

What it is:

Lyme disease (also known as Lyme borreliosis) is an **infectious disease caused by spirochaete bacteria** of the genus *Borrelia* spp., **transmitted through the bite of infected ticks**. Within the *Borrelia* genus, 20 different species can cause Lyme borreliosis (LB), with *Borrelia burgdorferi sensu stricto* being the species most frequently responsible for the typical clinical manifestations of Lyme disease in both humans and animals.

Lyme disease is a zoonosis that **infects a wide range of hosts, including domestic and wild mammals** and, to a lesser extent, birds and reptiles.

Categories



WILD MAMMALS



DOMESTIC MAMMALS

In Europe, *B. burgdorferi* is **primarily found in reservoir species such as small mammals and ground-feeding birds**, which serve as the **main source of infection for larval and nymphal ticks**. Although large animals, such as **deer, roe deer, wild boar, and other wild ungulates**, are accidental hosts of *Borrelia*, they **represent the primary blood meal source for adult ticks**, thus playing an important role in vector maintenance.

Origin and Transmission

In Europe, Lyme disease is **primarily caused by *B. burgdorferi*, *B. afzelii*, and *B. garinii***, and is **mainly transmitted by the tick *Ixodes ricinus***. Humans and animals become infected during the **blood meal of an infected tick**, while ticks **acquire the pathogen by feeding on infected reservoir hosts**. Adult *Ixodes* ticks typically feed on large mammals, and during co-feeding - simultaneous feeding at the same site - ticks can transmit the pathogen to one another.

Exposure to ticks can occur year-round, but they are most active during the warmer months (from April to September). Transmission of the bacterium from the tick to the host is not immediate; the blood meal must last more than 24 hours. For this reason, **prompt removal of the tick can prevent infection**.

To date, direct transmission between humans (e.g., via contact, saliva, sexual intercourse, or aerosols) **has not been demonstrated**. Other transmission routes, although rare and not yet fully documented, may include congenital transmission, blood transfusions, and organ transplants.

Symptoms and Impacts

ANIMALS	HUMANS
<p>The symptoms in animals vary depending on the affected species. The most common clinical signs of Lyme disease in dogs and horses include recurrent lameness affecting one or more limbs, joint pain and inflammation (arthritis), fever, lethargy, depression, lymphadenopathy (enlarged lymph nodes), and anorexia.</p> <p>The most severe complications are rare and include glomerulonephritis, which can lead to renal failure, as well as cardiac or neurological dysfunctions (the latter being extremely rare in dogs). In cattle, the disease is generally subclinical, but in rare cases it may cause lameness, arthritis, and abortion (if infection occurs during gestation). Small wild mammals such as hedgehogs, rodents, and foxes are often asymptomatic; in these species, the pathogen persists without causing apparent disease.</p>	<p>The first stage of the disease in humans is characterised by a skin lesion known as erythema migrans, which develops at the site of the tick bite. At the same time, fever and general malaise may develop. If left untreated, the infection can spread to the joints, heart, and nervous system, progressing to a second stage in which the bacterium may cause multiple skin lesions, joint pain (arthralgia), facial paralysis, and arrhythmias. If still untreated, months or years later the disease can progress to a third, chronic stage, characterised by arthritis, encephalopathy, neuropathies, and fatigue. People who live in or frequently visit wooded areas are at greater risk of contracting Lyme borreliosis.</p>

Geographical Distribution

Lyme disease was **first identified in 1976** during an outbreak in Lyme, Connecticut, and is currently **the most frequently reported tick-borne disease in the United States**. The disease is now **also present in other regions worldwide**.

Lyme borreliosis is **widespread in Europe**, showing considerable geographical variability in incidence, with peaks reported in Estonia, Lithuania, Slovenia, and Switzerland. In other European countries, **including Italy**, the epidemiological situation is less well documented.

Preventive Measures

Reducing tick exposure is the best defense against Lyme disease. Ticks inhabit grassy, bushy, and wooded areas, as well as animals, making it **important to adopt personal protective measures** against ticks during outdoor activities in at-risk areas. Such **measures include wearing clothing that covers the skin, using repellents, and carefully inspecting clothing and the body** for the possible presence of ticks after spending time in wooded or grassy environments.

References:

- CDC, Lyme Disease
<https://www.cdc.gov/lyme/about/index.html>
 - Incidence of Lyme Borreliosis in Europe from National Surveillance Systems (2005-2020). DOI: 10.1089/vbz.2022.0071
 - MANUALE MSD, Malattia di Lyme
<https://www.msmanuals.com/it/professionale/malattie-infettive/spirocheti/malattia-di-lyme>
 - WOA, Borreliosis
<https://www.woah.org/en/disease/borreliosis/>
-