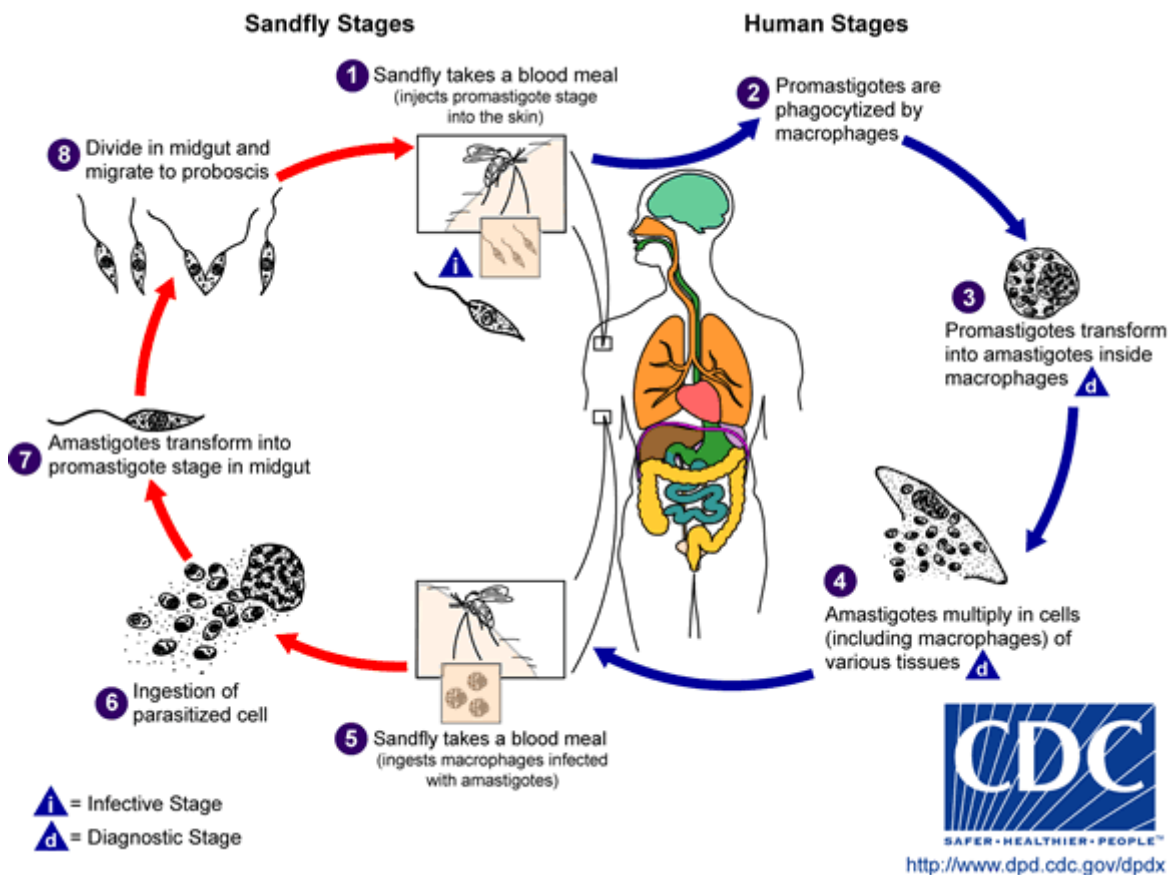


Leishmaniasis

Causal Agent:

Leishmaniasis is a vector-borne disease that is transmitted by sandflies and caused by obligate intracellular protozoa of the genus *Leishmania*. Human infection is caused by about 21 of 30 species that infect mammals. These include the *L. donovani* complex with 3 species (*L. donovani*, *L. infantum*, and *L. chagasi*); the *L. mexicana* complex with 3 main species (*L. mexicana*, *L. amazonensis*, and *L. venezuelensis*); *L. tropica*; *L. major*; *L. aethiopica*; and the subgenus *Viannia* with 4 main species (*L. (V.) braziliensis*, *L. (V.) guyanensis*, *L. (V.) panamensis*, and *L. (V.) peruviana*). The different species are morphologically indistinguishable, but they can be differentiated by isoenzyme analysis, molecular methods, or monoclonal antibodies.

Life Cycle:



Leishmaniasis is transmitted by the bite of female phlebotomine sandflies. The sandflies inject the infective stage, promastigotes, during blood meals **1**. Promastigotes that reach the puncture wound are phagocytized by macrophages **2** and transform into amastigotes **3**. Amastigotes multiply in infected cells and affect different tissues, depending in part on the *Leishmania* species **4**. This originates the clinical manifestations of leishmaniasis. Sandflies become infected during blood meals on an infected host when they ingest macrophages infected with amastigotes (**5**, **6**).

In the sandfly's midgut, the parasites differentiate into promastigotes **7**, which multiply and migrate to the proboscis **8**.

Geographic Distribution:

Leishmaniasis is found in parts of about 88 countries. Approximately 350 million people live in these areas. 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.

Leishmaniasis is found in Mexico, Central America, and South America—from northern Argentina to southern Texas (not in Uruguay, Chile, or Canada), southern Europe (leishmaniasis is not common in travelers to southern Europe), Asia (not Southeast Asia), the Middle East, and Africa (particularly East and North Africa, with some cases elsewhere).

Clinical Features:

Human leishmanial infections can result in 2 main forms of disease, cutaneous leishmaniasis and visceral leishmaniasis (kala-azar). The factors determining the form of disease include leishmanial species, geographic location, and immune response of the host. Cutaneous leishmaniasis is characterized by one or more cutaneous lesions on areas where sandflies have fed. Persons who have cutaneous leishmaniasis have one or more sores on their skin. The sores can change in size and appearance over time. They often end up looking somewhat like a volcano, with a raised edge and central crater. A scab covers some sores. The sores can be painless or painful. Some people have swollen glands near the sores (for example, in the armpit if the sores are on the arm or hand).

Persons who have visceral leishmaniasis usually have fever, weight loss, and an enlarged spleen and liver (usually the spleen is bigger than the liver). Some patients have swollen glands. Certain blood tests are abnormal. For example, patients usually have low blood counts, including a low red blood cell count (anemia), low white blood cell count, and low platelet count. Some patients develop post kala-azar dermal leishmaniasis. Visceral leishmaniasis is becoming an important opportunistic infection in areas where it coexists with HIV.

Laboratory Diagnosis:

Examination of Giemsa-stained slides of the relevant tissue is still the technique most commonly used to detect the parasite.

Diagnostic findings

- Microscopy

Isolation of the organism in culture (using for example the diphasic NNN medium) or in experimental animals (hamsters) constitutes another method of parasitologic confirmation of the diagnosis, and in addition can provide material for further investigations (e.g., isoenzyme analysis). Antibody detection can prove useful in visceral leishmaniasis but is of limited value in cutaneous disease, where most patients do not develop a significant antibody response. In addition, cross reactivity can occur with *Trypanosoma cruzi*, a fact to consider when investigating *Leishmania* antibody response in patients who have been in Central or South America. Other diagnostic techniques exist that allow parasite detection and/or species identification using biochemical (isoenzymes), immunologic (immunoassays), and molecular (PCR) approaches. Such techniques, however, are not readily available in general diagnostic laboratories.

Treatment:

Physicians may consult CDC to obtain information on how to treat leishmaniasis.