

## Leishmaniasis

- Leishmaniasis is a vector-borne disease that is transmitted by sand flies and caused by obligate intracellular protozoa of the genus *Leishmania*
- Human infection is caused by about 21 of 30 species that infect mammals.

### Mode of transmission

- Leishmaniasis is transmitted by the bite of infected female phlebotomine sand flies
- The sand flies inject the infective stage (promastigotes) during blood meals.

### Distribution

- **Age distribution:**

A fatal type of visceral leishmaniasis, which is found along the Mediterranean, specifically affects infants.

Although occurrence is proportional to sand fly exposure, children younger than 15 years represent a large proportion of cases in endemic areas.

- Untreated visceral leishmaniasis in a pregnant mother can also have consequences on the fetus or result in congenital visceral leishmaniasis.

- Certain types of visceral leishmaniasis affect certain pediatric age groups more than others (eg, visceral leishmaniasis in the Mediterranean Basin caused by *Leishmania infantum* mainly affects children aged 1-4 y).

- **Sex distribution**

Males are more commonly infected than females, most likely because of their increased exposure to sand flies.

Visceral leishmaniasis, in particular, has been shown to be twice as common in males than in females.

- **Geographic Distribution:**

Leishmaniasis is found in parts of about 88 countries.

Most of the affected countries are in the tropics and subtropics.

The settings in which leishmaniasis is found range from rain forests in Central and South America to deserts in West Asia.

- More than 90 percent of the world's cases of visceral leishmaniasis are in India, Bangladesh, Nepal, Sudan, and Brazil.
- Australia and the South Pacific are not considered regions where leishmaniasis is present as an endemic illness.
- In the Middle East *L. major* and *L. tropica* are the most common species

## Types of leishmaniasis

There are several ways to classify leishmaniasis (e.g. by geography or taxonomy ) are available.

- *Clinically*, it can present itself in various ways, and is more easily classified as:

1. Cutaneous
2. Mucocutaneous
3. Visceral leishmaniasis

## Cutaneous leishmaniasis

- The typical lesions of cutaneous leishmaniasis were described as early as 900 BC and have been referred to as:
  - the "Balkan sore" in the Balkans,
  - the "Delhi boil" in India,
  - the "Baghdad boil" in Iraq, and
  - "Saldana" in Afghanistan.
- Cutaneous leishmaniasis can be simple or diffuse.
- Different species, as well as host factors, can also affect the clinical picture, where some species cause "wet" ulcers and others "dry" ulcers.
- After the bite of an infective sand fly, the incubation period is usually several weeks after inoculation, but this incubation period is variable.
- Initial lesions can appear immediately after a bite, or the incubation period may last for several months.
- These lesions are usually painless.
- Skin trauma can result in activation of seemingly latent cutaneous infection long after the initial bite.

- Over a period of weeks to years, some lesions may resolve spontaneously without treatment.
- Characterized by one or more sores, papules, or nodules on the skin.
- Often described as looking somewhat like a volcano with a raised edge and central crater
- Sores are usually painless but can become painful if secondarily infected
- Sores can heal & may leave significant scars and be disfiguring if they occur on the face



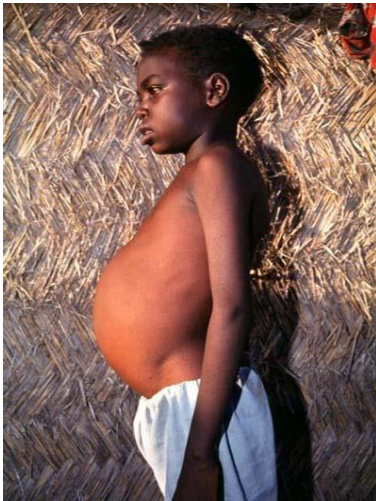
### Mucocutaneous leishmaniasis

- The incubation period is from 1-3 months.
- Mucocutaneous leishmaniasis can be the primary manifestation of the disease, but the primary lesions may also be limited to cutaneous manifestations, with mucosal lesions appearing only later in the course of disease when untreated cutaneous lesions progress to involve the oral and nasal surfaces.
- Initial symptoms related to mucosal lesions may include nasal obstruction and bleeding.
- Mucosal lesions become painful gradually and can become sites of infection, sometimes leading to sepsis.



## **Visceral leishmaniasis (Kala-azar)**

- Kala azar is the Indian name for visceral leishmaniasis.
- The term means "black disease", which is a reference to the characteristic darkening of the skin that is seen in patients with the disease.
- Incubation Period of visceral leishmaniasis ranges from 2 weeks to more than 1 year or longer
- Visceral leishmaniasis can take different forms ranging from asymptomatic or self-resolving disease.
- Bouts of fever, hepatosplenomegaly, diarrhea, anemia, and lymphadenopathy.
- In ~ 75-90%, it is lethal if untreated & 30% lethal if treated
- Post kala-azar dermal leishmaniasis occurs as a sequel of visceral leishmaniasis



*Profile view of a teenage boy suffering from visceral leishmaniasis.*

*The boy exhibits splenomegaly, distended abdomen and severe muscle wasting.*

## **Causative agents**

- Cutaneous leishmaniasis
  - ☐ Americas -*Leishmania tropica mexicana*, *Leishmania braziliensis*, and *Leishmania amazonensis*
  - ☐ Old World -*Leishmania tropica*, *Leishmania major*, *L infantum*, and *Leishmania aethiopica*
- Mucocutaneous leishmaniasis
  - ☐ Americas -*L braziliensis*
  - ☐ Old World -*L aethiopica*
- Visceral leishmaniasis
  - ☐ India, Kenya -*Leishmania donovani*
  - ☐ South Europe, North Africa, & Middle East -*L infantum*
  - ☐ Americas -*Leishmania chagasi*

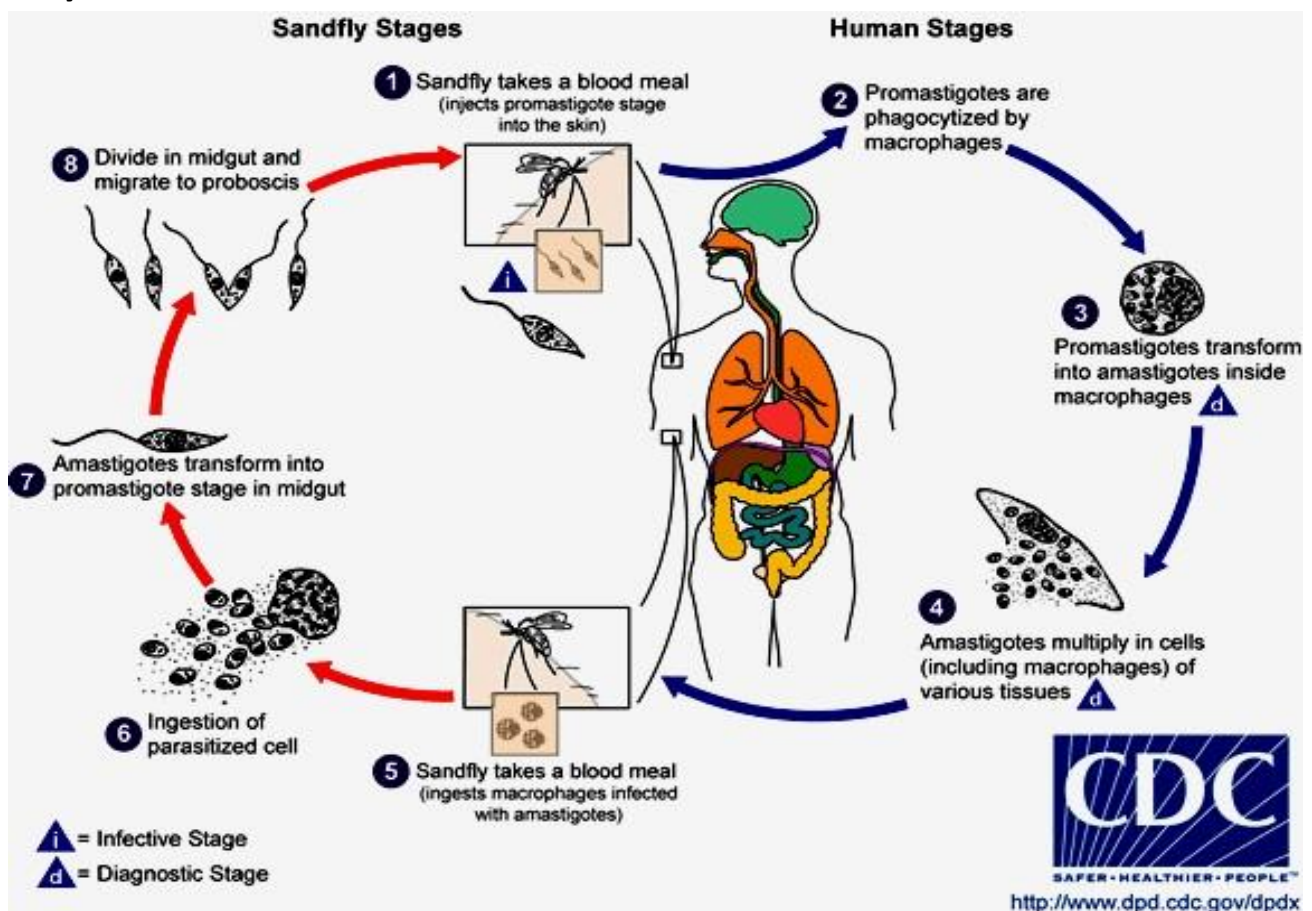
## Reservoir

- Cutaneous Leishmaniasis: Humans, rodents, & dogs
- Muco-cutaneous leishmaniasis: Rodents
- Visceral leishmaniasis: Humans, rodents, & dogs

## Risk factors

- Children are at greater risk than adults in endemic areas
- Malnutrition
- Persons with AIDS are at 100-1000 times greater risk of developing visceral leishmaniasis in certain areas
- Incomplete therapy of initial disease is a risk factor for recurrence of leishmaniasis.
- Some studies have shown protection against cutaneous leishmaniasis with vaccination of killed *Leishmania* promastigotes and (BCG).
- However, this does not seem to be protective against visceral leishmaniasis.
- The bite of one infected sand fly is sufficient to cause the disease, since a sand fly can ingest more than 1000 parasites per bite.

## Life cycle



## **Prevention & control**

- Most cases of Cutaneous leishmaniasis heal without treatment, leaving the person immune to further infection.
- Other forms of leishmaniasis are extremely difficult to treat, often requiring a long course of pentavalent antimony or sodium stibogluconate.
- Infection can be prevented by avoidance of sand fly bites through use of repellents or insecticides.

## **The World Health Organization Response**

WHO has set the following measures:

1. provide early diagnosis and prompt treatment.
2. control the sand fly population through residual insecticide spraying of houses and through the use of insecticide-impregnated bed nets.
3. provide health education and produce training materials.
4. detect and contain epidemics in the early stages.
5. provide early diagnosis and effective management for Leishmania/HIV co- infections.

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