

Leishmaniasis

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Leishmaniasis

Leishmania donovani (complex) (VL)

Leishmania tropica (CL)

Leishmania major (CL)

Leishmania aethiopica (CL)

Leishmania mexicana (Complex) (CL)

Leishmania brazilliensis (complex) (MCL)

Leishmania peruriana

The Parasite

- ▶ **Phylum** Sarcomastigophora
- ▶ **Order** Kinetoplastida
- ▶ **Family** Trypanosomatidae
- ▶ **Genus** Leishmania

Morphology

Digenetic Life Cycle

▶ Promasitogte

- Insect
- Motile
- Midgut

▶ Amastigote

- Mammalian stage
- Non-motile
- Intracellular

Morphology

▶ Promastigote

▶ Amastigote

Flagella

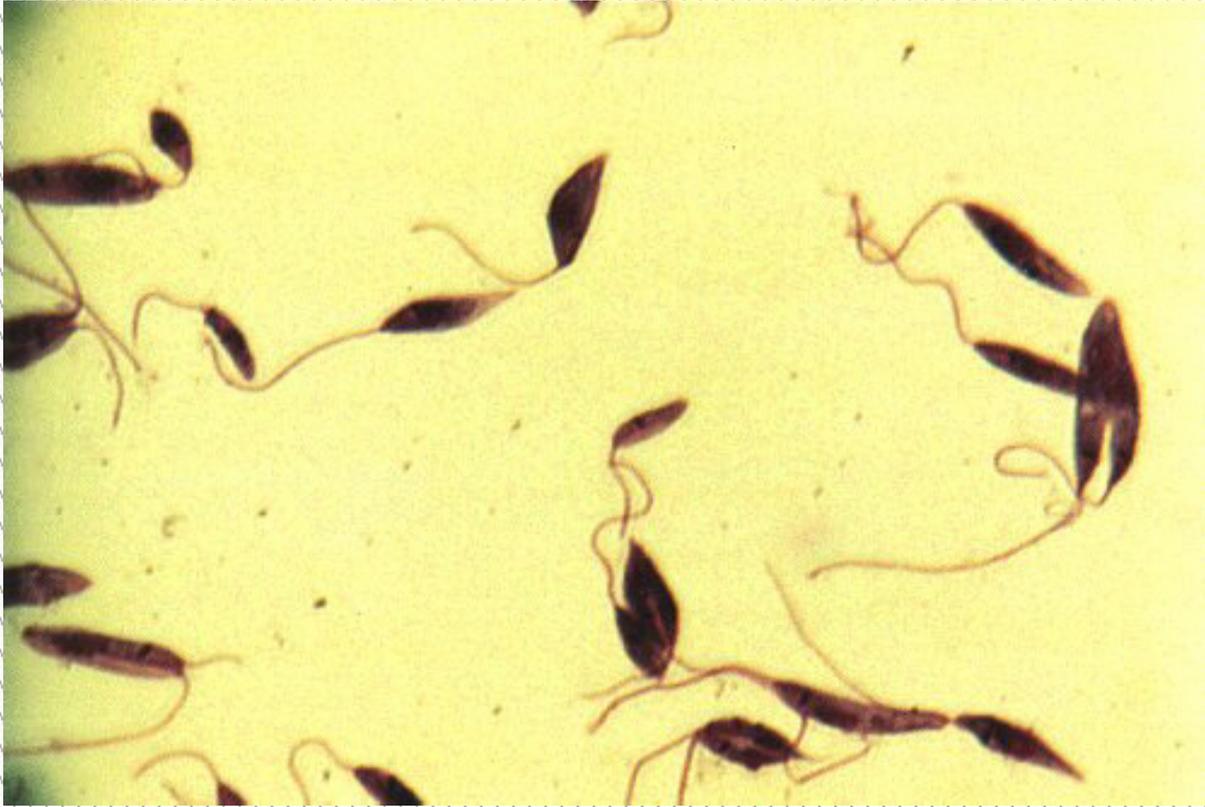
Kinetoplast

Golgi

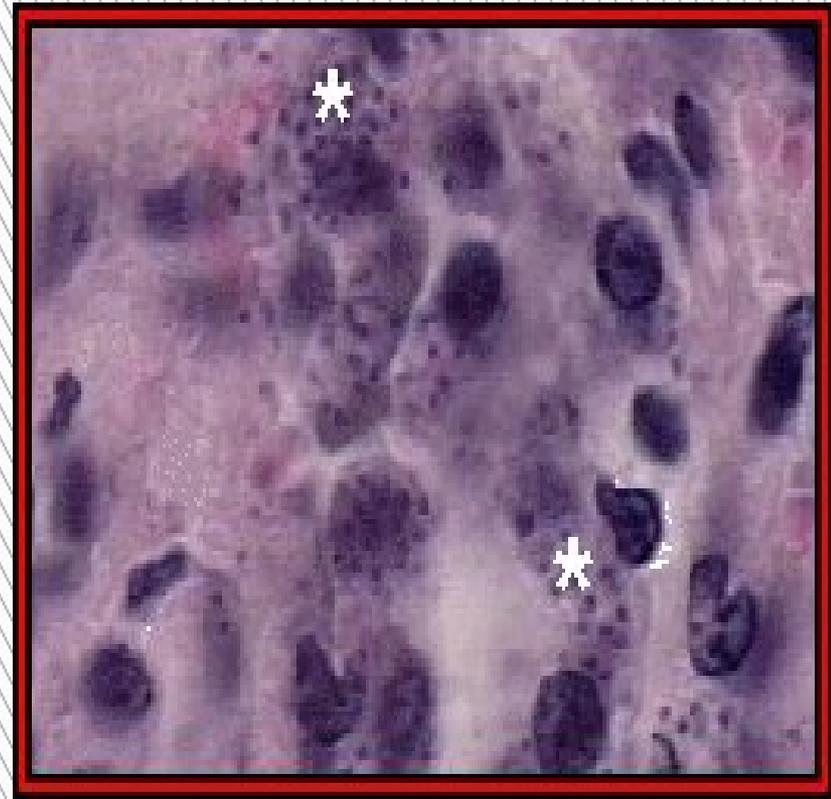
Nucleus

Cytoskeleton

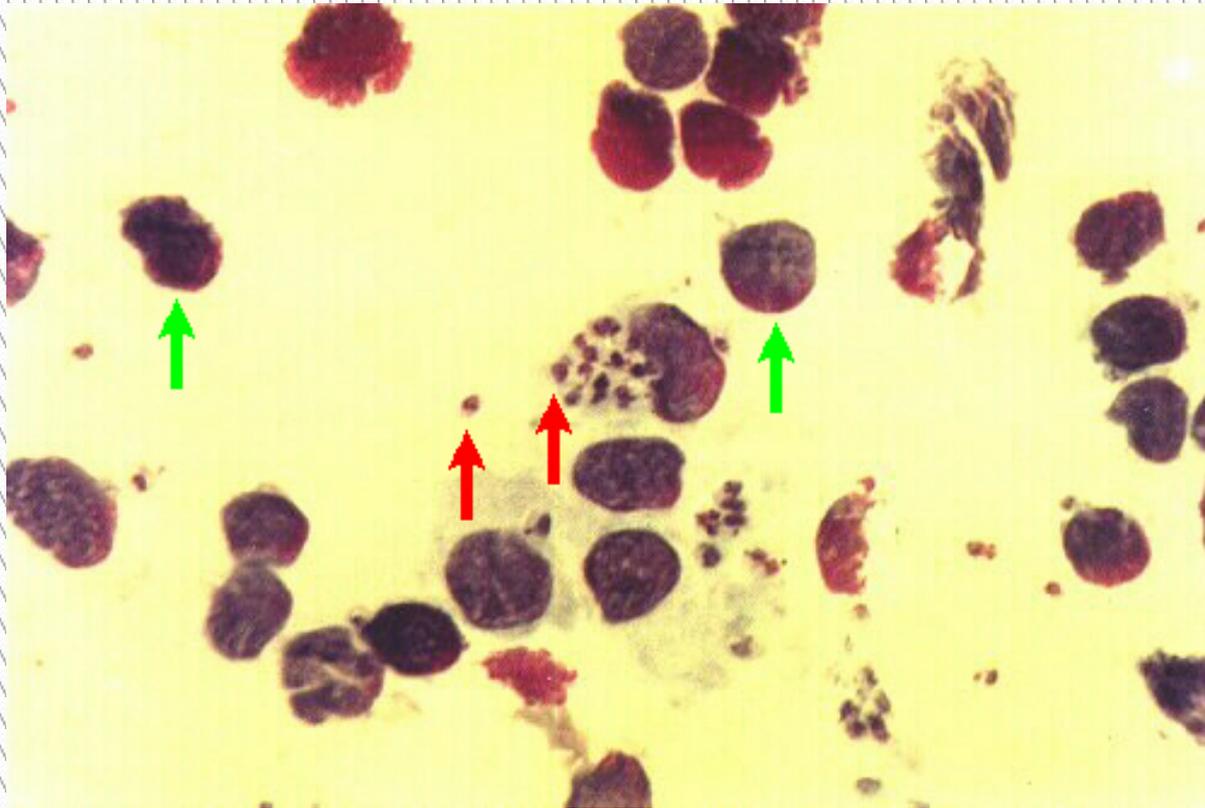
Promastigote



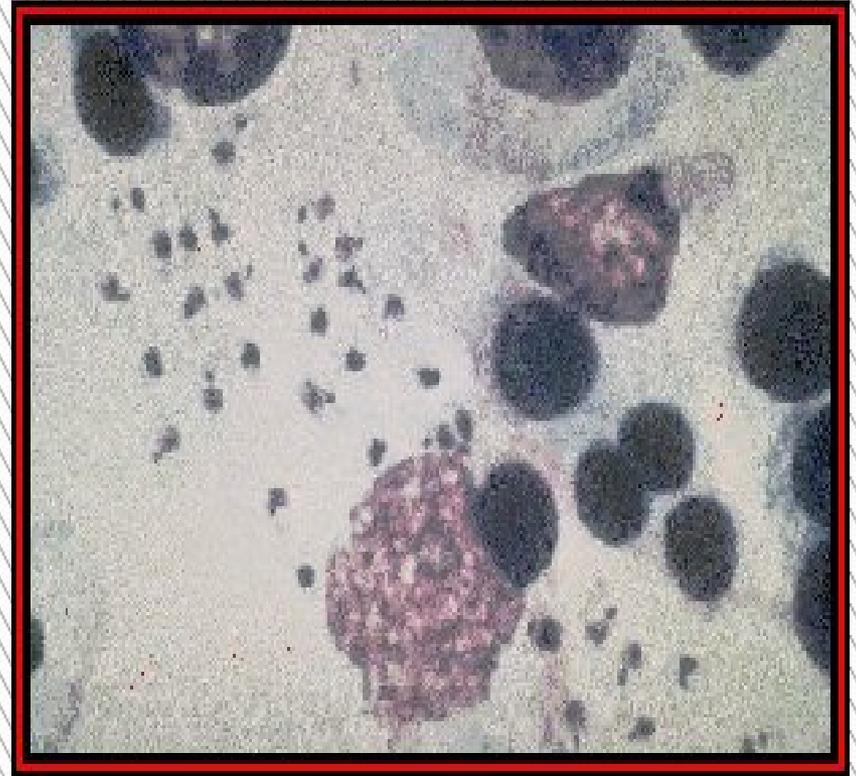
- ▶ Amastigotes (*) of *Leishmania donovani* in the cells of a spleen. The individual amastigotes measure approximately 1 μm in diameter.

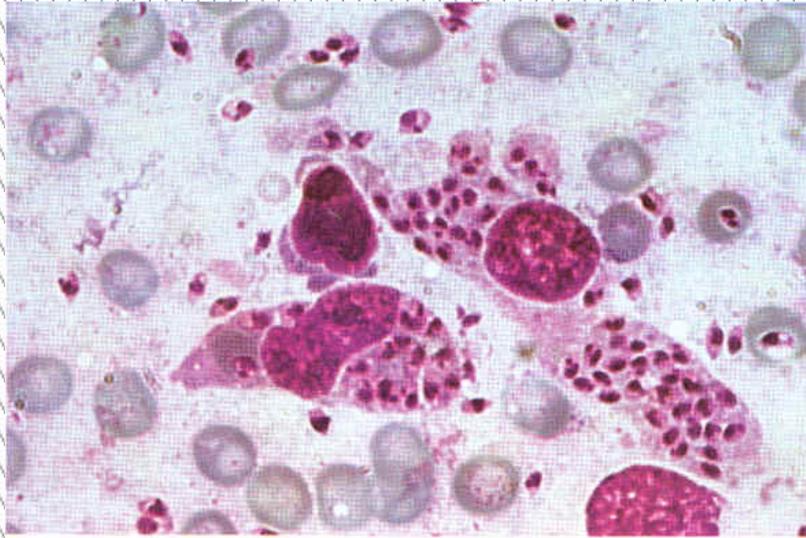


Amastigote



- ▶ Amastigotes of *Leishmania* in a macrophage from a lymph node of a dog.

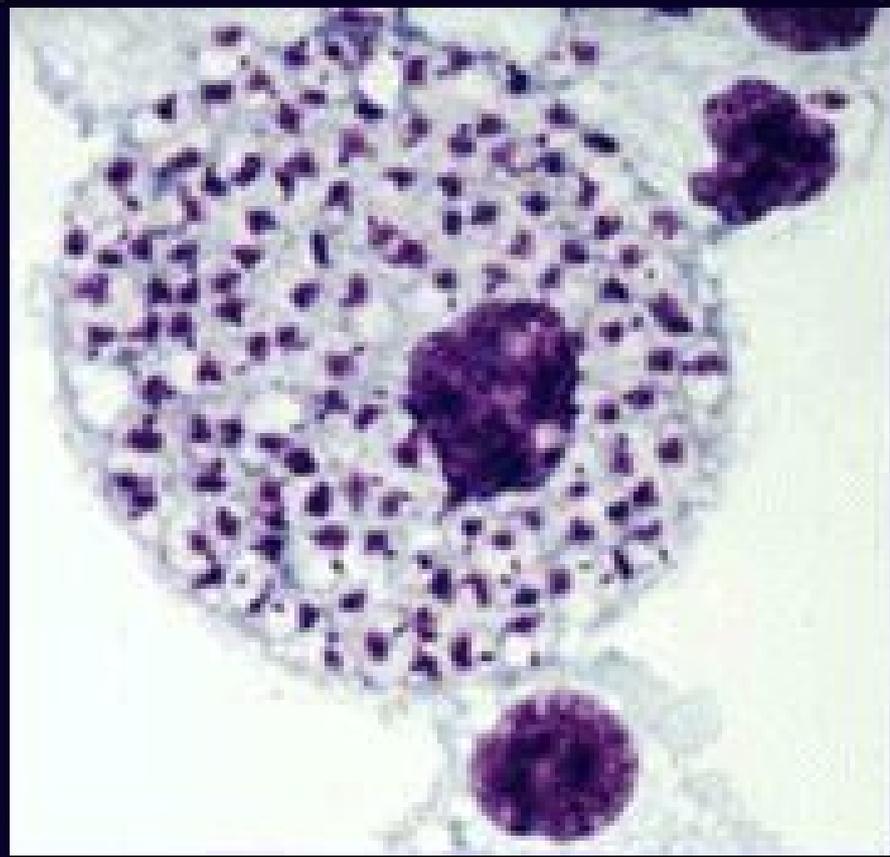




- ▶ **Leishmania (Leishman-Donovan or LD bodies).** Lying in macrophage cells from liver.
- ▶ **Giemsa. ×12000.** Enlarged by 9.6.

- ▶ A macrophage filled with *Leishmania* amastigotes.

Leishmania

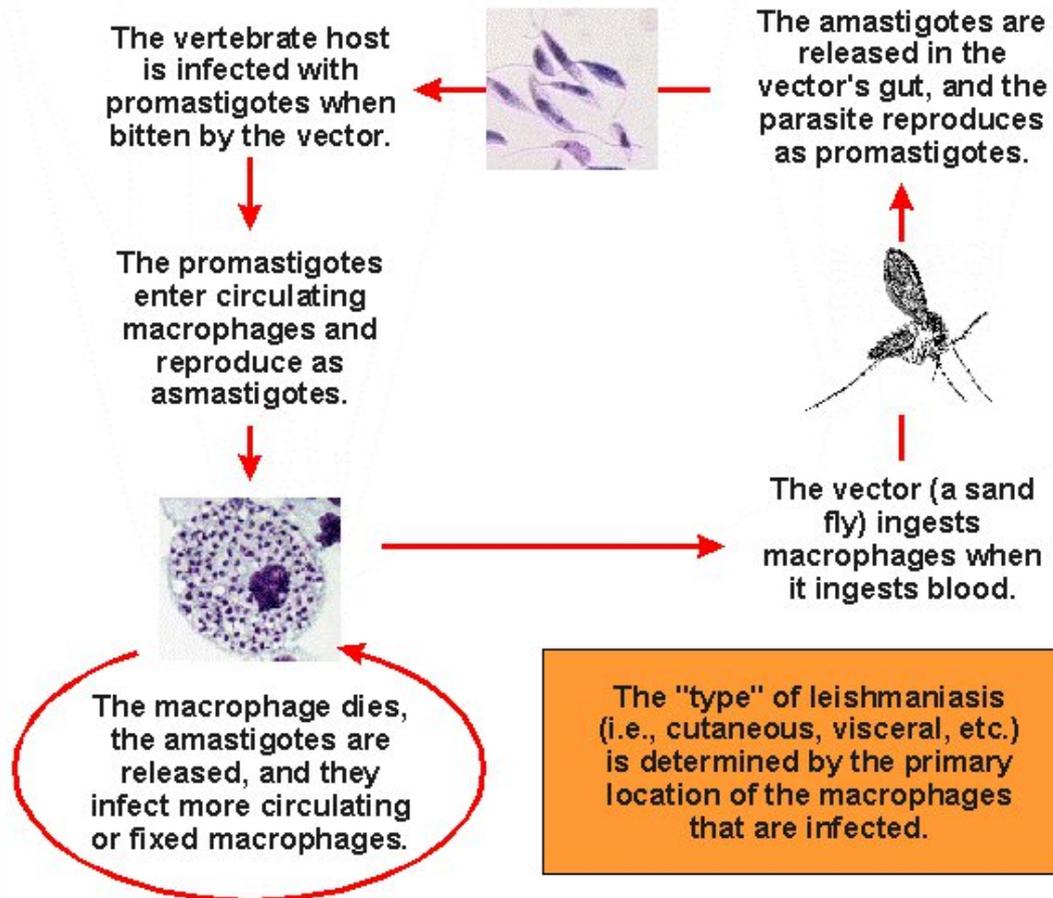


(by Mike Belosevic)

Life cycle

- ❖ The organism is transmitted by the bite of several species of blood-feeding sand flies (*Phlebotomus*) which carries the promastigote in the anterior gut and pharynx.
- ❖ It gains access to mononuclear phagocytes where it transform into amastigotes and divides until the infected cell ruptures.
- ❖ The released organisms infect other cells.
- ❖ The sandfly acquires the organisms during the blood meal, the amastigotes transform into flagellate promastigotes and multiply in the gut until the anterior gut and pharynx are packed.
- ❖ Dogs and rodents are common reservoirs.

THE LIFE CYCLE OF *LEISHMANIA* SPP. (VARIOUS FORMS OF LEISHMANIASIS)



Mammalian Hosts

- ▶ Rodents
- ▶ Gerbils
- ▶ Hyraxes
- ▶ Bats
- ▶ Porcupines
- ▶ Opossums
- ▶ Sloths
- ▶ Primates
- ▶ Dogs
- ▶ Foxes
- ▶ Anteaters
- ▶

Vectors

- ❖ **Phlebotomine Sandflies**
- ❖ **6 genera world wide distribution**
- ❖ **Phlebotomus & Lutzomia**
- ❖ **500 species**
- ❖ **Females Haematophagus**
- ❖ **Males sap feeders**



Clinical Disease

▶ Visceral

- Fatal (90% untreated)
- Liver
- Spleen
- Bone marrow

▶ Cutaneous

- Generally Self-healing
- Skin
- Mucous membranes

SPECTRUM OF DISEASE

Initial Infection

- ❖ Similar in all species
- ❖ Inoculation of promastigotes
- ❖ Inflammation & chemotaxis
- ❖ Receptor mediated phagocytosis



Parasite Spread

- ❖ Macrophage lysis & parasite release
- ❖ Lymphatic spread
- ❖ Blood spread
- ❖ Target organs
- ❖ Skin/lymph nodes/spleen/liver/
- ❖ bone marrow