

NOTES
LEISHMANIA

MICROBE OVERVIEW

- Flagellated, parasitic protozoan
- Contains kinetoplast (form of mitochondrial DNA)
- *Hosts:* humans, canids, rodents, hyraxes

Classification

- "Old World"
  - Usually found in Africa, Asia, Middle East, India
  - Includes *Leishmania infantum*, *L. donovani*, *L. tropica*, *L. aethiopica*, *L. major*
- "New World"
  - Usually found in Central, South America; Mexico
  - Includes *L. braziliensis*, *L. mexicana*, *L. infantum* (*chagasi*), *L. amazonensis*, *L. panamensis*, *L. guyanensis*

Life stages

- Amastigote
  - Oval; 3–6μm
  - Intracellular, nonmotile form (no external flagella)
  - Found in human circulatory system in mononuclear phagocytes
- Promastigote
  - Spindle-shaped; 15–30μm
  - Extracellular, motile form (long external flagellum)
  - Found in alimentary tract of sandflies

LEISHMANIA

osms.it/leishmania

PATHOLOGY & CAUSES

- Causes disease leishmaniasis
- Spread by female sandflies of genus *Lutzomyia*/*Phlebotomus*
- Human leishmaniasis characterized by ulcers (e.g. skin, oral, nasal mucosa), systemic illness
- Lipophosphoglycan layer helps it survive immune system

TYPES

Cutaneous leishmaniasis (CL)

- Most common
- Usually caused by *L. major*, *L. tropica*, *L. aethiopica*

Mucocutaneous leishmaniasis (ML)

- Causes mucosal, skin ulcers
- Usually caused by *L. braziliensis*

Visceral leishmaniasis (VL)

- AKA kala-azar
- Most severe, systemic involvement
- Usually caused by *L. donovani*, *L. infantum*
- *If recurs post-treatment:* post kala-azar leishmaniasis
- Resists host's complement system, prevents natural killer cells
- Infected macrophages spread infection
  - Spleen → splenomegaly
  - Liver → Kupffer cells with increased size

→ liver dysfunction
- Bone marrow → hyperplastic → ↓ hematopoiesis → pancytopenia
- Lymph nodes → lymphadenopathy

RISK FACTORS

- Poverty, malnutrition, poor hygiene; deforestation, urbanization

SIGNS & SYMPTOMS

CL

- Skin ulcers resembling leprosy lesions

ML

- Ulcers on oropharyngeal, nose mucosa
- *Midfacial destruction:* nose cartilage/septal granulation, tear; ulcers on palate, uvula, lips
- Hoarse voice, gingivitis, periodontitis
- Genital mucosal (severe cases)

VL

- Fever, weight loss, hepatosplenomegaly, pancytopenia, hypergammaglobulinemia, abdominal tenderness

DIAGNOSIS

LAB RESULTS

- Enzyme-linked immunosorbent assay (ELISA)
- Antigen-coated dipsticks
- Direct agglutination test

Light microscope

- Amastigotes/*Leishman-Donovan body visualization:* blood, aspirates from marrow, spleen, lymph nodes, skin lesions
  - Blood, spleen monocytes
  - Circulating neutrophils, aspirated tissue macrophages

Polymerase chain reaction (PCR)

- Detects *Leishmania* kinetoplast DNA (most sensitive, specific)

TREATMENT

MEDICATIONS

CL

- Topical paromomycin, miltefosine, pentamidine isethionate, fluconazole, ketoconazole

ML

- Liposomal amphotericin B, miltefosine, pentamidine

VL

- Liposomal amphotericin B, miltefosine

OTHER INTERVENTIONS

Prevention

- Nets treated with insecticide while sleeping; over doors, windows
- Insect repellents, insecticide-impregnated dog collars
- Treat infected dogs



Figure 80.1 A leishmaniasis ulcer on the leg.