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Leishmaniasis



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Summary Leishmaniasis remains an important neglected tropical infection that affects children more than adults. Geographical variation exists in the distribution of the various *Leishmania* species. Although the majority of the disease burden is found in poor countries, leishmaniasis is also endemic in several countries within Southern Europe. Transmission is mediated by the sandfly and may follow an anthroponotic or zoonotic cycle that also varies by region. The expression of leishmaniasis depends on a complex interaction between the type of infecting species and the host immune response. Infection may be asymptomatic or may manifest as cutaneous disease that is pleiomorphic in presentation, muco-cutaneous disease or the visceral form that may be lethal if untreated. Molecular techniques aid diagnosis especially in cases where amastigotes are not visualised. The efficacy of treatment varies with the type of infecting species and resistance patterns. Preventive measures aimed at avoiding sandfly bites are effective in reducing acquisition of leishmaniasis and should be promoted for travellers visiting endemic regions. The persistent lack of a vaccine against human leishmaniasis is a result of the poor investment in this neglected parasitosis.

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Introduction

Leishmaniasis is a neglected vector-borne tropical infection that is considered to be a disease of poverty. Although mostly concentrated in poor countries within South East Asia, East Africa and Latin America, leishmaniasis is also endemic in several Mediterranean countries making this parasitosis an important disease for local inhabitants as well as for travellers. The protean manifestations of leishmaniasis, if expressed, range from cutaneous, which if left untreated may result in disfiguring scars associated

with social stigma, to potentially lethal disseminated infections. Among all parasitic diseases, mortality from leishmaniasis is second only to malaria, and in terms of disability adjusted life years (DALYs), the third most common cause of morbidity after malaria and schistosomiasis, with children <15 years suffering most of the disease burden.¹ The increase in the number of immunosuppressed individuals, secondary to HIV infection, post-transplant and chemotherapeutic agents and the recently introduced biologic therapies for chronic inflammatory conditions, has resulted in an increase in leishmaniasis

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within Europe.² Furthermore, international travel has resulted in an increase in cases of leishmaniasis in non-endemic countries,³ making this parasitic infection important to recognise.

Microbiology

The genus *Leishmania*, consisting of trypanosomatid protozoans belonging to the order *Kinetoplastida*, embraces more than 20 different species. Geographic variation in the species type/s exists between endemic countries characteristically having a sub/tropical climate (Table 1).⁴ *Leishmania* is classified into two subgenera based on anatomical differences in the sites of parasite development within the gut of the sandfly: *Leishmania*, which is found in the New (the Americas) and Old World (Europe, Asia and Africa), and *Viannia*, endemic only in the Old World.⁷ Multilocus enzyme electrophoresis is a classic standardised biochemical method that is widely used to distinguish between the different species.⁷ Molecular techniques which have recently been introduced for clinical diagnosis⁸ are especially useful in areas where different species co-exist.

Vector

The female sandfly, belonging to the genera *Phlebotomus* in the Old World and *Lutzomyia* in the New World, is the sole vector responsible for transmitting leishmaniasis (Table 1). Ninety three of the around 800 known sandfly species spread leishmaniasis.⁷ The haematophagous sandfly is a noiseless 2–3 mm long arthropod whose colour ranges from black to white and unlike other *Diptera* species characteristically positions its wings at an angle to the abdomen.⁹ Sandflies are active in the warm summer months in the Mediterranean region.¹⁰ Most sandfly species bite outdoors from dusk till dawn although there are some species which bite indoors and in the daylight, behaviour that impacts the methods of insecticide spraying utilised in their control.⁹ Sandflies infected with the *Leishmania* parasite tend to probe several times on the same host, an adaptive method that increases transmission.⁵ The limitation ability of the sandfly to hop vertically, managing only in short distances of up to 1 m makes it less likely for individuals sleeping on higher floors to get bitten.¹¹

Table 1 Disease manifestations and transmission of predominant *Leishmania* species found in the New and Old Worlds.^{4–6}

Leishmania (<i>L.</i>) species	Sandfly vector (Phlebotomus [<i>P.</i>] or Lutzomyia [<i>L.</i>] species)	Main affected areas	Reservoir	Disease manifestations
<i>L. aethiopica</i>	<i>P. longipes</i> <i>P. pedifer</i>	Ethiopia, Kenya	Hyraxes	Cutaneous, diffuse, mucosal
<i>L. amazonensis</i>	<i>L. flaviscutellata</i>	East Andes	Rodents	Cutaneous, disseminated
<i>L. braziliensis</i>	<i>L. ovallesi</i> <i>L. wellcomei</i> <i>L. neivai</i> <i>L. whitmani</i>	East and West Andes	Rodents, marsupials, dog	Cutaneous, mucosal
<i>L. donovani</i>	<i>P. argentipes</i> <i>P. martini</i> <i>P. orientalis</i>	India, Bangladesh, Nepal Bhutan Sudan, Ethiopia	Human	Visceral
<i>L. guyanensis</i>	<i>L. umbratilis</i>	East Andes	Arboreal edentate mammals	Cutaneous, mucosal
<i>L. infantum</i> (same as <i>L. chagasi</i> in the New World)	<i>P. ariasi</i> <i>P. perniciosus</i> <i>L. longipalpis</i>	Mediterranean region	Dog	Visceral, cutaneous
<i>L. major</i>	<i>P. duboscqi</i> <i>P. papatasi</i>	Latin America Sub-Saharan Africa North Africa, Middle East Iran, Pakistan, India	Rodents Gerbils, Rodents	Cutaneous
<i>L. mexicana</i>	<i>L. olmeca olmeca</i>	West Andes	Rodents, marsupials	Cutaneous, diffuse, mucosal
<i>L. panamensis</i>	None proven	West Andes	Arboreal edentate mammals	Cutaneous, mucosal
<i>L. peruviana</i>	None proven	Peru	Rodents, marsupials, dog	Cutaneous, mucosal
<i>L. tropica</i>	<i>P. sergenti</i> <i>P. arabicus</i> <i>P. guggisbergi</i>	North Africa, Middle East, Iran, Afghanistan North and sub-Saharan Africa	Human Hyraxes	Cutaneous

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