

►► **Multiple choice questions**

1. Intermediate host of *Leishmania* is :
(a) *Phlebotomus* (sandfly)
(b) tse-tse fly
(c) mosquito (d) house fly
2. Who discovered *Leishmania* :
(a) David Bruce (b) Ross
(c) Charles Laveran (d) Lancisi

3. *Leishmania* causes :
(a) kala azar (b) malaria
(c) dysentery (d) sleeping sickness
4. Black fever is caused by :
(a) *Plasmodium* (b) *Trypanosoma*
(c) *Giardia*
(d) *Leishmania*

5. (7-1)

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5. Leptomonad form of *Leishmania* is found in :
(a) man (b) sandfly
(c) tse-tse fly (d) bed bug
6. *Leishmania* is intracellular parasite of :
(a) leucocytes
(b) hepatic cells
(c) cells of spleen
(d) all
7. Reservoir host for *Leishmania* :
(a) dog (b) jackal
(c) squirrel
(d) all of these
8. Due to infection of *Leishmania* occur :
(a) Kala-azar (b) Oriental sore
(c) Esphundia (d) all

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9. Cause of Kala-azar :
(a) *Leishmania donovani*
(b) *L. infantum*
(c) *L. chagasi* (d) *L. canis*
10. General body surface of *Leishmania* perform :
(a) nourishment (b) respiration
(c) excretion (d) all
11. Each of the following statements concerning kala-azar is correct except :
(a) Kala-azar is caused by *Leishmania donovani*
(b) Kala-azar is transmitted by the bite of sandflies
(c) Kala-azar occurs primarily in rural latin America
(d) Kala-azar can be diagnosed by finding amastigotes in bone marrow

LEISHMANIA DONOVANI

Leishmania donovani is digenetic haemoflagellate endoparasitic protozoa occurs as the amastigote, in the cells of the reticulo-endothelial system throughout the body, specially in the spleen, liver and bone marrow. The promastigote occurs in the gut of sand fly, mainly species of phlebotomus in the old world and in some part of the new world and species of Lutzomyia in the tropics of the new world.

No reservoir of infection exist in India. In other areas squirrels and other rodents have been found infected.

Discovery and Distribution

Leishmania donovani was discovered in human blood by Leishman and Donovan in 1903. It occurs in India, central Asia, China, Sudan, Tropical Africa and South America.

Structure

The genus *Leishmania* occurs in man as amastigote form only.

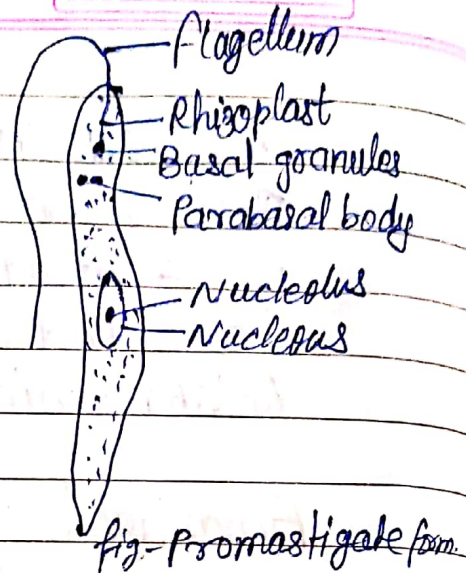
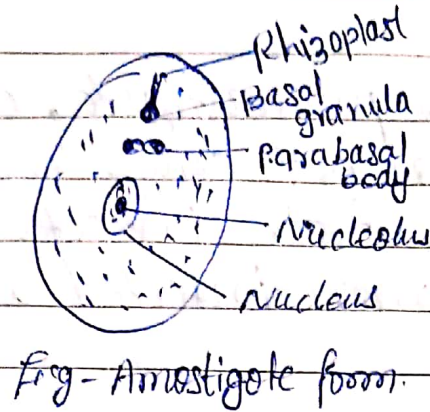
the flagellates or promastigote, does not occur in man but only in the gut of certain insects which have fed on man infected with leishmania.

Amastigote :-

It is found in man in the cells of reticuloendothelial system throughout the body. Manson-Bahr (1961) thought that it is found at any organ of the body.

It is very small, oval or round 2-5 μm in diameter. Nucleus is large rounded or oval, solid looking structure. It is usually centrally in position in the body of the animal. Kinetoplast is round or rod shaped from which flagellum appears to take origin.

The flagellum may terminate at the anterior end of the parasite. Flagellum does not help in locomotion but is motor organ. Kinetoplast is composed of DNA and is situated within mitochondria. Sometimes a parabasal body also seen.



Promastigote form

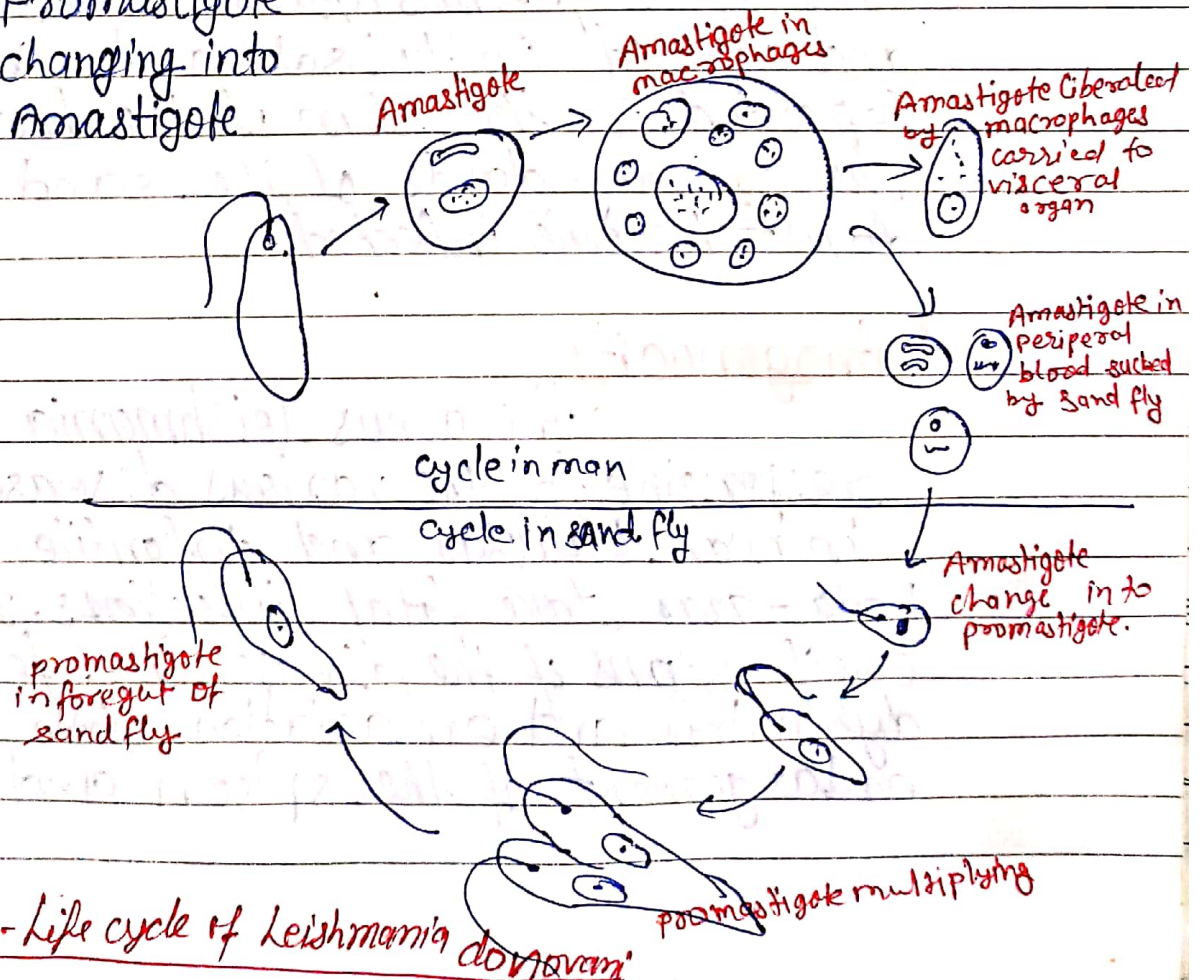
It has elongated body measuring 10-20 μm in length and free flagellum, which may be as long as body or even longer. There is however no undulating membrane. The nucleus is central and kinetoplast anterior in position.

Life cycle.

IN MAN: — The infective form, conveyed to man by the bite of sandflies as the amastigote form and are taken up by macrophages in the subcutaneous tissue. Inside these cells the parasite divide by binary fission and multiply continuously till they fill the cell which finally ruptures and release the contain parasites. These are engulfed by reticulo-endothelial cells and the process of

multiplication is repeated. large mononuclear cells become invaded, occa- occasionally polymorphonuclear leucocytes also, and in these the parasites are carried week or months later to the viscera, where they produced a generalized infection of reticulo- endothelium. Kala-azar parasites, even in the most favourable localities, are not usually found in the blood by microscopic examination. Nodular or mole macular skin lesions result and the condition is known as "dermal leishmanoid"

Promastigote
changing into
Amastigote



IN SAND FLY

- (i) When a sand fly (*phlebotomus argentipes*) feeds on infected persons the amastigote developed in the gut into promastigotes, and may multiply to enormous numbers.
- (ii) The flagellates in the insects tend to accumulate in the anterior portion of alimentary canal and they spread forward, still multiplying until they block the foregut.
- (iii) When the infected sandfly subsequently bite man or animals some of the promastigotes are dislodged and carried in the saliva to be deposited in the skin of the host. The salivary glands of the sand fly do not become infected.

Pathogenicity

The genus *Leishmania* is responsible for the various diseases in man. Kala-azar and infantile kala-azar take fatal infections. The chief signs of the disease are fever, dysentery and emaciation with enlargement of the spleen and liver.

Diagnosis:

(i) By examination of stained film of peripheral blood, parasite may be found in large mononuclear cells.

(ii) Examination of juice obtained from gland puncture is sometimes successful in Indian infections.