# LIVESAY EXPEDITIONS & ADVENTURES

# Lyme Disease

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## Infectious Agent

Lyme disease is caused by spirochetes belonging to the *Borrelia burgdorferi* sensu lato complex, including:

- *B. afzelii*
- *B. burgdorferi* sensu stricto
- *B. garinii*

## Mode of Transmission

Infection occurs by vector-borne transmission via bite of infected ticks of the *Ixodes ricinus* complex.

## Occurrence

- Temperate forested regions throughout Europe and northern Asia; more common in eastern and central Europe than western Europe.
- Northeastern, north central, and Pacific coastal regions of North America; about 20,000 cases are reported yearly in the United States. Lyme disease is the most common vector-borne disease in the United States and Europe.
- Transmission has not been documented in the tropics.

## Risk for Travelers

- Lyme disease is rarely reported in returning travelers.
- All ages are at risk for infection with travel to endemic areas.
- Infection is associated with exposure to tick habitats (e.g., wooded, brushy, or grassy areas).
- Vector ticks are very small; infected persons are often unaware that they have been bitten.

## Clinical Presentation

- Infection can result in dermatologic, rheumatologic, neurologic, or cardiac abnormalities.
- Incubation period is 3–32 days.
- In 70%–80% of cases, patients develop a characteristic rash, erythema migrans (EM), within 30 days of exposure to *B. burgdorferi*. EM is a red expanding rash, with or without central clearing, that is often accompanied by symptoms of fatigue, fever, headache, mild stiff neck, arthralgia, or myalgia.
- Within days or weeks, infection can spread to other parts of the body, causing more serious neurologic conditions (meningitis, radiculopathy, and facial palsy) or cardiac abnormalities (carditis with atrioventricular heart block).
- Untreated, infection can progress over a period of months to cause mono- or oligoarticular

arthritis, peripheral neuropathy, or encephalopathy. Long-term sequelae can be typically observed over a number of months; range from 1 week to a few years.

## Diagnosis

- Lyme disease is diagnosed on the basis of physician-observed clinical manifestations and a history of likely exposure to infected ticks.
- Culture may be done (e.g., from EM lesion) early in disease; PCR is more reliable from areas such as joint fluid.
- Serologic testing is often negative in the first few weeks of illness and is therefore not recommended to confirm the diagnosis in patients with recent onset (2–3 weeks) of a characteristic EM rash.
- Serologic testing may be helpful in patients with musculoskeletal, neurologic, or cardiac symptoms.
- Patients suspected of acquiring Lyme disease overseas should be tested by using a C6-based assay, as other serologic tests may not detect infection with European species of *Borrelia*.

## Treatment

- Guidelines for treatment of Lyme disease have been published by the Infectious Diseases Society of America and are available at www.journals.uchicago.edu/doi/full/10.1086/508667.
- Depending on the stage of disease, most patients can be treated with either oral doxycycline or intravenous ceftriaxone.
- Physicians unfamiliar with Lyme disease may wish to consult an infectious disease specialist for further guidance.
- Additional information about Lyme disease can be found at www.cdc.gov/ncidod/dvbid/lyme/index.htm.

## Preventive Measures for Travelers

- No vaccine is currently available.
- Measures to prevent Lyme disease and other tick-borne infections include avoidance of tick habitat, use of insect repellent (see the Protection Against Mosquitoes, Ticks, and Other Insects and Arthropods section in Chapter 2) on exposed skin and clothing, and carefully checking every day for attached ticks.
- Remove ticks by grasping them firmly with tweezers as close to the skin as possible and lifting gently.
- Ideally, tick removal should be done within 24 hours of attachment; 24–72 hours of attachment is necessary before transmission of the spirochete occurs.
- Prophylactic antibiotics are not recommended for travelers.
- Postexposure prophylaxis is generally not recommended unless the traveler sustained a tick bite(s) in a highly endemic area.

## References

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