LYME DISEASE

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Lyme Disease

Lyme disease, also called Borreliosis or Lyme borreliosis, is a bacterial infection transmitted by ticks. It was first described in the USA in 1975 in Old Lyme, Connecticut. Lyme disease has been reported on all five continents. It occurs in almost all countries in Europe, especially Germany, Austria, Switzerland and other central European countries, but also in Scandinavia.

Public awareness of Lyme disease has been steadily growing in recent years.

In Europe, currently around 65,000-80,000 Lyme disease cases are officially reported each year. The actual number, however, is much higher – possibly even many times higher. The reason is that Lyme disease infection displays various symptoms that cannot easily be classified. These will be discussed in detail in this brochure. The fact is that Lyme disease is one of the most common unrecognized or misdiagnosed infectious diseases in Europe and USA.
The causative pathogen of Lyme disease is a bacterium of genus borrelia, which belongs to the spirochetes family. Spirochetes are spindle-shaped, actively moving bacteria. There are several dozen subspecies of borrelia. About a dozen of them can trigger Lyme disease in humans.

Lyme disease is manifested as an inflammatory disease that can affect many organs in the body. In its early (localized) stage it affects mainly the skin. In later stages the inflammation spreads to the joints, nervous system and also to the heart, muscles or other organs. Since conventional therapies with antibiotics do not usually destroy all pathogens and, in the late stages of the disease, have only a limited effect, Lyme disease can develop or flare up, although the patient initially shows no symptoms.

Several medical disorders, recognized over the years as separate clinical cases, are currently accepted as indicators of Lyme disease. They include a red rash (erythema migrans); chronic dermatitis, especially in the extremities (acrodermatitis chronica atrophicans); inflammation of the superficial lymphatic vessels (lymphadenosis benigna cutis); chronic joint complaints; as well as diseases of the heart, nervous system and other organs.
How Humans can get Lyme Disease

The main carrier of borrelia is the tick, in whose intestines the pathogens multiply. However, not all ticks are infected with borrelia.

Ticks belong to the spider family and feed on blood sucked from humans and animals. Human infection with borrelia can happen directly or via intermediate hosts. These are animals that themselves became a reservoir for bacteria, as the result of a previous tick bite.

The most frequent intermediate hosts include dogs, horses and other domestic animals, as well as numerous wild animals such as deer, raccoons, weasels, foxes and squirrels.

In nature, ticks mature following several sequential transformation stages. Starting from eggs they transform into larva, nymph and finally take on their adult form. The infection can be spread at all development/maturation stages. However, of most concern are the nymph forms, since they are abundant during spring and summer. Nymphs are small (1-2 mm).
Since their bite is painless they are very difficult to detect. They can attach to any part of the human or animal body but are often found in the areas where they are most easily missed, such as the scalp, armpits or groin area.

Most often, human infection happens while walking in the woods, in tall grass or via the transfer of borrelia from an intermediate host, such as the domestic dog.

How Lyme Disease progresses

*There are four recognized stages of Lyme disease:*

1. **Stage I – Early Stage** *(appears 3-30 days after tick bite)*

   • Skin lesion at the injection site, followed by redness of the surrounding skin area. In many cases this redness begins to migrate over the body surface. This is known as the red rash (erythema migrans). Some infected people suffer from this rash in several different sites of the body.

   • Flu-like symptoms: Symptoms include fatigue, chills, fever, headache, muscle and joint aches, swollen lymph nodes, and nausea. It is important to note that these symptoms may vanish without treatment.
2. Stage II – Early disseminated Stage

*(appears days to weeks after tick bite)*

- rashes appearing in other places on the body
- fatigue, nausea, diarrhea
- depression, anxiety, mood swings
- cognitive impairment, light/sound sensitivity
- severe headaches and/or neck stiffness due to meningitis
- pain and swelling in the large joints (ankle, wrist, elbow, knee, hip and shoulder joint)
- shooting pains with or without sleep disturbance
- facial palsy with loss of muscle tone on one or both sides of the face
- heart palpitations and dizziness due to changes in heartbeat
Neurological complications: Up to 5% of patients with untreated Lyme disease develop neurological symptoms such as shooting pains, weakness or itching/tingling in the hands and/or feet, impaired short-term memory, muscle impairment, and severe fatigue. Also, heart problems (an irregular heartbeat), and inflammation of the eyes and liver (hepatitis) can appear.

Arthritis: About 60% of patients with untreated Lyme disease develop arthritis (severe joint pain with swelling), usually in the knees, although pain can move from one joint to another. Note: arthritis manifests differently than arthralgia (pain, but not swelling).

4. Stage IV – Chronic Stage

- muscle pains
- joint pains
- cognitive defects
- neuralgia
- sleep disturbance
- fatigue

These symptoms can develop in approximately 10-20% of patients with Lyme disease and continue for months, or even years, after treatment. They can cause severe tissue damage and even organ failure.

Note: The Jarisch-Herxheimer reaction (the body’s response to bacterial toxins) has been reported in about 15% of Lyme disease patients and appears within 24 hours or longer after treatment. It is caused by the decay of Lyme bacteria, for example, under antibiotic treatment. It includes elevated temperature, muscle and joint pains.
How Lyme Disease is diagnosed

Lyme diagnosis is often difficult due to its diverse symptoms. In general, a diagnosis is made by the following steps:

• **Recording of the patient’s medical history,** incl. mention of stays in tick-affected areas.

• **Examination of the body surface** for suspicious injection sites or localized rash (erythema migrans).

• **Laboratory procedure:** measurement of antibodies against Borrelia components (antigens) in the blood using the ELISA test (Enzyme-Linked Immunosorbent Assay). A positive result means that a borrelia infection is likely. However, a negative result does not exclude an infection as it may just be at an early stage of development.

• **If necessary, more specific laboratory tests.**

• **The safest method** is direct detection in the patient’s blood via a so-called blood culture. However, this is only available in a few specialized laboratories.

If the disease remains undiscovered or is diagnosed too late, it can lead to serious symptoms for weeks, months or even years after a tick bite.
The borrelia bacteria can occur in our body in three forms, which basically reflect the stages of the disease. These include:

1. **The Nymphal Stage.** At this stage after an infection the borrelia bacteria are in their original form, the spindle-shaped spirochete.

2. **The Rounded-Form Stage.** At this stage the filamentous bacteria structures have contracted to a spherical shape. This is a kind of “protective mechanism” for bacteria, which particularly occurs when antibiotics are administered.

3. **The Biofilm Stage.** At this stage the borrelia bacteria have built their own “nest”. This nest is called biofilm and represents a deposit of bacterial colonies, nestled between connective tissue molecules. Biofilms embedded in muscle or joint structures occur particularly frequently, but can also affect any other organ. In this way, borrelia bacteria can survive years or even decades in the human body.

This distinction is of practical importance:

Antibiotic treatment shows a significant effect only in the first stage (nymphal stage). In subsequent stages, antibiotics have limited or no effect at all.

Therefore, the search for new ways to be able to effectively inhibit Lyme disease, at even advanced stages, was especially important.

Recent research has shown that certain micronutrients – i.e. natural substances – are able to control even advanced stages of Lyme disease.
Micrograph of the nymphal form (spirochete) of borrelia bacteria.*

Visualization of biofilms of two different borrelia bacterial strains.*

Visualization of rounded form of borrelia.*

*All micrographs of Borrelia were provided by the Dr. Rath Research Institute.
Limited Therapeutic Options of Conventional Medicine

Conventional medicine approaches Lyme disease, as with many other infectious diseases, by using antibiotics; for example: Doxycycline, Amoxicillin, or Cefuroximaxetil. These are usually prescribed for the early form of Lyme disease for about 14-21 days. In advanced cases these antibiotics may also be given intravenously, although success is usually limited.
**Micronutrient Synergy against Lyme Disease**

At the Dr. Rath Research Institute, natural approaches have been researched for controlling Lyme disease. The most important research results are presented in a summary:

In the first series of experiments, we examined the effectiveness of a combination of micro-nutrients in killing borrelia spirochetes in comparison with the most commonly used antibiotic (Doxycycline). The chart above shows that the micronutrients were as effective as the antibiotic.

In a second series of experiments, we studied the same micronutrient combination and the same antibiotic with regard to their effectiveness in killing the round forms of borrelia bacteria. As the chart shows, at this stage the antibiotic is barely effective and the percentage of active bacteria remains equal to that under antibiotic treatment (red line). In contrast, when using micronutrients the percentage of bacteria that are still active is reduced by 50 % (black line).

Figure 1

*Synergistically chosen micronutrients are equally as effective as the antibiotic Doxycycline in inhibiting the growth of borrelia spirochetes.*
In a third series of tests, the effectiveness of the selected micronutrient combination was examined for its ability to eliminate existing borrelia biofilm nests. It turned out that the micronutrients were significantly more effective than antibiotics in killing borrelia cultures. More information on these studies can be found at: http://www.ncbi.nlm.nih.gov/pubmed/26457476

These results are remarkable in several respects. First, they demonstrate the advantages of a combination of natural substances compared to conventional antibiotics in the fight against Lyme disease. Secondly, the possible use of natural substances also reduces the occurrence of the severe side effects that appear during long-term use of antibiotics.

Figure 2
Synergistically acting micronutrients are more effective than the antibiotic Doxycycline in eliminating rounded forms of borrelia.

Figure 3
Synergistically acting micronutrients are more effective than the antibiotic Doxycycline in eliminating existing biofilm forms of borrelia.
How to be protected against Lyme Disease

When planning any trip to wooded areas, grasslands or yards where Lyme disease is prevalent, it is important to take precautions as these are the preferred dwellings of ticks. Ticks do not handle sunny lawns well as they dry out quickly and die. The peak times of infection with Lyme disease have been observed in late spring, summer, and in early fall when juvenile ticks are starting to feed. During winter months, however, being bitten by deer ticks is possible.

Useful Tips

• When walking through wooded areas, grassy areas or yards, wear long sleeves and tightly laced bright clothes that are tucked into pants and boots.

• After any outdoor trip routinely check yourself, your family, your pets and all clothing for ticks.

• To kill any remaining ticks, shower and shampoo your hair, then wash and tumble dry clothes on high heat for an hour.

Chemical tick repellents should be used with caution as they can cause serious side effects, particularly when used frequently or in high concentrations. They should not be used on infants or children as younger people are especially at risk for adverse reactions.
The Dr. Rath Institute in Cellular Medicine is located in Silicon Valley, California. The Institute is staffed with experts handpicked from the fields of medicine, biochemistry and nutrition. Here, world-class scientists conduct innovative research utilizing the principle of nutrient synergy, and investigate the role of nutrients in preventing and treating a host of diseases.

The team at the Dr. Rath Research Institute develops new scientific concepts based on the discoveries of Dr. Rath in the fields of cardiovascular diseases, cancer, infections and other diseases. The team’s scientific work has been published by various media worldwide.

www.drrathresearch.org
RESEARCHERS

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Dr. Goc is a Senior Researcher at the Dr. Rath Research Institute. She leads the Microbiology Laboratory and is focused on developing effective and safe approaches to controlling infections. She has wide-ranging knowledge in the fields of microbiology, immunology, cancer, and vascular biology. Her research work has been published in numerous scientific journals and honored by national and international awards.

Dr. Aleksandra Niedzwiecki
Dr. Aleksandra Niedzwiecki is the Director of the Dr. Rath Research Institute and a leading biomedical researcher in the field of micronutrient research. Dr. Niedzwiecki’s work on cardiovascular disease and cancer has earned her great recognition, particularly her research on the relationship between micronutrient deficiency and the development of diseases.

Dr. Matthias Rath
Dr. Rath is a world-renowned physician and scientist who is known for his pioneering research in natural and cellular health. He is the founder of the scientific concept of Cellular Medicine – the systematic introduction into clinical medicine of biochemical knowledge on the role of micronutrients as biocatalysts in a multitude of metabolic reactions at the cellular level.
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