Genus 2: *Leishmania*

This parasite cause disease called leishmaniasis (leishmaniosis). The disease can present in three main forms: cutaneous, mucocutaneous and visceral.

Host: man, dogs, rodents, and wide variety of wild animals (dog and rodents act as a reservoir hosts).

Vector: Sand fly (*Phlebotomus papatasi*).

Site: The protozoa multiply within macrophages.

(*Phlebotomus* spp.)

***Three important Species:**

I-Visceral leishmaniasis (VL), **(black fever, Kala-azar, dum-dum):** Involving endothelial tissue liver, spleen and bone marrow in human and dogs which cause by:

A. *Leishmania donovani*: found in Iraq, India, Kenya, Sudan, and China.

B. *L. infantum*: Infected children under five years in old, found in Iraq.

C. *L. chagasi*: Infect human in all ages but more common in children, the dogs and fox act as a reservoir hosts, and this species is distributed in South America.

Clinical Signs: (Visceral leishmaniasis).

A- Enlargement of abdomen due to enlargement of liver and spleen.

B- Anemia.

C- Intermittent fever.

D- Good appetite.

(Dog with visceral leihmaniasis) (Child with visceral leihmaniasis)

II-Cutaneous leshmaniosis (CL): Involving epithelial cells the skin at the site of sand fly bite, which caused by ***L. tropica*.**

1. *L. tropica* minor (*L.T.* minor): Causing dry oriental sore (dry cutaneous leshmaniasis), found in Iraq and called **Baghdad boil**, also distributed in Mediterranean area and in central and north India. This type called **urban type.**

2. *L. tropica* major (*L.T.* major): Causing moist oriental sore, distributed in Middle East area and India this type called **rural type**.

Clinical Signs: (Cutaneous leishmaniosis).

1- A sore at the bite site.

2- Which heals in a few months to a year.

3- Leaving an pleasant looking scar.

Cutaneous leishmaniasis

III- Mucocutaneous leishmaniosis (Espundia). Infect cutaneous and spread to mucosa of mouth, nose, pharynx, larynx, and ears, and caused by:

1. *L. braziliensis*

2. *L. maxicana*

Clinical Signs: (Mucocutaneous leishmaniosis).

- Start with ulcers which spread, causing tissue damage in nose and mouth specially.

(Child with mucocutaneous leishmaniasis)

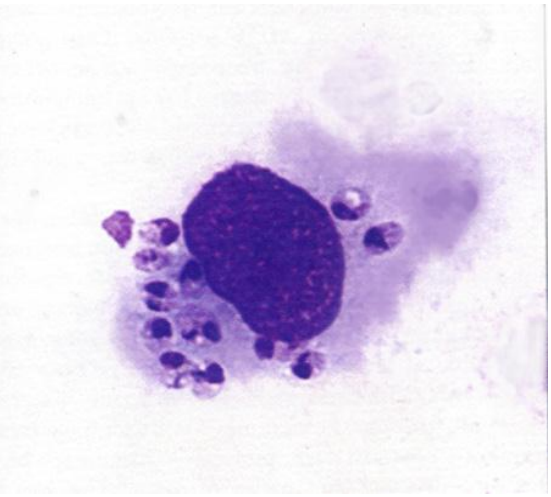
Life Cycle

The parasite passage in two stages during its life cycle which are:

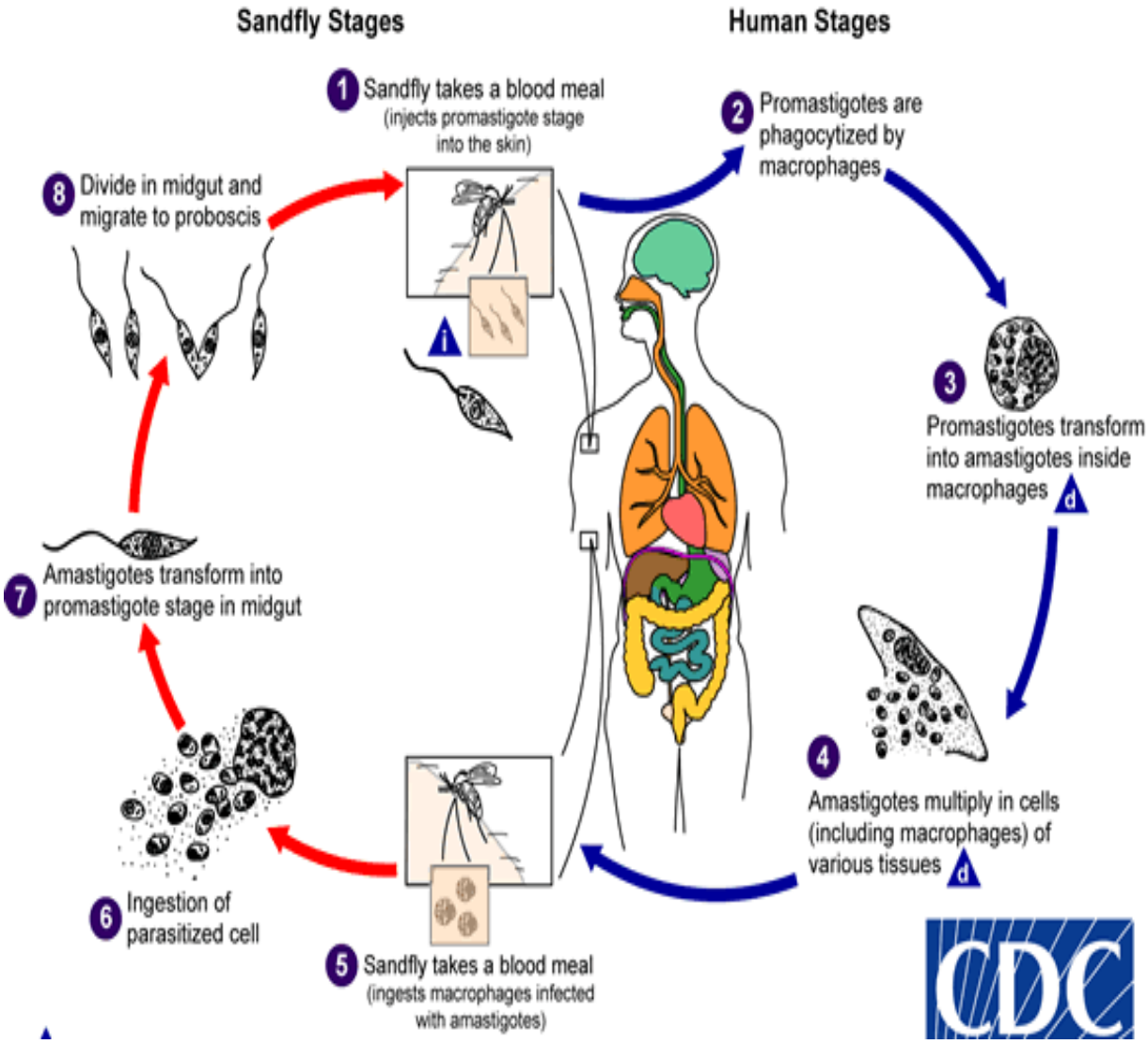
1- Amastigote form (leishman form): visible in vertebrates (man, dogs, *etc*).

2- Promastigote form (leptomonal form): visible in invertebrates (sand fly) and media.

Promastigote form



Amastigote form



Diagnosis:

1. Clinical singes

2. Samples:

A. Biopsy from spleen or bone marrow in case of visceral leishmaniasis.

B. Crushing from lesion edges and stained with gemsa.

3. Serological tests.

4. Culture.

5. Animal inoculation (especially golden hamster).

Control:

1- Treatment of infected cases.

2- Eradication the sand fly by using the insecticides.

3- Eradication the stray dogs and rodents (reservoir hosts).

Treatment:

1- **Visceral leshmaniosis**:

A- Antimonial 1mg/kg, I.V., 2-8 days.

B- Diamidine = , = , = .

C- Amphotricine B = , = , = .

2- **Cutaneous leishmaniosis**:

Sodium antimony gluconate 600mg/day, 6-10 days.

Family: Trichomonadidae

These are the trichomonads occurring usually in the **Digestive tract** but they may also be founding the **Reproductive system**, most of them are pear in shape, one nucleus, and number of free flagella (3-5) with flagellum return backward to formed undulating membrane in addition to a hyaline rod structure called axostyle with a skeletal function.

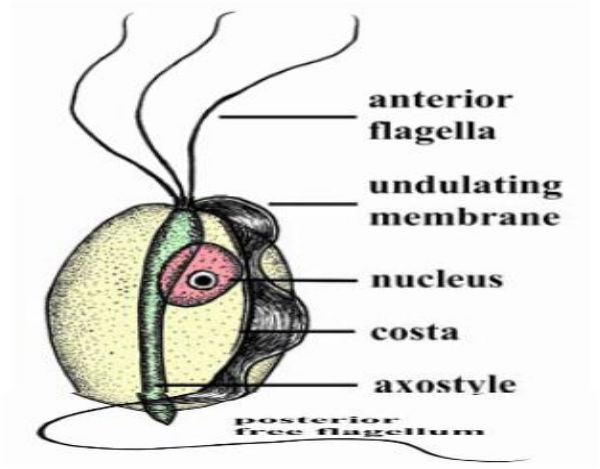
Several genera occur in the family and the speciation is largely dependent on the number of anterior flagella. Those with **three anterior flagella** belong to the genus *Tritrichomonas (Tritrichmonas foetus)*, those with **four anterior flagella** to *Trichomonas (T. gallina, T. vaginalis)* and those with **five anterior flagella** to the genus *Pentatrichomonas (P. hominis)*

Genus: *Tritrichomonas*

The anterior end of parasite have three flagella.

Species: *Tritrichomonas foetus*.

It is a single celled flagellated protozoan parasite that is known to be a pathogen of the bovine reproductive tract , it may also occur in the pig, horse and deer . The parasite causes specific venereal disease in bovine called trichomoniasis or bovine trichomonal abortion or bovine genital trichomoniasis, three of flagella are free anteriorly, while the 4th extended backward to form undulating membrane continue posteriorly to form free flagellum.



Host: cattle

Site: In cows, the uterus and intermittently the vagina.

In bulls, the preputial cavity.

Distribution: Worldwide distribution.

Transmission:

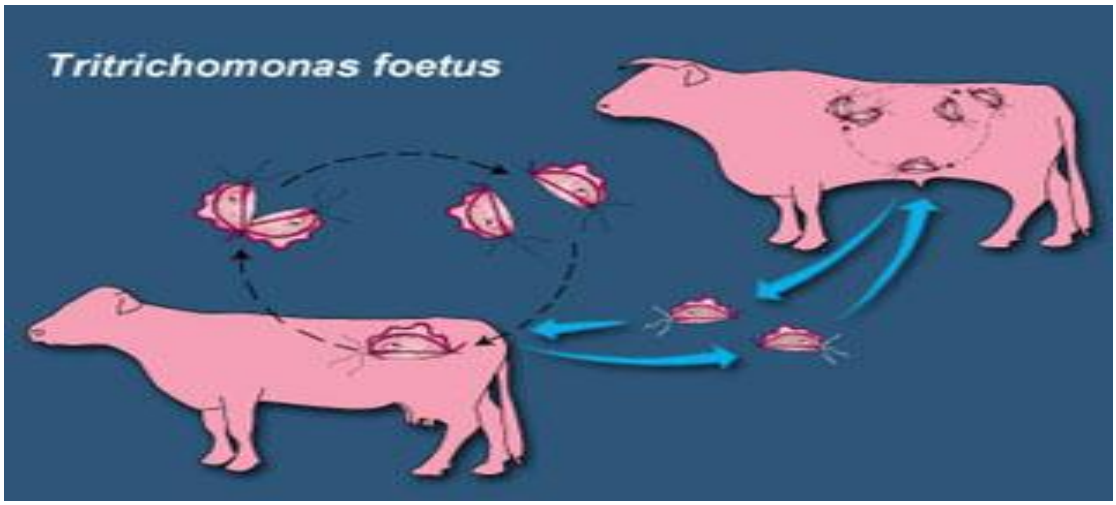
1- Coitus.

2- Artificial insemination.

3- Gynecological examination.

Life cycle

Trichmonas trophozoites are transferred from the peins to the vagina during copulation.



Pathogenesis:

In the bulls the principle is the preputial cavity and urethra. Muco-purulent discharges may be present and swelling of prepuce is seen, but these signs disappear after 1-2wks and the animal become carrier of the disease and act as a source of infection.

In cows, after 14-18 days of parasite entering ,there are vaginitis and muco-purulent discharges are seen and then the parasite is invade the uterus and lead to early abortion with complete expulsion of the foetus and fetal membranes. Spontaneous recovery **(self-cure)** may be occur, but occasionally some of the

placenta was retained in the uterus and lead to chronic catarrhal and purulent endometritis and the cow become **sterile**.

In some cases the dead foetus is not expulsion but it was **macerated** and this lead to pyometra (**septicemia and lead to dead of cow**).

Diagnosis:

1- Sample of vaginal mucous or exudates or saline washing from vaginal or preputial cavity and examined microscopically.

2- In case of abortion sample from foetal tissues should be taken.

3- Serological test.

4- Culture of sample.

***Note** / abortion occur in 2-3 months of pregnancy.

Treatment:

-Dimetrinedazole (Flagyl) 50mg/kg B.W. for 5 days orally or 10mg/kg B.W. for 5 days I.V.

Genus: *Trichomonas*

Members of this genus are pyriform and typically have four free anterior flagella

1. *T. vaginalis*

Resemble *T. foetus* but it has 4 in front flagella and the 5th toward back and reach to the middle of the body. Also it is contain granules.

Host: human

Site: Vagina and urethra of women, seminal vesicle and urethra of men.

Transmission:

1. Direct sexual contact **2.** Contaminated towels **3.** Clothing **4.** Toilet seats.

Clinical Signs:

Man carries the infection but without clinical signs, while women are suffering from the following:

1. Intense inflammation with itching. **2.** Profuse white vaginal discharges (leukorrea). **3.** Not lead to abortion.

2-*T. gallinae* (synonym: *T. columbae, Cercomonas gallinae*)

This parasite has 4 in front flagella and the 5th return back to form the undulating membrane, but not reach to the posterior end and the free flagellum is absent. Infected the bird cause disease called **Canker**.

Host: Pigeon, turkey and chicken.

Site: Mouth, oesophagus, and crop of pigeon squabs.

Transmission: Through contaminated food and water or pigeon milk.

Clinical Signs:

1- Greenish to yellowish fluid or cheesy material around the mouth (peak).

2- Restless and ruffled feather.

3- Emaciation and death.

Lesion:

The lesion is start in the oral cavity and then distended to the Oesophagus, crop, proventriculus, liver and lung. In P.M. we will see yellowish to grayish lesion in mouth, Oesophagus and liver.

Diagnosis: **1.** Swap from the mouth **2.** C.S. **3.** P.M. and culture.

Treatment:

1. Dimetrinedazole 0.05% in drink water. **2.** Furazolidone 25-30mg/day for 7 days in gelatin capsules.

Family: Monoceromonadidae

Genus: *Histomonas*

Species: *H. meleagridis*

Is species of parasitic protozoan that infects a wide range of birds including chickens and turkeys **(especially young turkey)** causing **black head disease** infectious **enterohepatitis** or **histomoniasis**. *H .meleagridis* can infect many birds but it is most **deadly in turkeys**.

Morphology

1. *H .meleagridis* is a microscopic, **pleomorphic protozoan** and can exist in dimorphic forms, **amoeboid** and **flagellated**.

2. It is round or oval parasite, 6-20μm in diameter and has one flagellum (flagellated).

3. The amoeboid form is typically 8-15μm in diameter and without flagellum.

Hosts:

Turkeys and occasionally pathogenic in chickens.

Transport host:

Ascarid worm is *Heterakis gallinarum* eggs.

Site:

It inhabits the **lumen of cecum** and **parenchyma of liver** where it causes extensive necrosis.

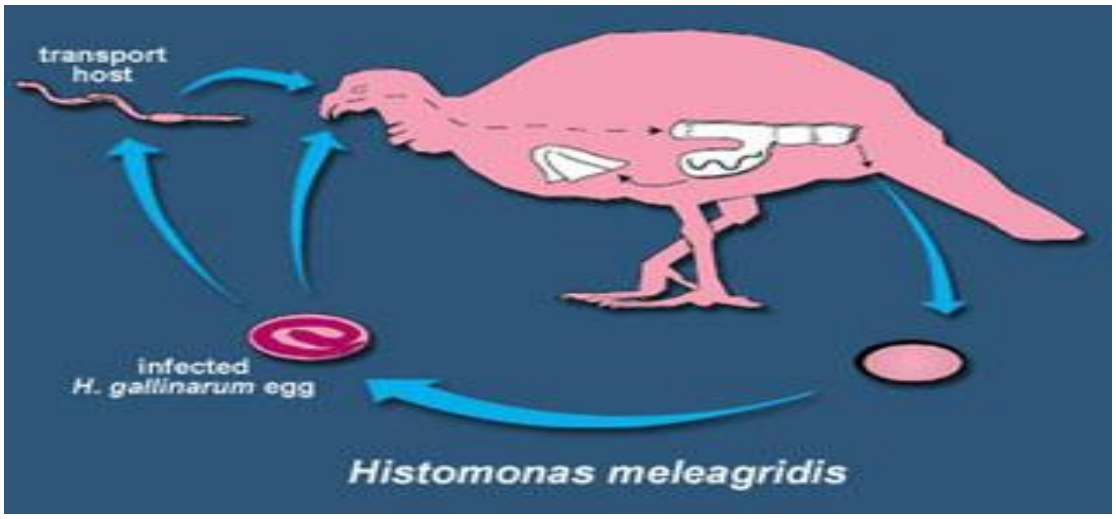
Distribution: Worldwide.

Transmission: It is transmitted by another cecal parasite the nematode *Heterakis gallinarum*.

Life Cycle:

The *Heterakis gallinarum* become infected with *Histomonas meleagridis* by ingestion and then the protozoa reach to the ovary of worm.

The infection of the birds may also result from the ingestion of the earth worms which are transport hosts for *Heterakis gallinarum* eggs.



Clinical Signs:

1. Cyanosis of head and wattles (black head). **2.** The bird is dull with ruffled feather. **3.** Sulphur to yellowish feces.

Diagnosis:

1- C.S.
2- P.M. (ulcers in caecum and necrotic foci in liver).
3- Swap from foci.
4- Culture.
5- Histological examination for liver and caecum.

Treatment:

1- Furazolidone 0.01-0.02% with food.
2- Nitrothiozole 0.02% with water or 0.25% with food.
3- Dimetrinedazole 0.05% with water.

Control:

1- The turkey should be not rear with chicken because the chicken acts as carrier to the disease.
2- Use of anthelamintics.
3- Discard of feces.
4- Continuous low level of medication (that described above) especially with food.