(*) HemoFlagellate ⇒ Present in blood ⇒ go to Lymp node ⇒ cause Parasitemia ⇒ go to organ ⇒ cause probem their

[*] most characterstic sign (mature) ⇒ undulating membrane

← انه ٢/١ يكون عندهم غشاء متموج

blood ↑

something in blood

Hemoflagellates

- [*] Flagellum or Parasite that use their flagellum to move inside the blood and other tissues.
- [*] They go to blood they cause ⇒ Parasitemia
- [*] go to specific organ ⇒ give some reaction and Pathological effect and disease (① clinical sign ② sequence of disease)

African, american Trypanosomiasis "وكيرة من كل من "tsetse ⇐ يسمى مرض النوم (*)

T. cruzi ويسمى هيك tsetse لانه بينتقل عن طريق هذه الحشرة وتحديدا "سبب

Blood and tissue protozoans of man

Organism	Disease	Epidemiology
→ Trypanosoma (T) brucei	sleeping sickness	→ African trypanosomiasis Central Africa: $10x10^6$
T. cruzi	Chagas' disease	→ American " South/Central America: $20x10^6$
→ Leishmania (L) donovani	① visceral leishmaniasis → hepatomegaly → splenomegaly	Asia: $10x10^6$
L. tropica	② cutaneous leishmaniasis	Mediterranean: $5x10^6$ (الشرق الأوسط)
L. Braziliensis and others	③ mucocutaneous leishmaniasis (→ skin → mucous memb) لما تكون اكثر اشي تكون على الوجه (حفرة بالوجه) ulser ⇒ leave a scar	South/Central America: $10x10^6$

(*) Leishmaniasis بتكون منتشرة بأماكن واسعة

بتكون اكثر شي بال hot places ⇐ واحيانا "ظهرت ما Jordanian river

ومن العراق بين دجلة والفرات ليش ؟ لا منطقة نخور

[because the have fly that can transmit the disease]

Blood and tissue protozoans of man

Organism	Disease	Epidemiology
P. falciparum, *P. ovale*, *P. vivax*, *P. malariae*	malaria	Tropics and subtropics: 200×10^6
T. gondii	Toxoplamosis	worldwide: opportunistic
B. microti	babesiosis, anemia	North America and Europe

Trypanosomiasis

African trypanosomiasis (sleeping sickness) ⇒ because go to brain and CNS and will suffer from intermittent comes ↓ due to Pathological effects on the brain

Trypanosoma brucei *T. rhodesiense*

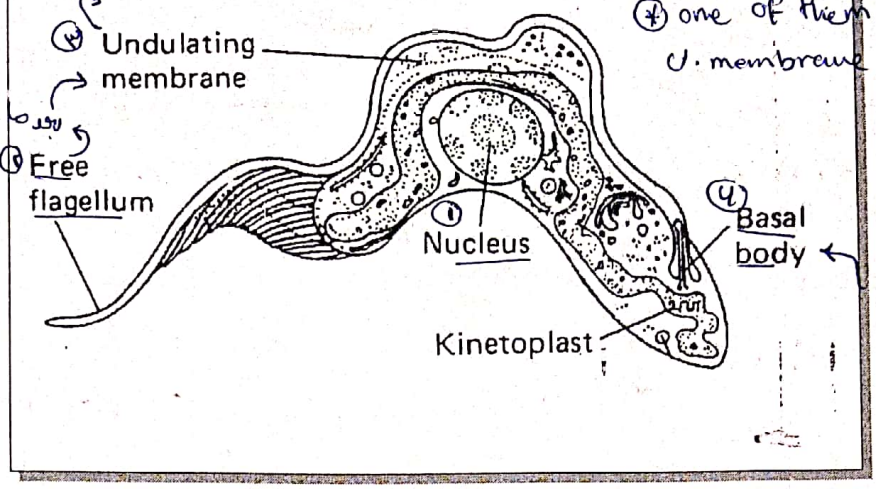
T. brucei gambiense

American trypanosomiasis (Chagas' disease)

Trypanosoma cruzi

Trypanosomes
general morphology

* membrane attached whole body almost
* They can differentiate between chagas and sleeping sickness cause
* one of them have complete U. membrane along the body

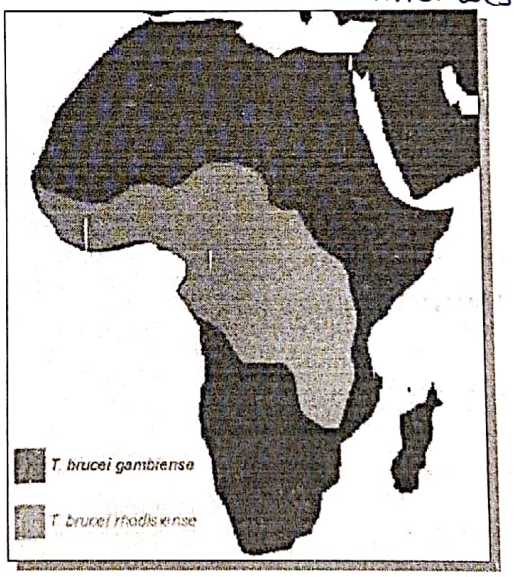


make to move ← Free flagellum in the blood

* The undulating membrane initiat From basal body

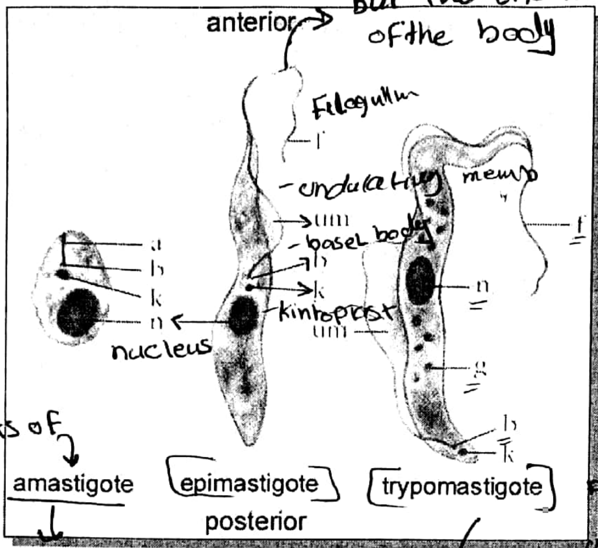
African trypanosomiasis
geographic distribution of *T. brucei*

↳ mid west African



* Countries suffer from problem because the have transmitter which is "tsetse fly" ⇒ they can carry and transfer this trypanosoma amongst the people

American trypanosomiasis
Etiologic agent (*T. cruzi*)



but the undulating.m start From middle of the body

لـ[حاوي عنا ل American]

⊛ نستطيع التمييز بين النوع هل هو American ولا African حسب الـ(U.m):

← اذا الغشاء بدأ من المنتصف يكون American معناها epi

← اذا كان يغطي كل الجسم African له معناها مرحلة try

(1) Starts of amastigote → very early creation of trypanosomia

trypomastigote ⇒ it has the basic of the well-developed organs in: but in this the undulating mem. it cover all the body

لـ[وهنا تكون عنا ل African]

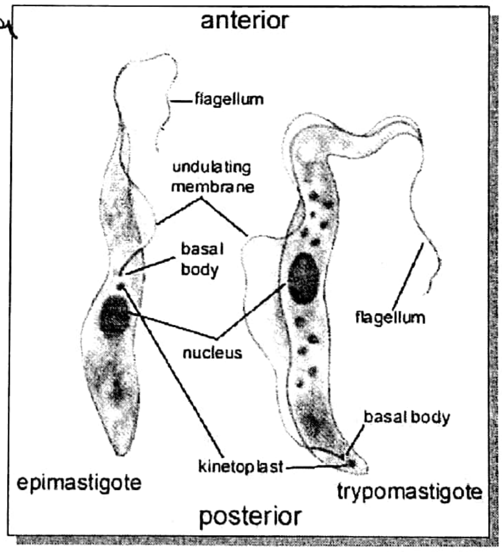
Trypanosoma brucei
morphological forms

⇒ Sleeping sickness

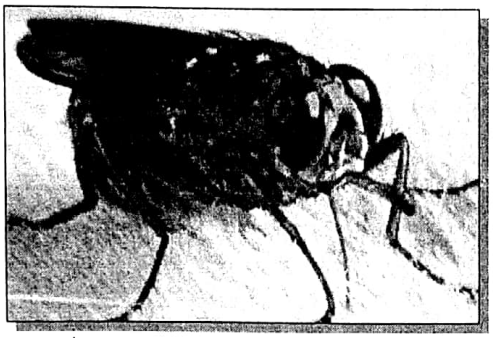
⊛ whats the life stage of trypanosoma Found in the insect? ↓

- Epimastigote (crithidial form) in the insect ⇒ tsetse Fly
- Trypomastigote (trypanosomal form) in the mammalian host ⇒ human beings

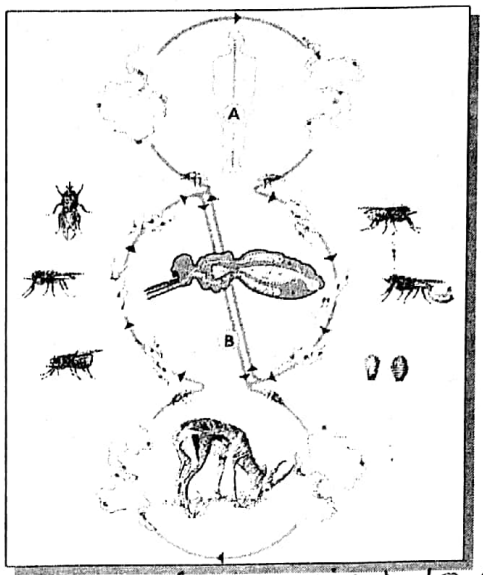
⊛ what's found in mammalian cell?



Trypanosoma brucei
life cycle



tsetse ذبابة ال



T. bruce

(*) it found in the blood then push out (epimastigot to our body) and then will be maturat to trypomastigote ⇒ go to other origen

Symptoms of African trypanosomiasis

→ it develop some sensitivity reaction or immune reaction which is first reaction

stage	organ Involved	symptoms
(1) bite reaction ↳ From tsetse fly	skin	non pustular, itchy, painful chancre; no scar ⇒ bitting sign
(2) parasitemia ↳ go to blood and other tissue	↳ blood circulation and lymph nodes	malaise, lassitude, insomnia, fever, edema, lymphadenopathy ← - general sign, - inFlammatory sign
(3) CNS stage ↳ The Patient's very tired and coma status, sleeping sickness	CNS, heart	personality changes, shuffling gait, lack of interest, tremulous speech, mental retardation, sleepiness, cardiac failure. -- death ⇒ specific signs

↓

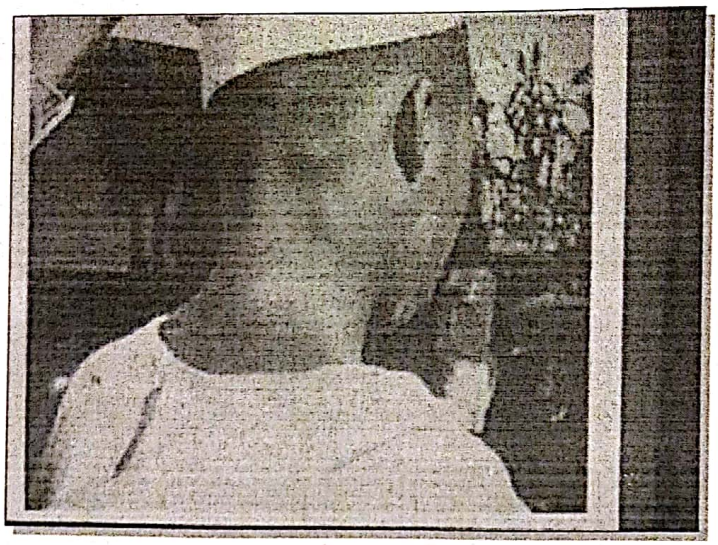
if untreated accure this stage

difficulty walking

(*) يمكن عودة الأعراض اذا وصل إلى مرحلة متأخرة حالة bad treatment

اما اذا كان علاج جيد ← يتعالج

T. Brucei :
Winterbottom's sign



⇒ this is Lymphadenopathy ⇒ cervical Lymph node enlarged ⇒ winterbottom's sign ⇒ وجود الجراثيم في الدم Parasitemia عند الناس

T. Brucei :

⇒ end stage: coma (Sleeping sickness ~~Fatal~~ ~~Heart Fata~~

- coma
- heart Failure
- death

يعني يلي بدك تعرفه انه لو انك ⇐ once got the trypanosoma (الجسم مرة فيها) ← راح يرجع تتعامل بجسمها و هاكذا
ما فيك ... في ... لانه
You got another trypanosoma ⇐ antigenic change صار

T. Brucei : pathology and Immunology

Pathology

- Inflammation
- Type III hypersensitivity
- Antigenic change
- CNS damage by the organisms

Immunology

- Antibodies are not protective due to antigenic change
- Polyclonal B cell expansion; Hyper-IgM
- hypocomplementemia
- Immunosuppression
- RE stimulation

[*] The most important thing?

The trypanisomia can change the antigen? ⇒ today the antibodies will produc after 6 month ⇒ will not because chang the antigen (one time or Long life inF) ⇒ to make new anti bodies ⇒ damag to CNS

T. Brucei : diagnosis

- History of travel and fly-bite
- Symptoms
- Blood smear and/or CSF
  ↳ To examine the flyate stage

Anionic support concentration
Bioassay (mouse)
EIA, IF

⇒ Try Pansoma inside the blood

(*) Features:-

① وجود ⇒ ondulating memb ⇒ give the ability to know which the trypano deal with ⇒ bruce (يعني اميرشولنوع يلي تتعامل معاه)

T. Brucei :
Prevention and treatment

Prevention

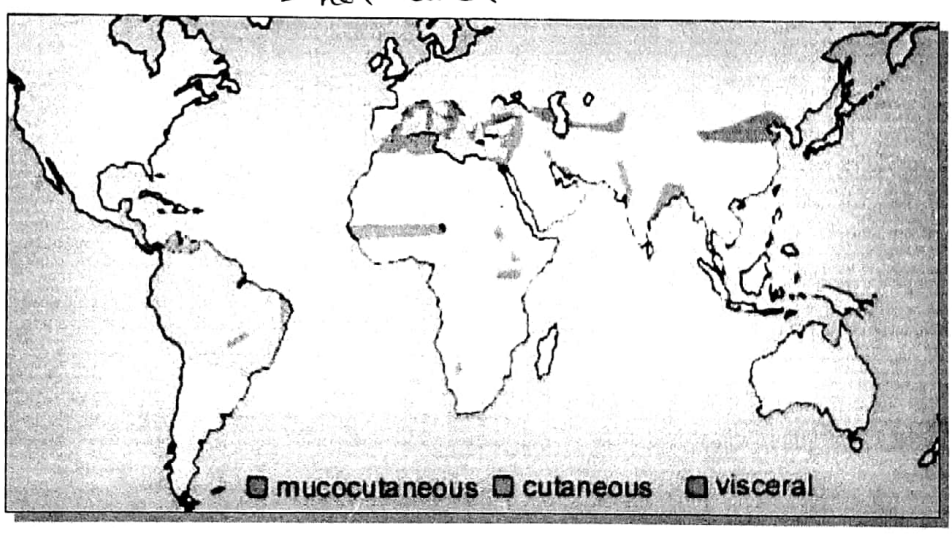
- No effective vaccine because the antigenic change
- Tsetse fly control
- Insect-bite avoidance
- Suramin or pentamidine

Treatment

- Acute disease by → biting / parasitemia
  - Suramin
  - Pentamidine
- Chronic (CNS) disease
  - Melarsoperol (arsenic)

Leishmaniasis
geographic distribution

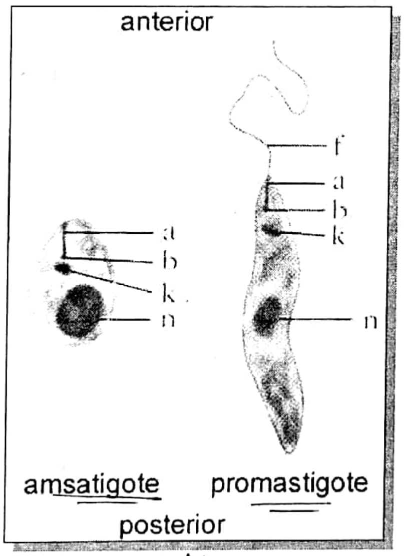
hot area



Leishmaniasis

Organism	Disease	Epidemiology
L. donovani	visceral leishmaniasis	Asia: 10x10^6
L. tropica	cutaneous leishmaniasis	Mediterranean: 5x10^6
L. Braziliensis and other	mucocutaneous leishmaniasis (mucos memns / skin)	South/Central America: 10x10^6

Leishmania morphology



Amastigote (Leishman-Donovan form) seen in the mammalian host

Promastigote (leptomonad) seen in sand fly

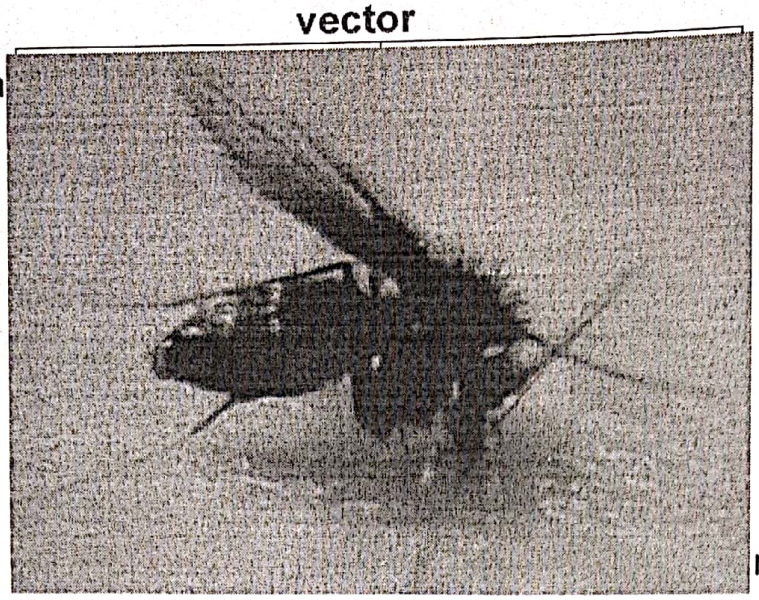
ذبابة الرمل

- الاختلاف بالشكل عن ال Trypanosomes
- يوجد Flagellum في الشكلين (L, T)
- لكن هنا لا يوجد membran . ✓ هذا الشكل المميز بعدم احتوائها على شيء مثل ال Trypanosome

Leishmania life cycle

vector

Human cycle



Animal reservoir

(+) This vector carry the Leptomonad ⇒ transmit the human beings ⇒ cause the disease

Leishmania symptoms

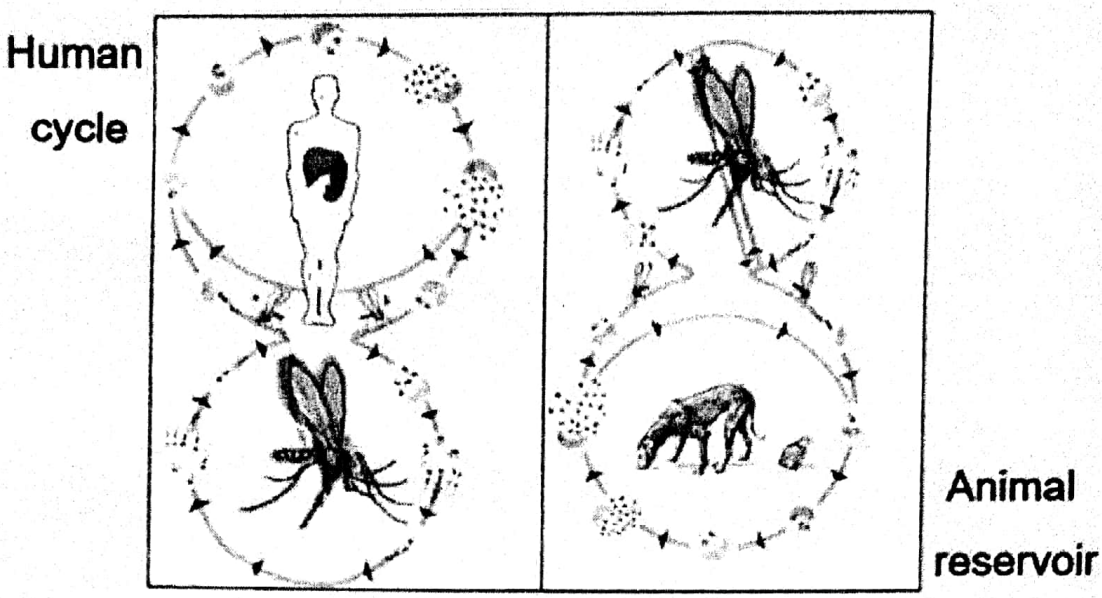
type	organ Involved	symptoms
visceral	liver, spleen, bone marrow, lymph nodes, skin	No bite reaction; lymphadenopathy, splenomegaly and hapatomegaly; parasitemia, chills and fever; darkening of skin
cutaneous	skin	centrifugally growing papular lesion with central crusting; heals spontaneously, permanent scar
muco-cutaneous	Skin and mucoid tissue	initially same as cutaneous lesion but it does not heal: necrosis of mucoid tissue; metastasis to distant mucoid tissues; very disfiguring

→ because sand Fly ⇒ اخفاشة biteless

→ will crusted مقشور

له محفورة و بقعة دائرة واضحة

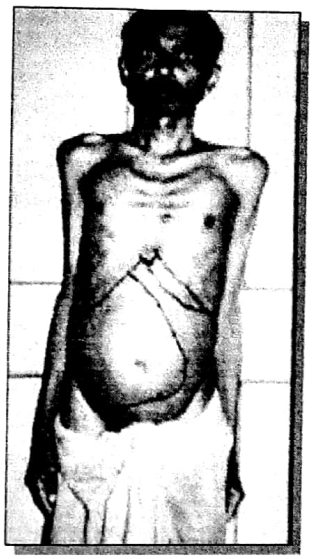
Leishmania
life cycle



[*] the insect they will go and infect the human beings ⇒ it will caused Parasitemia and they Parasite will go to ~~visceral~~ visceral ⇒ internal organs or skin (if muco cutaneous) → skin, → mucous mem

Visceral Leishmania

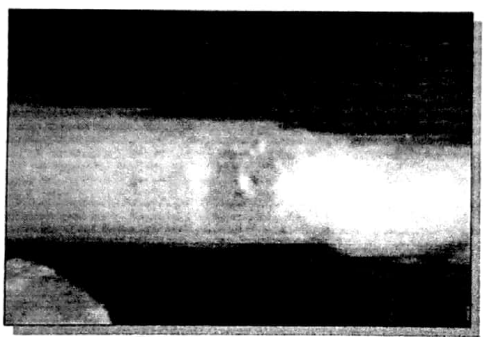
- 1-4 months: fever chills, diarrhea, dysentery } general sign
- Progressive hepato-splenomegaly
- skin hyperpigmentation
- Death, if untreated

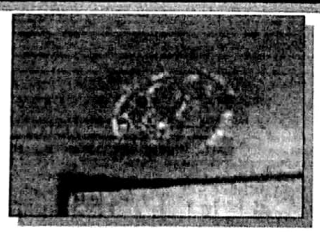


الـ skin بتسود

Cutaneous leishmaniasis

→ it will heal and leave scar in skin





Leishmaniasis
Pathogenesis and immunology

- Damage due to CMI (cellular mediated immunity)
- Leishmanial proteoglycan
- Leukopenia with monocytosis and lymphocytosis
- immunosuppression
- Interferon and TNF are protective

Leishmaniasis
Prevention and treatment

- No vaccine
- Control of sand fly (vector) and infected animals
- avoidance of sand fly
- Pentostam (antimony gluconate)