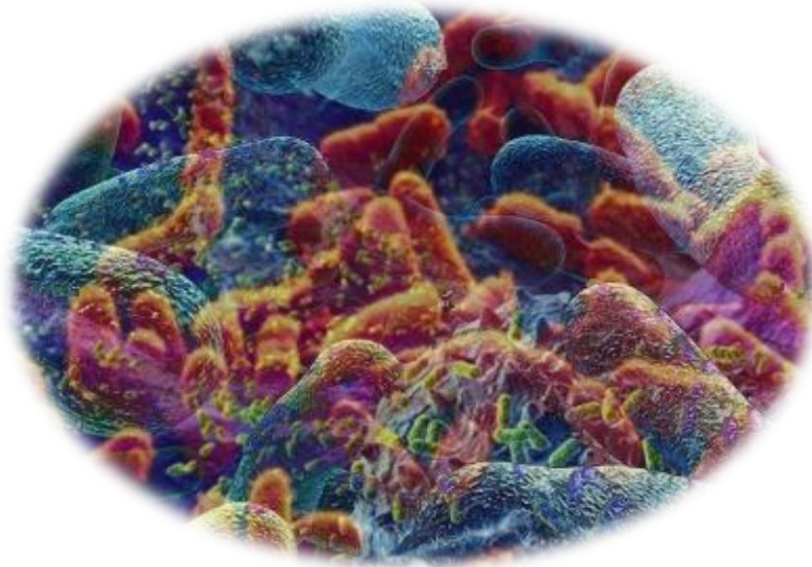


431
Microbiology Team

**Haemoflagellates (Leishmaniasis &
Trypanosomiasis)**

GIT & HAEMATOLOGY BLOCK



Leaders:

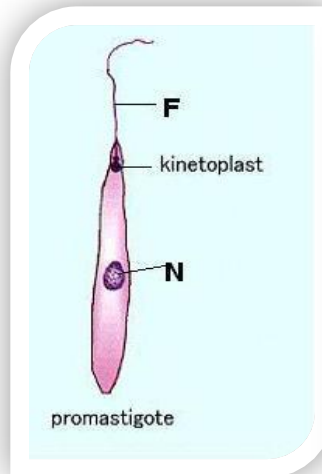
Faisal Al Rashid , Eman Al-Shahrani

Done by:

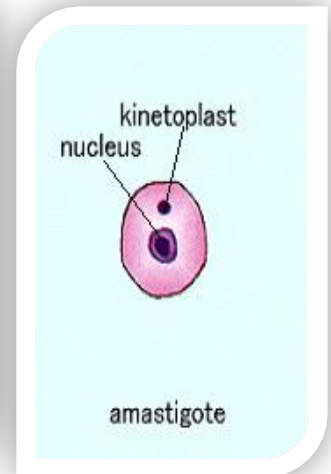
Ghaida AlSugair , ahmed saleem

LEISHMANIASIS

A disease caused by **leishmania parasites**, and transmitted by sand fly bite as **PROMASTIGOTES (infective stage)**. Inside humans they are found in macrophages and tissue as **AMASTIGOTES (diagnostic phase)**.



Infective Stage – in insects



Diagnostic Phase – in human lives inside macrophages so it affects the reticuloendothelial system (**visceral leishmaniasis**)

↳ Pathogen: *Leishmania*

- *Leishmania major** (main species in KSA)
- *Leishmania tropica**
- *Leishmania aethiopica*
- *Leishmania Mexicana*

Cutaneous Leishmaniasis
(common form)

- *Leishmania donovani**
- *Leishmania infantum**
- *Leishmania chagas*

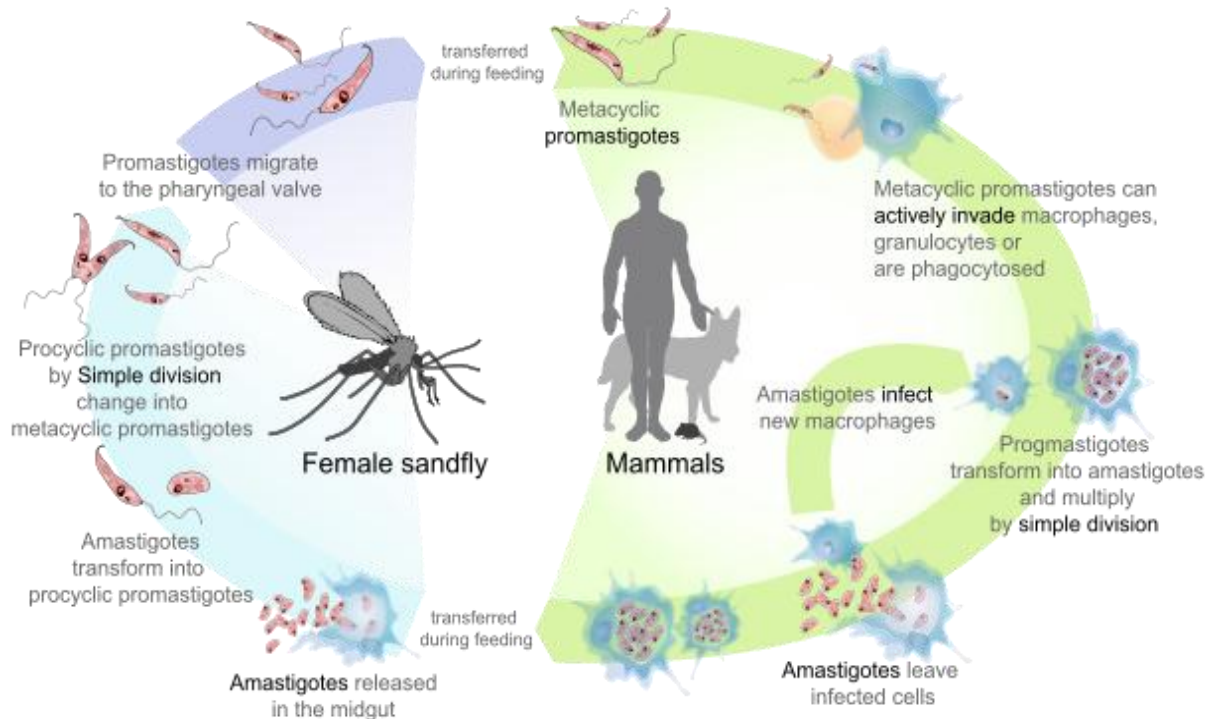
Visceral Leishmaniasis
(severe form)

- *Leishmania braziliensis* → **Mucocutaneous leishmaniasis**

↳ Life Cycle:

❖ **Female sand fly is the vector for the disease.**

Found in humans and rattans as **AMASTIGOTE** → sand fly takes a blood meal → amastigote grow to **promastigote** in sand fly → sand fly takes blood meal and infect humans by **promastigote** → promastigote phagocytized by macrophages → promastigote transform to **amastigote** → **amastigote** multiply in cells (including **macrophages**) of human tissue → sand fly transmit the disease again.



- ❖ **Amastigote** [*diagnostic phase*] found inside human tissue and macrophages.
- ❖ **Promastigote** [*infective stage*] found and develop inside sand fly.

CUTANEOUS LEISHMANIA :

↳ Common Clinical types of cutaneous Leishmaniasis:

- **Leishmania major:** Zoonotic (from animal to human) cutaneous Leishmaniasis : wet lesions with **severe** reaction.
- **Leishmania tropica:** Anthroponotic (from human to human) cutaneous Leishmaniasis : Dry lesions with **minimal** ulceration.

↳ Clinical presentation:

Oriental sore (most common) classical **self-limited ulcer**.

↳ Uncommon types of cutaneous Leishmaniasis:

- Diffuse cutaneous leishmaniasis (DCL):
Caused by *L. aethiopica*, **diffuse** nodular non-ulcerating lesions. Low immunity to Leishmania antigens, numerous parasites.

- Leishmaniasis recidiva (lupoid leishmaniasis):
Severe immunological reaction to leishmania antigen leading to persistent dry skin lesions, few parasites.

↳ Diagnosis:

- **Smear:** **Giemsa stain** – microscopy for **LD bodies (amastigotes)** LD = Leishman-Donovan
- **Biopsy:** microscopy for **LD bodies** or **culture in NNN medium** for **promastigotes**.

↳ Treatment:

- No treatment – **self-healing lesions**
- Medical:
 - Pentavalent antimony (**Pentostam**), **Amphotericin B**
 - +/- Antibiotics for secondary bacterial infection.
- Surgical:
 - Cryosurgery
 - Excision
 - Curettage

Cryosurgery (cryotherapy) is the application of extreme cold to destroy abnormal or diseased tissue.
Excision : Surgical removal by cutting.
Curettage : Surgical scraping, usually of the lining of a body cavity, to clean it of foreign matter, to remove tumours or other growths or diseased tissue.

VISCERAL LEISHMANIA : (kala-azar)

↳ Etiology:

- ***Leishmania infantum*** mainly affect **children**
- ***Leishmania donovani*** mainly affects **adults**

↳ Presentation:

- **Fever (2 times per day)**
- **Splenomegaly, hepatomegaly, hepatosplenomegaly**
- **Weight loss**
- Anaemia
- Epistaxis (Bleeding from nose)
- Cough
- Diarrhea

- Untreated disease can be **fatal** >< (**affect the reticuloendothelial system**)
- After recovery it might produce a condition called **post kala-azar dermal leishmaniasis (PKDL)**

↳ Diagnosis:

- **Parasitological diagnosis:**

- **Bone marrow aspirate**
- Splenic aspirate (very dangerous)
- Lymph node
- Tissue biopsy (not done)

Methods :

1. Microscopy → **Amastigotes (LD bodies)**
2. Culture in NNN medium → **Promastigotes**

- **Immunological diagnosis:**

- **Specific serologic tests:** Direct Agglutination Test (**DAT**), **ELISA**, **IFAT**
- **Skin test (leishmanin test)** for survey of populations and follow-up after treatment.
- Non specific detection of hypergammaglobulinaem by formaldehyde (formol-gel) test or by electrophoresis.

↳ Treatment:

- Pentavalent antimony- sodium stibogluconate (**Pentostam**)
- **Amphotericin B**

- **Treatment of complications:**

- Anaemia
- Bleeding
- Infections etc.

N.B the following 2 infections aren't endemic here; there for the doctor said don't concentrate on the lifecycle

TRYPANOSOMIASIS

- In Africa → **African sleeping sickness.**
- In Latin America → **Chagas disease.**

African Sleeping Sickness:

↳ Etiology:

- ***Trypanosoma brucei rhodesiense:***
East Africa, wild and domestic animal reservoirs.
- ***Trypanosoma brucei gambiense:***
West and Central Africa, mainly human infection.

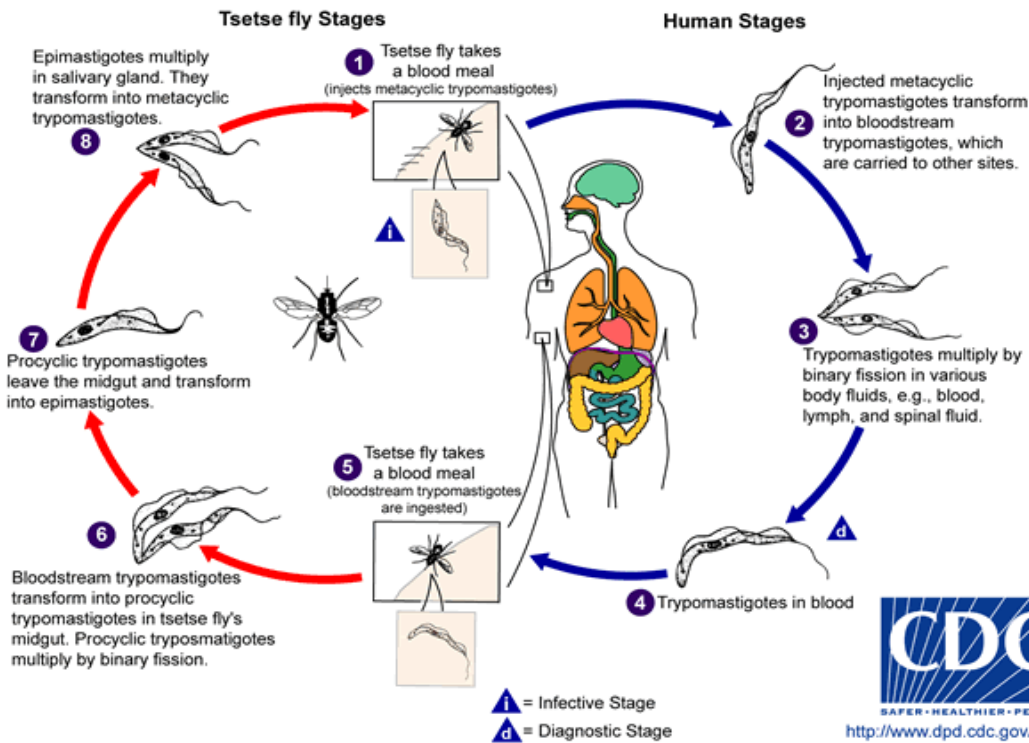
↳ Life Cycle:

- **Human Stage:**

The tsetse fly taking blood from a mammalian host, an infected tsetse fly injects **metacyclic trypomastigotes** into skin tissue → parasites first enter the **lymphatic system** and then pass into the **bloodstream** → they transform into bloodstream **trypomastigotes** → reach other body fluids (e.g., lymph, spinal fluid), and continue to replicate by binary fission.

- **Tsetse fly stage:**

A tsetse fly becomes infected with bloodstream trypomastigotes when taking a blood meal on an infected mammalian host → In the fly's midgut, the parasites transform into procyclic trypomastigotes → multiply by binary fission → leave the midgut → transform into epimastigotes → epimastigotes reach the fly's salivary glands and continue multiplication by binary fission.



Trypomastigotes → diagnostic phase

Metacyclic trypomastigotes → infective phase

↳ Pathology & Clinical Presentation:

3 Stages:

1. Skin stage: **chancre**. (painless ulceration at the site of entry of a pathogen)
2. Haematolymphatic stage (**Winterbottom's stage**) : **generalized lymphadenopathy** (swollen lymph nodes due to infection and inflammation) , **anaemia**, generalized organ involvement.
3. Central nervous system stage (CNS): **Meningoencephalitis**.

(Involvement of the CNS also cause the sleeping sickness)

- Development of the disease more rapid in **Trypanosoma brucei rhodesiense**. (They die before reaching the sleeping sickness)

↳ Diagnosis:

- **Lymph node aspiration** (in Winterbottom's stage) → Microscopy
- **CSF aspiration** (in CNS stage) → Microscopy

↪ Treatment:

For early infection : Pentamidine , Suramin .

For late infection : eflornithine (Diflouromethylornithine- DFMO)

Chagas Disease: usually transmitted through the conjunctiva

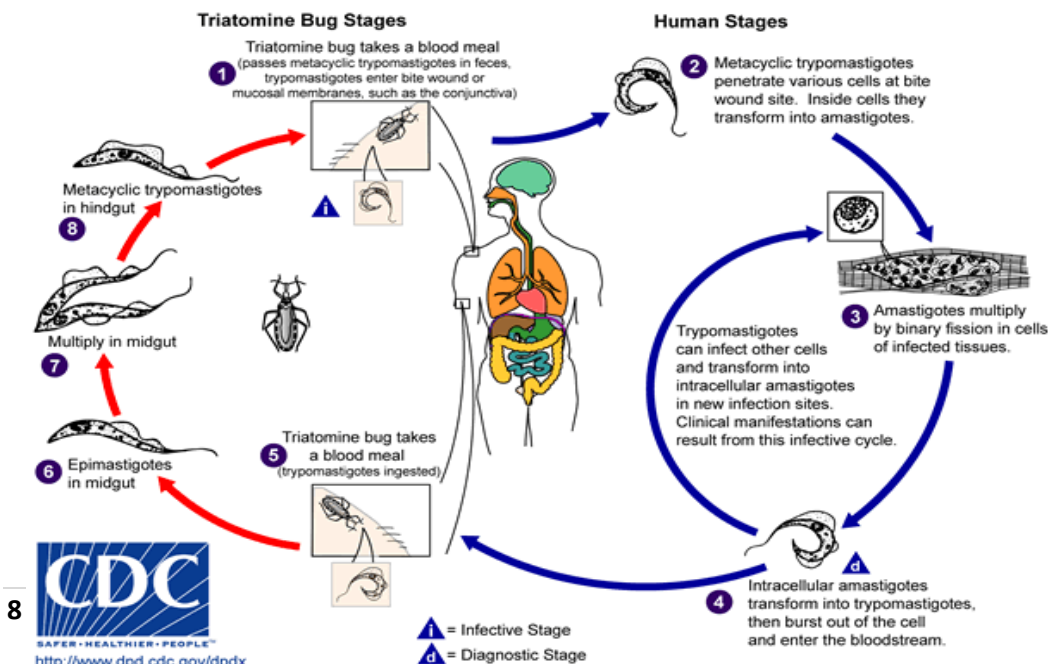
Other name is American TRYPANOSOMIASIS

↪ Etiology:

Trypanosoma cruzi

↪ Life Cycle:

Scratching the site of the bite causes the trypomastigotes to enter the host through the wound, or through intact mucous membranes → inside the host, the trypomastigotes invade cells → they differentiate into intracellular amastigotes → amastigotes multiply by binary fission and differentiate into trypomastigotes → released into the bloodstream. This cycle is repeated in each newly infected cell. Replication resumes only when the parasites enter another cell or are ingested by another vector.



Reduviid (Triatomine) bugs are vectors

↳ Clinical Presentation:

- **Chagoma** → **cutaneous stage** (local swelling where the parasite entered the body)
- **Ocular lesion** → **Romana's sign** (swelling of the eyelids on the side of the face near the bite wound)
- **Heart damage** → **Myocarditis** (in chronic stage)

↳ Diagnosis:

- **Blood film**
- Serology: **IFAT** (Immunofluorescence Antibody Test)
- **Xenodiagnosis**: feeding bugs on a suspected cases.

Xenodiagnosis is a process to diagnose an infectious disease by exposing tissue to a vector and then examining the vector for the presence of a microorganism or pathogen.

↳ Treatment:

- benznidazole
- nifurtimox

N.B doctor Adele said don't worry about the drugs for TRYPANOSOMIASIS BECAUSE THERE'RE NOT VERY COMMON

 Questions:

Q1- what is the most common etiology for cutaneous Leishmaniasis in Saudi Arabia ?!

A-Leishmania major

B- *Leishmania aethiopica*

C- Leishmania infantum

D- *Leishmania chagasi*

Q2-what acts as the vector for the transmission of Chagas Disease?!

A-Tsetse fly

B- sand fly

C-Mammals

D- Triatomid bugs

Answers; A,D