Leishmaniasis

Prof. Dr. Muna M. Jori

Leishmaniasis
(Cutaneous and Visceral)

Kala-azar, Black Fever, Dumdum Fever, Oriental Sore, Tropical Sore, Uta,

Chiclero Ulcer, Aleppo Boi, Pian Bois; Espundia, Leishmaniosis

Importance

Leishmaniasis is an important complex of protozoal vector-borne diseases that affects both humans and animals.

A few of these organisms are primarily maintained in humans, but most circulate mainly in animals. Most of the latter organisms are zoonotic.

Leishmaniasis is transmitted by sandflies and can be difficult to prevent, and some of the drugs used for treatment have significant side effects or limited availability outside endemic regions.

-In humans, leishmaniasis has three general forms – cutaneous, mucocutaneous and visceral – and different species of *Leishmania* tend to cause each type.

-Cutaneous leishmaniasis, a form that typically remains limited to the skin. A few species of *Leishmania* regularly affect the mucous membranes, as well as the skin. Both cutaneous and mucocutaneous leishmaniasis may result in disfigurement, but mucosal involvement is generally more serious.

-Two organisms, *L. donovani* and *L. infantum*, cause most cases of visceral leishmaniasis, the most serious form. Visceral leishmaniasis is characterized by damage to the internal organs, and fully symptomatic cases are considered life-threatening.

-*Leishmania* can also cause skin and mucosal lesions and/or visceral signs in animals.

-Most species of *Leishmania* are maintained in wildlife, often without clinical signs, but dogs are an important reservoir host for *L. infantum*. Dogs are also the domesticated animal most often affected by leishmaniasis. Clinical cases in this species can be life-threatening, and may be difficult to treat.

-Cases of leishmaniasis are also seen occasionally in guinea pigs, cats, equids, and captive or free-living wild species.

-Ruminant livestock are rarely affected.

Life cycle

Leishmaniasis is transmitted by the bite of infected female phlebotomine sandflies.

The sandflies inject the infective stage (i.e., promastigotes) from their proboscis during blood meals .

Promastigotes that reach the puncture wound are phagocytized by macrophages cells.

Progmastigotes transform in these cells into the tissue stage of the parasite (i.e., amastigotes) , which multiply by simple division and proceed to infect other mononuclear phagocytic cells .

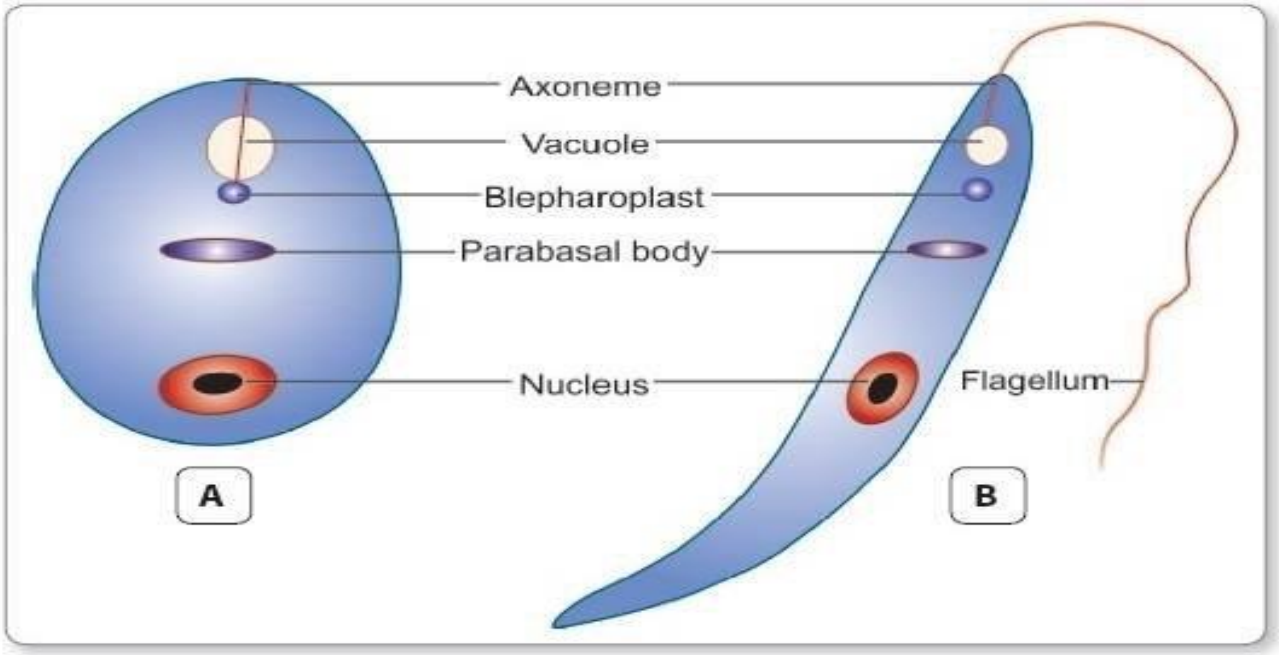
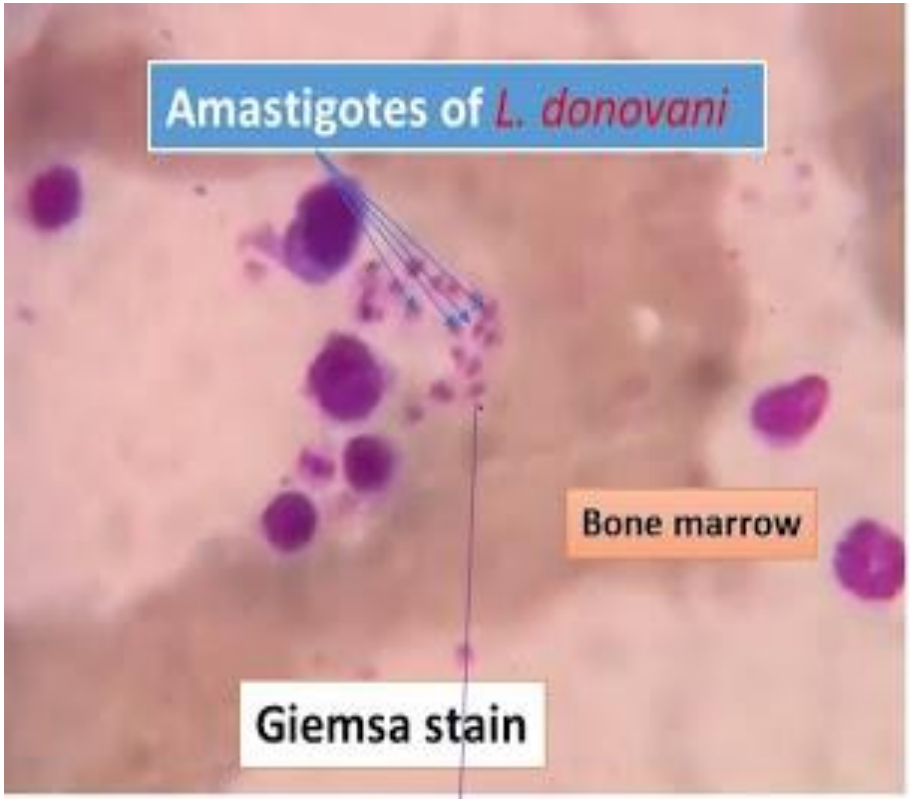
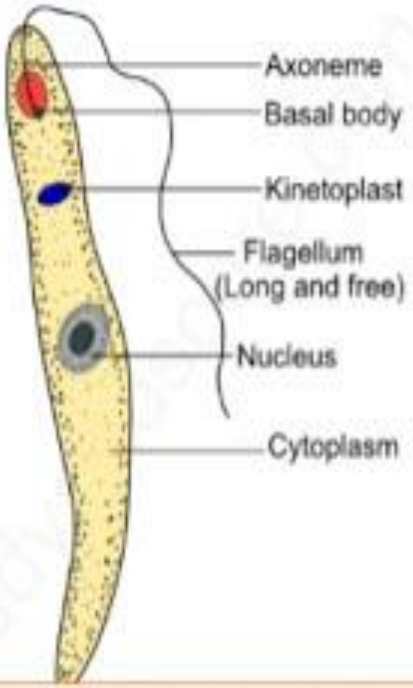


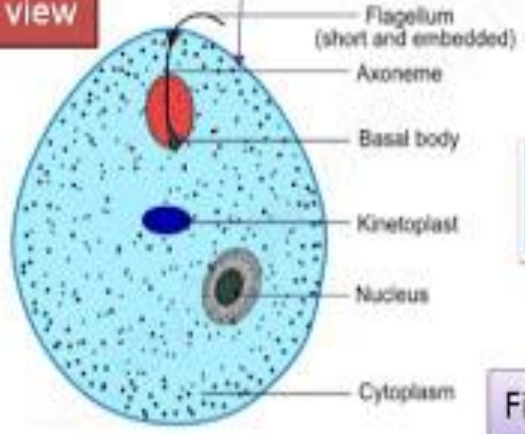
Fig. 5.9: Morphology of *Leishmania donovani*. **A.** Amastigote (LD body); **B.** Promastigote





Promastigote stage (occurs in culture and sandfly)

Enlarge view



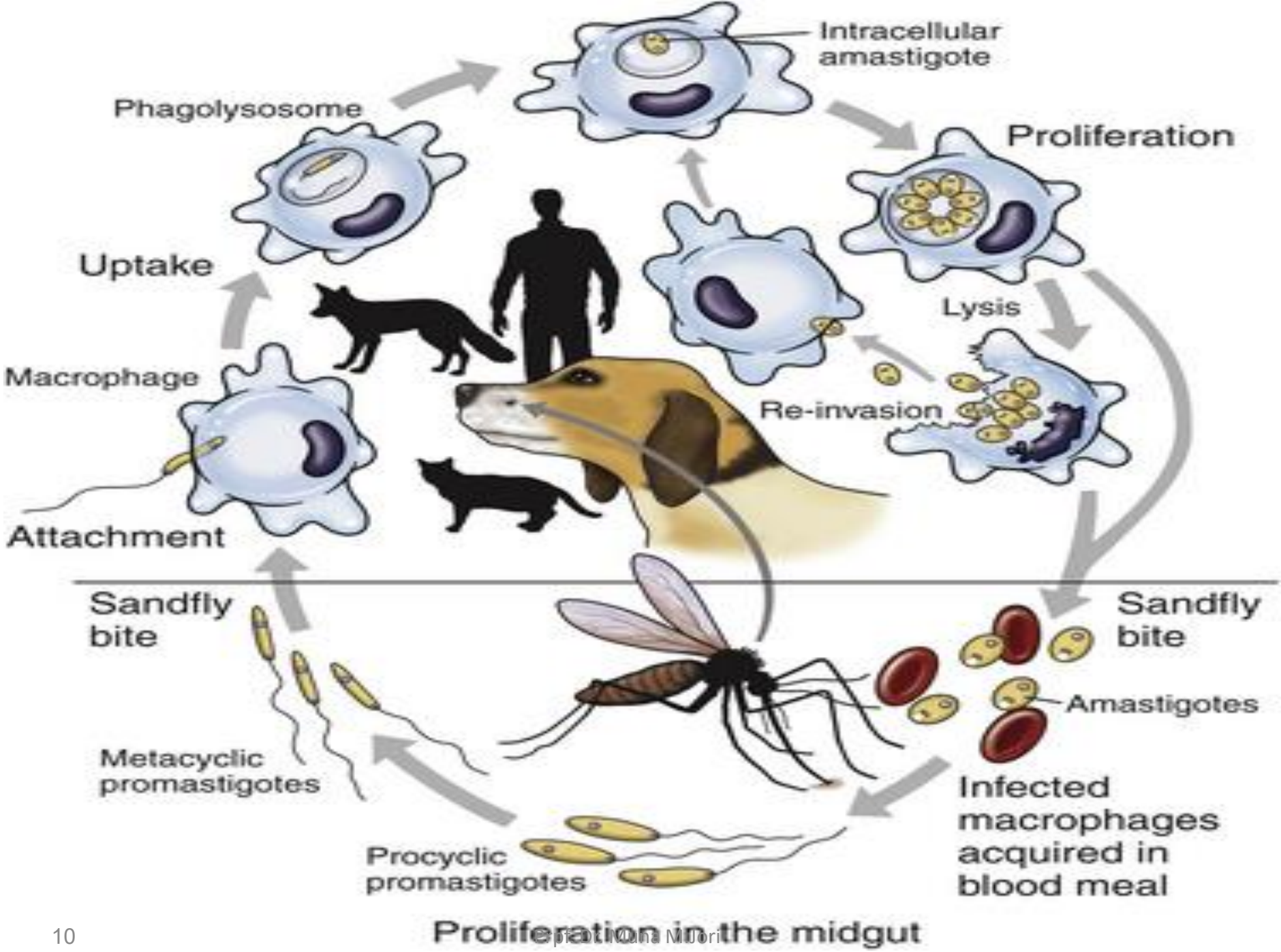
Amastigote stage (occurs in man)

Figure: Both stages *of Leishmania donovani*

Parasite, host, and other factors affect whether the infection becomes symptomatic and whether cutaneous or visceral leishmaniasis results.

Sandflies become infected by ingesting infected cells during blood meals.

In sandflies, amastigotes transform into promastigotes, develop in the gut (in the hindgut or midgut for organisms depending on sub genus of leishmaniasis), and migrate to the proboscis.


Intracellular amastigote
Phagolysosome
Proliferation
Uptake
Lysis
Macrophage
Re-invasion
Attachment
Sandfly bite
Sandfly bite
Amastigotes
Metacyclic promastigotes
Infected macrophages acquired in blood meal
Procyclic promastigotes
Proliferation in the midgut

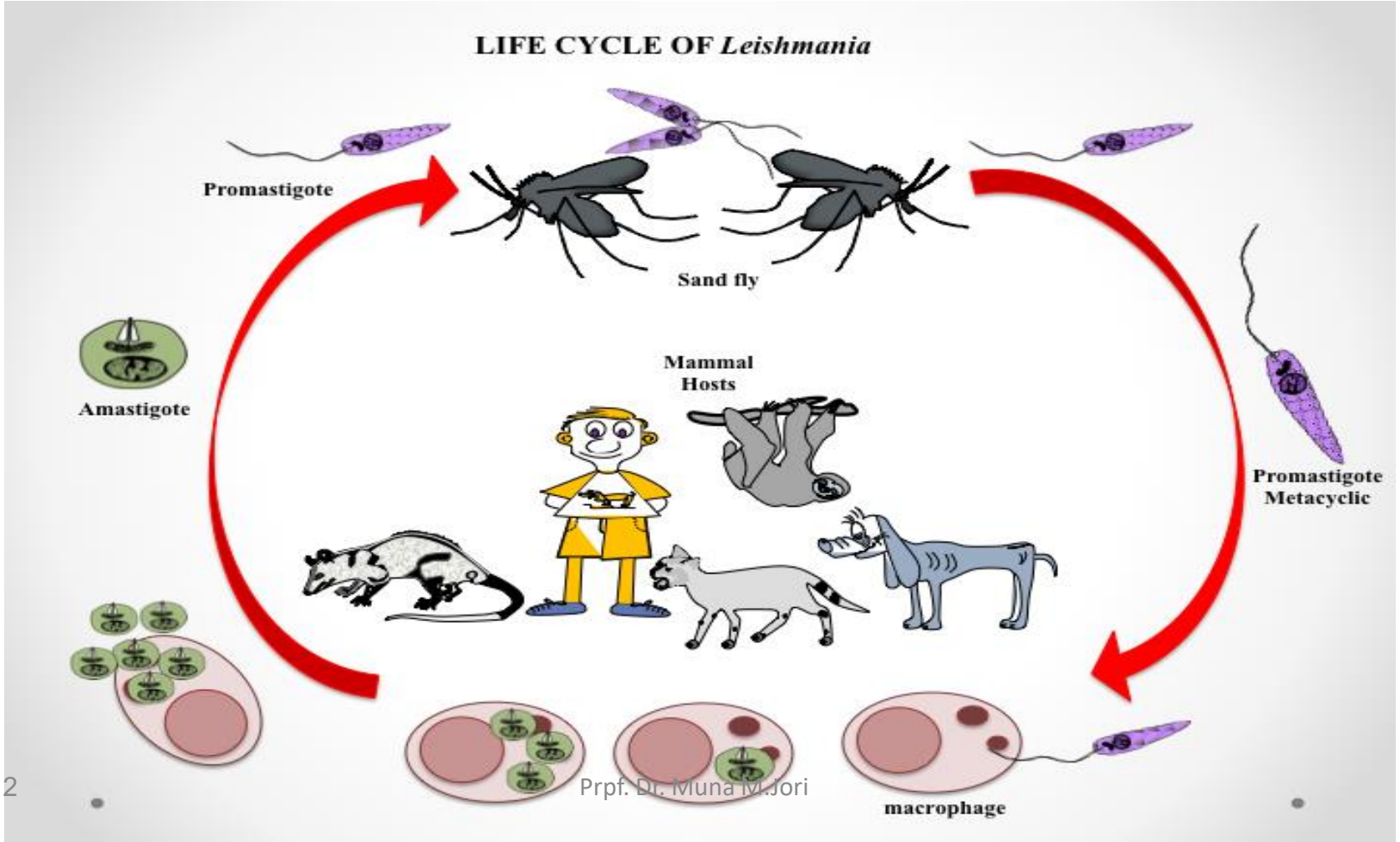
Transmission

Vectors

Sandfly activity mainly occurs when it is humid and there is no wind or rain. These insects are generally most active at dawn, dusk and during the night (especially early in the night), but they will bite if they are disturbed in their hiding places during the day. Common hiding places include animal burrows, holes in trees, caves, houses and other relatively cool, humid locations. Sandflies are attracted to light and may enter buildings at night.

The *Leishmania* that infect mammals are usually transmitted by phlebotomine sandflies in the genera *Phlebotomus* and *Lutzomyia*, which act as biological vectors.

Each species of *Leishmania* is adapted to development in specific species of sandflies. But in the *L. macropodum* has been found in midges of the genus *Forcipomyia*, but not in sandflies.



Leishmaniasis in animals

Many of the organisms that cause leishmaniasis in humans have also been found in clinical cases in animals.

Two additional species, *L. macropodum* and *L. enriettii*, affect animals but have not been found, to date in humans.

The distinction between cutaneous and visceral syndromes is not seen in animals, at least with *L. infantum*. Because dogs are important reservoir hosts for *L. infantum,* "canine leishmaniasis" generally refers to infections with this organism. However, dogs can also be infected by other *Leishmania* species.

Reported infections and animal reservoir hosts

Each species of *Leishmania* has one or more primary reservoir hosts, although it can also infect other animals.

L. infantum is the best understood *Leishmania* in animals. Dogs are major reservoir hosts for this organism. Wildlife reservoirs also seem to be significant in some areas.

L. infantum can also infect a wide variety of other mammals, at least occasionally. Infections have been reported in domesticated cats and equids, numerous free-living or captive wild canids, various captive felids in zoos.

L. tropica is primarily maintained in humans, but parasitological evidence of infection has been reported occasionally in animals such as cats, golden jackals (*Canis aureus*), foxes and rodents.

Clinical Signs

Dogs

L. infantum that causes leishmaniasis in dogs are can cause cutaneous signs, visceral signs or both simultaneously. Clinical cases range from mild to severe, and many infected dogs remain asymptomatic.

Common visceral signs include lethargy, weight loss, a decreased appetite, anemia, splenomegaly.

Fever can be intermittent, and is absent in many cases. Chronic renal disease is common in dogs infected with *L. infantum*; and it is often the cause of death.

Skin lesions are common in dogs with visceral disease, but they can also occur separately. The most common cutaneous syndrome in *L. infantum*-infected dogs seen especially around the eyes and on the face, ears and/or feet.

Secondary bacterial infections are common in skin and mucosal lesions.

Figure 1. Ulcer in hind limb of patient with suspicion of visceral leishmaniasis.

Cats

Cats occasionally develop leishmaniasis, although most infected cats are thought to remain asymptomatic.

Skin and/or mucosal lesions are described most often, with or without visceral signs. However, visceral signs can occur without cutaneous involvement.

In cats, skin lesions tend to occur on the nose, ears, eyelids or lips, but they can also be found on other sites such as the paws.

The initial lesions are often single, but they can be multiple, and may sometimes disseminate.

Oral and/or nasal lesions have been described.

Visceral lesions and signs reported in cats include fever, hepatomegaly, jaundice, vomiting, diarrhea, nasal discharge, anemia and leukopenia.


A
B
C

Equidae

Horses, mules and donkeys sometimes develop skin lesions, particularly on the head, neck, legs.

The most common lesions are multiple papules or nodules, which are often ulcerated. Disseminated skin disease has also been reported. Visceral leishmaniasis has not been documented in equids

Post-Mortem Lesions

The gross lesions are highly variable and may be minimal in some cases. Ulcers are occasionally seen on the mucous membranes, and in some cases, hemorrhages may be evident in internal organs. Small, light colored nodular foci (granulomas) may be found in a variety of organs, including the kidney, liver and pancreas.

Control
&
Prevention

Keeping susceptible animals, indoors between dusk and dawn, especially during the warmer months, can reduce their exposure to sandflies.

Insecticide-impregnated collars or topical insecticides (spot-on preparations, sprays) are reported to decrease sandfly bites in dogs. Some collars also appear to be effective in cats.

Kennels and homes may be sprayed with insecticides, and insecticide-treated door and kennel nets and curtains may help keep sandflies out.

These insects are tiny and can get through untreated mesh unless it is extremely fine.

Because sandflies are poor fliers and are deterred by wind, fans may also be helpful.

Habitat modifications to remove or dry out moist sandfly breeding areas around the home can also be considered.

Canine vaccines for *L. infantum* are available in some countries. Some vaccines are reported to decrease the incidence of clinical cases and/or reduce the number of infections.


THANK YOU