

## 21.2 Chronische Lyme-Borreliose (Stadium III) mit Erregernachweis, Literaturübersicht

Die Diagnose einer Lyme-Borreliose im Stadium III (chronische Lyme-Borreliose) wurde in zahlreichen Publikationen mittels Erregernachweis belegt. Zugleich zeigen all diese Studien, dass die Symptomatologie der Lyme-Borreliose im Stadium III (chronische Lyme-Borreliose) in der Tat durch Erregerpersistenz bedingt ist. Überdies wurden all diese Daten bei Patienten erhoben, die zuvor antibiotisch behandelt wurden.

Der Erregernachweis erfolgte mittels Kultur, Polymerasekettenreaktion (PCR) oder durch histologischen Nachweis.

Die Proben entstammten verschiedenen Organen, Organstrukturen, Blut, Liquor oder Gelenkergüssen. Bezüglich der Einzelheiten sei auf die Tab. 1 verwiesen.

**Tab. 1**  
**Erregerresistenz bei Lyme-Borreliose Stadium III (chronische Lyme-Borreliose) nach antibiotischer Behandlung**

<b>Autor</b>	<b>Nachweismethode</b>	<b>Probenherkunft</b>
Weber et al (1)	Histologie	Gehirn, Leber (Autopsie)
Schmidli et al (2)	Kultur	Synovialflüssigkeit
Cimmino et al (3)	Histologie	Milz
Preac-Mursic et al (4)	Kultur	Haut, Liquor
Pfister et al (5)	Kultur	Liquor
Strle et al (6)	Kultur	Haut
Preac-Mursic et al (7)	Kultur	Iris
Haupt et al (8)	Kultur	Gelenkkapsel
Strle et al (9)	Kultur	Haut
Preac-Mursic et al (10)	Kultur	Haut
Oksi et al (11)	Kultur	Liquor
	PCR	Gehirn
	PCR	Gehirn (Autopsie)
Priem et al (12)	PCR	Synovialflüssigkeit
Oksi et al (13)	Kultur, PCR	Blut
Breier et al (14)	Kultur	Haut
Hunfeld et al (15)	Kultur	Haut
Hudson et al (16)	Kultur, PCR	Haut
Steere et al (17)	Histologie	Synovialflüssigkeit
Kirsch et al (18)	Histologie	Lymphknoten
Liegner et al (19)	Histologie	Haut
	PCR	Blut

Battafarano et al (20)	Histologie, PCR	Synovialflüssigkeit, Gelenkkapsel
Chancellor et al (21)	Histologie	Harnblase
Nocton et al (22)	PCR	Synovialflüssigkeit
Shadick et al (23)	Histologie	Gehirn (Autopsie)
Masters (24)	Kultur	Blut
Lawrence et al (25)	PCR	Liquor
Bayer et al (26)	PCR	Urin
Nocton et al (27)	PCR	Liquor
Hassler et al (28)	PCR	Haut

## Literaturverzeichnis

1. K Weber, HJ Bratzke, U Neubert, B Wilske, PH Duray. *Borrelia burgdorferi* in a newborn despite oral penicillin for Lyme borreliosis during pregnancy. *Pediatr Infect Dis J* 1988; 7:286-289.
2. J Schmidli, T Hunziker, P Moesli, UB Schaad. Cultivation of *Borrelia burgdorferi* from joint fluid three months after treatment of facial palsy due to Lyme borreliosis. *J Infect Dis* 1988; 158:905-906.
3. MA Cimmino, A Azzolini, F Tobia, CM Pesce. Spirochetes in the spleen of a patient with chronic Lyme disease. *Am J Clin Pathol* 1989; 91:95-97.
4. V Preac-Mursic, K Weber, HW Pfister, et al. Survival of *Borrelia burgdorferi* in antibioticly treated patients with Lyme borreliosis. *Infection* 1989; 17:355-359.
5. HW Pfister, V Preac-Mursic, B Wilske, E Schielke, F Sorgel, KMJ Einhaupl. Randomized comparison of ceftriaxone and cefotaxime in Lyme neuroborreliosis. *Infect Dis* 1991; 163:311-318.
6. F Strle, V Preac-Mursic, J Cimperman, E Ruzic, V Maraspin, M Jereb. Azithromycin versus doxycycline for treatment of erythema migrans: clinical and microbiological findings. *Infection* 1993; 21:83-88.
7. V Preac-Mursic, HW Pfister, H Spiegel, et al. First isolation of *Borrelia burgdorferi* from an iris biopsy. *J Clin Neuroophthalmol* 1993; 13:155-161.
8. T Haupl, G Hahn, M Rittig, et al. Persistence of *Borrelia burgdorferi* in ligamentous tissue from a patient with chronic Lyme borreliosis. *Arthritis Rheum* 1993; 36:1621-1626.
9. F Strle, V Maraspin, S Lotric-Furlan, E Ruzic-Sabljić, J Cimperman. Azithromycin and doxycyclin for treatment of *Borrelia* culture-positive erythema migrans. *Infection* 1996; 24:64-68.

10. V Preac-Mursic, W Marget, U Busch, D Pleterski Rigler, S Hagl. Kill kinetics of *Borrelia burgdorferi* and bacterial findings in relation to the treatment of Lyme borreliosis. *Infection* 1996; 24:9-16.
11. J Oksi, H Kalimo, RJ Marttila, et al. Inflammatory brain changes in Lyme borreliosis. A report on three patients and review of literature. *Brain* 1996; 119:2143-2154.
12. S Priem, GR Burmester, T Kamradt, K Wolbart, MG Rittig, A Krause. Detection of *Borrelia burgdorferi* by polymerase chain reaction in synovial membrane, but not in synovial fluid from patients with persisting Lyme arthritis after antibiotic therapy. *Ann Rheum Dis* 1998; 57:118-121.
13. J Oksi, M Marjamaki, J Nikoskelainen, MK Viljanen. *Borrelia burgdorferi* detected by culture and PCR in clinical relapse of disseminated Lyme borreliosis. *Ann Med* 1993; 31:225-232.
14. F Breier, G Khanakah, G Stanek, et al. Isolation and polymerase chain reaction typing of *Borrelia afzelii* from a skin lesion in a seronegative patient with generalized ulcerating bullous lichen sclerosus et atrophicus. *Br J Dermatol* 2001; 144:387-392.
15. KP Hunfeld, E Ruzic-Sabljić, DE Norris, P Kraiczky, F Strle. In vitro susceptibility testing of *Borrelia burgdorferi* sensu lato isolates cultured from patients with erythema migrans before and after antimicrobial chemotherapy. *Antimicrob Agents Chemother* 2005; 49:1294-1301.
16. BJ Hudson, M Stewart, VA Lennox, et al. Culture-positive Lyme borreliosis. *Med J Aust* 1998; 168:500-502.
17. AC Steere, PH Duray, EC Butcher. Spirochetal antigens and lymphoid cell surface markers in Lyme synovitis. Comparison with rheumatoid synovium and tonsillar lymphoid tissue. *Arthritis Rheum* 1988; 31:4887-495.
18. M Kirsch, FL Ruben, AC Steere, PH Duray, CW Norden, A Winkelstein. Fatal adult respiratory distress syndrome in a patient with Lyme disease. *JAMA* 1988; 259; 2737-2739.
19. KB Liegner, JR Shapiro, D Ramsay, AJ Halperin, W Hogrefe, L Kong. Recurrent erythema migrans despite extended antibiotic treatment with minocycline in a patient with persisting *Borrelia burgdorferi* infection. *J Am Acad Dermatol* 1993; 28(2 pt 2):312-314.

20. DF Battafarano, JA Combs, RJ Enzenauer, JE Fitzpatrick. Chronic septic arthritis caused by *Borrelia burgdorferi*. *Clin Orthop* 1993; 297:238-241.
21. MB Chancellor, DE McGinnis, PJ Shenot, P Kiilholma, ICH Hirsch. Urinary dysfunction in Lyme disease. *J Urol* 1993; 149:26-30.
22. JJ Nocton, F Dressler, BJ Rutledge, PN Rys, DH Persing, AC Steere. Detection of *Borrelia burgdorferi* DNA by polymerase chain reaction in synovial fluid from patients with Lyme arthritis. *N Engl J Med* 1994; 330:229-234.
23. NA Shadick, CB Phillips, EL Logigian, et al. The long-term clinical outcomes of Lyme disease. A population-based retrospective cohort study. *Ann Intern Med* 1994; 121:560-567.
24. E Masters. Spirochetemia after continuous high-dose oral amoxicillin therapy. *Infect Dis Clin Prac* 1994; 3:207-208.
25. C Lawrence, RB Lipton, FD Lowy, PK Coyle. Seronegative chronic relapsing neuroborreliosis. *Eur Neurol* 1995; 35:113-117.
26. ME Bayer, L Zhang, MH Bayer. *Borrelia burgdorferi* DNA in the urine of treated patients with chronic Lyme disease symptoms. A PCR study of 97 cases. *Infection* 1996; 24:347-353.
27. JJ Nocton, BJ Bloom, BJ Rutledge. Detection of *Borrelia burgdorferi* DNA by polymerase chain reaction in cerebrospinal fluid in Lyme neuroborreliosis. *J Infect Dis* 1996; 174:623-627.
28. Hassler D, Zorn J, Zöller L, Neuss M, Weyand C, Goronzy J, Born IA, Preac-Mursic V. Nodular panniculitis: a manifestation of Lyme borreliosis? *Hautarzt* 1992; 43(3): 134-8.