

this disease. (Expert Rev Anti Infect Ther 2004;2(Suppl):S1-S13). For more information please see below.

Main symptoms indicating nervous system involvement:

Symptoms of cognitive loss such as:

- Memory impairment or loss ('brain fog')
- Word-finding problems and dyslexia/ problems dealing with numbers
- Visual/spatial processing impairment (losing things, getting lost, disorganisation)
- Slowed processing of information
- Poor abstract reasoning
- Losses in fields of attention/executive functions such as inability to maintain divided or sustained attention
- Poor auditory and mental tracking and scanning (loss in ability to follow daily affairs, which is complicated by persistent distractibility)

Neurological symptoms and signs including:

- Headaches
- Neuralgia, i.e. nerve pain
- Tremor
- Panic attacks
- Facial palsy, numbness and tingling, especially of the face
- Cranial nerve disturbances such as - optic neuritis, trouble swallowing, distortions of taste and smell, visual disturbance, certain movement disorders
- States that mimic other defined neurological disorders such as Parkinson's disease or MS
- In children, indications of neurological involvement include behaviour changes, learning disabilities, school phobia, hypersensitivities of the skin and headaches.

Some patients have developed Lyme-related:

- Psychoses including hallucinations and delusions
- Seizures
- Violent behaviour, irritability
- Rage attacks/inability to control impulses/out of context crying spells
- Depression
- Anxiety/Panic attacks
- Rapid mood swings that may mimic bipolar disorder (mania/depression)
- Obsessive-compulsive disorder (OCD)
- Sleep disorders

- An Attention deficit/hyperactivity disorder (ADD/ADHD)-like syndrome
- Autism-like syndrome
- Progressive dementia

Further Sources of Information.

*More information on treatment is available at the website of The International Lyme and Associated Disease Society (ILADS), a professional medical and research society. The document 'Diagnostic Hints and Treatment Guidelines for Lyme and Other Tick Borne Illnesses' by Dr. Joseph Burrascano is recommended. See www.ilads.org

*The Lyme Disease Research Program at Columbia University, New York has further professional information upon the role of neurology and psychiatry. Available at www.columbia-lyme.org

*Dr. Robert Bransfield, a psychiatrist who specialises in infectious causes of neuropsychiatric illness, has developed a structured clinical interview to assess Lyme seronegative patients. See www.mentalhealthandillness.com

LDA gratefully acknowledges the assistance of Drs. Virginia Sherr, Daniel Cameron and Joseph Burrascano and the ILADS Board of Directors in the preparation of this leaflet.

All our leaflets are available free of charge from our website where you can find out more about Lyme disease, including links to many other resources. www.lymediseaseaction.org.uk

Leaflets are also available from:

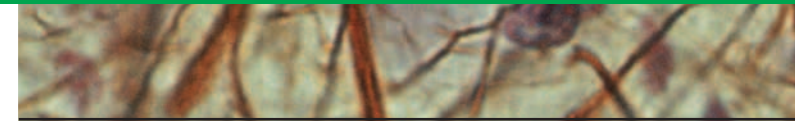
Lyme Disease Action
PO Box 235, Penryn, TR10 8WZ. UK.

Including a donation/sae will help us in our work for people affected by Lyme disease.

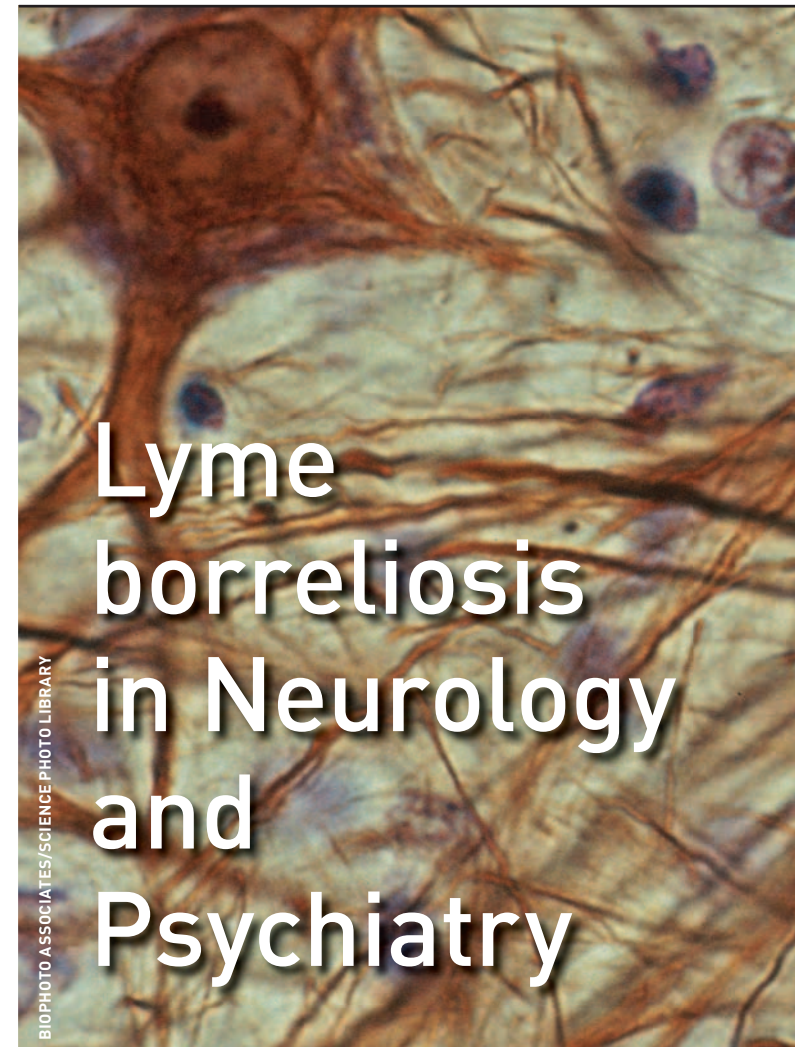
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**Lyme
borreliosis
in Neurology
and
Psychiatry**

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Involvement of the Central and Peripheral Nervous System

As more becomes known about the possible long-term effects of neurological Lyme disease, also known as Lyme borreliosis, it becomes imperative that both the general public and medical professionals are made more aware of this disease.

The organisms that cause Lyme disease in Europe include at least three species within the bacterial genus *Borrelia*. These are *Borrelia burgdorferi sensu stricto*, *Borrelia garinii* and *Borrelia afzelii*.

People with this disease may develop an extensive range of symptoms that affect both the body and the mind. In many cases these symptoms are similar to those that may develop in the disease syphilis. This is because these bacterial (spirochaetal) diseases are closely related.

What is the Role of the Doctor?

Doctors from many disciplines need to be aware of the infections caused by these bacteria. Otherwise, the crucial diagnosis of Lyme disease may be missed.

If left untreated, there is a high risk that the patient will start suffering a great range of bodily and mental symptoms. The mental symptoms that develop may mimic other brain disorders. They can occur in any person at any age, including children. Therefore it is essential that doctors diagnose their patients correctly and offer the right treatments as soon as possible.

Symptoms that affect the Nervous System

Neuro-psychiatric symptoms tend to develop after early signs and symptoms of the infection have occurred, although they may be the earliest and/or only signs (e.g. panic attacks). Whilst this stage, termed neuroborreliosis, can be greatly handicapping, it is unlikely to be inevitable when Lyme disease is properly treated.

After what is often a flu-like start to the infection, patients may develop arthritic, cardiac or early neurological problems. Neurological problems may include:

- Meningitis - inflammation of the brain's enveloping membrane
- Encephalitis - inflammation within the brain, and
- Nerve disorders (neuropathies) involving any part of the nervous system

Lyme associated nerve disorders may include:

- Facial palsy
- Facial weakness
- Sensory distortions
- Numbness or pains
- Shoulder droop
- Disturbance of the nerve roots (radiculopathy with pain and/or numbness)
- Panic attacks and other neurological signs
- Suspected gastrointestinal motility disturbances
- At any time after infection, symptoms affecting a person's reasoning and comprehension may appear. These symptoms, known as **cognitive symptoms**, are listed at the end of this leaflet.

Disorders of the nervous system have been found in up to 40% of late-stage Lyme patients.

What are the symptoms that might develop over time?

As noted, neuro-psychiatric symptoms that mimic primary psychiatric disorders may develop at any stage of untreated or undertreated disease. Studies at Columbia University Department of Psychiatry, New York, indicate that many nervous system symptoms, in both mild and severe forms, are recorded in people with Lyme disease. The main groups of symptoms that may occur are listed at the end of this leaflet.

Where do the ticks that carry this disease occur in Europe?

According to surveys, many parts of mainland Europe have large areas where the ticks that carry these diseases occur. Human infection rates for the described species tend to reflect the geographical distribution of these ticks. Mainland Europe, especially Eastern Europe, appears to have a greater number of cases than the British Isles. However, recent publications about ticks, their ecology and distribution, indicate that scientific knowledge is still likely to be incomplete in the latter area.

How do the signs of the disease differ between Europe and the USA?

Both North American and European *Borrelia burgdorferi sensu stricto* cases frequently tend to have arthritic symptoms as a major aspect. Of the additional European species, *B. afzelii* tends to cause skin and connective tissue symptoms and *B. garinii* tends to cause nervous system symptoms. All species

may cause an enlarging red rash, termed Erythema migrans or EM, which may be in the form of a 'Bull's eye' rash. However, not every case of Lyme infection exhibits an enlarging rash or even a rash at all. How this infection affects a particular individual is unpredictable, therefore the differences in typical symptoms between the species of bacteria are only general trends.

How many cases of Lyme disease occur in the UK?

The Health Protection Agency (HPA) has recorded at least 500 confirmed cases per annum in recent years. However, it is thought that confirmed cases are an under-estimate. The degree of underestimation is unknown but the HPA suggest that somewhere closer to 2,000 cases may occur each year. Lyme Disease Action believes that in reality the number may be higher still. Definitive figures are difficult to arrive at whilst a number of factors that could affect infection rates remain unknown. Co-infections with other tick-borne parasites may also complicate the picture. The situation for all European countries can be seen at the website for European Union concerted action on Lyme borreliosis (EUCALB).

<http://www.oeghmp.at/eucalb/index.htm>

How is Lyme disease treated?

Early treatment with antibiotics is recommended to give a patient the best chance of avoiding symptoms, especially those of the nervous system. The later a patient starts treatment the less successful the outcome is likely to be. Lyme Disease Action has been advised that medicines and other treatments known to improve neurological and mental symptoms are very useful in helping neuroborreliosis patients. Once initiated by borreliosis, most serious psychiatric symptoms need to be treated by both antibiotics and neuro-psychiatric medications.

Our advisors have also noted that it is important to extend the antibiotic treatment period beyond resolution of symptoms. This is to ensure full coverage over subsequent bacterial reproductive cycles due to the organism having a slow, complex life cycle that makes it difficult to eradicate.

Treatment regimes can be very person-specific. Most individuals with Lyme disease respond to antibiotics. The International Lyme and Associated Disease Society (ILADS) has published evidence-based guidelines for the diagnosis and treatment of