

MEDICAL PROTOZOLOGY

A NOTE ON TAXONOMY

Taxonomy is the science of defining groups of biological organisms on the

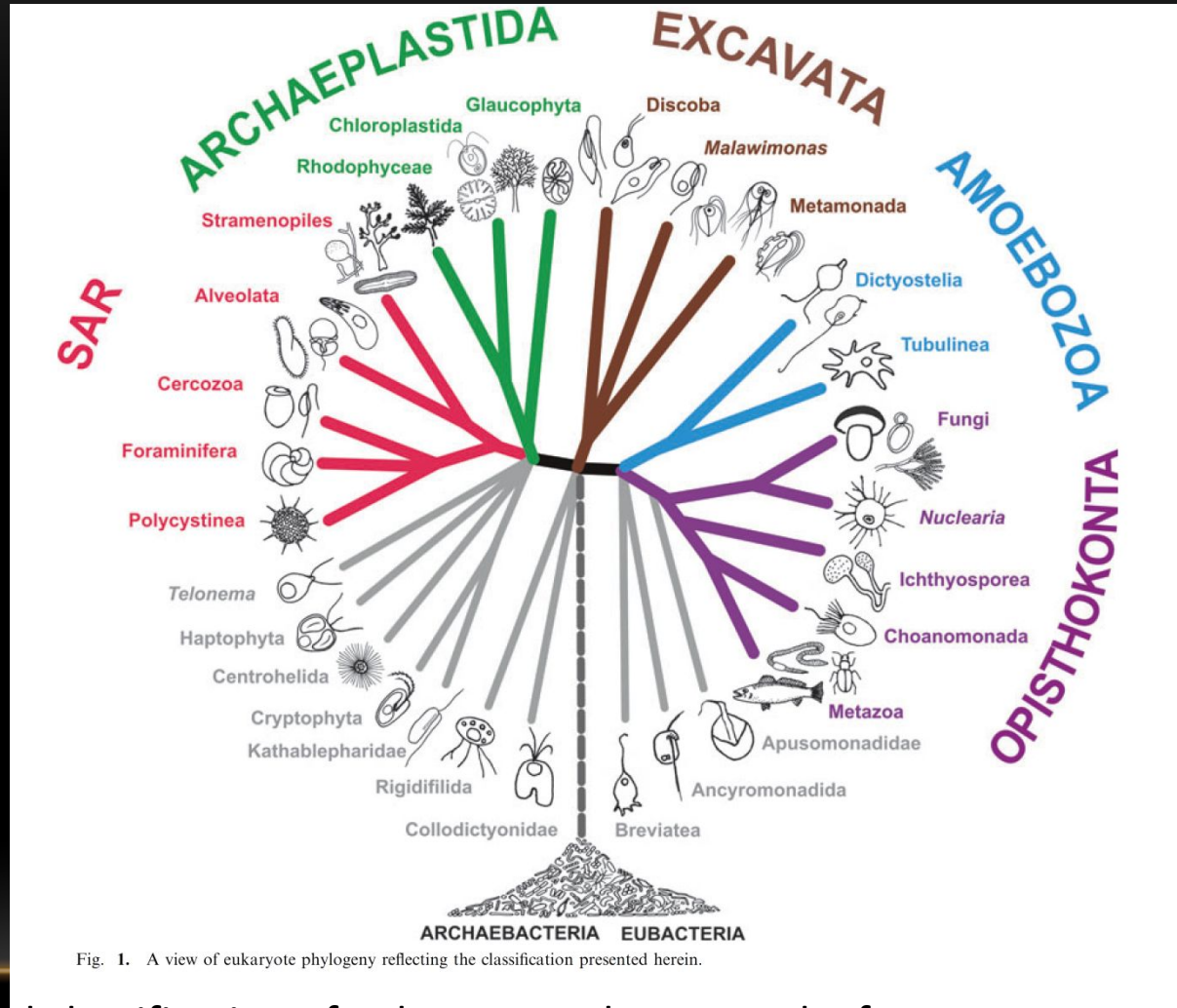


Fig. 1. A view of eukaryote phylogeny reflecting the classification presented herein.

PROTIST VS. PROTOZOA

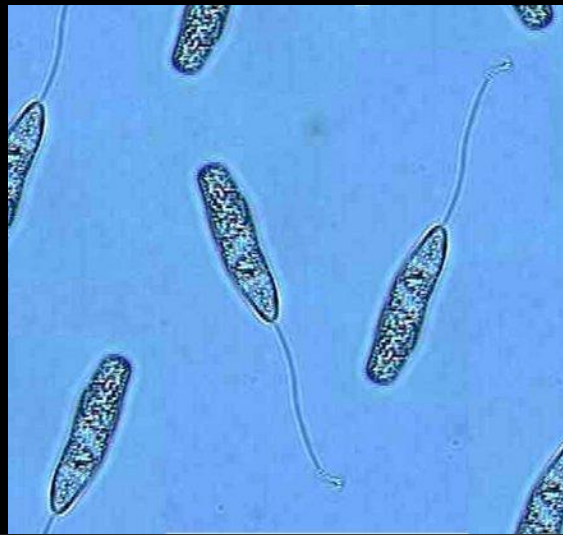
- Kingdom Protista (single-celled eukaryotic
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IMPORTANT TERMS

- Trophozoite – actively motile feeding stage
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MORPHOLOGY-BASED TAXONOMY

- Depending on the locomotion mode protozoa divided into four major groups:



MORPHOLOGY-BASED TAXONOMY

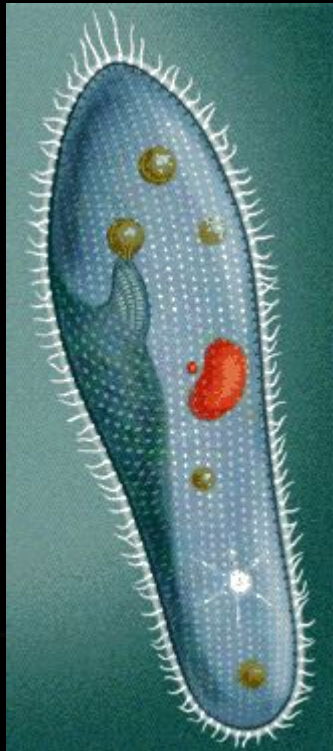
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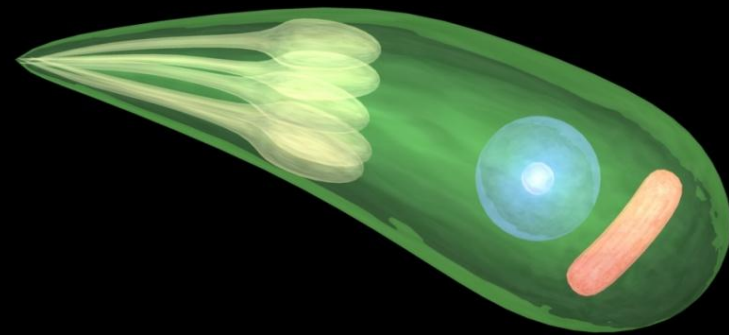
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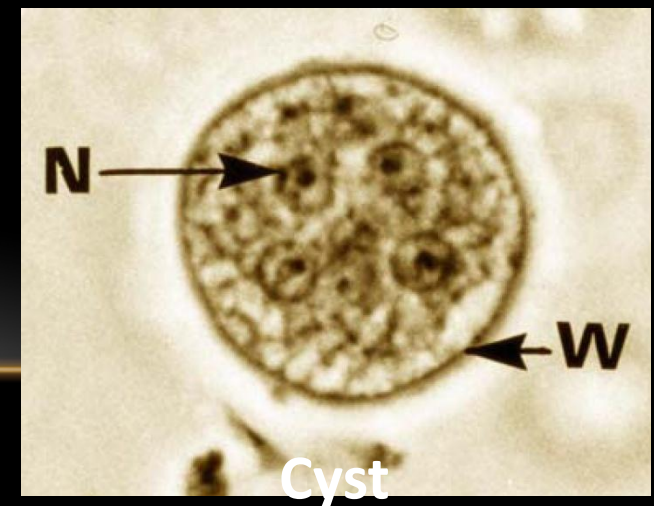


PARASITIC AMOEBAE

- Six species of amoebae are common in humans in most parts of the world but only one, *Entamoeba histolytica*, is an important pathogen.
 - *Dientamoeba fragilis*
 - *Entamoeba coli*
 - *Entamoeba hartmanni*
 - *Endolimax nana*
 - *Iodamoeba buetschlii*

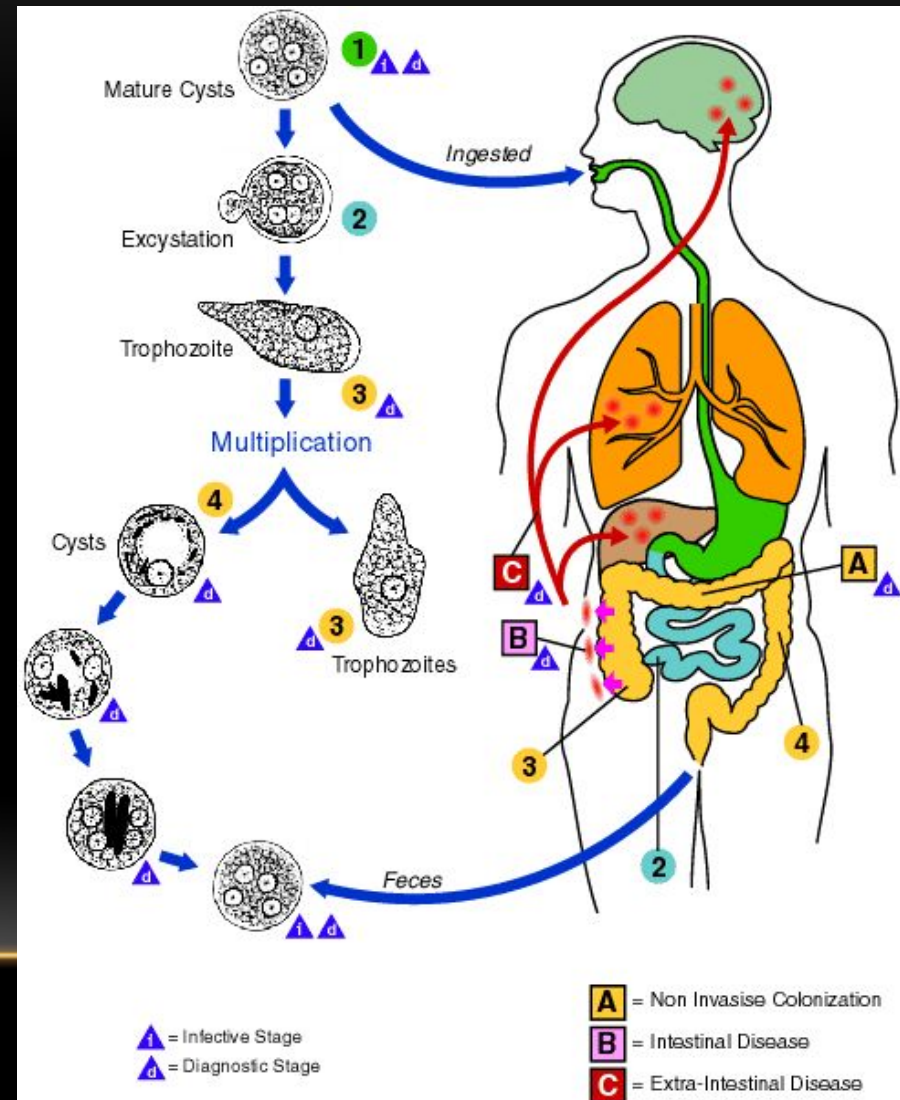
AMOEBIASIS (OR AMEBIC DYSENTERY)

- *Entamoeba histolytica*
- Distribution: worldwide
- The trophozoite inhabits the lower small intestine and colon



LIFE CYCLE OF *E. HISTOLYTICA*

- Infective stage: cyst
- Mode of infection: ingestion
cysts-contaminated food or water
- Main clinical symptoms:
abdominal pain, bloody-slimy
diarrhoea, liver dysfunction in
case of liver abscess



DIAGNOSIS AND PREVENTION OF AMOEBIASIS

- Diagnosis: Microscopical determination of cysts in fecal samples, serology.
 - Prevention: Avoidance of uncooked food/water in endemic regions.
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NON-INTESTINE PARASITIC AMOEBAE

- ... human infection is not an obligate part of their life cycle.
- *Naegleria fowleri* (causes Primary amoebic meningoencephalitis)
- *Acanthamoebae castellanii*
- *Balamuthia mandrillaris* (causes Granulomatous amoebic encephalitis and Primary amoebic meningoencephalitis)

PARASITIC CILIATES

- The only ciliates known to infect human is *Balantidium coli* – Balantidiosis (dysentery)
- Distribution: Worldwide
- Reservoir hosts: pigs
- *Balantidium*'s habitats in humans are the cecum and colon

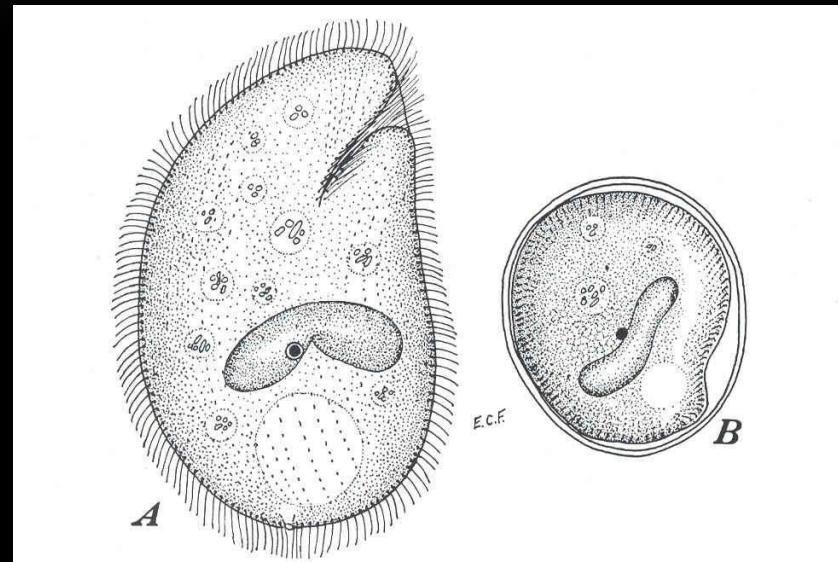
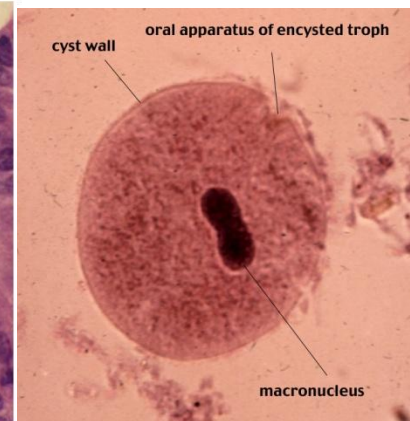
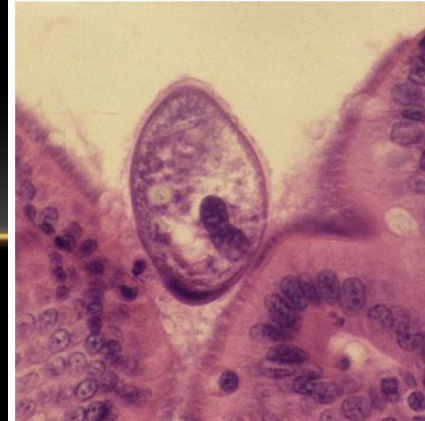
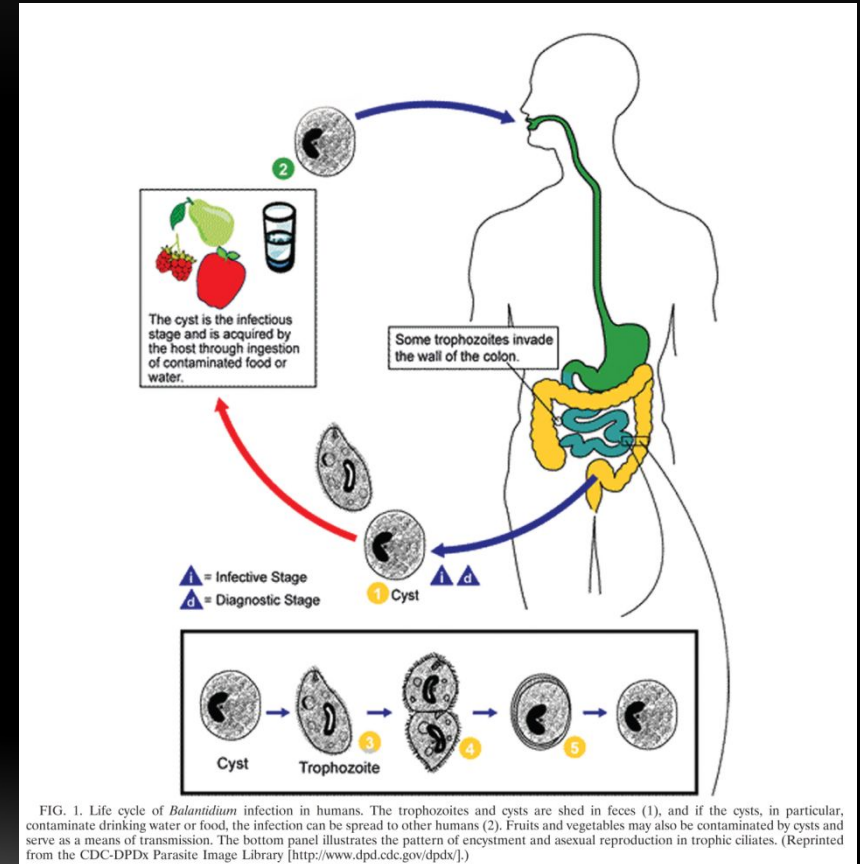


Fig. 15-1. *Balantidium coli*. A. trofozoito; B. quiste. (750 aumentos.) (Original de Faust.)



LIFE CYCLE OF *B. COLI*

- Infective stage: cyst
- Mode of infection: ingestion
cysts-contaminated
food or water
- Clinical forms:
asymptomatic carrier,
acute cases with
diarrhoea or chronic
cases

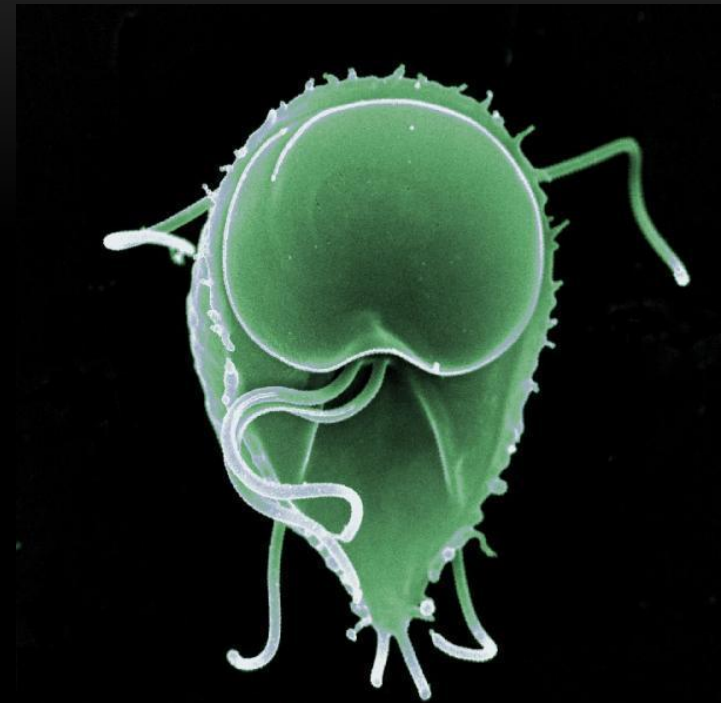


PARASITIC FLAGELLATES

- Depending on the infected organs, parasitic flagellates might be
 - *Trypanosoma*
 - *Leishmania*
 - *Trichomonas*
 - *Trichomonas vaginalis*
 - *Trichomonas tenax* (mouth)
 - etc

LAMBLIASIS (GIARDIASIS)

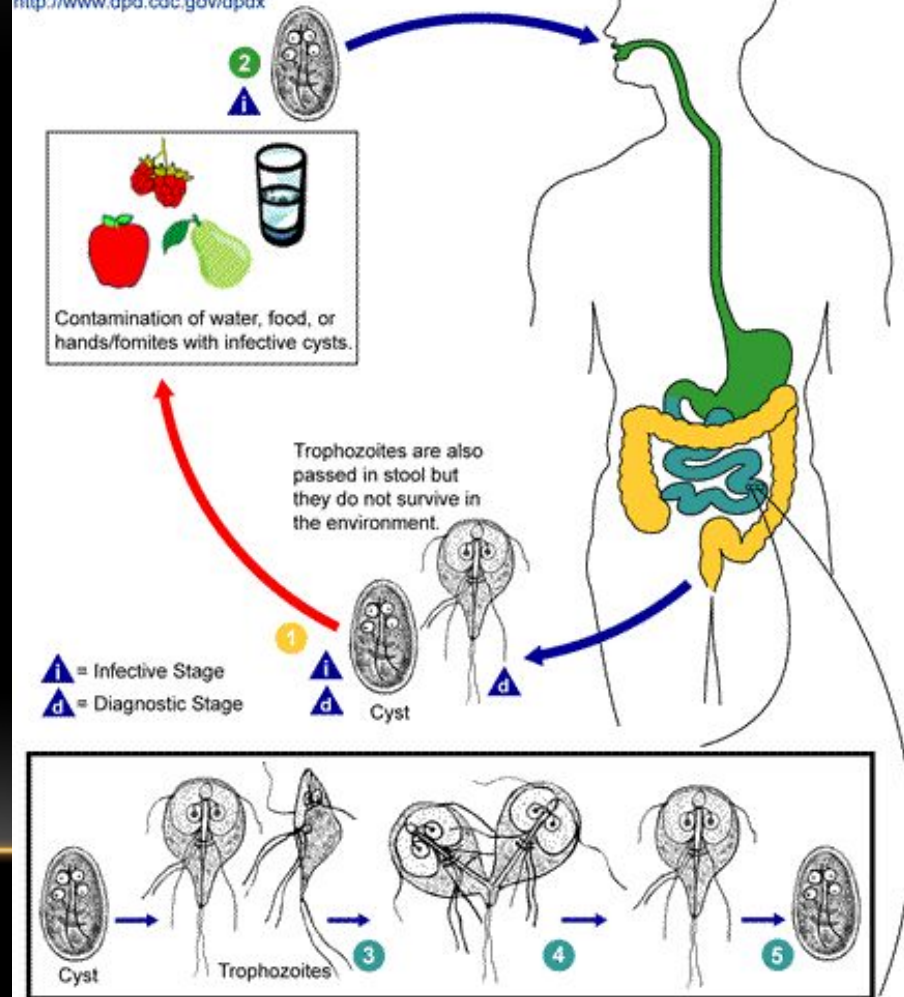
- *Giardia duodenalis* (a.k.a *G. lamblia*, *G. intestinalis* or *Lamblia intestinalis*)
- Distribution: Worldwide
- The parasite lives in the duodenum and upper small intestine, where it is closely applied or attached to the epithelium by means of a suction disk.



Cyst

LIFE CYCLE OF *G. DUODENALIS*

- **Infective stage:** cyst
- **Mode of infection:** ingestion
cysts-contaminated food or water
- **Main clinical symptoms:**
Abdominal pain, slimy non-bloody,
diarrhoea, malabsorption.

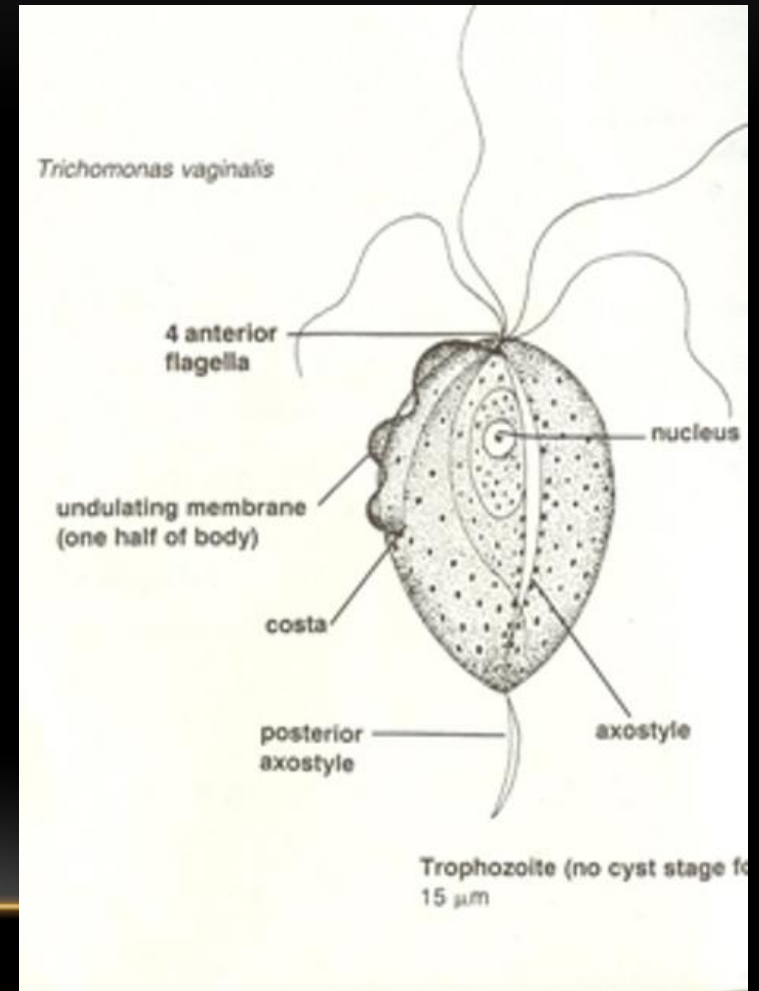


DIAGNOSIS AND PREVENTION OF LAMBLIASIS

- Diagnosis: Microscopic determination of trophozoites and cysts in faecal samples.
 - Prevention: Avoid contact with human or animal faeces.
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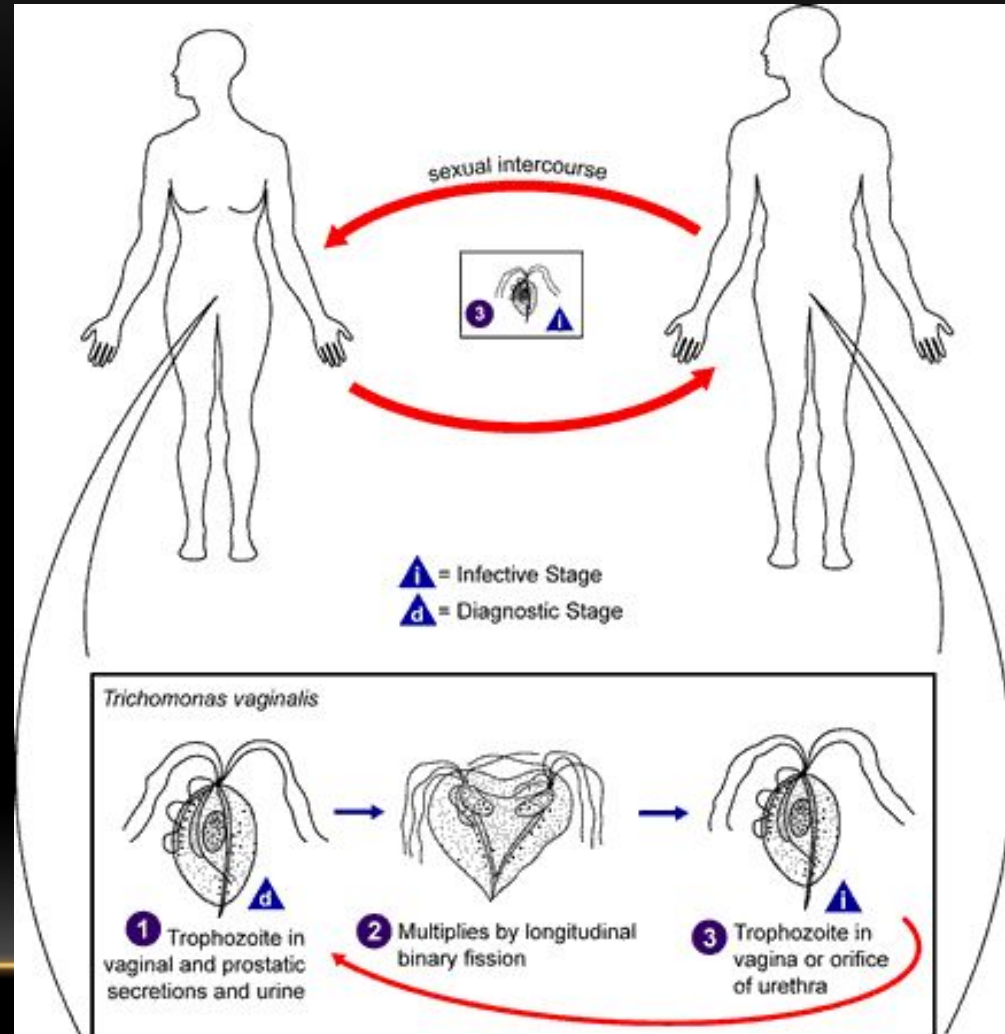
HUMAN TRICHOMONIASIS

- *Trichomonas vaginalis*
- Distribution: Worldwide
- Trophozoites live in the vagina and prostate gland.



LIFE CYCLE OF *T. VAGINALIS*

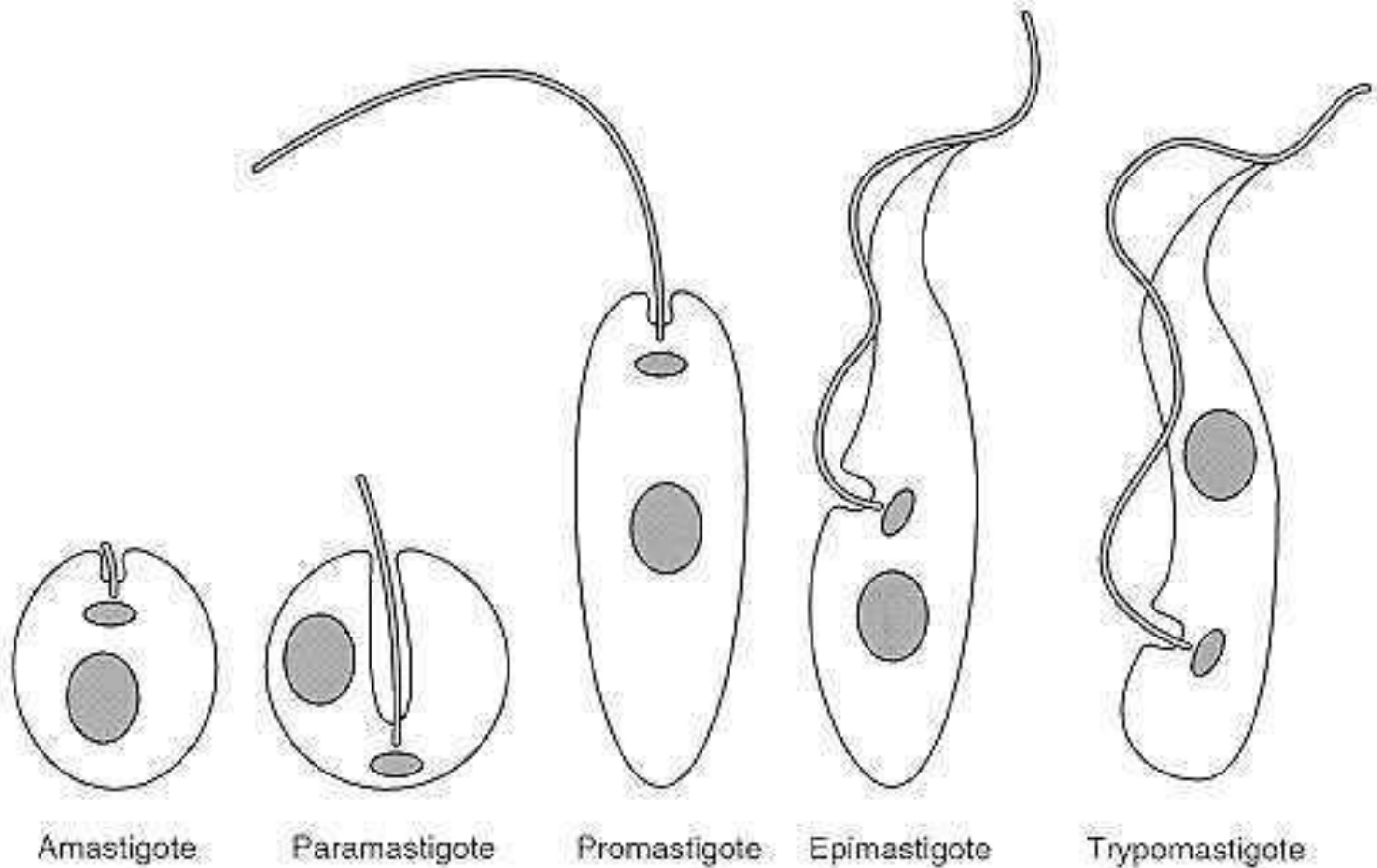
- Infective stage: trophozoites
- Mode of infection: through sexual or genital contact
- Main clinical symptoms: Occurrence of whitish mucus, feeling of burning in vaginal and urethral regions



DIAGNOSIS AND PREVENTION OF TRICHOMONIASIS

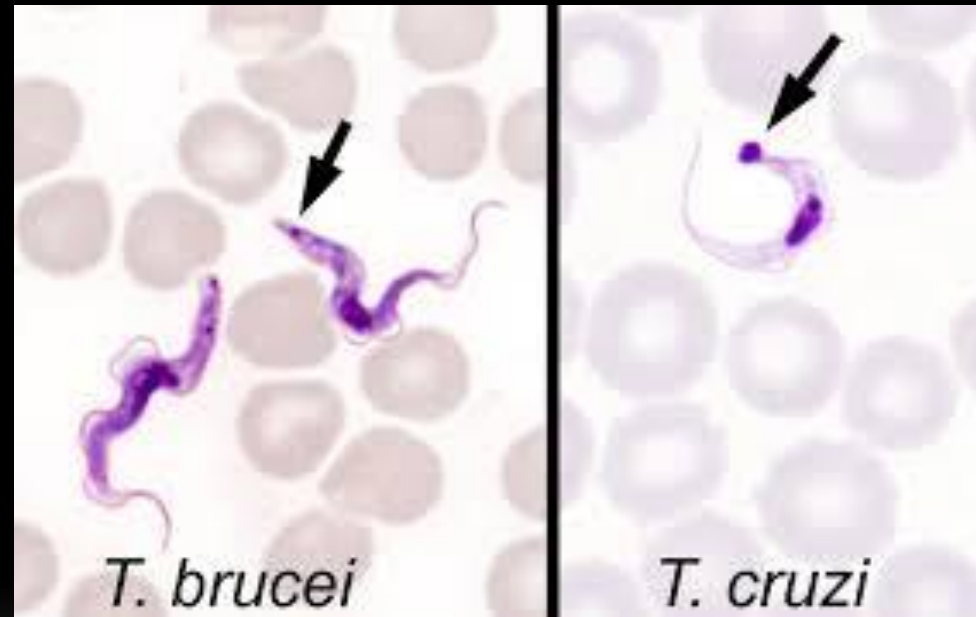
- Diagnosis: Microscopic detection of trophozoites in mucus samples.
- Prophylaxis: Avoid unprotected sexual intercourse.

MORPHOLOGICAL STAGES OF HAEMOFLAGELLATES



TRYPANOSOMIASIS OR TRYPANOSOMOSIS

... several diseases in vertebrates



CHAGAS DISEASE (OR AMERICAN TRYPANOSOMIASIS)

- Distribution: Mainly in Latin America

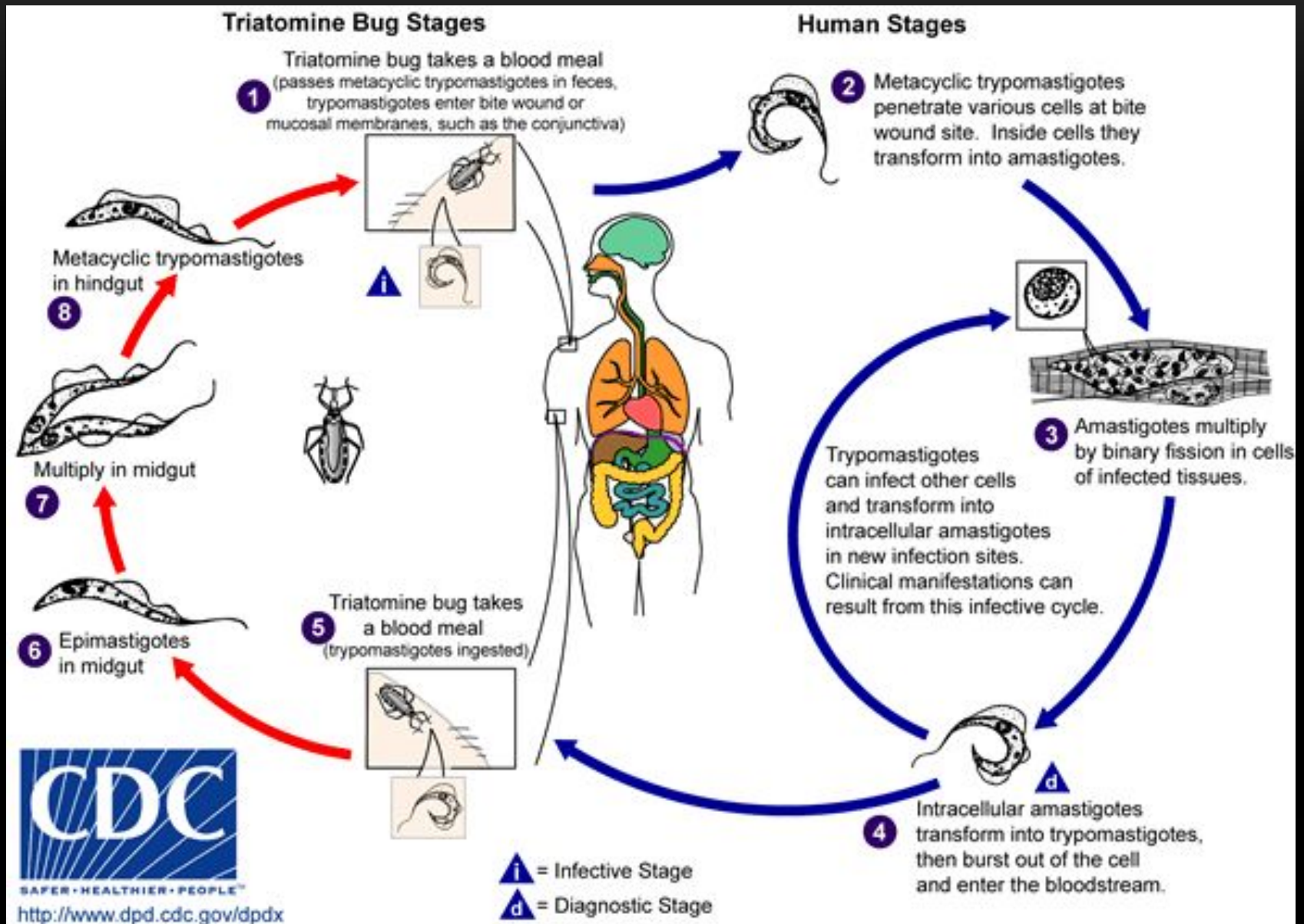
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LIFE CYCLE OF *T. CRUZI*



CLINICAL SYMPTOMS, DIAGNOSIS AND PREVENTION

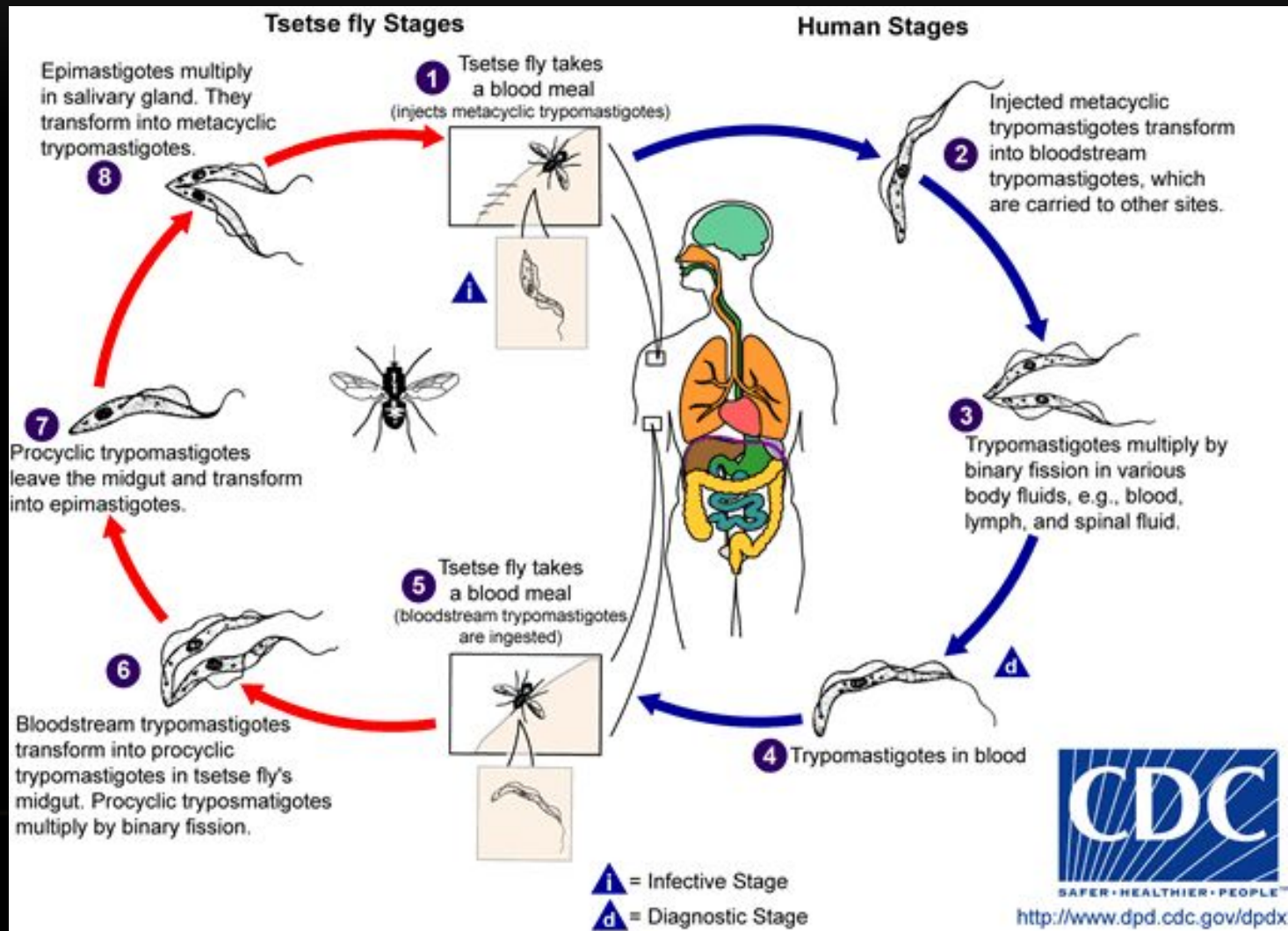
- Main clinical symptoms: Chagom at bite site, fever,
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-

SLEEPING SICKNESS OR AFRICAN TRYPANOSOMIASIS

- Distribution: 36 countries of sub Saharan Africa



LIFE CYCLE OF *T. BRUCEI*



CLINICAL SYMPTOMS, DIAGNOSIS AND PREVENTION

- Main clinical symptoms: Fever, local edema, possibly polyadenitis,

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LEISHMANIASIS

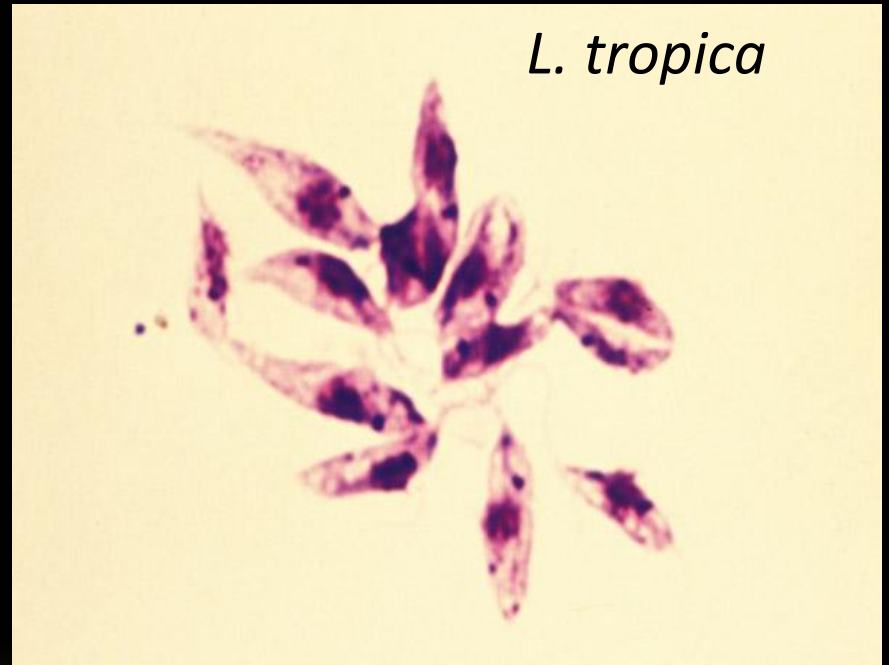
- More than 20 species of *Leishmania*

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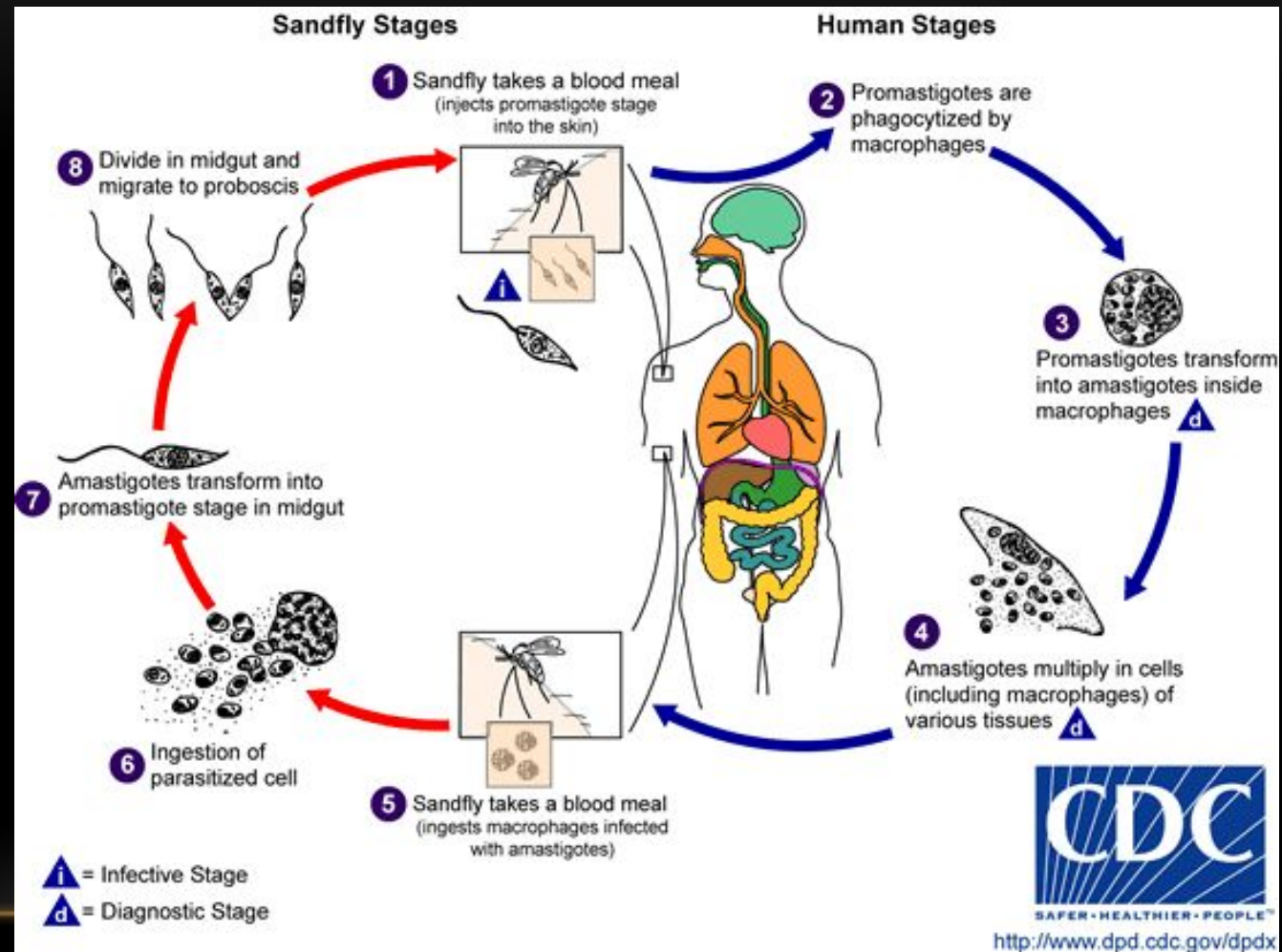
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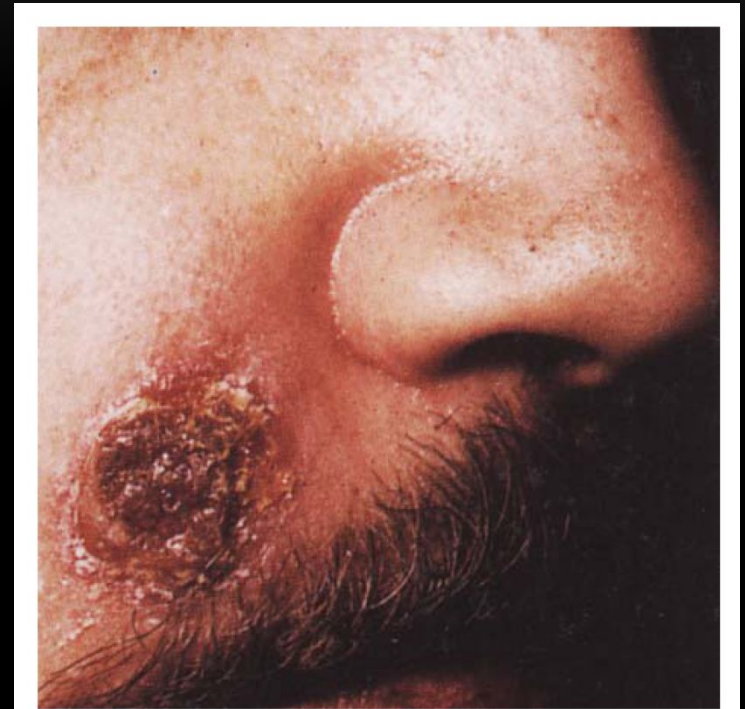
LIFE CYCLE OF *LEISHMANIA*

- Infective stage: Promastigote



CLINICAL SYMPTOMS, DIAGNOSIS AND PREVENTION

- Cutaneous Leishmaniasis (CL)
 - Main clinical symptoms: Skin



Leishmaniasis, Man. Figure 4 *Leishmania*-sore in the face.

CLINICAL SYMPTOMS, DIAGNOSIS AND PREVENTION

- Cutaneous Leishmaniasis (CL)
 - Main clinical symptoms: Skin nodules, ulceration, necrosis
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 -
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 -

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 - ...to the bite of the vector.
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DIAGNOSIS AND PREVENTION OF BALANTIDIASIS

- Diagnosis: Microscopic determination of cysts and trophozoites in fecal smears.
 - Prevention: Avoid contact with human or pork faeces.
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PARASITIC APICOMPLEXA (FORMER SPOROZOA)

- a large group of parasitic protists, most of which possess a unique organelle, a type of plastid called an apicoplast, and an apical complex structure involved in penetrating a host's cell.
- Diseases caused by apicomplexan organisms include, but are not limited to:
 - Babesiosis (*Babesia*)
 - Malaria (*Plasmodium*)
 - Forms of coccidiosis including:
 - Cryptosporidiosis (*Cryptosporidium parvum*)
 - Cyclosporiasis (*Cyclospora cayetanensis*)
 - Isosporiasis (*Isospora belli*)
 - Toxoplasmosis (*Toxoplasma gondii*)