  |
| Infective stage    | embryonated eggs containing fully developed larvae.   |
| Mode of infection: | <ul style="list-style-type: none"><li>➤ Ingestion of eggs through contaminated food and drink or hand to mouth via handling contaminated articles as clothes, bed linens, toilet seats, doorknobs.</li><li>➤ Autoinfection (external): eggs are carried under fingernails to the mouth.</li><li>➤ Internal autoinfection (Retro-infection): eggs hatch on the perianal region and larvae migrates back through the anus to the rectum and caecum.</li><li>➤ Air-borne infection: inhalation of infective eggs</li></ul> |
| Diagnostic stage:  | Fully embryonated eggs containing fully developed larvae.   |

# *Enterobius vermicularis*

## Morphology (the worm)

**Shape:** round

**Color:** white

**Size:**

**Females:** 8 to 13 mm long

**males:** 2 to 5mm long

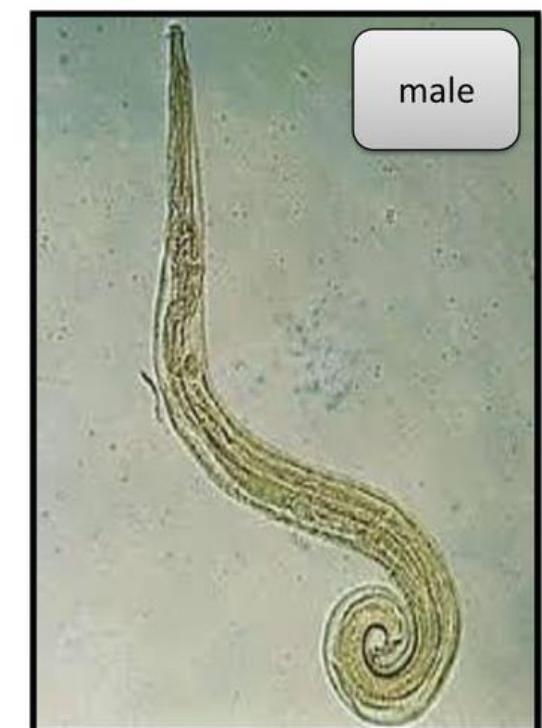
**posterior end:**

Tapered in females

curved in males

**anterior part(cervical alae):**

found in both male and female worms



## Eggs of *E. vermicularis*

*E.vermicularis* are oviparous worms

**Shape:** D shaped

**Size:** 50- 60 x 20-30  $\mu\text{m}$

**Color:** colorless

**Shell:** thin

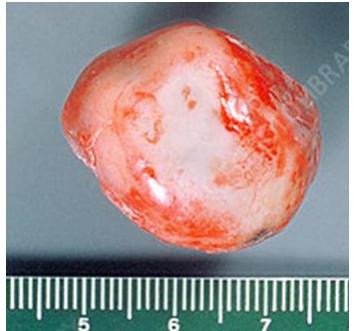
**Contents:**

- Single cell ( immature egg) or
- Larva (mature egg)

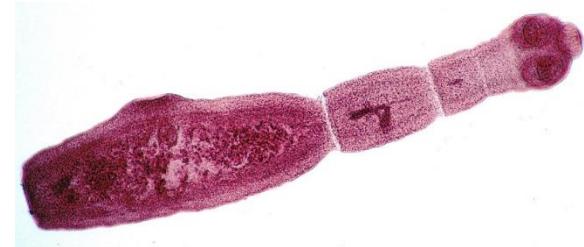


ASM MicrobeLibrary.org/JofC



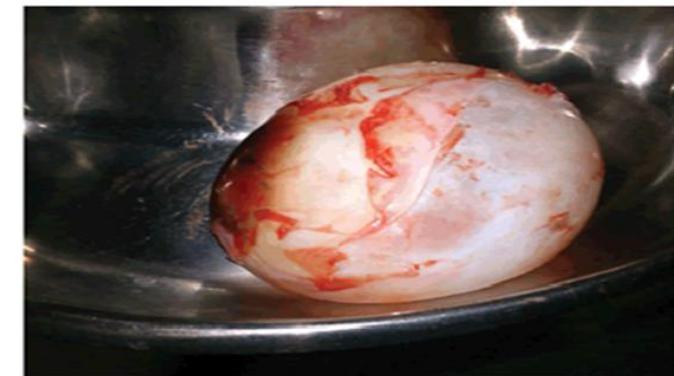
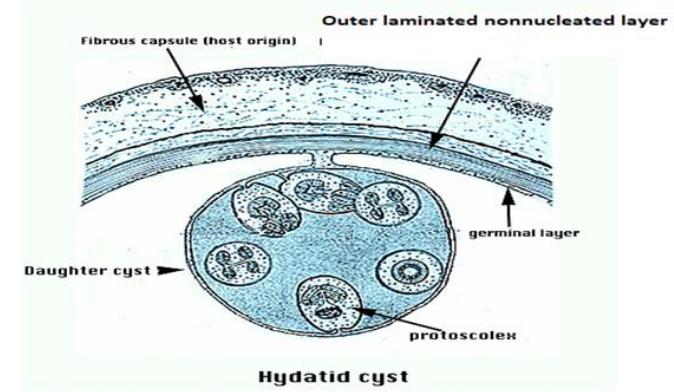
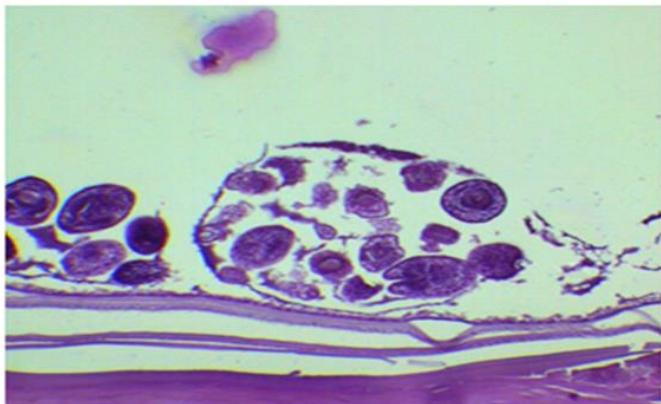


### 3. Hydatid cyst



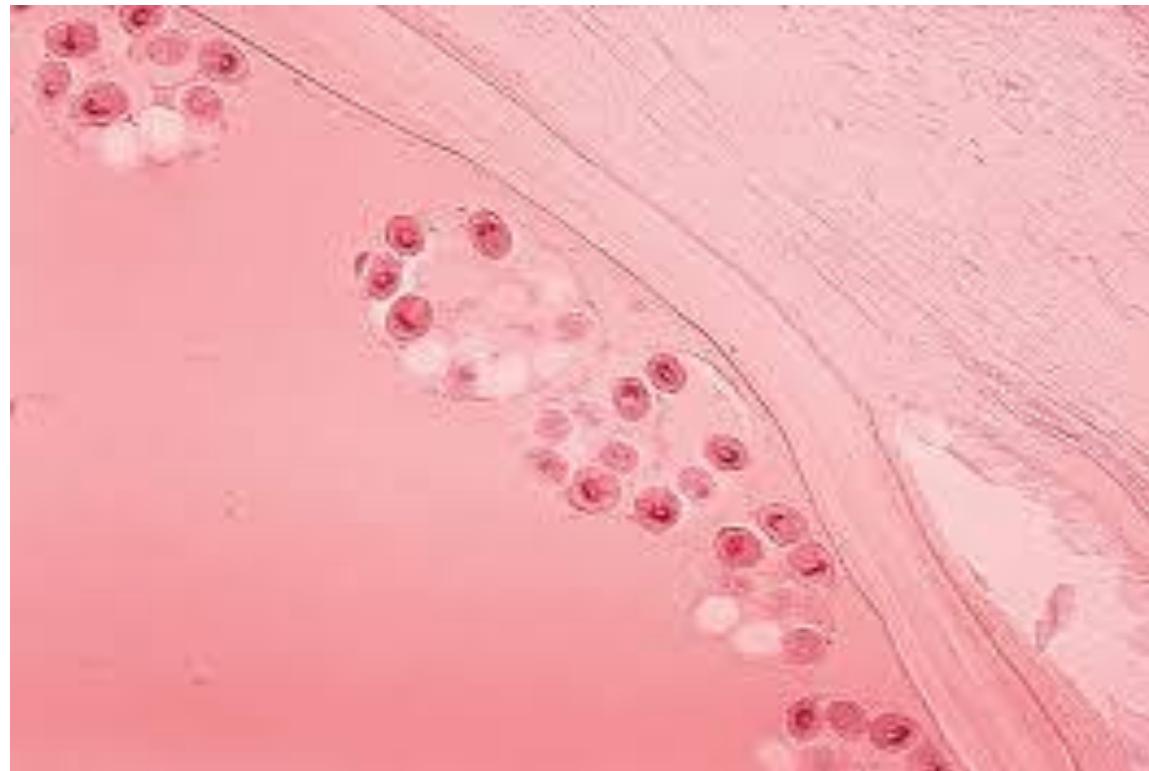
|                            |   |
|----------------------------|---|
| <b>Causative parasite:</b> | <i>Echinococcus granulosus</i> (cystic or unilocular hydatid cyst)<br><i>E. multilocularis</i> (alveolar or multilocular hydatid cyst).     |
| <b>Geog. Dist.</b>         | <i>E. granulosus</i> : Cosmopolitan specially sheep-herding areas<br><i>E. multilocularis</i> : Europe, Asia, North America, Russia.        |
| <b>Definitive host</b>     | <i>E. granulosus</i> : dogs<br><i>E. multilocularis</i> : foxes, dogs, cats, wolves   |
| <b>Habitat</b>             | Small intestine of definitive host  |
| <b>Intermediate host</b>   | <i>E. granulosus</i> : Herbivorous animals, man ( <b>blind intermediate host</b> )<br><i>E. multilocularis</i> : Rodents , accidentally man |

- Cyst has a well-defined outline.
- Varying in size from 1-10 cm and its diameter may reach 20 cm
- Spherical in shape surrounded by fibrous capsule.
- Opaque-white in color
- Composed of an outer laminated non-nucleated layer and an inner germinal layer.
- Filled with pale yellow fluid called hydatid fluid.



# Hydatid Cyst

- Scolices and broad capsules are attached to or detached from the germinal layer.

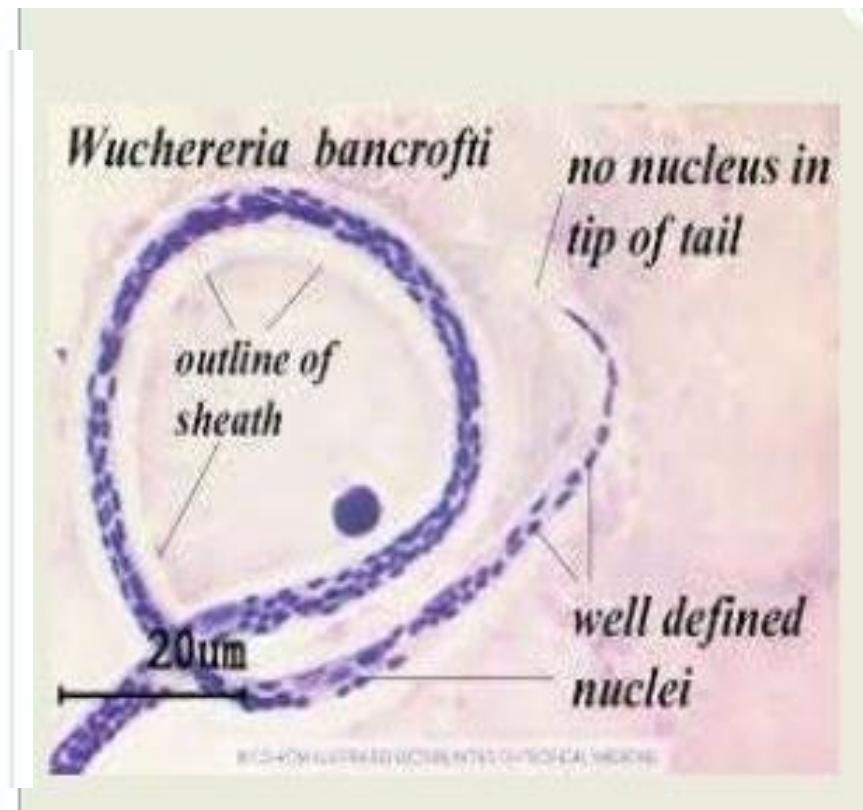


## 4. *Wuchereria bancrofti*

|                           |  |
|---------------------------|--|
| <b>Definitive host:</b>   | man  |
| <b>habitat:</b>           | Adult in lymphatics mainly of the lower limb<br>Microfilaria in peripheral blood (nocturnal) or pooled in the lung |
| <b>Intermediate host:</b> | Mosquitoes   |
| <b>Mode of infection</b>  | Bite of mosquitoes harboring   |
| <b>infective stage:</b>   | Third-stage larvae (filariform larva, embryofilaria)   |

#### 4. *Wuchereria bancrofti* microfilariae

- 244- 296 um by 7.5- 10 um
- Nuclei not reaching tail end
- No terminal nuclei
- Nuclei regularly spaced, dispersed
- Bigger, wider than *B. Malayi*
- Graceful sweeping curves
- Short head space (as long as broad)
- Sheath unstained with Giemsa
- Blutely rounded anteriorly and pointed caudally

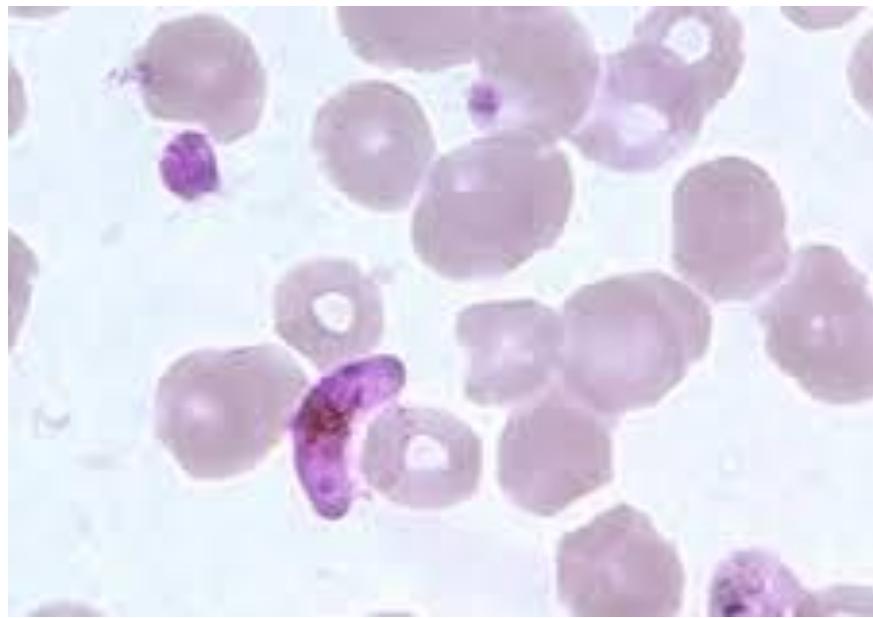


*Wuchereria bancrofti* microfilariae

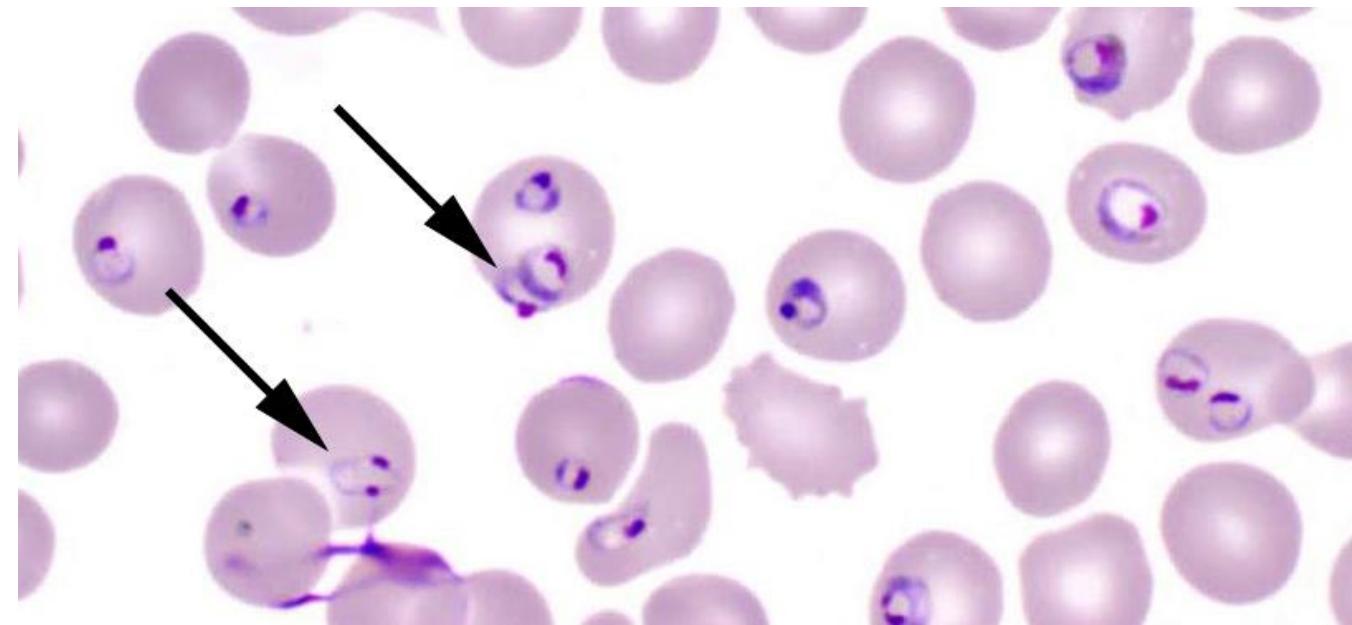


## 5. Malaria

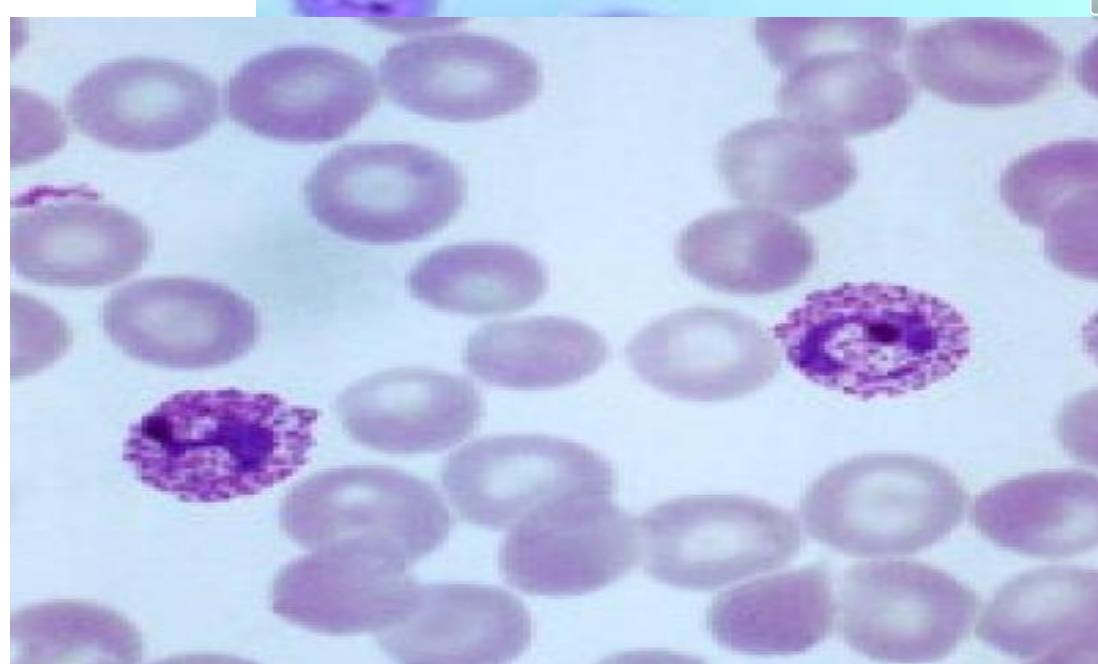
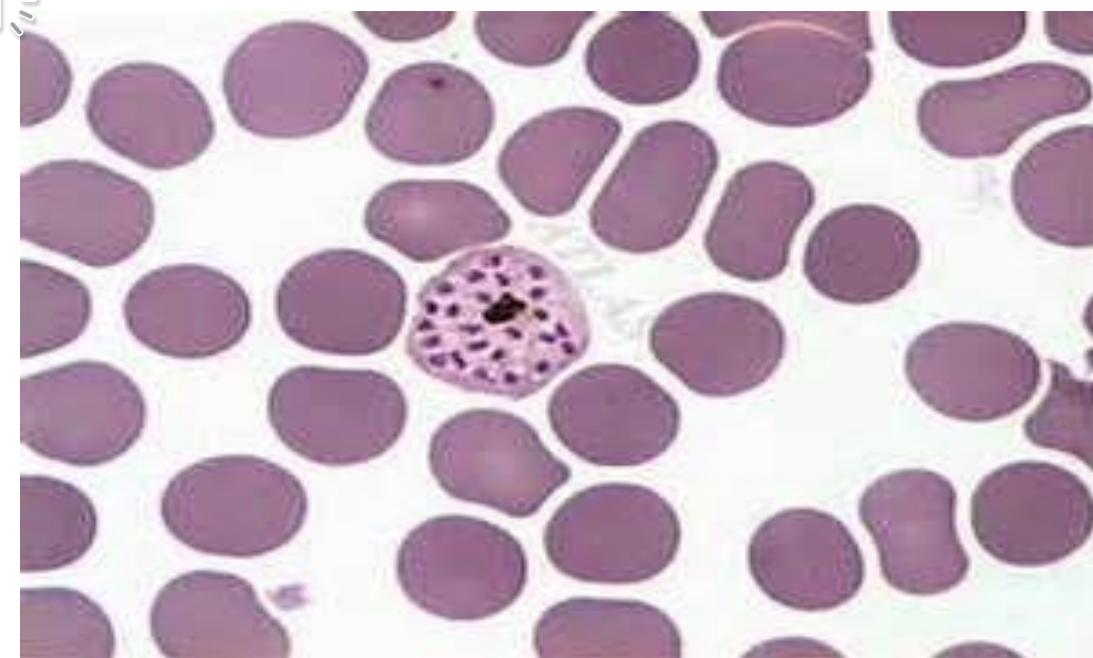
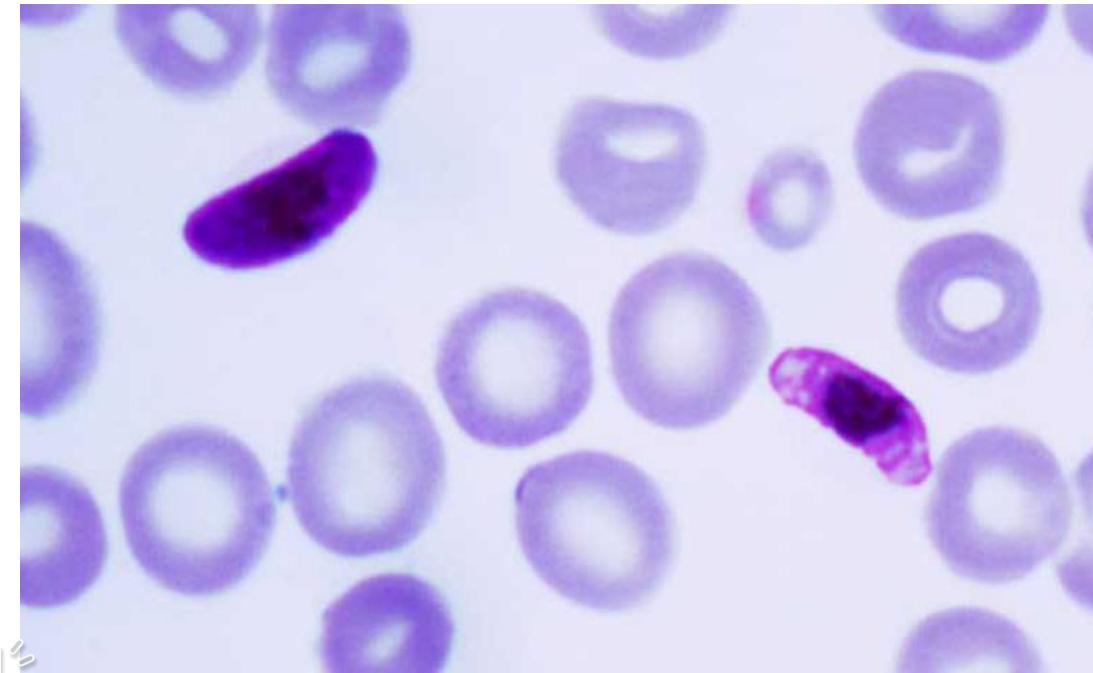
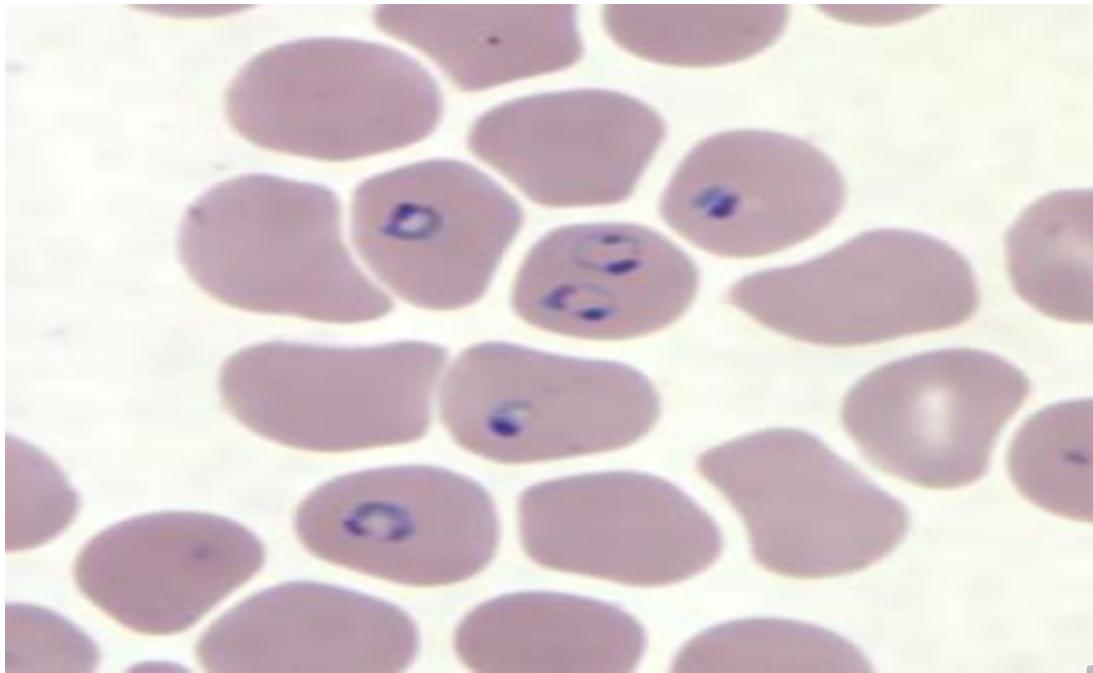
|                             |  |
|-----------------------------|--|
| <b>Causative protozoa :</b> | Plasmodium vivax, Plasmodium ovale,<br>Plasmodium malariae, Plasmodium falciparum                          |
| <b>Geog. Dist.</b>          | Tropics and subtropics.  |
| <b>Definitive host:</b>     | Man  |
| <b>Habitat:</b>             | Liver cells and R.B.Cs   |
| <b>Infective stage:</b>     | ➤ Sporozoites  |
| <b>Diagnostic stage:</b>    | ➤ blood stages.  |
| <b>Mode of infection:</b>   | 1. Through the bite of female Anopheles mosquitoes.<br>2. blood transfusion<br>3. Congenital transmission. |



*Plasmodium falciparum*  
gametocyte stage

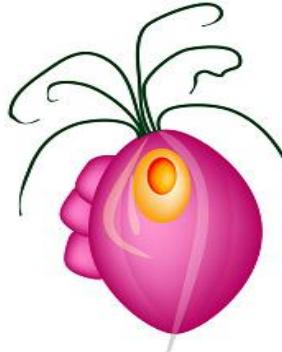


*Plasmodium falciparum*  
ring stage



## 6. *Trichomonas vaginalis*

### Trichomoniasis



|                      |  |
|----------------------|--|
| Causative protozoa : | <i>Trichomonas vaginalis</i> (Urogenital flagellates)  |
| Geog. Dist.          | Cosmopolitan.  |
| Definitive host:     | Man  |
| Habitat:             | <ul style="list-style-type: none"><li>➤ Vagina and urethra of female</li><li>➤ Prostate, seminal vesicles and urethra of male</li></ul>          |
| Infective stage:     | <ul style="list-style-type: none"><li>➤ Trophozoites.</li></ul>  |
| Diagnostic stage:    | <ul style="list-style-type: none"><li>➤ Trophozoites.</li></ul>  |
| Mode of infection:   | <ul style="list-style-type: none"><li>➤ Sexually Transmitted Infection (STI).</li><li>➤ Contaminated toilet articles and toilet seats.</li></ul> |

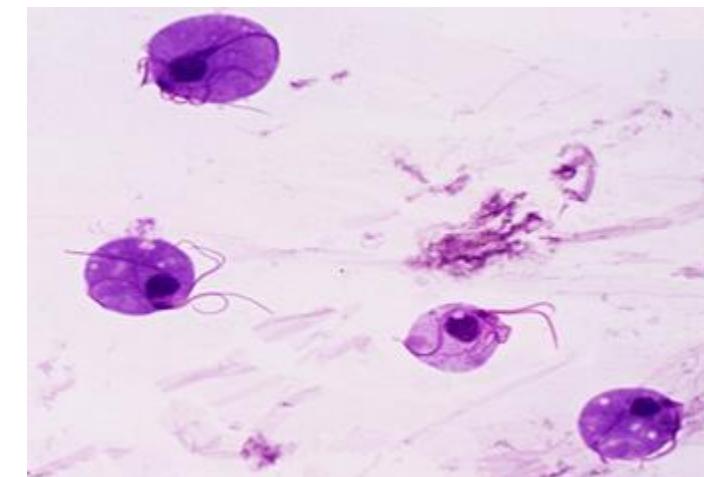
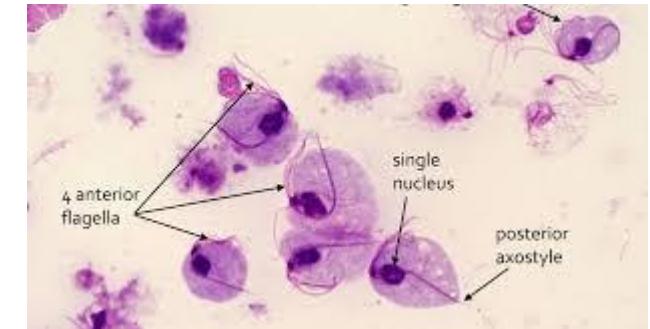
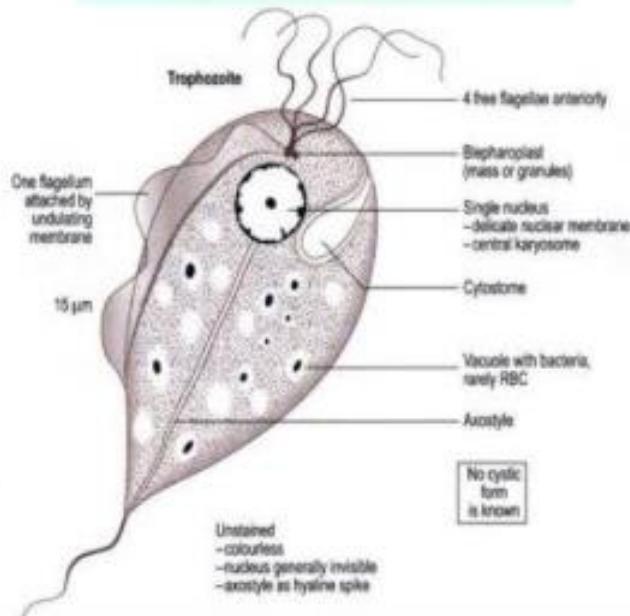
# Morphology

## Trophozoite

□ *T. vaginalis* exists only as a **trophozoite stage**, which:

- is pear-shaped, ~15x8 µm in size.
- has 5 flagella (4 anterior free & 1 marginal) & an undulating membrane.
- has a very small antero-lateral cytostome & a nucleus.
- has an axostyle extending from anterior to posterior ends & protrude outside.

**Trophozoite is the IS & DS**



### **3. *Entamoeba histolytica***

**Definitive host:**

**habitat**

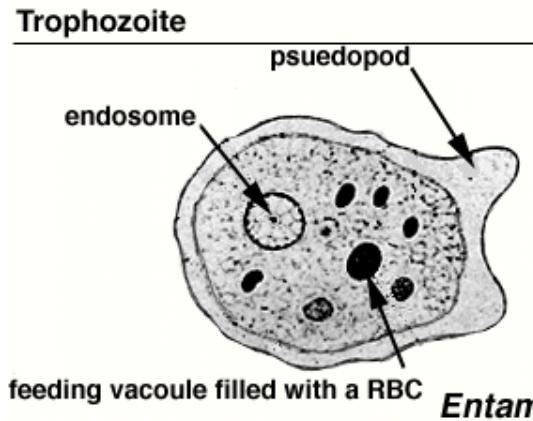
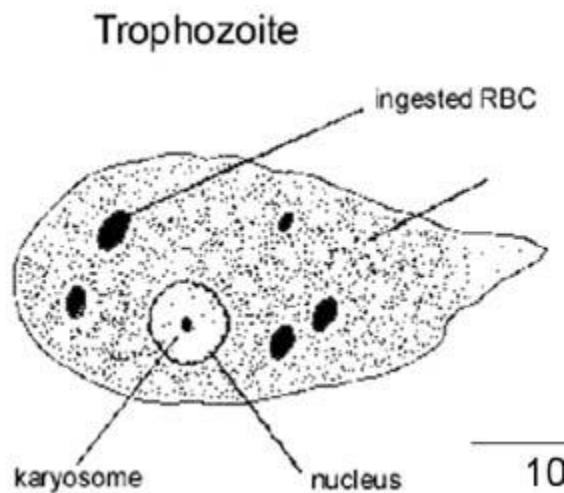
**Infective stage:**

**Diagnostic stage:**

**Mode of infection:**

- Man, dog / large intestine
- Large intestine
- Quadrinucleated cyst
- Quadrinucleated cyst and trophozoite.
- ingestion of the quadrinucleated cysts in contaminated food, water, or hands

# *Entamoeba histolytica*



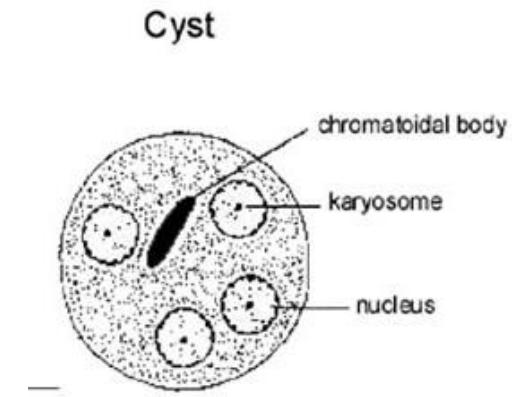
**shape:** amoeboid with single pseudopodium

**Size:** ranging from 18-40  $\mu\text{m}$ ; average being 20-30  $\mu\text{m}$

**Cytoplasm:** cytoplasm is divided into two portion; a clear transparent ectoplasm and a granular endoplasm. Ingested RBCs, tissue granules and food materials are also found in endoplasm

**Nucleus:** It is single, spherical shape and size ranging from 4-6 $\mu$ . Nucleus contains central karyosome and fine peripheral chromatin.

- It is the infective form of parasite.
- **Shape:** It is round or oval in shape
- **Size:** 12-15  $\mu\text{m}$  in diameter
- It is surrounded a cyst wall
- **Nucleus:** A mature cyst is quadri-nucleated.
- **Cytoplasm:** Cytoplasm shows chromatid bars and glycogen masses but no RBCs or food particles.



## 8. Leishmania donovani

### PATHOLOGY:

Amastigotes multiply in macrophage, destroyed the macrophage

eventually rupturing the cell

- Free amastigotes then invade the circulatory system.

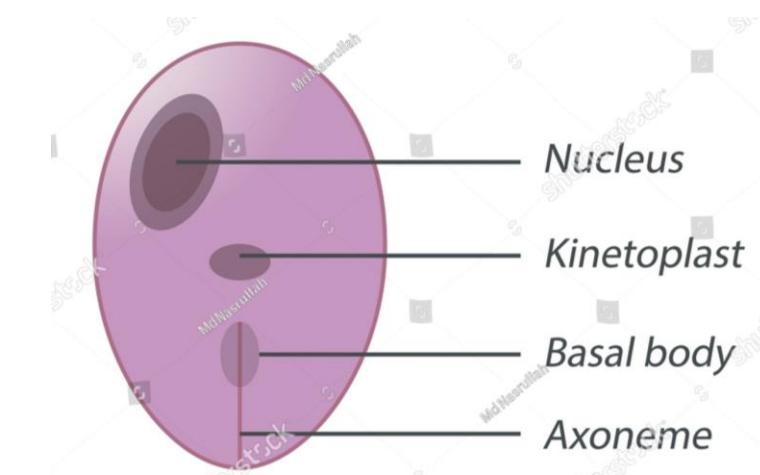
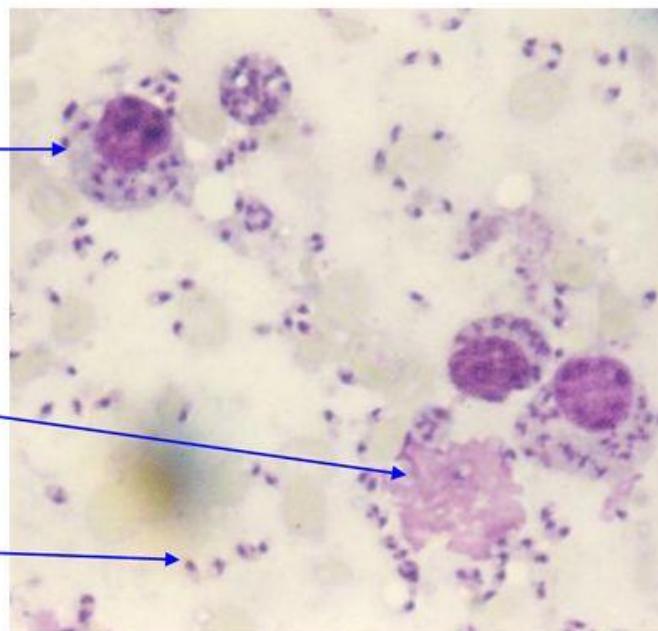
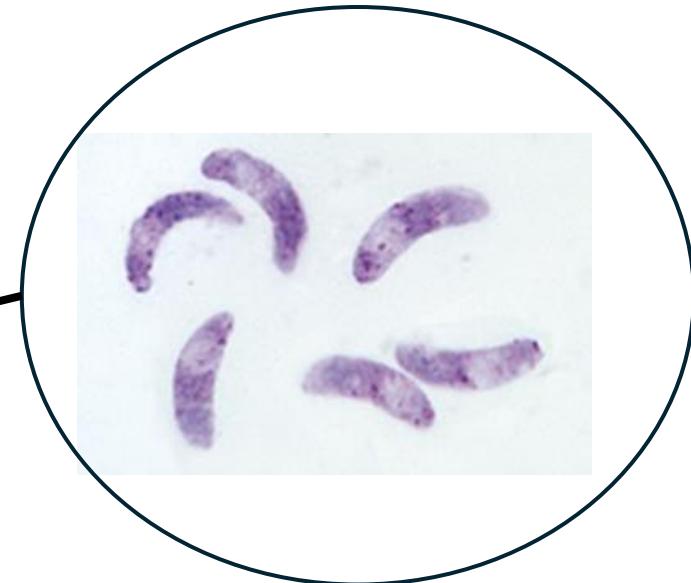
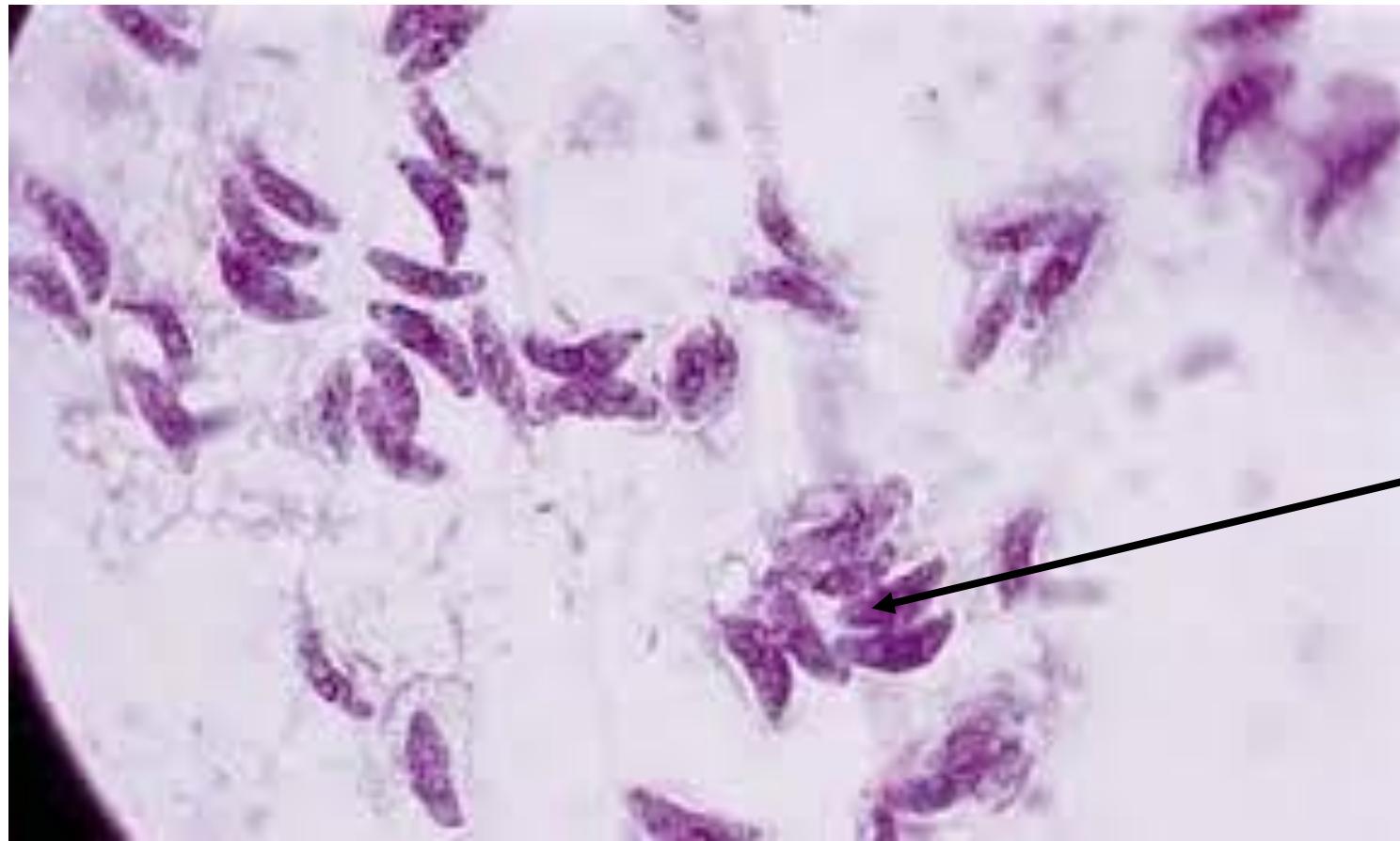


Fig: Amastigote of *L.donovani*

## 9. *Toxoplasma gondii*

|                              |  |
|------------------------------|--|
| <b>Definitive host:</b>      | The domestic cat (predator)  |
| <b>Intermediate host:</b>    | All vertebrate hosts including humans serve as prey hosts.   |
| <b>Developmental stages:</b> | Oocyst, Schizonts, Gamonts, Tachyzoites, Bradyzoite cyst.  |
| <b>Mode of infection</b>     | <ul style="list-style-type: none"><li>a) Ingestion of sporulated oocysts in contaminated vegetables or water or during handling of litter trays or by aids of flies</li><li>b) Ingestion of tachyzoites or bradyzoites in cysts in undercooked meat or during handling infected raw meat.</li><li>c) Blood transfusion and organ transplant.</li></ul> |

# *Toxoplasma gondii*



Trophozoite: Crescent or banana shaped organisms measured 2-4  $\mu\text{m}$   
Nucleus: central, compact



**Identify the parasite (mention the genus, species and the stage)**

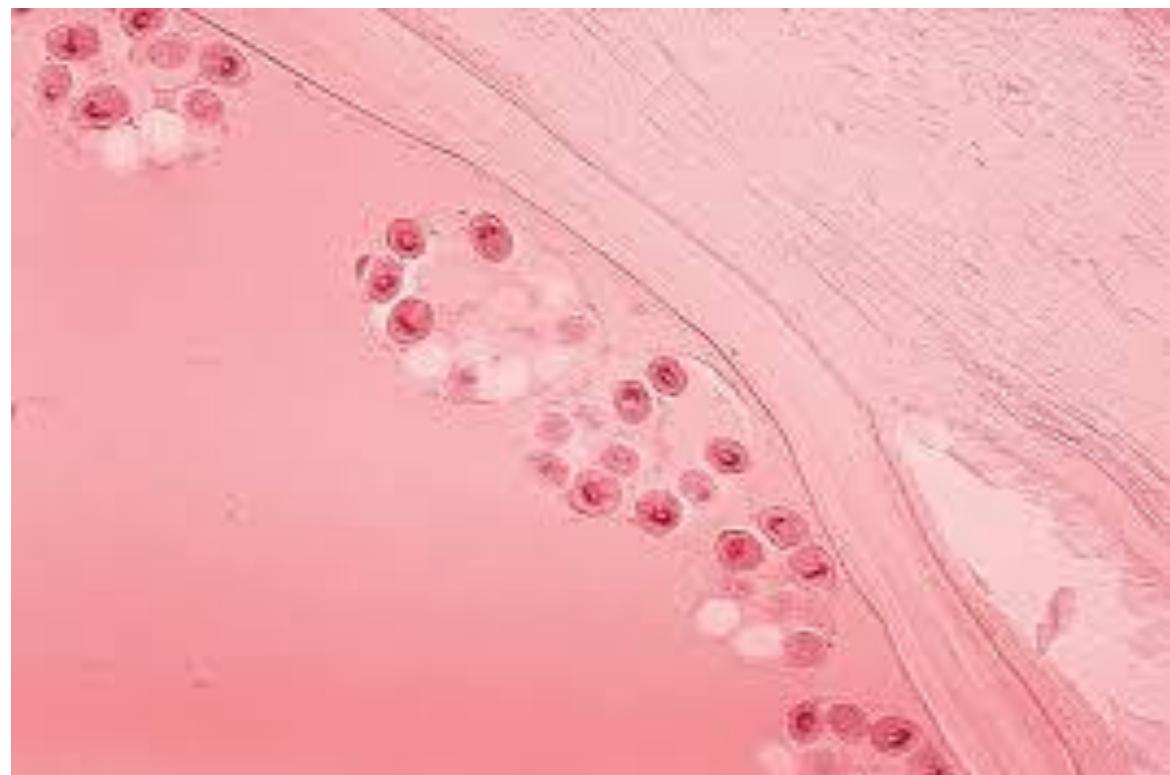
**1. Lung affection:**

**2. Definitive host:**

**3. Intermediate host:**

**4. Mode of infection**

**5. Infective stage:**



**Identify the parasite (mention the genus, species and the stage)**

**1. Lung affection:**

**2. Definitive host:**

**4. Mode of infection**

**5. Infective stage:**

**A**



**B**



**Identify the parasite (mention the genus, species and the stage)**

**1. Lung affection:**

**2. Definitive host:**

**3. Intermediate host:**

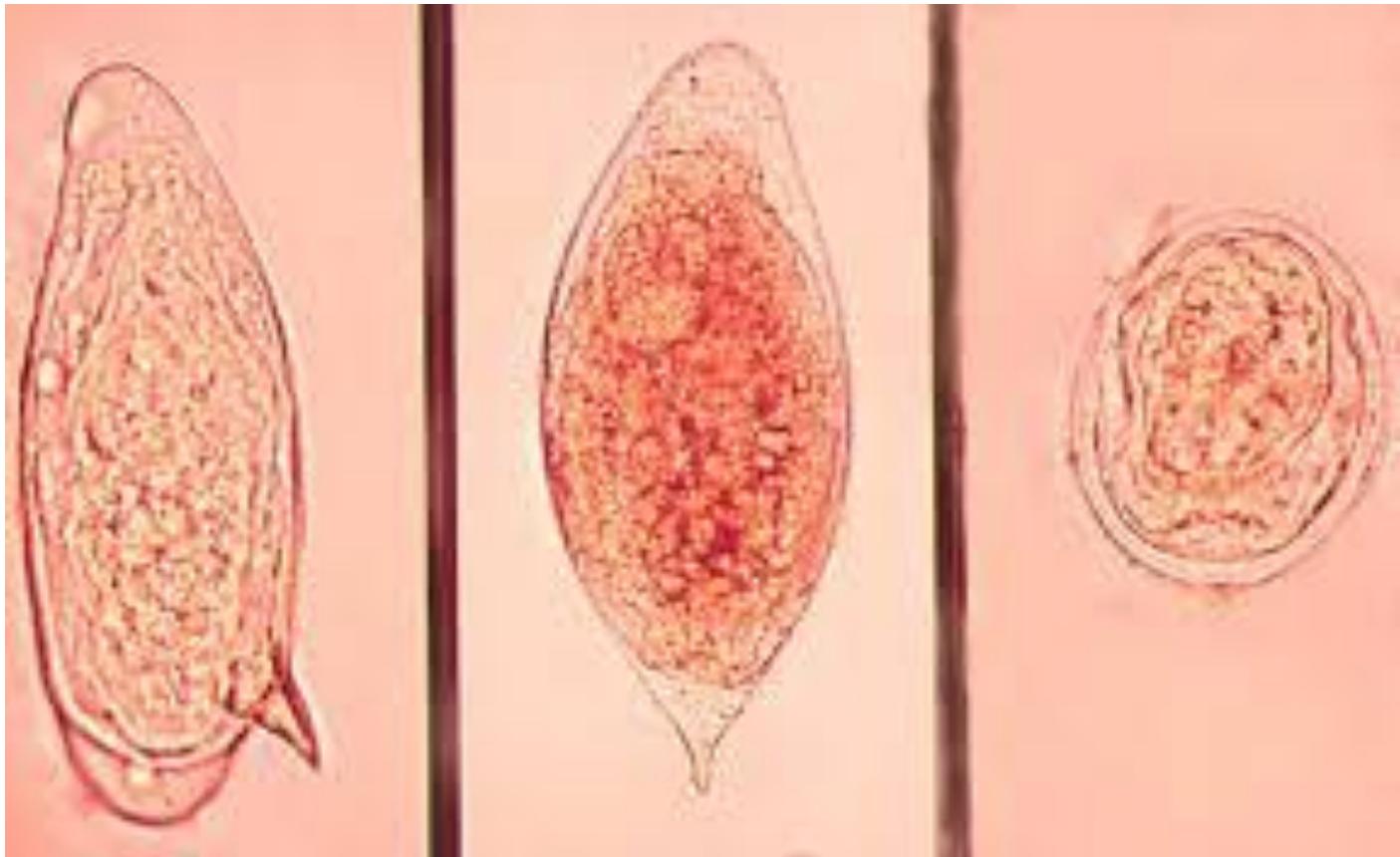
**4. Mode of infection**

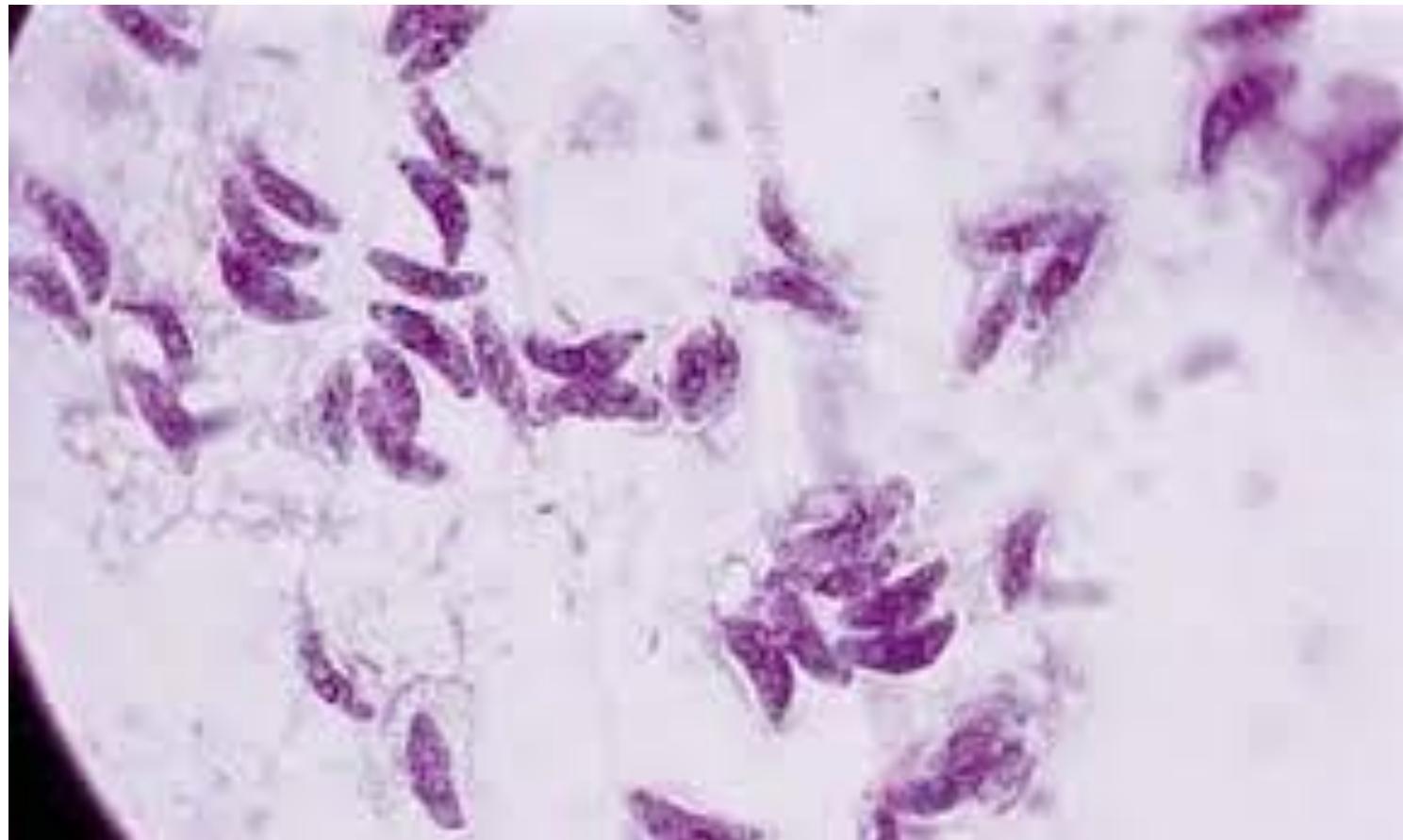
**5. Infective stage:**

**A**

**B**

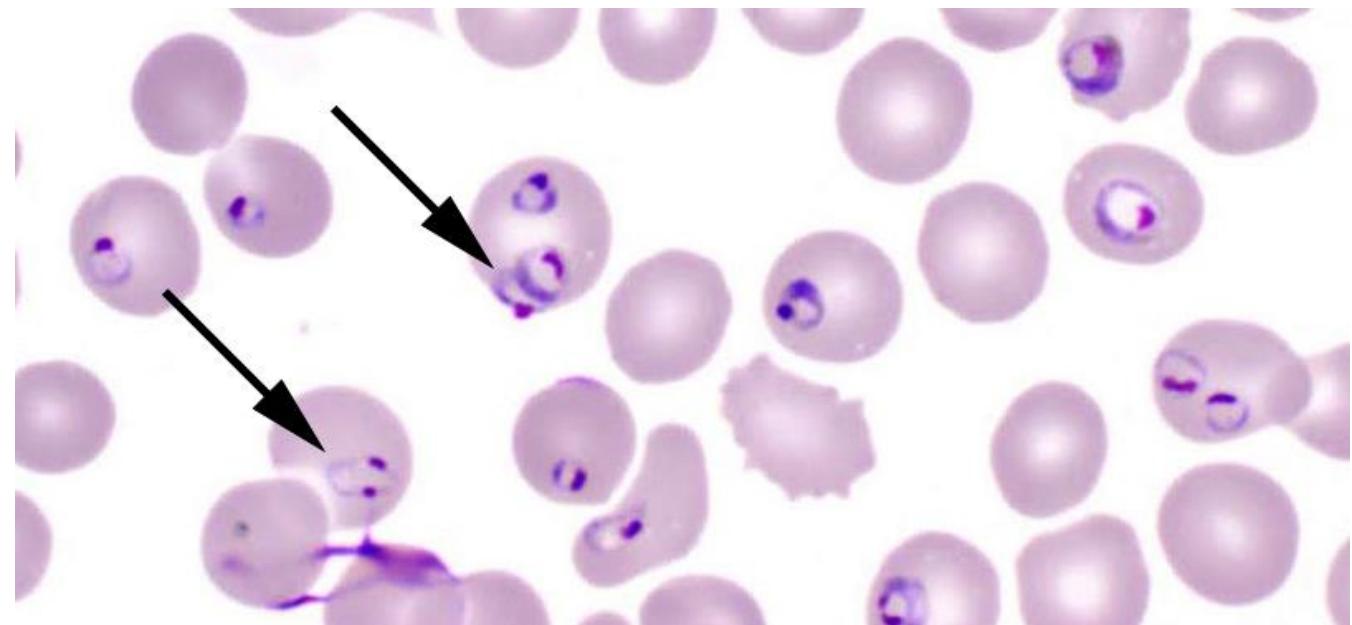
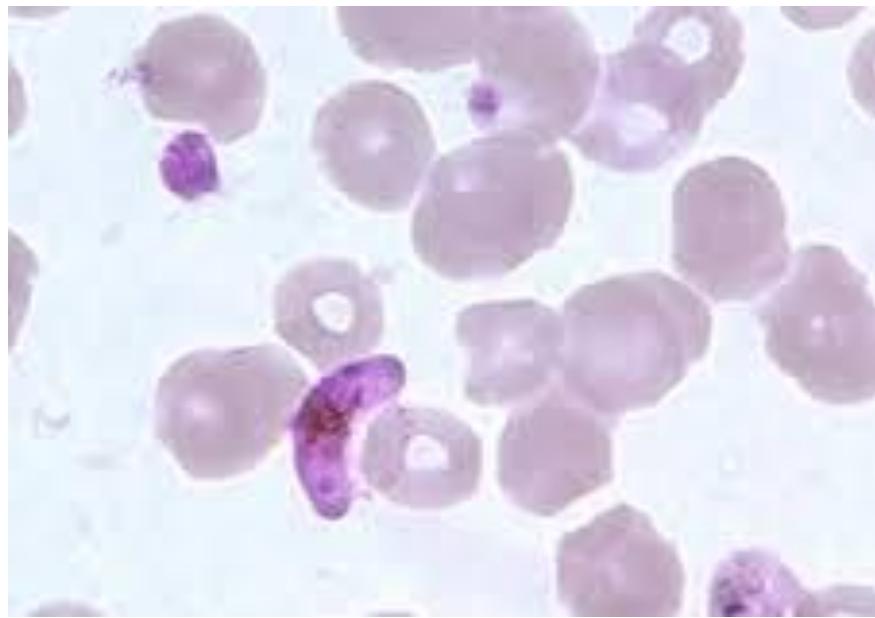
**C**





Identify the parasite

Mention the infective stage and mode of infection



Identify the parasite  
Mention the infective stage and mode of infection



**Identify the parasite (mention the genus, species and the stage)**

**Lung affection:**

**Definitive host:**

**Intermediate host:**

**Mode of infection**

**infective stage:**



**THANK YOU!**